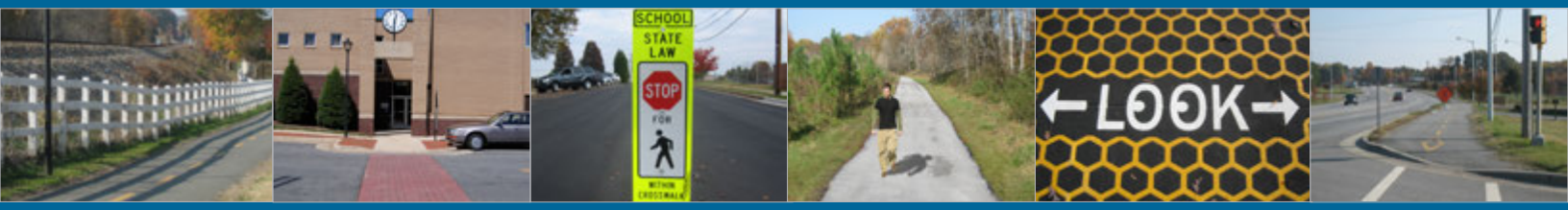
City of Conover

Pedestrian Transportation Plan



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Prepared for:
The City of Conover

Prepared by:
Greenways Inc.

GREENWAYS
INCORPORATED
Landscape Architecture
Multi-Objective Trail Planning
Open Space Planning

Division of Bicycle & Pedestrian Transportation

Acknowledgements

Pedestrian Plan Steering Committee

Lance Hight	Planning Director
Dan Robinson	Planner
Erik Schlichting	GIS Coordinator
Jimmy Clark	Public Works Director
Terry Jones	Assistant Public Works Director
Keith Crafton	Street Dept Supervisor
Donald Duncan	City Manager
Ken Hilderbran	Planning Board Member
Randy Williams	Conover Citizen
Shane Moore	Conover Police Department
Kathy Smith	Conover Citizen
John Marshall	WPCOG-RPO Transportation Planner
John Tippett	WPCOG-MPO Transportation Planner (Alternate)
Steven Kiger	Conover Citizen
Jim Barrymore	Conover Citizen
Jerry Bange	Conover Citizen
Linda Enderson	Conover Citizen
Wesley Enderson	Conover Citizen
John Vine-Hodge	NCDOT Division of Bicycle and Pedestrian Transportation Project Manager

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Appendices

Maps and Tables

Maps and tables below are 11x17 and found at the conclusion of the respected chapters.

Implementation
Realizing The Vision

Implementing the recommendations within the Conover Pedestrian Transportation Plan will require leadership on the part of the City of Conover and a dedication to the development of a pedestrian friendly community.

Sidewalk and greenway facilities were prioritized by the facility segment's ability to provide connectivity, serve areas in need, and improve safety in areas of concern. Each sidewalk segment in need of improvement is ranked with custom-designed criteria for Conover, based on public input, and existing conditions data collected in the field. A map and cost estimates are provided for the Top 11 sidewalk segments.

Implementing the recommendations of this plan will require a combination of funding sources that include local, state, federal, and private money. It will be necessary for the City of Conover, other area governments, and the NCDOT to secure the funding necessary to undertake the short-term, top priority projects and develop a long-term funding strategy to allow continued development of the overall system. Community foundations and revenue-generating programs for pedestrian facilities should also be utilized to raise funds for development and maintenance.

Action steps were developed as guidance for the City and include:

- Adopt this plan
- Begin top priority projects
- Create pedestrian-friendly landscape with Broyhill Development
- Improve and enforce City regulations
- Create a Bicycle/Pedestrian/Greenway Commission
- Take advantage of cost-effective opportunities for sidewalk and greenway construction (roadway reconstruction or development)
- Seek multiple funding sources
- Develop pedestrian programming (especially Safe Routes to School)
- Ensure planning efforts Are integrated regionally
- Take maintenance steps
- Work with NCDOT Division 12
- Apply for NCDOT Bike Plan Grant
- Integrate pedestrian facility design guidelines

Programs and Policies

Creation of a successful Pedestrian Network will involve more than facility improvements. The long-term success of the network will also depend on use and support of sidewalk and greenway facilities. It will be critical for the City of Conover, the surrounding communities, and the State to ***educate*** pedestrians and motorists about safe behaviors in a multi-modal roadway environment, to ***enforce*** laws that make pedestrian travel safer, and to ***encourage*** people of all ages and abilities to use the sidewalk and greenway facilities. It will be equally important to promote and develop programmatic activities that encourage physical activity and healthy living. Programs can include Safe Routes to School, community-wide messages encouraging physical activity, walkathons, and Walk to Work Days. These programs enhance the overall health and wellness of the community by promoting, teaching, and enforcing safety.

Design Guidelines

Pedestrian facility design guidelines that adhere to national standards were provided in this Plan. The treatments and guidelines put forward in this Plan are important because they represent the minimum standards for creating a pedestrian-friendly, safe, accessible community.

Conover Pedestrian Transportation Plan

Executive Summary

In 2007, the City of Conover was awarded a grant from the North Carolina Department of Transportation (NCDOT) to complete a comprehensive pedestrian transportation plan. The City is making a strong statement through this Plan to improve pedestrian facilities and pedestrian safety. By offering choices and improved safety, the City of Conover can create an integrated, safe, and convenient multi-modal transportation system.

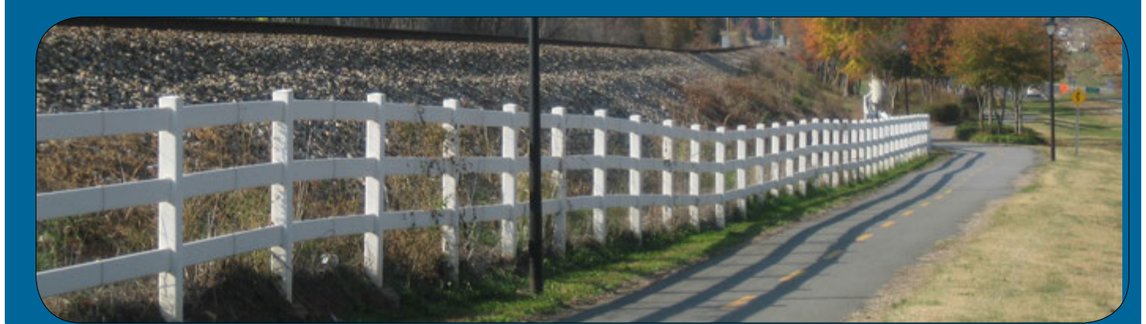
The City of Conover and a specially constituted project Steering Committee, worked closely with the public to support the vision and preparation of this Comprehensive Pedestrian Transportation Plan.

This Plan represents a comprehensive evaluation and program of action for addressing the immediate and long-term needs for pedestrian facilities. The Plan provides a set of phased recommendations for facilities, programs, and policies.

The benefits of a more walkable community include reduced auto dependency, increased health and physical activity, reduced traffic congestion, increased economic vitality, enhanced community aesthetic, and improved quality of life.

Project Goals

- Improve connectivity between residential areas and new development into Downtown.
- Provide connectivity to all destinations, including schools, transit stops, parks, places of work, commercial and residential areas.
- Improve intersection crossing for pedestrians.
- Provide long-term strategies for improving connections to underserved outlying areas.
- Prioritize the pedestrian facility improvements.
- Update current policies to address pedestrian improvements such as sidewalks and greenways.
- Enhance community commitment to programming (engineering, education, encouragement, and enforcement) of walking.
- Design and maintain streets, roads, and trails to encourage walking.
- Create more public awareness of economic and health benefits of walking.
- Ensure that pedestrian facilities are considered part of an overall transportation system.
- Dedicate funding for pedestrian improvements.



Existing Conditions Analysis

Background

In order to propose a comprehensive pedestrian system for the City of Conover, the existing conditions such as demographics, land use, trip attractors, and current pedestrian conditions were examined. A comprehensive approach consisting of intensive research, analysis, fieldwork, GIS organization and analysis, and Committee meeting discussion was conducted to examine existing conditions. The City's geographic, population, and development characteristics significantly affect transportation, the environment, and everyday decisions by motorists and pedestrians.

Use Of GIS

Geographic Information Systems (GIS) allowed for the layering of mapped information for the City of Conover. GIS was used to examine roadways, existing pedestrian sidewalks, and land uses in order to analyze connectivity between such places as parks, schools, waterways, and commercial areas. Pedestrian crash data from 1990-2006 was also mapped to allow for analysis of these sites.

Fieldwork

Fieldwork was a critical element of existing conditions analysis. Gaps in the existing pedestrian system, possible off-road greenway corridors, and intersections were examined and inventoried. A digital photo inventory was collected for locations throughout the City of Conover. Fieldwork allowed for the direct experience of being a pedestrian in the City.

Intersection Inventory

A thorough examination of key intersections throughout Conover were inventoried for their existing pedestrian facilities. Most significant, signalized intersections were in need of some form of improvement. Safe crossing conditions are critical because they are the places were motorists and pedestrians interact (75% of all police-reported pedestrian crashes involve pedestrians crossing roadway travel lanes). This inventory set the stage for crossing improvement recommendations.

Existing Plans

Numerous plans, guidelines, ordinances, and strategies have addressed issues related to pedestrian planning in Conover such as transportation, development, and land use. These were examined and integrated into the development of this Plan.

Public Input

Significant public input was gathered from multiple efforts throughout the planning process, which helped shape the outcome of a majority of the recommendations in this Plan. Public input was solicited via two public workshops, public outreach, paper opinion forms, and an online interactive version of the opinion form. Approximately 90 people provided input at the two workshops (held at the YMCA) through map markups, direct conversation with Client and consultant, and comment forms. 114 residents completed either the online comment form or hardcopy comment form distributed at the workshops.

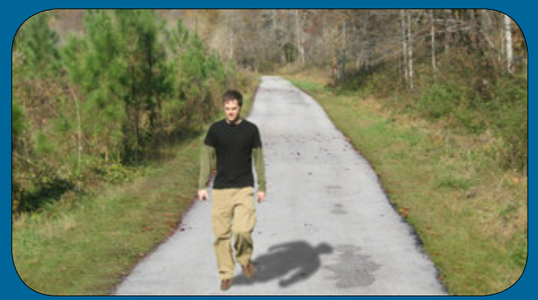
Pedestrian Network

Sidewalk Corridors

Approximately 22 miles of sidewalk exists currently throughout the City of Conover. Still gaps in the sidewalk system create a lack of connectivity in some areas. County Home Road is an example shown above where sidewalk could connect areas north of I-40 to Downtown.

Crossings

16 intersections were inventoried in the City with some form of improvement recommended for all of them. Ladder crosswalk markings (shown above at the NC 16/Zelkova Court exchange near Wal-Mart) create a more highly visible crossing. Also, refuge islands create a safe space for pedestrians in their journey across an intersection.



Greenways

Greenways in this Plan refer to off-road, multi-use, paved pathways for both recreation and transportation. The greatest opportunity in the City of Conover is the Lyle Creek Greenway corridor. The picture above shows an existing, cleared, and graded easement near County Home Road presenting a tremendous opportunity.

1. Introduction

1.0 Overview

The City of Conover has made a commitment to improve its pedestrian environment. In 2007, the City applied for and was awarded a grant from the North Carolina Department of Transportation (NCDOT) to conduct a pedestrian planning process. A Technical Steering Committee composed of City staff and local citizens was assembled to guide in the development of a Comprehensive Pedestrian Transportation Plan. Greenways Incorporated, a bicycle and pedestrian planning firm, was brought in to lead the planning process. This process included a significant public input component. This final document is a result of the dedication and efforts of the City of Conover and its community.

The City of Conover, like many North Carolina towns, has a pedestrian-friendly Downtown core with the most recent growth occurring outside the core. Recent ordinances have required commercial and residential developers to add sidewalk as a component of their development. As a result, there are substantial gaps in pedestrian facilities between the Downtown and outlying development. This Plan focuses on pedestrian facility connectivity that will provide residents a safer, more viable transportation alternative.

This document presents the findings of a public input process along with an assessment of existing pedestrian facilities in Conover. From these findings, a set of phased recommendations is developed for a pedestrian system that meets the future needs of area's residents. These recommendations include an integration of both on-road and off-road pedestrian facilities along with improved roadway crossings. The recommendations include both physical changes and policy changes to help guide pedestrian-friendly growth. The Plan also provides program recommendations to promote walking and funding sources to facilitate the Plan's implementation.

1.1 Benefits of Walking

For many years, small and large communities across the United States and throughout the world have been implementing strategies for serving the pedestrian needs of their residents. They do this because of their obligations to promote health, safety and welfare, and also because of the growing awareness of the many benefits of walking. These benefits can include increased health and physical activity, reduced traffic congestion, affordable mobility, improved quality of life, reduced auto dependency, conservation of fossil fuels, increased economic vitality, and increased community connections.

1.1.1 Increased Health and Physical Activity

A growing number of studies show that the design of our communities—including neighborhoods, cities, transportation systems, parks, trails and other public recreational facilities—affects people's ability to reach the recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth). The Centers for Disease Control and Prevention (CDC) determined that creating and improving places to be active could result in a 25 percent increase in the percentage of people who exercise at least three times a week **(1)**. According to the CDC, "physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes to the obesity epidemic" **(2)**. The increased rate of disease associated with inactivity reduces overall quality of life for individuals and leads to increased medical costs for families, companies, and local governments.

1.1.2 Economic Benefits

Walking is an affordable form of transportation. According to the Pedestrian and Bicycle Information Center (PBIC), of Chapel Hill, NC, the cost of operating car for a year is $5,170 while walking is virtually free. The PBIC explains, "When safe facilities are provided for pedestrians and bicyclists, more people are able to be productive, active members of society. Car ownership is expensive, and consumes a major portion of many Americans' income" (3). Walking becomes even more attractive from an economic standpoint when the increasing cost of fuel is also factored into the equation.

1.1.3 Environmental Improvements

When people choose to get out of their cars and walk, they make a positive environmental impact. They reduce their use of gasoline, which then reduces the volume of pollutants in the air. Other environmental impacts can be a reduction in overall neighborhood noise levels and improvements in local water quality as fewer automobile-related discharges wind up in the local rivers, streams, and lakes. Furthermore, every car trip replaced with a pedestrian trip reduces U.S. dependency on fossil fuels, which is a national goal.

1.1.4 Transportation Benefits

In 1995, The National Household Travel Survey found that roughly 40% of all trips taken by car are less than 2 miles (4). By taking these short trips by foot rather than in a car, citizens can have a substantial impact on local traffic and congestion. Additionally, many people do not have access to a vehicle or are not able to drive. A pedestrian network provides greater and safer mobility for these residents.

1.1.5 Quality of Life

Many factors go into determining the quality of life for the citizens of a community: the local education system, prevalence of quality employment opportunities, and affordability of housing are all items that are commonly cited. Increasingly though, citizens claim that access to alternative means of transportation and access to quality

recreational opportunities such as parks, trails, greenways, and bicycle routes, are important factors for them in determining their overall pleasure within their community. Communities with such amenities can attract new businesses, industries, and in turn, new residents. Furthermore, quality of life is impacted by walking through the increased social connections that take place by residents being active and spending time outdoors in their communities.

1.1.6 Summary and Additional Resources
Many private and public organizations have completed studies and surveys that show the many benefits of walking. The ideas presented above are only a small sample of the information that is available. If you would like to learn more about the benefits of walking, the Internet can be a great source of information. A good starting point is:

http://www.walkinginfo.org/why/benefits.cfm
This website is provided by the Pedestrian and Bicycling Information Center based in Chapel Hill, NC.

1.2 Goals and Objectives

The following goals and objectives were generated for this planning process in late 2007-early 2008 from Steering Committee representatives and public participants. These goals provided an overall guide for developing the Pedestrian Plan.

- Improve connectivity between residential areas and new development into Downtown.
- Provide connectivity to all destinations, including schools, transit stops, parks, places of work, commercial and residential areas.
- Improve intersection crossing for pedestrians.
- Provide long-term strategies for improving connections to underserved outly ing areas.
- Prioritize the pedestrian facility improvements.
- Update current policies to address pedestrian improvements such as sidewalks and greenways.
- Enhance community commitment to programming (engineering, education, encouragement, enforcement) of walking.
- Design and maintain streets, roads, and trails to encourage walking.
- Create more public awareness of economic and health benefits of walking.
- Ensure that pedestrian facilities are considered part of an overall transportation
system.
- Dedicate funding for pedestrian improvements.

Figure 1.1: Public input is gathered at the Shuford YMCA.

1.3 Elements of this Plan

The main elements of this plan describe current conditions of the Conover area, a recommended pedestrian network, programs to make walking viable and integral to daily life, implementation strategies and next steps for developing a network of pedestrian facilities and design guidelines for making the community more pedestrian friendly.

This Plan document includes the following major components:

This Introduction that presents the overview, benefits of walking, goals and objectives, and guiding principles of this Plan (Chapter 1).

An assessment of Existing Conditions that overviews existing pedestrian conditions, land use, trip attractors, and also summarizes existing related plans of Conover (Chapter 2).

A recommended Pedestrian Network that puts forward a framework of recommended facilities (pedestrian corridors, intersection improvement projects, and greenways) (Chapter 3).

Program Recommendations for education, encouragement, and enforcement and Policy Review and Recommendations (Chapter 4).

Implementation recommendations that outline specific steps for achieving the plan's key elements including phasing and prioritization of the Pedestrian Network (Chapter 5).

Design Guidelines to guide the City of Conover in current facility design and standards (Chapter 6).

Appendices that provide a summary of public input, the prioritization matrix, cost estimates, funding recommendations, acquisition strategies, a glossary of terms, and

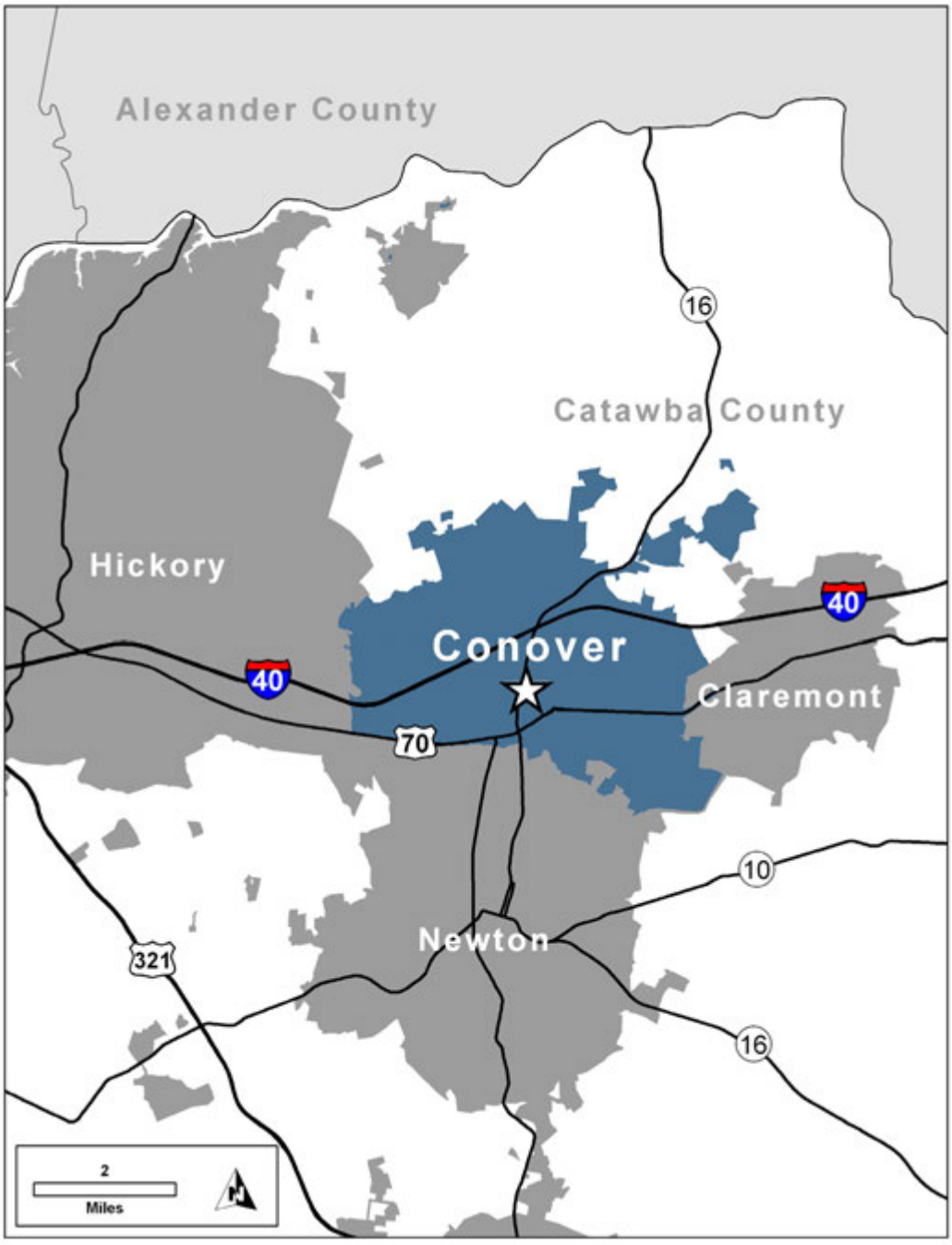


Figure 1.2: Context map for the Pedestrian Transportation Plan

Footnotes

1 US Department of Health and Human Services, Centers for Disease Control and Prevention. (2002). Guide to Community Preventive Services.

2 US Department of Health and Human Services, Centers for Disease Control and Prevention (1996). Physical Activity and Health: A Report of the Surgeon General.

3 Pedestrian and Bicycle Information Center. Economic Benefits of Bicycling. http://www.bicyclinginfo.org/why/benefits_economic.cfm

4 Pedestrian and Bicycle Information Center. Transportation Benefits of Bicycling. http://www.bicyclinginfo.org/why/benefits_transportation.cfm

2. Existing Conditions

2.0 Overview

The City of Conover is located in the north central portion of Catawba County, just east of Hickory and bordering Newton (the County Seat) to the north. Separated by I-40, the City is mostly south of the interstate with newer development north of I-40. Like many other portions of North Carolina, this area continues to grow with future development coming.

In order to propose a comprehensive pedestrian system for the City of Conover, the existing conditions, such as demographics, land use and development, trip attractors, and pedestrian conditions need to be examined. The City's geographic and population characteristics significantly affect transportation, the environment, and everyday decisions by motorists and pedestrians. In addition, numerous plans, guidelines, and strategies have addressed issues related to pedestrian planning in Conover such as transportation, development, and land use.

A comprehensive approach consisting of intensive research, analysis, fieldwork, GIS organization and analysis, and Committee meeting discussion was conducted to examine existing conditions. To understand pedestrian conditions in Conover, it is important to consider a number of specific factors that affect the overall character of the community. This work lays the foundation for the recommendations found later in this Plan. The findings are presented below.

2.1 Demographics

To help demonstrate pedestrian needs, it is useful to understand population changes and composition. The City of Conover has experienced steady growth over recent years with the 1990 population of 5,465 and 2000 population of 6,604. This represents growth of 17% over a decade. It is estimated that population will continue its steady growth.

Map 2.1 shows 2000 population density (at the block level) throughout the City of Conover and surrounding areas. The densest, most populated areas are found in patches around the City. The biggest areas are residential areas surrounding Downtown, especially between NC 16 and Thornburg Drive and just west of the railroad. Other pockets of denser population can be found along 1st Avenue South towards Newton and north of I-40 along County Home Road. Areas of development will fill in current population gaps north of I-40 and east of Downtown due to growth constraints on all other sides by surrounding municipalities.

An examination of median age addresses the pedestrian needs in Conover in terms of

health, accessibility, and pedestrian facility requirements. In 2000, the median age of Conover was 38.0 compared to 35.3 for all of North Carolina. 15.4% of the population in Conover is over 65 compared to 12.2% for the entire State. This shows that there is a significant elderly population that needs consideration when planning for pedestrian improvements.

Map 2.2 shows median age across Conover and surrounding areas at the block level. While it is difficult to identify clear patterns, the areas of high median age are mostly south of I-40, surrounding the Downtown area. The middle zone of ages 35-55 dominate the residential areas along major roadways and near Downtown. Areas where the median age is 35 and below are typically census blocks that hold apartments and multi-family housing. All zones are important for pedestrian connectivity and ADA accessibility where possible.

Despite the current population structure, it is likely that a mix of population groups will move into the Conover area through the coming years. Development pressure for the region of Hickory, Conover, and Newton will likely continue along I-40 and US 70.

Considering the existing population totals, composition, median age distributions, and density, it is important to provide pedestrian access for current populations and future populations. Senior citizens are a large part of the community and special attention should be given to providing safe, convenient, and ADA-accessible pedestrian facilities, especially near their homes. New population centers inside future development should be connected into the City's pedestrian network with access to downtown. Residential areas north of I-40 and south of US 70, where a significant percentage of the population currently resides, should have safe, connected pedestrian facilities into the downtown area where commercial facilities and other destinations can be found.

2.2 Land Use and Development

Current land use (shown in Map 2.3) is a result of development activity over the past few decades. Multiple land uses can be found across the City of Conover with distinct patterns emerging. These patterns and characteristics have a major influence on pedestrian transportation. Proximity of uses and types of uses matter in a person's choice to walk, along with the quality of environment, ease of access, and safety.

Conover does not feature a typical grid-street pattern throughout its history of development. Established originally at a "Y" railroad intersection, the City has grown outwards in more of radial, diagonal fashion. The major roadways are I-40 and US 70 which both run east-west through the City. US 321, which terminates at its north end in Conover, and NC 16 are key north-south roadway corridors. The city is largely residential, with single-family homes dominating. Multi-family housing is scattered in some parts of Town.

There are three significant business/commercial destinations: 1) downtown, 2) US 70

and 3) Wal-Mart shopping center at NC 16/Thornburg Drive/I-40. The chief commercial area is along the US 70 roadway corridor. Businesses, fast-food restaurants, and shopping centers occur on US 70 and near Interstate 40 interchanges. The downtown area is walkable with boutique shopping, locally-owned restaurants, and other appealing tourist stops.

Existing recreational sites are found throughout the City. The most utilized facility is the Shuford YMCA on US 70 near Thornburg. A number of running groups and joggers use this area and meet at this location. Parks are mostly small in nature, at the neighborhood scale. The Downtown Park offers passive open space and picnic facilities. Hunsucker, Travis, Majestic, and Hines Parks offer some facilities including playgrounds and picnic tables. Currently there are no parks north of I-40.

Figure 2.1: Two major destinations in Conover are the Downtown area and Shuford YMCA.

Due to area growth and demand, residential areas will continue to develop on the northern side of the City, north of I-40 (where Conover can continue growing). Conover is bound by the City of Hickory to the West, Newton to the South and Claremont to the East which dictates that future growth/large scale annexation for Conover is limited to a northerly direction. Building permits issued for 2007 indicate that 62% of all permits issued are for the northern quadrants of the city and this is consistent with past trends. These homes will be longer distances from the center of Town resulting in some reduced pedestrian connectivity to various land uses. Multiple uses within new development and pedestrian connections towards the center of Town along NC 16, County Home Road, and Rock Barn Road should be considered.

2.3 Trip Attractors

People currently walk to a variety of destinations across Conover for various purposes. These destination points are referred to in this document as trip attractors. The most common categories of pedestrian trip attractors in Conover include:

- Downtown
- Schools (Shuford Elementary, Concordia Lutheran, Lyle Creek Elementary, Conover School, Newton Conover Middle, Tri-City Baptist, future elementary school at Northern Drive/County Home Road)
- Shopping locations (grocery stores, shopping centers, restaurants, downtown)

- Parks (Downtown, Hunsucker, Travis, Majestic, Hines)
- Community and recreation centers (Shuford YMCA)
- Historic and other points of interest (Library, Catawba County Firefighters Museum)
- Places of employment (downtown, Town offices, US 70 area)
- Greenways (Gateway Sidewalk along 1st Street, across US 70)

Each of these categories of pedestrian trip attractors was considered when determining locations for the physical pedestrian improvements recommended in Chapter 3. They represent important starting and ending points for pedestrian travel and provide a good basis for planning ideal walking routes. Many citizens have expressed a desire to be able to walk to places such as YMCA and the Downtown.

2.4 Pedestrian Conditions

The City of Conover is making pedestrian mobility a priority in its comprehensive planning, ordinances, and quality facilities. The downtown is lined with sidewalks, street furniture, plantings, and windowed storefronts. Wide sidewalks along Thornburg Drive and the Gateway Sidewalk on 1st Street West are excellent, existing pedestrian facilities. Many smaller residential roads leading to downtown provide relatively safe places to walk despite not always having sidewalks. One funded TIP project provides pedestrian accommodations with the replacement of the 1st Avenue North (NC 16) bridge over I-40 (FY 2011). Still there is room for improvement to connect gaps that are apparent throughout the City. Map 2.4 shows locations of existing sidewalks, greenways, and trip attractors.

Also displayed in Map 2.4 are pedestrian crash sites from 1990-2006 (Data courtesy of NCDOT). The majority of crashes were near the Downtown area but a substantial amount also occurred in surrounding, rural two-lane roads without sidewalk. Well over half the crashes occurred at sites with no sidewalk (Appendix H presents a recent 2007 study on crash reduction factors and shows that a 74% crash reduction factor can be expected when adding sidewalk). A number of crashes also occurred at intersections. These intersections were inventoried and described in Table 2.1 (at the conclusion of this chapter).

Sidewalks

Throughout Conover, there is a lack of connectivity in its sidewalk network (which consists of 22.9 miles). The immediate downtown and areas radiating out from downtown mostly have adequate sidewalk connectivity. A number of excellent facilities are present including wide sidewalks along Thornburg and the Gateway sidewalk along 1st Street West. However, sidewalk gaps or missing sidewalks can be found in several areas of the City. Growth that has occurred outside of downtown has not always provided connected, safe, pedestrian facilities leaving gaps between downtown, trip attractors, and residences. This happened because adequate ordinances were not in place. Significant corridor deficiencies include:

• US 70 (State): Significant stretches without sidewalk and key gaps.

Figure 2.2: Newly constructed sidewalk with new commercial development along US 70, near 7th Street. This is one of the few stretches of sidewalk with nothing connecting to the east or west.

• NC 16 (State): Key gaps in sidewalk system especially between I-40 and new Wal-Mart shopping center.

Figure 2.3: NC 16. On left, a brief piece of sidewalk at Holiday Inn, north of I-40. On right, the sidewalk ends from Downtown, nearing I-40.

• County Home Road: Lack of sidewalk connecting Downtown to residential areas north of I-40.

Figure 2.4: County Home, near I-40 underpass.

• Rock Barn Road: Lack of sidewalk on important roadway corridor coming into Conover from the northeast.

Figure 2.5: Rock Barn, at I-40.

• 4th Street SW: Important, long roadway corridor connecting areas just west of Downtown without sidewalk.

Figure 2.6 A sidewalk along 4th Street SW, in front of Brookside Townhomes, is not connected and is only one of two short segments of sidewalk on this road.

Greenways

Currently, there are no off-road greenways but two significant on-road sidepaths/ sidewalks are present. As mentioned above, an eight-foot sidewalk runs along Thornburg Drive from I-40 southward to US 70. The Gateway Sidewalk is a multi-use sidepath that extends from north of I-40 along 1st Street West almost to the Downtown center.

The Lyle Creek corridor offers the most opportunity with stretches of sewer easement and a stretch of dedicated open space just west of the Wal-Mart shopping center. Providing a paved, multi-use greenway along the Lyle Creek would provide a key transportation and recreational corridor.

Intersections

Most significant, signalized intersections in Conover need some form of improvement. Safe crosswalks are important because there is much greater risk for a pedestrian when entering the roadway environment. Safe crossing conditions are a necessity at intersections and in high pedestrian activity zones such as downtown, schools, and shopping centers. Many intersection crosswalks in Conover have no markings and those that do are simple and not as noticeable with only two solid parallel lines. In some cases, sight distance is inadequate, curb radii are too wide, and curb ramps are not found. Crossing signals only exist in a few locations. The most pedestrian-friendly, major intersection is Thornburg Drive and US 70 where new crossing signals and curb ramps have been installed.

Traffic congestion and pedestrian movement is most significant downtown and along US 70. The Downtown crossing features are fair with highly-visible, custom-painted crossings. The Five-point intersection in the center of Downtown is unsafe, with unclear, timed movements of motorists and pedestrians.

Intersections outside of Downtown are very deficient in pedestrian crossing features. Along US 70, many intersections feature wide curb radii which allow automobile traffic to move too quickly around a turn. Marked crosswalks are not always present. Countdown signals are generally not present, but necessary at crossings of US 70. Some areas, including new development along Thornburg Driveand NC 16 (new Wal-Mart development) along with Concordia Lutheran School feature some marked crosswalks but improvements are still necessary.

Figure 2.7: New crosswalks at Concordia Lutheran Church are highly-visible and effective facilities.

Intersections of particular significance and need for improvement are:

- Downtown 5-Point intersection

Figure 2.8: Despite highly-visible marked crosswalks and curb ramps, many residents, including City employees, cross the road in a mid-block setting to avoid the 5-point intersection.

- US 70 and 3rd Street SE

Figure 2.9: Sidewalks must first be developed but this intersection provides a gateway towards Downtown from areas south of US 70.

- US 70 and 1st Street E

Figure 2.10: This is a large intersection presenting a high level of difficulty for a pedestrian. Sidewalks are limited with no crossing facilities whatsoever.

• NC 16 and Thornburg Drive

Figure 2.11: Some crossing features are present but are inconsistent for the entire intersection, like the marked crosswalk crossing Thornburg Drive (left), or the lack thereof crossing NC 16 shown here (right).

• 1st Avenue South and 7th Street Pl SW

Figure 2.12: This is an important intersection because of Conover School.

A complete inventory and description of key intersections can be found in Table 2.1. Recommendations for improvements may be found in Chapter 3.

2.5 Summary of Public Input

Public input was gathered through several different means and is described in more detail in Appendix A. Public meetings and comment forms were the key instruments used to receive input. Key information gathered from the public that informed the recommendations of this Plan include:

• Creating a more walkable community was very important to over 84% of residents and somewhat important to 14% of residents surveyed.
• Top 5 roadway corridors in need of improvement: NC 16 to Wal-Mart, Conover Blvd., NC 16 to Newton, County Home Road, and Rock Barn Road

• Leading discourager of walking was a lack of pedestrian facilities, especially sidewalks and crosswalks
• Top destinations for walking were Downtown, Wal-Mart, YMCA, parks, and restaurants.
• Residents walk mostly for fitness (88% of those surveyed). Still 34% of those surveyed also walk for transportation.

2.6 Summary of Existing Documents

The following documents represent important efforts, provide valuable insight and background, and have influenced the development of this plan. The current plans are reviewed and summarized below only as they relate to pedestrian planning in Conover. Sidewalk-related ordinance additions and recommendations are addressed in Chapter 4 - Program and Policy Recommendations. For further information on each plan, please consult the specific document in its entirety.

Document: Land Development Plan (2003)
This Plan updates the last comprehensive land development plan in 1992. The 2003 Plan is an effort to reinforce and improve the community atmosphere in Conover. It recognizes growth and increased automobile usage along with the necessity of addressing alternate means of transportation and the preservation of open space. Specific goals of this Plan include establishing open space and access to floodplains as greenways, and linking streets, public spaces, and parks.

One chapter addresses mobility with sections on sidewalks, bikeways, and greenways. A Sidewalk Plan and ordinance was passed in 2001, requiring developments to build sidewalks as part of the required infrastructure. It is also adopted policy that any new development along identified roadways must construct sidewalk. Some progress has occurred with 8-foot sidewalks along Thornburg and the Gateway Sidewalk Project along First Street West.

The Land Use chapter addresses open space and greenways. It is the goal of the City to establish a greenway system primarily along the Lyle and Cline Creek floodplains through requiring developers to dedicate the areas as part of open space and through working with property owners. Otherwise, water and sewer easements along with sidewalks will provide connection between open spaces.

Document: Conover Code of Ordinances
The following statements are taken directly from the Code of Ordinances. Recommendations for improvements to these policy statements can be found in Chapter 4.

Chapter 19: Streets and Sidewalks
Article IV. Street Improvement Policy

Sec. 19-45. Petition required.
The city council will not consider the paving of any street, not already accepted into the street system, or the construction or reconstruction of a sidewalk unless and until a petition, on form furnished by the city clerk, shall be submitted requesting such improvements signed by the property owners for at least fifty (50) percent of all the linear feet of frontage of the property abutting upon the street or streets or part of a street or streets or sidewalks proposed to be improved. The petition shall befiled with the city clerk, who will submit the petition to the city council at the next scheduled council meeting. The work will be undertaken based upon funds available as are provided in the annual operating budget of the city. The work will be placed on a construction priority list when [owner of] fifty (50) percent of the footage of the project has deposited at least ten (10) percent of their share of the cost.
Property owners may deposit cost of the improvements with the city. Property owners not depositing cost of the improvements with the city shall be assessed over a period of five (5) years at the rate of interest and collection permitted by general law.
Participation by the city for existing accepted city streets will generally be one-third (1/3) of the total cost including engineering costs. Petitioners will be furnished an estimated cost of the project prior to its undertaking, with assessment by the city being based upon actual cost of the project.
The city will not participate in the cost of street construction in new subdivision developments. New streets in new subdivision developments shall be approved by the planning board and city council.

ARTICLE V. SIDEWALK IMPROVEMENTS

Sec. 19-60. Thoroughfare sidewalks.
All development and new construction projects shall construct thoroughfare sidewalks along the thoroughfare roads as shown on the city sidewalk plan as adopted by the city council. Sidewalks shall be built to City of Conover, North Carolina Department of Transportation (NCDOT), and the Americans with Disabilities Act (ADA) standards.
(Ord. No. 20-01, § 1, 6-4-01)

Sec. 19-61. New residential development.
All new residential development is required to build sidewalks as provided by Appendix B, "Subdivisions," Section 86, "Sidewalks."
(Ord. No. 20-01, § 1, 6-4-01)

Sec. 19-62. Alternative improvements.
In such cases as a sidewalk is impractical to be constructed due to topographic, wetland, infrastructure or other instances, alternative improvements may be acceptable. These alternatives include bikeways, street markings, and greenways as examples, but are not limited to these improvements. Alternative improvements shall be approved

by city council and be in accordance with good engineering and design standards.
(Ord. No. 20-01, § 1, 6-4-01)

Sec. 19-63. Neighborhood sidewalk priorities.
Within existing residential developments upon a valid petition neighborhood sidewalks as shown on the city sidewalk plan shall have priority for construction.
(Ord. No. 20-01, § 1, 6-4-01)

Appendix B: Subdivision Ordinance

Article VII. Section 70-72 Sketch Plan, Preliminary, and Final Plat.
Sketch plans must show proposed street, sidewalk, and lot layout.

Preliminary Plans must show any proposed riding trails, natural buffers, pedestrian, bicycle, or other rights-of-way, utility or other easements, their location, width, and purposes. All proposed streets and sidewalks must be shown including those of properties adjoining the subdivision.

Article VII. Section 82
Pedestrian crosswalks shall be at least fifteen feet wide.

ARTICLE VIII. IMPROVEMENTS REQUIRED AND MINIMUM DESIGN STANDARDS
86. Sidewalks.
All subdivisions must provide pedestrian access and convenience.
86.1. Multi-family. Sidewalks are required on both sides of all public and private streets and for pedestrian access to all units in subdivisions developed for multi-family housing and in planned unit developments. Outer boundaries of the subdivision and/or planned unit development bordering on public streets (other than controlled access facilities) shall have sidewalks. When the sidewalk is constructed in the right-of-way of a street controlled (or to be controlled) by NCDOT the sidewalk shall meet at least minimum NCDOT standards of design and construction. If constructed outside the right-of-way of a street controlled (or to be controlled) by NCDOT it shall meet at least minimum NCDOT standards of design and construction to the extent NCDOT standards are applicable, and when such standards are not applicable the design and construction shall be in accordance with good sidewalk design and construction practices as determined by the city. Sidewalks shall be concrete.
86.2. Single-family. In single-family subdivisions sidewalks are required on one (1) side of all public streets. Outer boundaries of the subdivision bordering on public streets (other than controlled access facilities) shall have sidewalks. When the sidewalk is constructed in the right-of-way of a street controlled (or to be controlled) by NCDOT the sidewalk shall meet at least minimum NCDOT standards of design and construction. If constructed outside the right of way of a street controlled (or to be

controlled) by NCDOT it shall meet at least minimum NCDOT standards of design and construction to the extent NCDOT standards are applicable, and when such standards are not applicable the design and construction shall be in accordance with good sidewalk design and construction practices as determined by the city. The side of the street within the subdivision upon which the sidewalk is to be constructed shall: provide for maximum continuous flow of pedestrian traffic, minimize street crossings, be connected so asto create a continuous flow without doubling back, can be connected to existing streets in the area, and fit into the sidewalk plan for the area to the extent possible. The city shall make the final determination on which side of the street the sidewalk will be constructed, taking into account the herein mentioned standards and good practices of subdivision sidewalk design. Sidewalks shall be concrete.
(Ord. No. 28-00, § 1, 9-5-00)

Appendix A: Zoning; Division 12. Traditional Neighborhood Development
Sec. 312.6. Streets.
312.6.5Street design:
(a) Specifications. Designs should permit comfortable use of the street by motorists, pedestrians, and bicyclists. Pavement widths, design speeds, and the number of motor travel lanes should be minimized to enhance safety for motorists and non-motorists alike. The specific design of any given street must consider the building types which have frontage and the relationship of the street to the overall town street network. The following specifications apply to street design:
1. Street trees and sidewalks are required on both sides of streets for commercial streets and one (1) side for residential streets. Planting area for street trees should be a minimum of five (5) feet in width and sidewalks should also be a minimum of five (5) feet in width. On streets which serve as main business streets, sidewalks should be a minimum of seven (7) feet in width. Generally, canopy trees shall be planted at a spacing not to exceed forty (40) feet on center. Where overhead utility lines precludethe use of canopy trees, small maturing trees may be substituted, planted thirty (30) feet on center.

Chapter 15 Motor Vehicles and Traffic
ARTICLE IV. PARKING, STANDING AND STOPPING*
Sec. 15-66. Prohibited in specified places.
No person shall stop, stand or park a vehicle, except when necessary to avoid a conflict with other traffic or in compliance with the directions of a police officer or traffic-control device, in any of the following places:
(1) On the sidewalks.
Sec. 15-70. Stop required when emerging from alley, driveway or building.
The driver of a vehicle emerging from an alley, driveway or building shall stop such vehicle immediately prior to driving onto a sidewalk or into the sidewalk areas extending across any alleyway and, upon entering the roadway, shall yield the right-of-way to all vehicles approaching on such roadway.

Section 37.3. Off-street loading, signs, dimensional requirements and buffer requirements.
37.3.6 Sidewalks are to be built along the frontage for any new building or expansion of a building. With respect to design, sidewalks constructed shall conform to the design in the immediate and connecting area, and if there is no connecting area then the nearest area. Construction shall be done in accordance with a commonly accepted engineering practice in the area with respect to design and construction standards. The construction plan shall be subject to the approval of the city engineer or public works director and the work shall be inspected for approval by the city engineer or public works director before acceptance by the city.

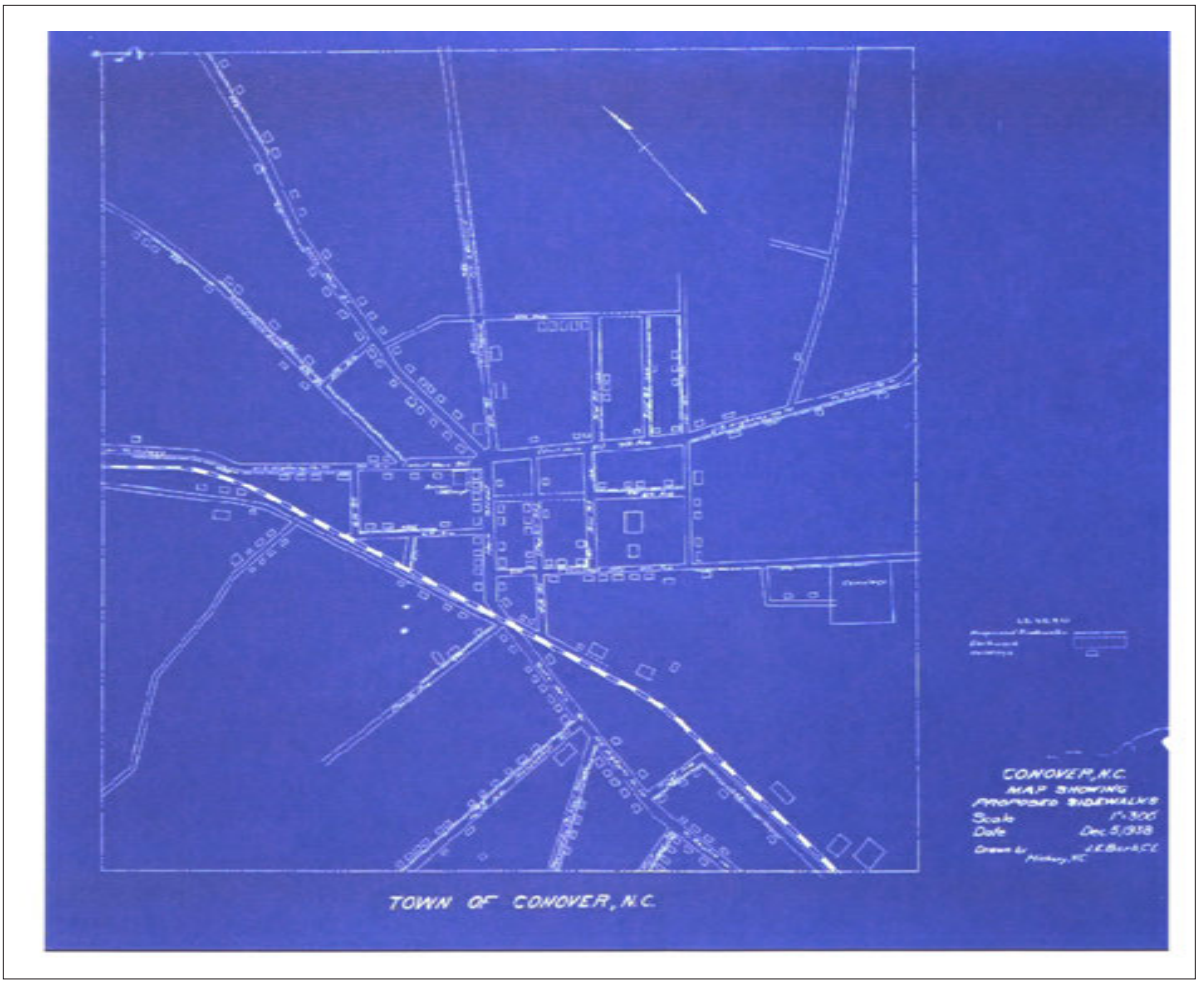
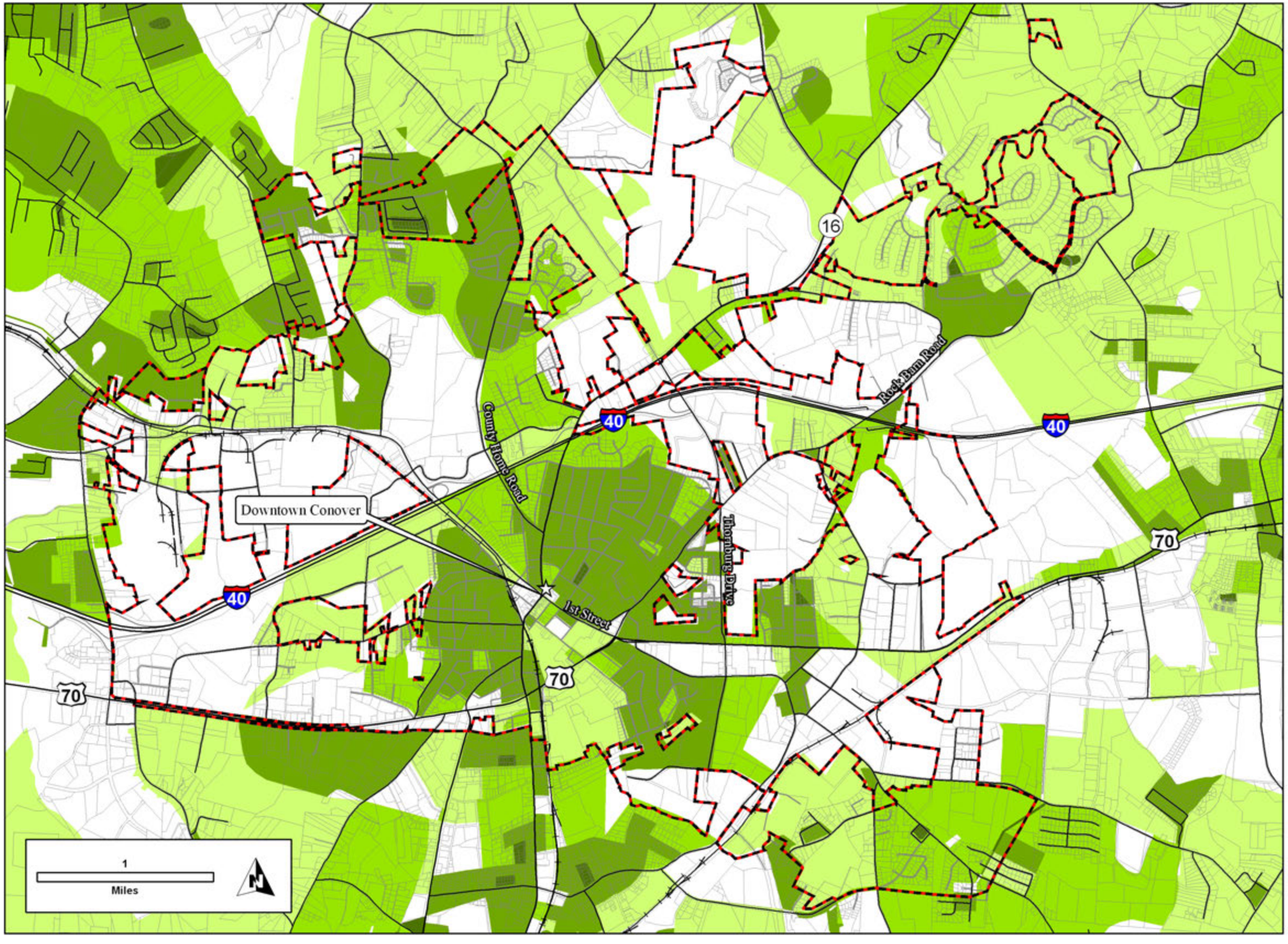


Figure 2.13:
Old Sidewalk Plan for the Town of Conover, NC 1938.



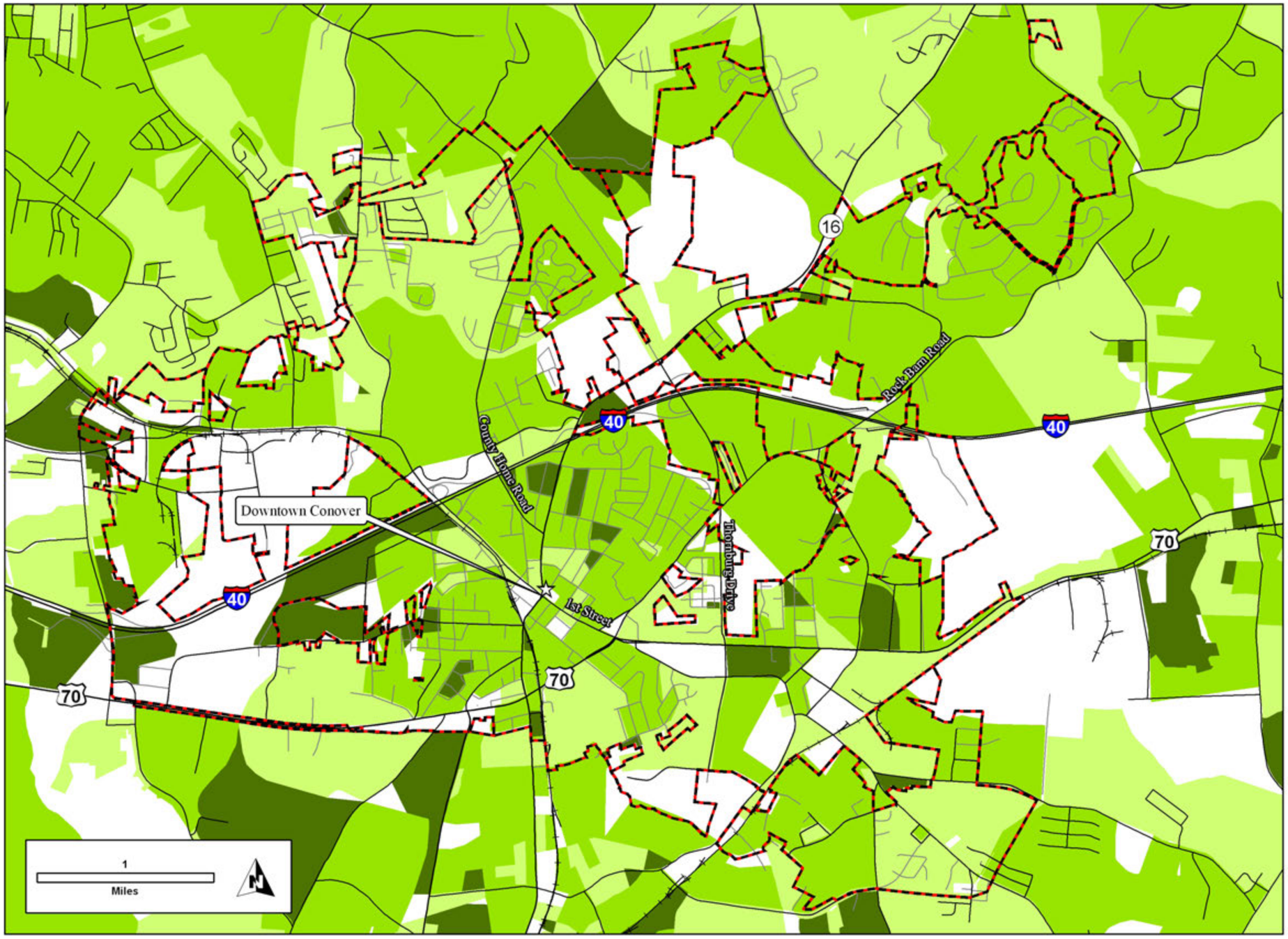
Population Density

Map 2.1

Legend

Population Density

- 0 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 5,000
- 5,000 - 50,000
- City Hall
- Major Road
- Local Road
- Rail Road
- Conover ETJ



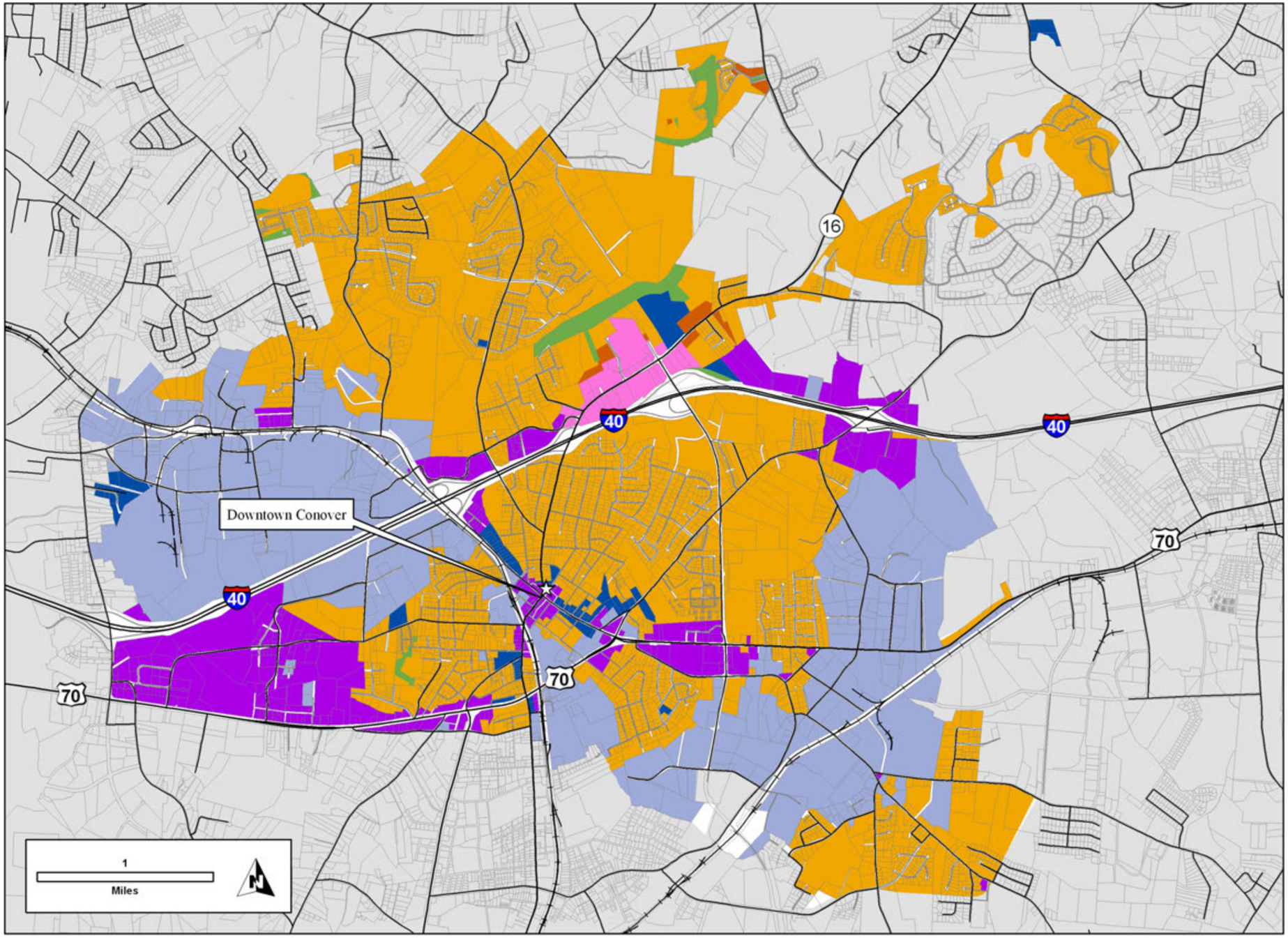
Median Age

Map 2.2

Legend

Median Age

- 0.0 - 0.1
- 0.2 - 35.0
- 35.1 - 55.0
- 55.1 - 89.5
- ☆ City Hall
- Major Road
- Local Road
- Rail Road
- Conover ETJ

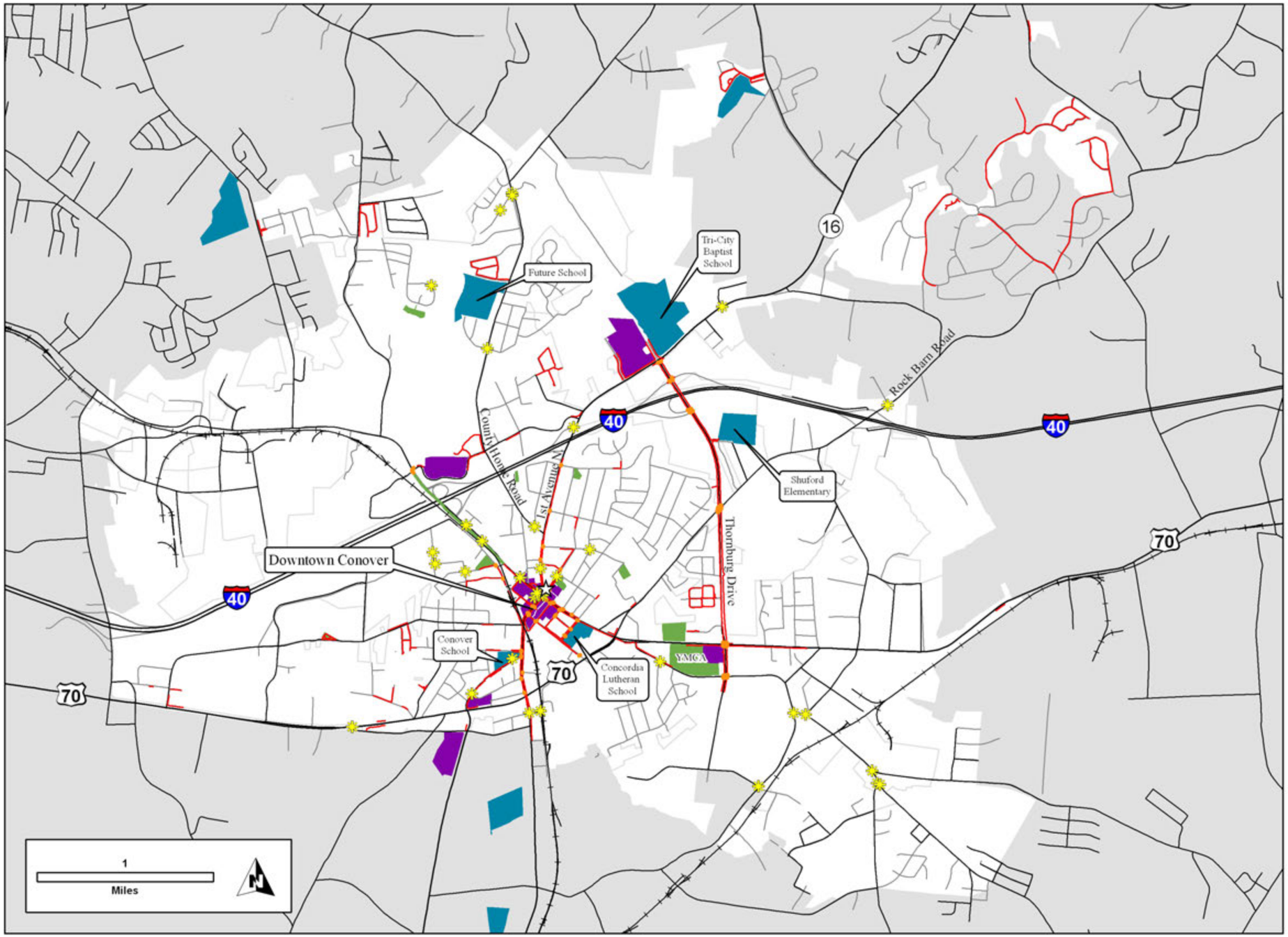


Existing Land Use

Map 2.3

Legend

- ☆ City Hall
- Business
- Comercial
- Manufacturing
- Mixed Use
- Open Space
- Office & Institution
- Residential
- Major Road
- Local Road



Existing Conditions

Map 2.4

Legend

- City Hall
- Pedestrian Crash Site
- Sidewalk - Existing
- Crosswalk - Existing
- Greenway Trail - Existing
- Major Road
- Local Road
- School Property
- Park Land
- Commercial Area
- Conover ETJ

Intersection Inventory

Table 2.1

Road 1	Road 2	Reason (Major intersection, school, connectivity, etc	Sight Distance	Signage (Y/N)	Controlled/ Uncontrolled	Curb Ramp (Y/N)	Curb Radius	Marked Crosswalk (Y/N)	Crosswalk Condition	Pedestrian Xing Signal (Y/N)	Curb Extension (Y/N)	Sidewalk	Speed Limit	Median island
1st Avenue South	7th Street Place SW	School; Major Roadway	Fair	N	C	Y (west side only)	Good	Y (not complete,only on west side, crossing 7th)	Good	N	N	Y (all sides but south side of 7th)	1st - 35; 7th - 35	N
3rd St. SE	US70	Lutheran School; Downtown connection across US 70	Fair	N	C	N, no curb	Wide	N	n/a	N	N	Y (along 3rd, north side away from intersection only)	3rd - 20; US 70 - 45	N
1st Street East	Conover Blvd E (US 70)	Connectivity-US70-Downtown	Poor	N	C	Y (only one ramp)	Wide	N	n/a	N	N	Y (brief segment at north corner only)	Conover Blvd - 35; 1st - 35	One - east side on 70
1st Street/1st Avenue	2nd Avenue	Downtown Center; Major Saftey Issue; Five Points Intersection	Poor	N	C	Y	Good	Y	Good	N	Y (not complete, by Town Hall only)	Y	20-25 all ways	N
1st Avenue South	3rd Street SE	Downtown	Poor	Y	C	Y (not complete)	Good	Y (not complete)	Good	N	N	Y	20-25 all ways	N
7th Street Place SW	Conover Blvd W (US70)	Connectivity; Commercial area	Fair	N	C	N	Wide	N	n/a	N	N	Y (brief new segment north side of US 70, east of intersection)	45 both ways	Y (on 70)
7th Street Place SW Midblock		Existing mid-block crossing that needs upgrading	Fair	Y	U	N	--	Y	Fair	N	N	Y (south side of 7th to west; north side of 7th to east)	7th - 35	N
4th Street SW	1st Avenue S	Downtown/residential	Fair	N	C	N	Wide	N	n/a	N	N	Y (on 1st)	4th - 25; 1st - 35	N
County Home Rd.	1st Avenue N	Future connectivity	Poor	N	C	N	Very wide	N	n/a	N	N	Y (on east side of 1st only)	35 both ways	Y (small one across County Home)
County Home Rd.	10th Street NW	Future connectivity; Commercial area nearby; Residental areas; Greenway connection	Good	N	C	Y (not complete)	Wide	N	n/a	N	N	Y (south side of 10th, west of intersection only)	County Home - 45; 10th - 35	N
Zelkova Court	NC16	Future connectivity; Wal-mart	Fair	N	C	Y (not complete)	Wide	Y (not complete and just two solid lines)	Good	Y (not complete)	N	Y (Zelkova and NC 16, east of intersection)	Zelkova - 20; NC 16 - 45	N
Thornburg Dr.	NC16	Future connectivity; Wal-mart	Good	N	C	Y (not complete)	Wide	Y (not complete and just two solid lines)	Good	N	N	Y (on Thornburg and briefly on NC 16 south side of intersection)	45 both ways	Y (small both ways)
Thornburg Dr.	I-40 exit ramp	Connectivity over I-40; Existing great sidewalk	Good	N	C	Y (not complete - not on islands)	Wide	Y (just two solid lines)	Good	N	N	Y (on Thornburg only)	Thornburg - 45; Ramps - accelerating	Y
County Home Rd.	Northern Dr.	Proposed school site	Fair	N	C	N, no curb	Wide	N	n/a	N	N	N	45/55 both ways	N
Rock Barn Rd.	I-40	Future connectivity	Fair	N	C	N	Wide	N	n/a	N	N	N	Rock Barn - 45	Y (islands in ramps)
Thornburg Dr.	US 70	YMCA proximity	Good	N	C	Y	Wide	Y (just two solid lines)	Good	Y	N	Y (except on north side of US 70, west of intersection)	45 both ways	N

3. Pedestrian Network

3.0 Overview

The proposed pedestrian network for the City of Conover is a series of pedestrian improvements that creates a more connected, comprehensive system. It has been developed from project visioning, field analysis, GIS mapping, and public input. This chapter presents the methodology, recommended pedestrian network facilities, and overall pedestrian network map. It also provides detailed recommendations for important network corridors and intersection improvements.

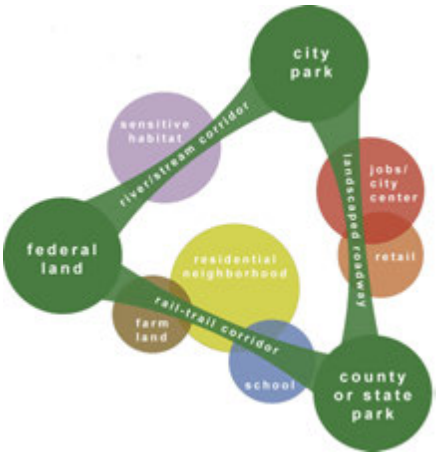


Figure 3.1: The "hubs and spokes" model guided the development of the pedestrian network.

The guiding philosophy in devising this network is the hubs and spokes model. Pedestrian corridors should connect trip attractors such as parks, schools, Downtown, shopping centers, and other pedestrian corridors. The network then becomes a practical solution for pedestrian connectivity.

3.1 Methodology

A variety of sources were consulted during the development of the Pedestrian Network: previous plans and studies, maps of existing pedestrian conditions, the consultants' fieldwork, public input, and noted pedestrian trip attractors. Detailed fieldwork included an examination of intersection conditions, greenway feasibility, areas of higher pedestrian activity such as the Downtown and US 70 corridor, and a consideration of gap connectivity. Map discussion and analysis was conducted at Steering Committee meetings and public meetings to pinpoint areas that need pedestrian improvements. Specific consideration was given to the following:

- Locations of existing facilities
- Observed gaps in existing facilities or deficiencies in facilities
- Locations of the existing arterial and collector roads
- Locations of existing and future trip attractors, including schools, parks, shopping areas, downtown historic district, high density residential areas, etc.
- Locations of major street intersections and crossings
- Locations of safety concern (high pedestrian and auto traffic and inadequate facilities)
- Connectivity of regional pedestrian and greenway networks

• Opportunities for greenway development including open space, available land, easements, and new developments
• Public comments collected from area residents via an online survey and during public workshops.
• Recommendations from representatives of the Steering Committee
• Field observations made by the consultant
• Projects and recommendations from previous planning efforts

3.2 The Pedestrian Network

The Proposed Pedestrian Network for Conover consists of sidewalk projects, crossing improvements, and off-road greenways. Together these proposed facilities should be developed or improved to create a safe and connected pedestrian network throughout the City. On-road and off-road components should be integrated to provide a connected pedestrian transportation and recreation network.

The network should be completed in phases as prioritized in Appendix B and discussed in Chapter 5, Implementation. However, network segments should be developed when there is opportunity, regardless of the order. Because of ordinances in place, sidewalks should be constructed by the developer when commercial or residential development takes place along the pedestrian network.

Successful development of the pedestrian network will require a long-term, cooperative effort between the City, the North Carolina Department of Transportation, and other local and state agencies. Regional connectivity should also be considered during future development of the sidewalk and greenway network.

All pedestrian corridor projects undertaken by the City of Conover should aim to meet the highest standards possible when topography and right-of-way allows. At a minimum, each pedestrian corridor should possess curb cuts with ramps at all driveways and intersections and be paved to increase accessibility and decrease maintenance costs. Within each identified corridor, roadway intersections should have marked crosswalks, and major intersections should have pedestrian crossing signals. Wider sidewalks, with curb cuts and improved surface conditions will correct sidewalks that currently do not satisfy the standards set forth by the American Disability Act of 1991.

Traffic calming measures, such as curb extensions, roundabouts, medians, and pedestrian refuge islands should be used to create a more hospitable environment for pedestrians in neighborhoods and commercial districts. See Chapter 6, Design Guidelines for specific descriptions on recommended facilities. Finally, opportunities should be taken to incorporate pedestrian facilities into all municipal and state roadway improvement and widening projects.

Three main types of pedestrian projects have been identified for the City of Conover and are outlined below. They include sidewalks, crossing/intersection improvements,

and off-road greenway corridors. Ancillary improvements to create a more hospitable pedestrian environment are also detailed. Design guidelines in Chapter 6 provide detailed information regarding proper placement and facility treatments. The complete recommended network of sidewalks, intersection improvements, and off-road greenways can be found on Map 3.1. Each segment can be found in the prioritization matrix found on Map B.1.

Sidewalk Projects

Sidewalk projects are the major component of the proposed pedestrian network in Conover. Sidewalks are located along road segments. In the long term, sidewalks should be constructed on both sides of arterial and collector roads wherever possible to provide adequate pedestrian connections throughout the City of Conover. The sidewalk network is focused on significant roadways that provide service to major destinations within Conover and link multiple land uses, such as residential, recreational, institutional, and commercial. The proposed pedestrian facilities along significant roadways craft the spine of the entire pedestrian network. Some sections along these significant roadways have existing sidewalk. However, the existing sidewalk is segmented, creating gaps in the connectivity or lacking sidewalk on one side of the street. Sidewalk projects are prioritized in Appendix B and high priority segments are illustrated on Map B.1.

Figure 3.2: Existing sidewalk along Thornburg, near I-40.

Pedestrian Crossings

Improving the safety of roadway crossings is essential for making Conover more walkable. Intersections present situations where a pedestrian must traverse the motor vehicle environment. Pedestrians have a much greater risk of being struck by a vehicle when crossing a roadway as opposed to walking on the shoulder or sidewalk beside it. Nationally, nearly 75% of all police-reported pedestrian crashes involve pedestrians crossing roadway travel lanes (1).

Figure 3.3: Marked crosswalk at intersection of US 70 and Thornburg.

Consultant fieldwork and public input identified numerous intersections in Conover that are in need of minor to significant pedestrian facility improvements. Adequate facilities should be provided specific to the intersection, to provide a safe crossing environment. Improvements may include marked crosswalks, curb extensions, curb ramps, and pedestrian-activated signals. Recommendations for each specific intersection are discussed in section 3.4.

It should be noted that this is a planning level analysis. Each of these locations will need a more detailed project-level review. The conclusions reached through more detailed review may vary from those presented herein.

Greenway Corridors

Greenway corridors, for the purposes of this study, are off-road, multi-use facilities that provide an excellent source for alternative transportation and recreation. Greenway corridors can also serve an environmental purpose, to protect forests and enhance water quality. Greenway corridors can be constructed of natural materials, gravel, crushed stone, asphalt, or concrete, depending upon the projected usage and surrounding landscape. These corridors typically take advantage of linear stream corridors, easements, and other tracts of open space. Greenway trails in Conover should be integrated with and serve as an off-road extension of the on-road pedestrian network. Numerous greenway opportunities were identified throughout Conover, via consultant fieldwork, public input, and other local and regional planning efforts. Proposed greenway corridors are illustrated on Map 3.1.

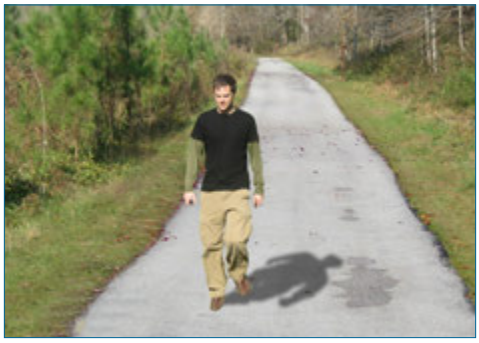


Figure 3.4: Photo rendering of a greenway near Lyle Creek.

Ancillary Treatments

In addition to the above facilities, a number of other important pedestrian treatments can improve safety throughout the pedestrian network. A full listing and description of these facilities and treatments can be found in Chapter 6 - Design Guidelines. A summary of the major treatments recommended in Section 3.3 are described below.

Median Refuge Island: This refers to an island in the roadway median, that offers a stopping or halfway point for a pedestrian.

Driveway Access Management: This refers to minimizing the size and amount of access points for motor vehicles crossing sidewalks to adjacent property.

Traffic Calming: This refers to a range of measures that reduce the impact of vehicular traffic on residents, pedestrians and cyclists - most commonly on residential streets, but also now on commercial streets.

3.3 Network Corridors

The following corridors and areas were chosen because of their importance in the overall network. They are key thoroughfares that connect multiple destinations and land uses. They also represent segments in need of significant improvements for pedestrian safety and connectivity. The complete network recommendations by segment may be found in the prioritization table (Appendix B).

US 70 East (From 6th Avenue - East)

Importance

- Major artery through Conover
- Connects multiple land uses including the YMCA and commercial sites
- Significant public interest in improvements here

Recommendations

- Continuous sidewalks along both sides through Conover City limits
- Sidewalk gap of critical importance is from US 70/6th Ave. interchange to YMCA
- Intersection crossing improvements throughout (see Section 3.4)
- Adequate buffer between roadway and sidewalk (heavy traffic at high speeds)
- Driveway access management needed

Possible Constraints

- Commercial driveways and drainage issues

Figure 3.5: US 70 East Corridor Map

US 70 West (From 6th Avenue - West)

Importance

- Major artery through Conover
- Connects multiple land uses including commercial sites
- Significant public interest in improvements here

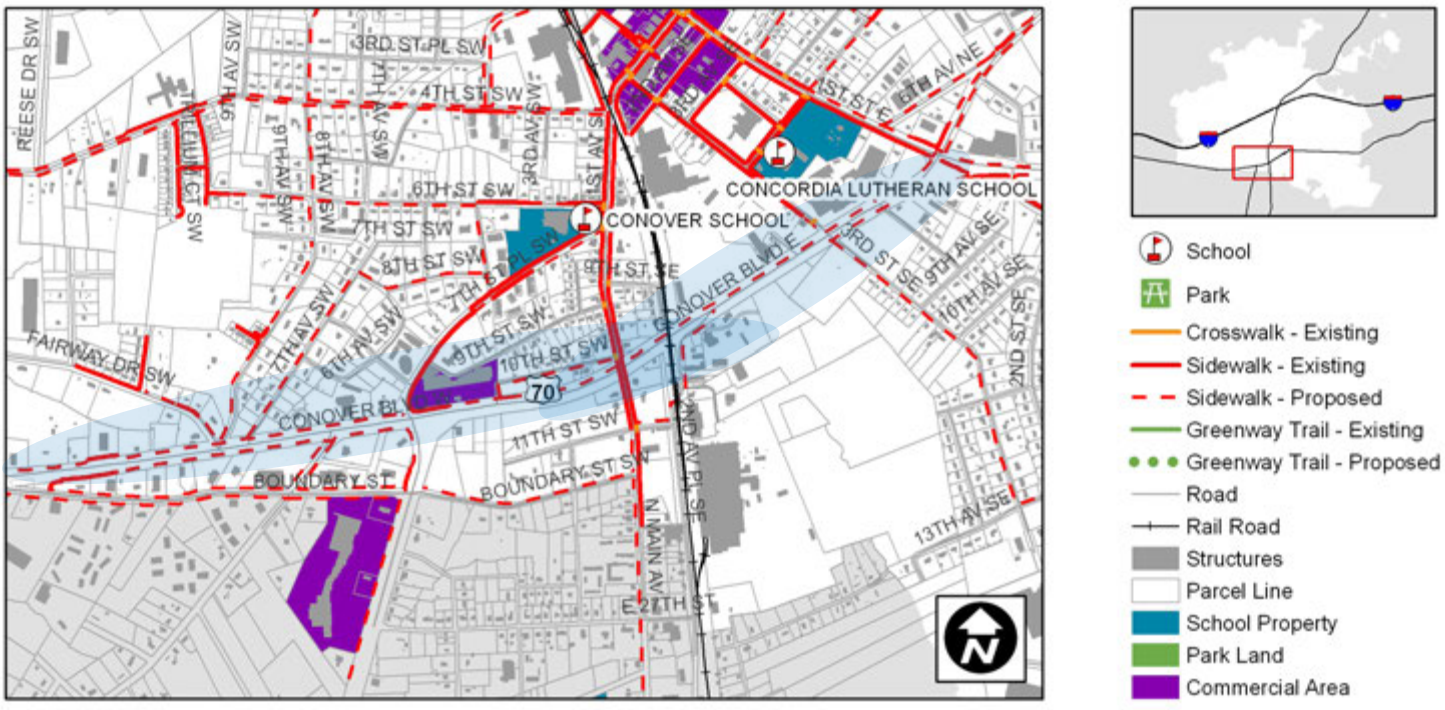
Recommendations

- Continuous sidewalks along both sides through Conover City limits
- Intersection crossing improvements throughout (see Section 3.4) to increase connectivity and safety between areas south of US 70 towards Downtown
- Adequate buffer between roadway and sidewalk (heavy traffic at high speeds)
- Driveway access management needed

Further study

1st Avenue South and Railroad overpasses at US 70. Currently, there is minimal space for a sidewalk under these bridges along US 70. Alternatives include guiding pedestrians away from US 70 crossing the railroad and 1st Avenue South at designated locations. If bridges are reconstructed in the future, adequate space for sidewalks should be provided.

Figure 3.6: US 70 West Corridor Map



NC 16 (Near I-40 - North)

Importance

- Major artery through Conover
- Near-term bridge replacement at I-40 (TIP project with construction scheduled for FY 2011)
- Connects Downtown to new Wal-Mart development area at NC 16 and Thornburg
- Connects Downtown to proposed Lyle Creek Greenway
- Significant public interest in improvements here

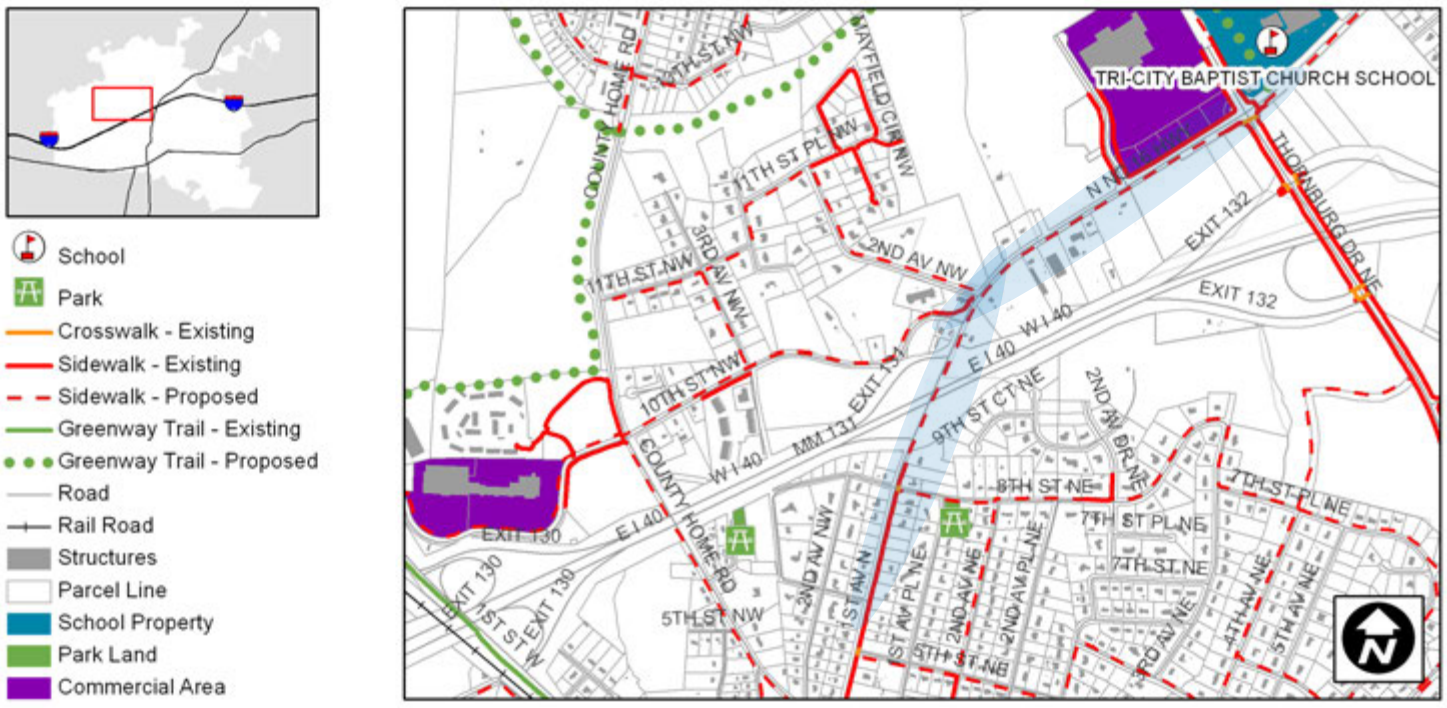
Recommendations

- Provide adequate pedestrian facilities across reconstructed bridge at I-40
- Provide pocket parks in locations of pre-existing Interstate exit and on ramps
- Provide sidewalk on both sides in the long-term. In the short-term, provide sidewalk on east side of NC 16 (to continue existing sidewalk from Downtown).
- Driveway access management needed
- Intersection crossing improvements throughout (see Section 3.4)

Possible Constraints

- Residential landowners
- Drainage issues

Figure 3.7: NC 16 Corridor Map



Rock Barn Road

Importance

- Major artery through Conover
- Connection of Rock Barn and other areas north of I-40 towards Downtown
- Provides service to Shuford Elementary
- Significant public interest in improvements here

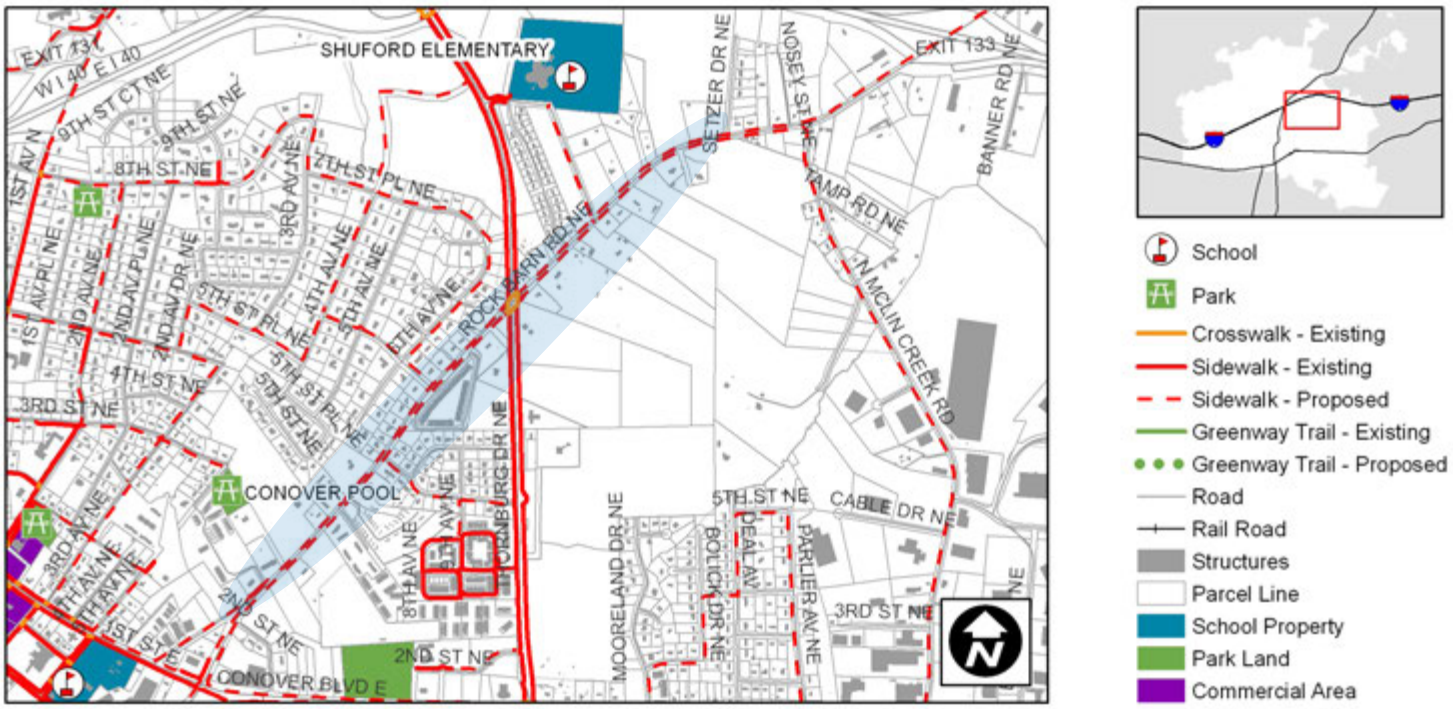
Recommendations

- Provide adequate pedestrian facilities across bridge at I-40
- Continuous sidewalk should be provided on both sides of 6th Street from Thornburg to US 70
- In short-term sidewalk should be provided on one side of Rock Barn from Thornburg across I-40. Provide sidewalk on both sides in the long-term.
- Intersection crossing improvements throughout (see Section 3.4)

Possible Constraints

- Residential landowners
- Drainage issues

Figure 3.8: Rock Barn Corridor Map



County Home Road

Importance

- Major artery through Conover, connecting areas north of I-40 towards Downtown
- Connects multiple land uses including residential and commercial (Canova shopping center) along with future elementary school (at County Home Road and Northern Drive).
- Connects to future Lyle Creek Greenway

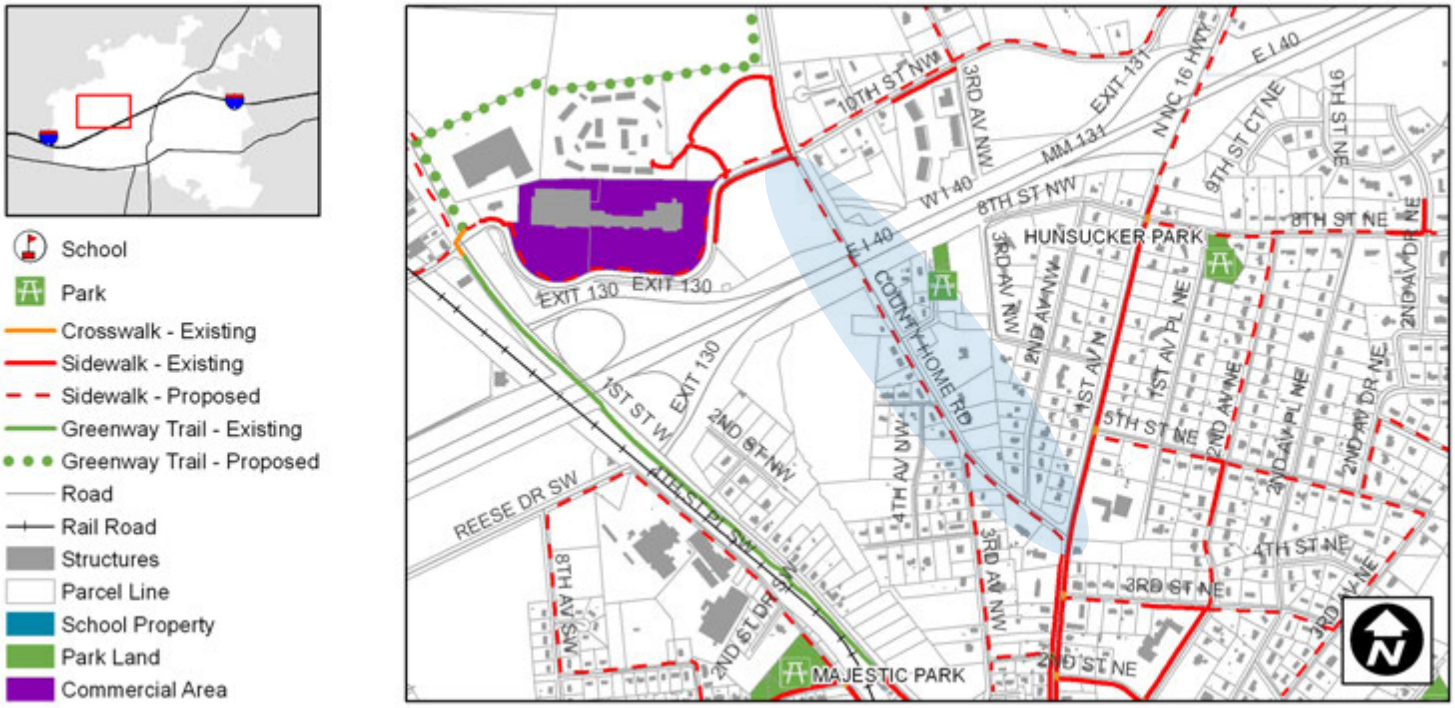
Recommendations

- Provide continuous sidewalk along west side of County Home (This side provides the least amount of topographic obstacle and connects well into K-Mart sidewalks and Lyle Creek Greenway corridor).
- North of 10th, this sidewalk should become an off-road greenway/sidepath taking advantage of existing utility easement
- Intersection crossing improvements throughout (see Section 3.4)

Possible Constraints

- Residential landowners

Figure 3.9: County Home Corridor Map

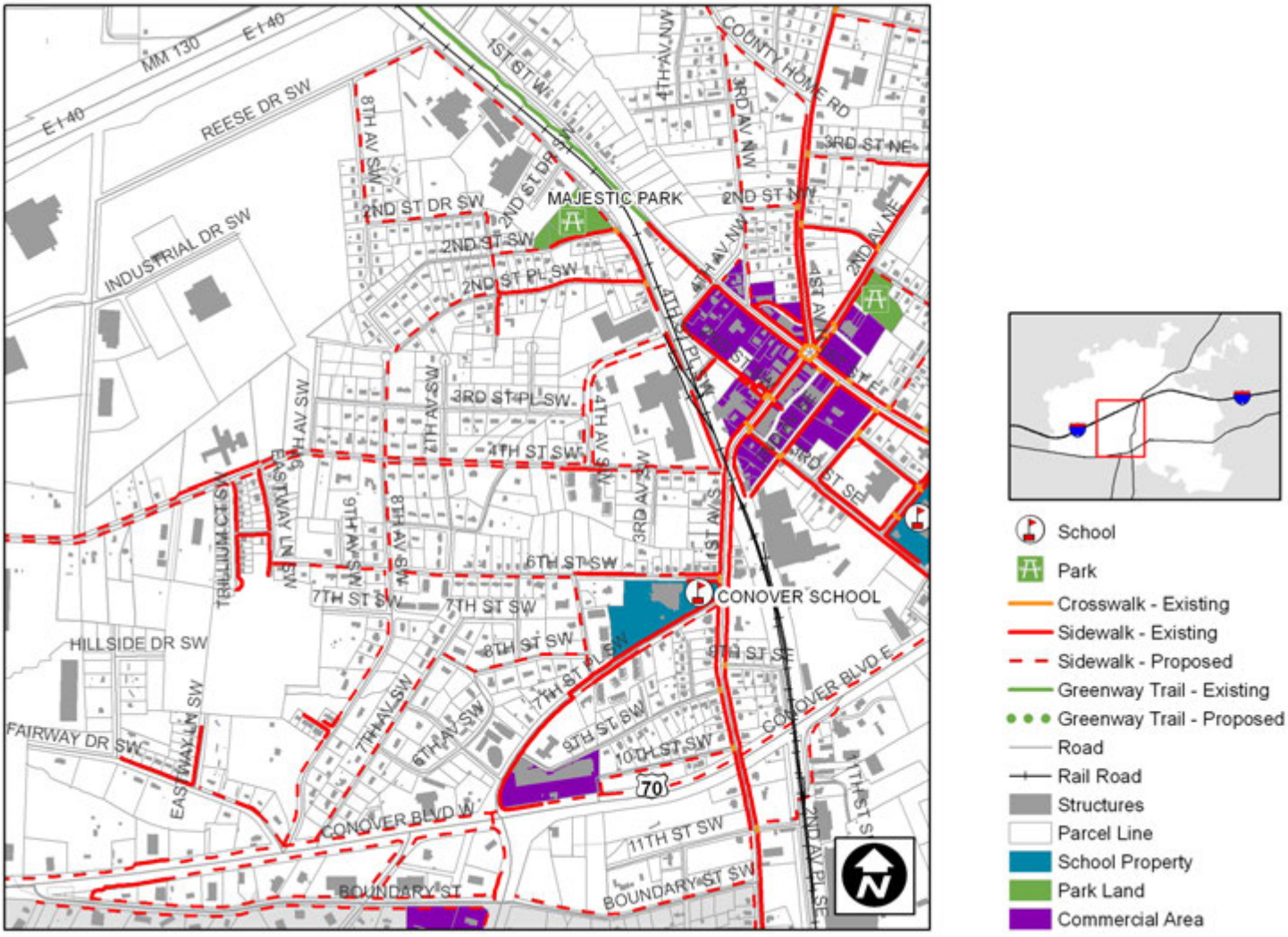


Key Areas

--Downtown West (Mostly residential areas west of RR)

4th Street: Provide continuous sidewalk along both sides to connect industrial and residential areas to Downtown. Create traffic calming to slow automobile traffic and encourage pedestrian movement.
7th Street Pl. SW: Fill gaps in sidewalk along both sides. Create traffic calming to slow automobile traffic and encourage pedestrian movement. The existing mid-block crossing should be enhanced with a raised median refuge island, updated painting, and improved curb ramps (A photo rendering of this improvement can be found in Section 3.6)

Figure 3.10: Downtown West Map



--Downtown Central

Broyhill Redevelopment: Provide pedestrian connectivity through redevelopment area to Downtown and areas south (See photo rendering in Section 3.6 and Chapter 5-Implementation for more information).

The redevelopment of the Broyhill Site (now known as "Conover Station") is a multi-faceted project that will occur over the next decade. The Broyhill furniture factory that once had over 450 employees closed its doors in 2004. In 2005, the City of Conover took a proactive approach in helping to insure the future vitality of the downtown by purchasing the 27 acre property in the heart of downtown Conover. The City is currently planning for the redevelopment of the site into a vibrant mixed-use center. The property has access to Highway 16 and Highway 70 and over 1600 feet of frontage on the Norfolk Southern Railway.

3rd Street SE: Complete sidewalks south of Concordia Lutheran School to US 70. This will require some driveway access management. Continue sidewalk on one side of 3rd Street south to provide safer access to US 70.

Further study
Five Points Intersection. Further study is recommended for this intersection. Currently, while having marked crosswalks, it is a very dangerous intersection for pedestrians. See Section 3.6 for alternative solutions.

Figure 3.11: Downtown Central Map

3.4 Crossings/Intersections

These recommendations are a planning-level analysis only and represent a start for improvements. Further analysis is warranted for each intersection. Constraints may include right-of-way issues and the need to coordinate with NCDOT on state roadways. Table 2.1 provides a detailed inventory of existing design features for crossings/intersections discussed below

US 70 and Rock Barn Road and 1st Street E

Importance
- US 70 is important commercial corridor
- Connects multiple land uses including residential and commercial
- Currently a dangerous intersection for pedestrians

Recommendations (See Section 3.6 for graphic)
- Add ladder marked crosswalks all ways
- Provide advanced stop lines
- Pedestrian-activated countdown signal all ways
- Reduce curb radius

5 Point Intersection (1st Avenue, 1st Street, 2nd Avenue NE)

Importance
- Downtown Central
- Dangerous crossing with unclear crossing times for pedestrians

Recommendations (See Section 3.6 for graphics of three alternatives)

Conover Blvd E and 3rd St. SE

Importance
- Connectivity of residential areas south of US 70 towards Downtown
- US 70 is important commercial corridor
- Concordia Lutheran Church

Recommendations
- Add sidewalk first along US 70 and west side of 3rd Street SE (south)
- Complete sidewalk gap on 3rd Street SE (north of intersection) requiring driveway access management
- Add ladder marked crosswalks all ways
- Reduce curb radii
- Pedestrian-activated countdown signal all ways

US 70 and 7th Street Place SW

Importance
- Connectivity of areas south of US 70 towards Downtown
- US 70 is important commercial corridor
- Wide pedestrian crossing with dangerous right-hand turn slip lanes

Recommendations
- Add sidewalks both sides all ways
- Add ladder marked crosswalks all ways
- Add curb ramps all ways
- Reduce curb radii
- Pedestrian-activated countdown signal all ways
- Elevate pedestrian refuge islands (portions of the right-hand turn slip lanes) and create perpendicular ladder marked crosswalks with curb ramps to those islands

US 70 and Thornburg Drive (See photo rendering, Section 3.6)
Importance
- Intersections of major road arteries
- YMCA nearby
- Existing, superb 8′ sidewalk on Thornburg

Recommendations
- Enhance marked crosswalk with ladder painting
- Enhance curb ramps with truncated dome
- Reduce curb radii

Thornburg Drive and I-40 Ramps (See photo rendering, Section 3.6)
Importance
- Connection over I-40 to new shopping area
- Existing, superb 8′ sidewalk on Thornburg

Recommendations
- Enhance marked crosswalk with ladder painting
- Curb ramp needed on island
- Pedestrian crossing sign on Thornburg
- Enhance curb ramps with truncated dome

NC 16 and Zelkova Court (See photo rendering, Section 3.6)
Importance
- Connectivity with future sidewalk along NC 16 towards Downtown
- Entrance to new Wal-Mart shopping center

Recommendations
- Enhance marked crosswalk with ladder painting
- Reduce curb radii
- Pedestrian-activated signal
- Pedestrian crossing sign for motorists exiting shopping center
- Add elevated pedestrian refuge island on right-hand slip lane (NC 16 entrance)

NC 16 and Thornburg Drive (See photo rendering, Section 3.6)
Importance
- Connectivity with future sidewalk along NC 16 towards Downtown
- Entrance to new Wal-Mart shopping center
- Existing, superb 8′ sidewalk on Thornburg
- Wide crossing intersection for pedestrians

Recommendations
- Enhance existing marked crosswalk with ladder painting
- Add marked ladder crosswalk across NC 16 (both sides)
- Add marked ladder crosswalk across Thornburg (Wal-Mart side)
- Add countdown signals all directions
- Pedestrian crossing sign for motorists exiting shopping center
- Add elevated pedestrian refuge island on right-hand slip lane (Thornburg turning right to NC 16)
- Enhance curb ramps with truncated dome

1st Avenue South and 3rd Street SE
Importance
- Downtown

Recommendations
- Add marked ladder or textured crosswalk across 1st (west side)
- Provide truncated curb ramp for the new marked crosswalk
- Add in-road pedestrian crossing sign on west side of intersection
- Add countdown signals across 1st

1st Avenue South and 7th Street Pl. SW (See photo rendering, Section 3.6)
Importance
- Connects Conover School
- Crossing of major roadway into Downtown

Recommendations
- Add marked ladder crosswalks over 1st
- Add curb ramps over 1st
- Enhance existing marked crosswalk across 7th with ladder painting
- Add countdown signals all directions
- Traffic calming and lower speed limits near Downtown
- Utilize crossing guards for school hours
- Enhance curb ramps with truncated dome

4th Street Southwest and 1st Avenue South
Importance
- Connectivity from residential into Downtown
- Future stoplight recommended here

Recommendations (future)
- Add sidewalk along 4th Street Southwest
- Ensure pedestrian accommodations are part of intersection improvement
- Railroad presents obstacle and further evaluaton of intersection may be necessary

County Home Road and 1st Avenue North
Importance
- Future connectivity between Lyle Creek Greenway, County Home, and Downtown

Recommendations
- Complete sidewalks along County Home (west side)
- Pedestrian crossing improvements added after stoplight signal added
- Add marked ladder crosswalks
- Reduce curb radii
- Pedestrian-activated signal

County Home Road and 10th Street NW
Importance
- Future connectivity towards Downtown
- Future connectivity with Lyle Creek Greenway
- Proximity to Canova shopping center

Recommendations
- Complete sidewalks along County Home (west side) and sidewalk along 10th (north side)
- Add marked ladder crosswalks across 10th (west side) and across County Home (north side)
- Pedestrian-activated coundown signal

County Home Road and Northern Drive
Importance
- Proposed School site (unknown school name and construction date at time of study)

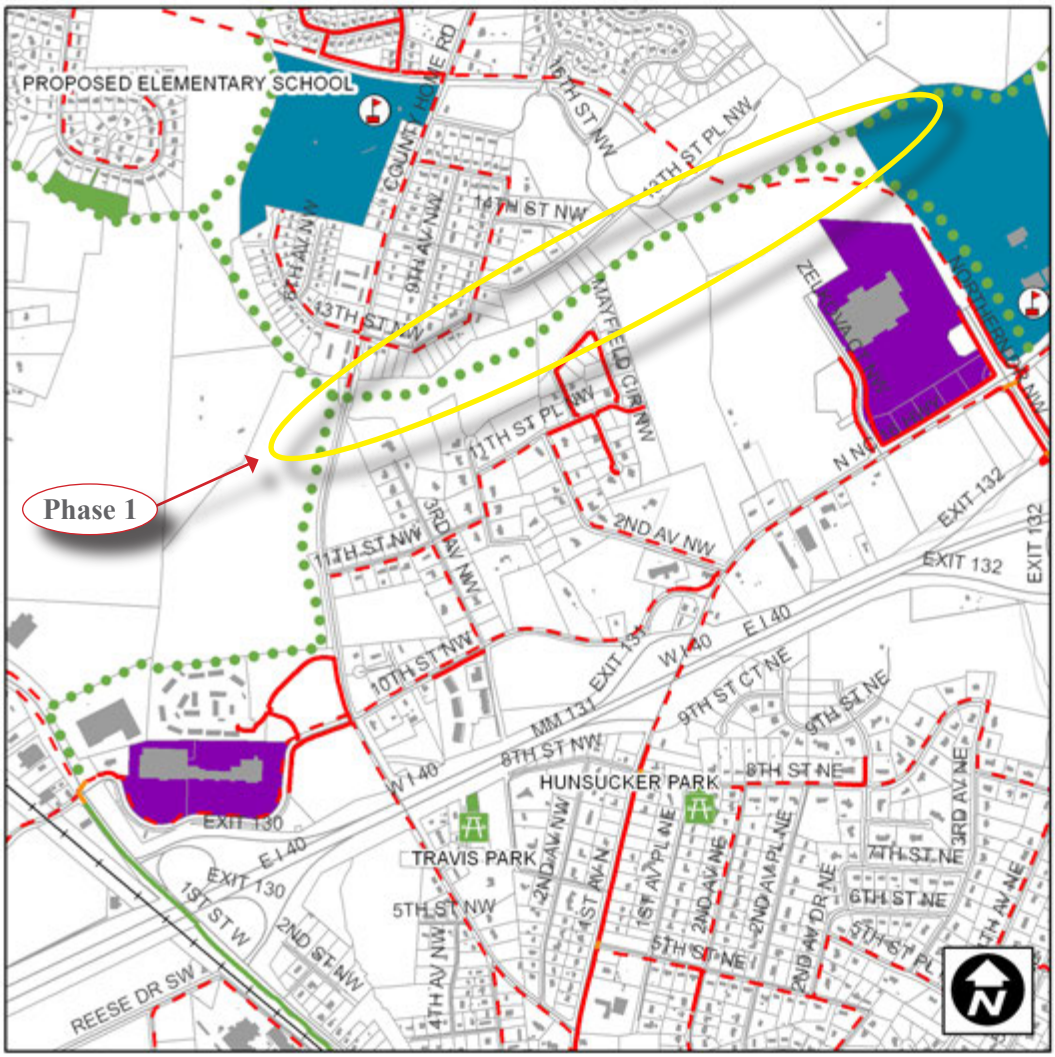
Recommendations (future)
- Once school is in place, sidewalks should be provided
- Once sidewalks provided, ladder marked crosswalks, curb ramps, and pedestrian-activated signals should be added

Rock Barn Road and I-40 Ramps
Importance
- Connectivity across I-40

Recommendations (future)
- Once sidewalks are in place along Rock Barn and across I-40, safe crossings should be provided, similar to recommended facilities at Thornburg and I-40 ramps.

Lyle Creek Greenway

The Lyle Creek Creek corridor, in northern Conover, possesses a significant opportunity to develop a long distance greenway trail along an existing sewer corridor that parallels the creek. This sewer corridor is currently maintained by the City of Conover's Public Works Department. Establishing a paved greenway path and dedicated public access points to the corridor would create a high quality multi-use facility for residents, while improving access for maintenance vehicles.



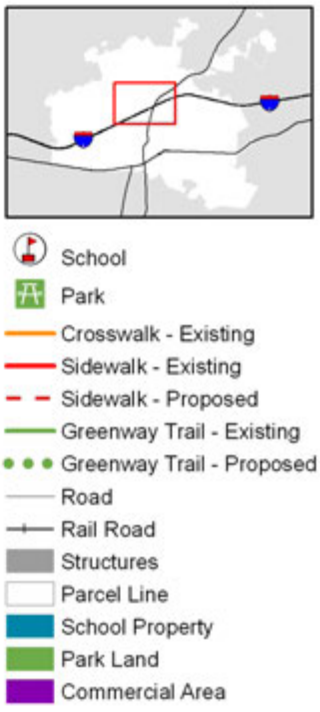
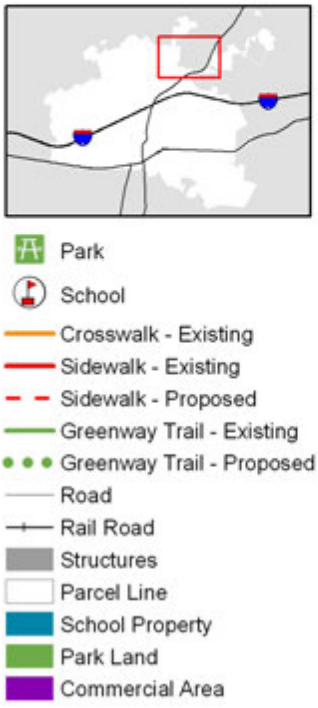
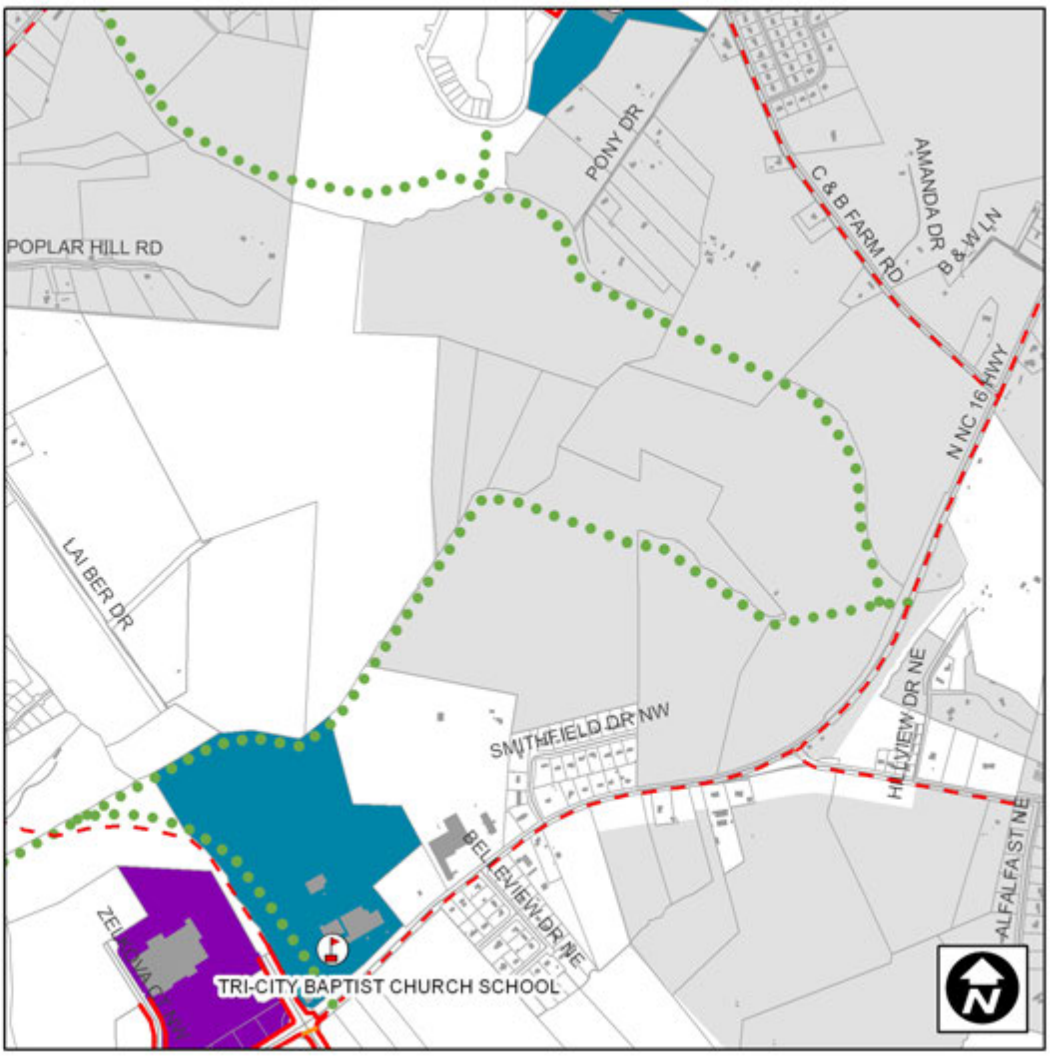


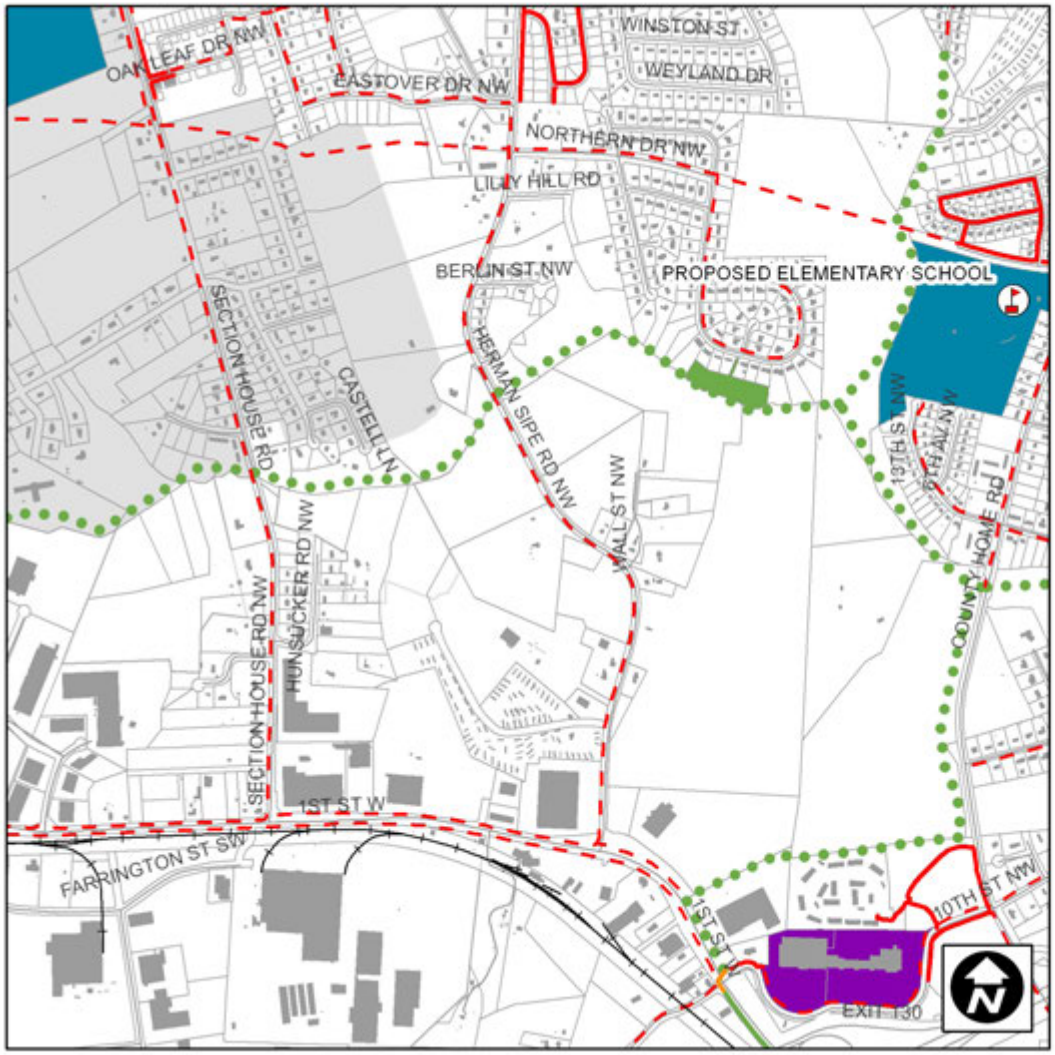
Figure 3.12: Central Segment of the proposed Lyle Creek Greenway.

The Lyle Creek Corridor covers a significant distance and would most likely be developed in phases. The central segment (Figure 3.12) is the most feasible for initial development, due to existing dedicated land and close proximity to existing development. Future segments to the east (Figure 3.13) and west (Figure 3.14) would expand the greenway across Conover, connecting neighborhoods to schools, parks, commercial areas and places of employment. Lands would need to be acquired and dedicated for this greenway. Another constraint is a lack of a long range parks plan which is being developed in 2009. When completed the Lyle Creek Greenway could become a component of a long distance regional pedestrian and greenway network , that would link residents to surrounding destinations and municipalities.

Figure 3.13: Eastern Segment of the proposed Lyle Creek Greenway.







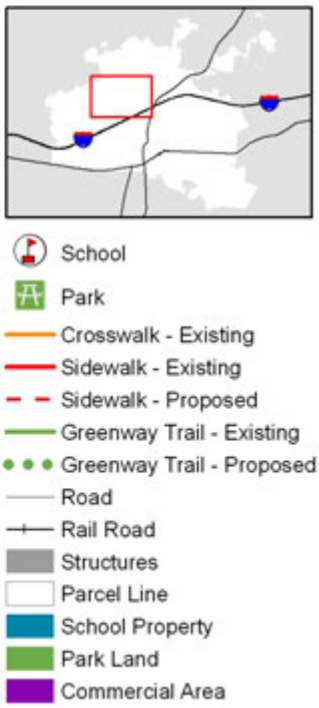


Figure 3.14: Western Segment of the proposed Lyle Creek Greenway.

3.5 Regional Connectivity

Conover should look beyond its city limits and link pedestrian facilities to neighboring and regional destinations. It is recommended that Conover coordinate efforts with Hickory, Newton, Claremont and Catawba County to create long distance connections for alternative transportation and recreation. Regional greenway trail connections will encourage and draw individuals to Conover from surrounding areas.

One of the most significant and valuable regional opportunities for pedestrian connections is the Carolina Thread Trail (www.carolinathreadtrail.org). The Carolina Thread Trail (Figure 3.x) is a regional trail effort that encompasses a 15 county area in the Greater Charlotte area and including spurs to Catwaba County and Conover. The Carolina Thread Trail aims to link individuals to local and regional destinations through a 500+ mile network of greenways, blueways, and trails.

Figure 3.15: Concept Map for the Carolina Thread Trail.

3.6 Photo Renderings

Photo renderings help visualize the pedestrian improvements recommended in this chapter. Key sites were photographed and rendered below.

Intersections

Figure 3.16: Photo rendering of a crosswalk enhancement at 1st Avenue South and 7th Street Place SW.

Figure 3.17: Photo rendering of a crosswalk enhancement on 7th Street Place SW, just north of US 70.

Figure 3.18: Photo rendering of a crosswalk enhancement at NC 16 and Thornburg.

Figure 3.19: Photo rendering of a crosswalk enhancement at Zelkova and NC 16

Figure 3.20 Photo rendering of a crosswalk enhancement at Thornburg and US 70.

Figure 3.21 Photo rendering of pedestrian crossings at Thornburg and I-40.

Corridors and Sites

Figure 3.22: Photo rendering of a greenway near Lyle Creek.

Figure 3.23: Photo rendering of a greenway on the south end of the Broyhill Development.

Figure 3.24: Photo rendering of a sidewalk on County Home Road, just north of I-40.

Five-Point Intersection (Downtown)

These graphics presented are only conceptual in nature. Further study is warranted to improve this complicated intersection.

Alternative 1

Figure 3.25 Conceptual improvement to Five Points intersection. This alternative re-routes 2nd Ave. NE and moves the post office to the 1st Street streetfront. Aesthetic improvements include tree plantings and

Alternative 2

Figure 3.26 Conceptual improvement to Five Points intersection. This alternative installs a roundabout to slow traffic but also keep it moving. Pedestrians would be provided with shorter crossing distances with

Alternative 3

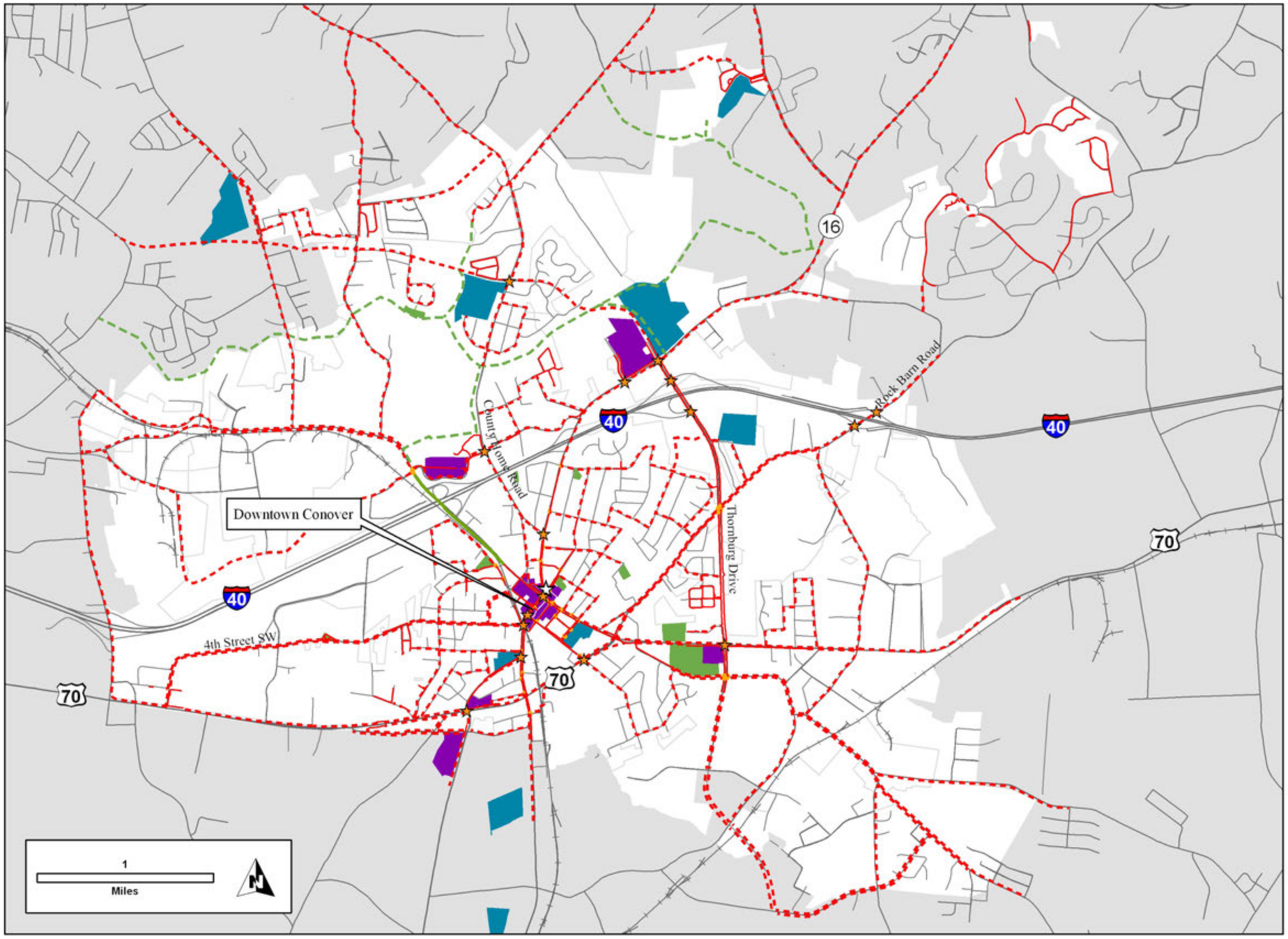
Figure 3.27 Conceptual improvement to Five Points intersection. This alternative would install diagonal and perpendicular pedestrian crossings and pedestrian-activated countdown signals, stopping all automobile traffic for a pedestrian crossing. This would be the lowest cost of the three but could impact automobile

US 70/Rock Barn/1st Street E Intersection

Figure 3.28 Conceptual improvement to US 70/Rock Barn/1st St. E intersection. This alternative would provide marked crosswalks, countdown signals, advanced stop bars, and curb extensions to reduce turning curb radii. Further analysis is warranted.

Footnotes

1 Zegeer, C.V., et al. Pedestrian and Bicycle Crash Types of the Early 1990s, Federal Highway Administration, FHWA-RD-95-163, p. 22, June 1996.



Proposed Network

Map 3.1

Legend

- Intersection Improvement
- City Hall
- Sidewalk - Existing
- Sidewalk - Proposed
- Crosswalk - Existing
- Greenway Trail - Existing
- Greenway Trail - Proposed
- Major Road
- Local Road
- School Property
- Park Land
- Commercial Area
- Conover ETJ

4. Program and Policy Recommendations

4.0 Overview

Meeting the goals of the City of Conover Pedestrian Transportation Plan will require more than construction and installation of recommended pedestrian facilities. It will also require the initiation and continued support of pedestrian-related programs from the local officials, local residents, and community organizations. In addition, the implementation of these facilities and programs will require the adoption and enforcement of new pedestrian-related policies. This chapter outlines recommended programs, policies, and in some cases, policy changes for the City of Conover to meet the needs of pedestrians that cannot be met through facility construction alone.

4.1 Program Recommendations and Resources

Pedestrian-related programs fall into three main categories: education, encouragement, and enforcement. The programs listed below are provided to demonstrate the variety of opportunities that exist for promoting walking and active lifestyles in Conover. Communities all across North America are using these programs. The City of Conover should work closely with local volunteers and community organizations to initiate at least one of the following programs or events (whichever are deemed the most appropriate and/or feasible to those organizing) within the first year of adopting this plan (See the action steps in Chapter 5 - Implementation for a listing of the top priority programs). Also, it will be necessary for staff to be assigned to focus on programming, researching additional program ideas, and working with local groups, non-profits, schools, and citizens to develop programs further.

Education

Pedestrian Advocacy Group

The City of Conover should actively participate in the development of a local pedestrian advocacy group. A local advocacy group is a beneficial resource for promoting safe pedestrian travel, providing feedback on opportunities and obstacles within the pedestrian system, and coordinating events and outreach campaigns (such as the programs outlined throughout this section). Advocacy groups also play a critical role in encouraging and evaluating the progress of overall plan implementation. This group can be modeled after the Pedestrian **Plan Steering** Committee, and may even include many of the same members. The group should meet on a regular basis (at least quarterly) following the adoption of the plan.

Public Education
Educational materials can focus on safe behaviors, rules, and responsibilities. Information may include important pedestrian laws, bulleted keys for safe pedestrian travel, safe motor vehicle operation around pedestrians, and general facility rules and regulations. This safety information is often available for download from national pedestrian advocacy organizations, such as the Pedestrian and Bicycle Information Center website, www.pedbikeinfo.org . Information can be distributed through brochures, newsletters, newspapers, bumper stickers, and other print media that can be inserted into routine mailings. It can also be posted on municipal websites and shown on local cable access television. Local events should be utilized to distribute information and a representative from the pedestrian advocacy group can answer questions related to pedestrian safety. A booth could also be used to display safety information at various community events.

Internal Education
'Internal' education refers to the training of all people who are involved in the actual implementation of the Pedestrian Transportation Plan. Internal training will be essential to institutionalizing pedestrian issues into the everyday operations of engineering and planning departments. In addition to relevant City staff, members of the local planning commission, NCDOT Division 12 staff, and county staff should also be included in training sessions whenever possible. This training should cover all aspects of the transportation and development process, including planning, design, development review, construction, and maintenance. This type of 'inreach' can be in the form of brown bag lunches, professional certification programs and special sessions or conferences. Even simple meetings to go over the Pedestrian Plan and communicate its strategies and objectives can prove useful for staff and newly elected officials that may not have otherwise learned about the plan. Pedestrian planning and design issues are complex, and national research and guidelines continue to evolve. Therefore, training sessions need to be updated and repeated on a regular basis.

Local law enforcement should be trained in accurate reporting of pedestrian crashes involving automobiles. In many communities, police do not always adequately understand the rights of pedestrians. Proper interpretation of individual circumstances and events is critical for proper enforcement and respect between motorists and pedestrians. Special training sessions should be instituted and occur annually for new employees within the Police Department that focus on laws relating to pedestrian travel.

Environmental and Historic Education/Interpretation
Educational programs and interpretative signage could be developed along greenways and pedestrian routes. Greenways provide opportunities for learning outside the classroom. Specific programs that focus on water quality and animal habitat are popular examples. Events such as learning walks about specific animals

or insects, tree identification, wildflower walks, environmental issues, stewardship education, and sustainability could be led by area experts. Also, simple educational signage would offer interactive learning opportunities for people who use the trail.

Figure 4.1: Examples of greenway interpretive signage from NCState (on left) and Greensboro, NC (on right).

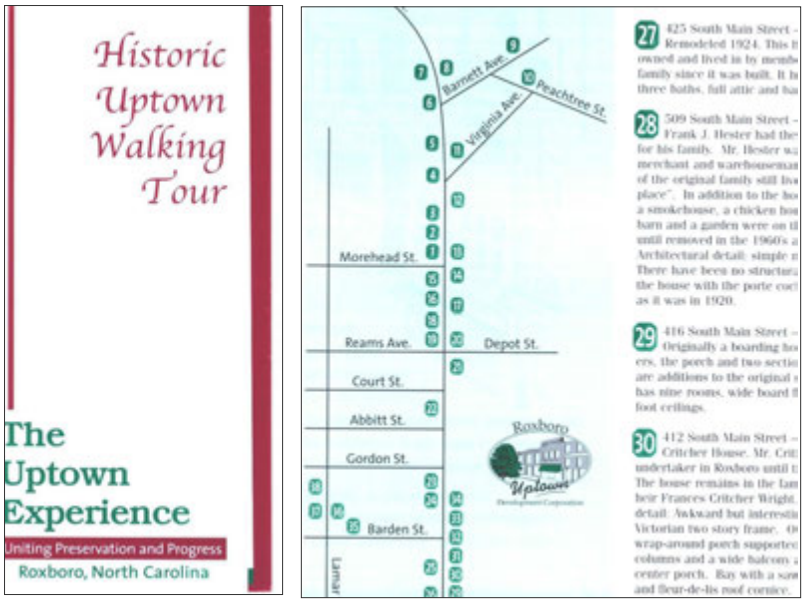


Figure 4.2 Example of Walking Tour brochure from the City of Roxboro, NC. Historic sites and descriptions are mapped for the

Interpretive Trails/ Guided Tours

An educational component to the pedestrian network could be added by developing historical, cultural, and environmental themes for the facilities. This idea can be adapted to create walking tours throughout the City, using signage to identify the events, architecture, and landmarks that make the City of Conover unique. These tours should be simple to navigate and should stand alone as an amenity. However, brochures can be used to supplement signage with more detailed information and a map of the tour. Other ideas to supplement the signage could be organized "talks" or lectures by local experts.

Education Actions

• Actively participate in the development of a local pedestrian advocacy group, starting with members from the Pedestrian Plan Steering Committee.

• Sponsor annual training sessions for pedestrian design/review

• Sponsor a session for law enforcement focusing on pedestrian issues

• Create a self-guided walking tour of downtown and surrounding area's historical/cultural/school/recreational sites

• Establish outdoor classrooms utilizing interpretative signage in open space, parks, greenways, etc.

• Produce and/or obtain a variety of safety materials for distribution to various age groups and at various events/locations

Education Resources

America Walks is a national coalition of local advocacy groups dedicated to promoting walkable communities. Their mission is to foster the development of community-based pedestrian advocacy groups, to educate the public about the benefits of walking, and, when appropriate, to act as a collective voice for walking advocates. They provide a support network for local pedestrian advocacy groups. http://americawalks.org

Safe Communities is a project of the National Highway Traffic Safety Administration (NHTSA). Nine agencies within the U.S. Department of Transportation are working together to promote and implement a safer national transportation system by combining the best injury prevention practices into the Safe Communities approach to serve as a model throughout the nation. http://www.nhtsa.dot.gov/safecommunities

Safe Kids Worldwide is a global network of organizations whose mission is to prevent accidental childhood injury, a leading killer of children 14 and under. More than 450 coalitions in 15 countries bring together health and safety experts, educators, corporations, foundations, governments and volunteers to educate and protect families. Visit their website to receive information about programs, involving media events, device distribution and hands-on educational activities for kids and their families. http://www.usa.safekids.org/

Stepping Out is an online resource for mature adults to learn about ways to be healthy by walking more often, and walking safely. www.nhtsa.dot.gov/people/injury/olddrive/SteppingOut/index.html

Pedestrian Fatalities Related to School Travel is a fact sheet pertaining to school age children (NHTSA).
http://www.nhtsa.dot.gov/people/injury/pedbimot/ped/Getting_to_School/pedestrian.html

Rules of the Road for Grandchildren: Safety Tips is an information website for grandparenting. If you are a grandparent, you can play an important role in teaching your grandchildren the "rules of the road." AARP.
http://www.aarp.org/confacts/grandparents/rulesroad.html

Streets in America are Unsafe and Unforgiving for Kids. Article by the Pedestrian Safety Roadshow. U.S. Department of Transportation. Federal Highway Administration.
http://www.tfhrc.gov/safety/pedbike/articles/unsafe.htm

Focusing on the Child Pedestrian. Pedestrian information related to children from the FHWA.
http://safety.fhwa.dot.gov/roaduser/pdf/PedFacts.pdf

Safekids is a child safety information website. Pedestrian injury remains the third leading cause of unintentional injury-related death among children ages 5 to 14.
http://www.safekids.org/

Eat Smart, Move More is a statewide movement that promotes increased opportunities for healthy eating and physical activity wherever people live, learn, earn, play and pray. http://www.eatsmartmovemorenc.com/

NCDOT Division of Bicycle and Pedestrian Transportation provides significant information related to pedestrian programming. http://www.ncdot.org/transit/bicycle/

Encouragement

School Programs

Many programs exist to aid communities in developing safer pedestrian facilities around schools. Programs can be adopted by parents or the schools to provide initiatives for walking or biking. Information is available to encourage group travel, prevent pedestrian related injuries, and sponsor commuter related events. For example, a 'Walking School Bus' is an encouragement program that provides an alternative way to transport children to school. A parent can be responsible for accompanying a group of children to school by utilizing the pedestrian system in Conover.

Community leaders, parents and schools across the U.S. are using Safe Routes to School programs to encourage and enable more children to safely walk and

bike to school. The National Center for Safe Routes to School aims to assist these communities in developing successful Safe Routes programs and strategies. The Center offers a centralized resource of information on how to start and sustain a Safe Routes to School program, case studies of successful programs as well as many other resources for training and technical assistance. For more information on Safe Routes to School, refer to the 'Encouragement Resources' section below.

Awareness Days/Events

A specific day of the year can be devoted to a theme to raise awareness and celebrate issues relating to that theme. A greenway and its amenities can serve as a venue for events that will put the greenway on display for the community. Major holidays, such as July 4th, and popular local events serve as excellent opportunities to include pedestrian information distribution. The following are examples of other national events that the City of Conover can use to improve usage of pedestrian facilities:

Walk to Work Day/International Car Free Day (September 22)

Designate one day a year for people to walk to work to help advance programs, promote active living, and raise awareness for environmental issues. Walk to Work Day can be at the end of an entire week or month of pedestrian promotional activities, including fitness expos, walking and jogging group activities, running and bicycling races and rides, etc.

"Strive Not to Drive Day"

This event example, from the Town of Black Mountain, is an annual event to celebrate and promote the Town's pedestrian achievements for the year throughout their region. Awards for pedestrian commuters, as well as booths, contests, and other events are organized through their local MPO Bicycle and Pedestrian Task Force and the Land-of-Sky Regional Council. A similar event could be held in Conover, as the Pedestrian Plan is implemented.

National Trails Day

This event is held every year in June. Other events, competitions, races, and tours can be held simultaneously to promote trail use within Conover. The Parks and Recreation-Trails Division sponsors National Trails Day for the City of Greensboro every year and it has become a huge event for the City.

Figure 4.3 National Trails Day in Greensboro, NC is celebrated every year with a trail race/walk, informational booths, and other competitions and prizes.

Earth Day

Earth Day is April 22nd every year and offers an opportunity to focus on helping the environment. Efforts can be made to encourage people to help the environment by walking to destinations and staying out of their vehicles. This provides an excellent opportunity to educate people of all ages in Conover.

Walk to School Day (www.walktoschool.org)
An annual event for schoolchildren, this event encourages walking to school. More information about this day is provided in "Encouragement Resources," later in this section.

Use Facilities to Promote Other Causes
Network facilities, especially trails, could be used for events that promote other causes, such as health awareness. Not only does the event raise money/publicity for a specific cause, but it encourages and promotes healthy living and an active lifestyle, while raising awareness for pedestrian activities. Non-profit organizations such as the American Cancer Society, American Heart Association, and the Red Cross sponsor events such as Breast Cancer Walk, Diabetes Walk, etc.

Pedestrian Activities/Promotion within Local Organizations
The City of Conover has numerous organizations that could be utilized to promote pedestrian activities (e.g. the YMCA, local schools/PTAs, neighborhood groups, homeowners associations, etc). Education, enforcement, and encouragement programs can be advertised and discussed in local organization newsletters, seminars, and meetings. Such organizations could even organize their own group walks, trail clean-ups, and other activities listed in this section.

Art in the Landscape
The inclusion of art along pedestrian corridors and trails would encourage use of facilities and provide a place for artwork and healthy expression to occur. Artwork could be displayed in a variety of ways and through an assortment of materials. Living artwork could be "painted" through the design and planting of various plant materials. Sculpture gardens could be arranged as an outdoor museum. Art through movement and expression could be displayed during certain hours during the day or during seasonal events. An "Art Walk" could be established as an event featuring destinations throughout the City that display local art. Artwork can be provided by local schools, special interest clubs and organizations, or donated in honor or memory of someone.

Walking/Running Clubs
Neighborhoods, local groups, or businesses could promote walking or running clubs for local residents or employees to meet at a designated area and exercise on certain days before or after work, during lunch breaks, or anytime that works for the group. This informal group could be advertised on local bulletin or information boards. These clubs could be specialized to attract different interest groups. Examples include:

- Mother's Morning Club (mom's with strollers)
- Walking Wednesdays (senior groups)
- Lunch Bunch (office workers who run during their lunch hour)

Adopt-A-Trail
Local clubs and organizations provide great volunteer services for maintaining and patrolling trails. This idea could be extended to follow tour routes or specified streets/sidewalks. A sign to recognize the club or organization could be posted as an incentive to sustain high quality volunteer service. The Boy Scouts of America serve as a good model for participation in this type of program.

Revenue Generating Programs
The City of Conover should be proactive in increasing revenue from programs and events that can help fund the building, management, and maintenance of future facilities. Fees could be increased in events annually or biannually to increase revenue. Specific program and event ideas that are being used to generate revenue across the country include:

- Races/triathlons (fees and/or donations)
- Concessions
- Educational walks/Nature walks/Historic walks (fees and/or donations)
- Fund-raisers including dinners/galas
- Moonlight bike rides and walks (fees and/or donations)
- Greenway parade (fees and/or donations)
- Concerts (fees and/or donations)
- Art events along greenway (fees and/or donations)
- Events coincident with other local events such as fairs, festivals, historic/folk events, etc.
- Media events and ribbon-cuttings for new walkways (donations)

Encouragement Actions
- Encourage children to walk to school, safely, through a combination of programs, listed under encouragement resources

- Establish awareness days

- Encourage the establishment of walking clubs

- Use pedestrian facilities, particularly trails, to promote causes and hold special events for causes

- Utilize greenways for artwork and plantings

Encouragement Resources
Safe Routes to School is a national program with $612 million dedicated from Congress from 2005 to 2009. Local Safe Routes to School programs are sustained by parents, community leaders, and citizens to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school. Recently, the state of North Carolina has started the NC Safe Routes to School Program based off of the national program. The state has $15 million over the next 5 years for infrastructure improvements within 2 miles of elementary and middle schools (http://ncdot.org/transit/bicycle/saferoutes/SafeRoutes.html). This funding can also be used towards the development of school related programs to improve safety and walkability initiatives. The state

requires the completion of a competitive application to apply for funding and a workshop at the school to determine what improvements are needed. http://www.saferoutesinfo.org

Figure 4.4 Photo on left is Safe Routes to School workshop (Photo courtesy of Christa Greene;) On right are parked bicycles

National Walk our Children to School Day is usually held in October with the objective to encourage adults to teach children to practice safe pedestrian behavior, to identify safe routes to school, and to remind everyone of the health benefits of walking. To register walking events in Conover, go to the main webpage, and follow the International Walk to School links: www.walktoschool-usa.org

Figure 4.5 Walking to school is an important way to create healthier lifestyles, a sense of community, and a reduction in automobile congestion and pollution.

Walk a Child to School in North Carolina. "Forty years ago, half of all U.S. school children walked to school. Today, according to the Centers for Disease Control, only an estimated 10 percent walk to school. In many communities, as much as 30 percent of morning commuter traffic is generated by parents driving their children to school. These traffic habits and children's lifestyle choices can have serious consequences. Traffic jams around our schools foul the air, waste fuel, and create safety problems for children. In addition, the U.S. Surgeon General recently reported that thirteen percent of children aged 6 to 11 years and 14 percent of adolescents aged 12 to 19 were overweight in 1999. This statistic has nearly tripled in the past two decades for adolescents. A growing number of community groups throughout the nation, such as health professionals, 'Smart Growth' advocates, traffic safety groups, local

PTAs, and elected officials, are promoting walking to school initiatives (1)." In North Carolina, Walk a Child to School Programs have gained a foothold and are growing each year. To date more than 5,000 students in 12 communities in the state have participated. http://www.walktoschool.org

Preventing Pedestrian Crashes: Preschool/Elementary School Children provides information to parents on pedestrian risks for preschool and elementary school children. Information about the Safe and Sober Campaign is available on the NHTSA website. www.nhtsa.dot.gov/people/outreach/safesobr/15qp/web/sbprevent.html

Kidswalk-to-School is a resource guide to help communities develop and implement a year-long walk-to-school initiative; sponsored by the Centers for Disease Control and Prevention.
www.cdc.gov/nccdphp/dnpa/kidswalk/kidswalk_guide.htm

Enforcement

Motorist Enforcement

Based on crash data analysis and observed patterns of behavior, law enforcement can use targeted enforcement to focus on key issues such as motorists speeding, not yielding to pedestrians in crosswalks, parking on sidewalks, etc. According to a 2007 FHWA study (see Appendix H), enforcement of speed limit results in a 70% crash reduction. Sidewalk parking, for example, is often not enforced but should be in order to maintain pedestrian accessibility, avoid maintenance issues, and comply with local ordinances. All of these key issues should be targeted and enforced consistently. The goal is for pedestrians and motorists to recognize and respect each other's rights on the roadway.

As traffic continues to increase on North Carolina's streets and highways, concern has grown over the safety of our children as they walk to and from school. At the same time, health agencies, alarmed at the increase in obesity and inactivity among children, are encouraging parents and communities to get their children walking and biking to school. In response, the Division of Bicycle and Pedestrian Transportation funded a study on pedestrian issues, including school zone safety, and decided to establish a consistent training program for law enforcement officers responsible for school crossing guards. According to the office of the North Carolina Attorney General, school crossing guards may be considered traffic control officers when proper training is provided as specified in GS 20-114.1.

For information on a school zone safety study, visit http://www.ncdot.org/transit/bicycle/safety/research_walkzone.html.

Pedestrian Enforcement

Observations made by local trail and pedestrian facility users can be utilized to identify any conflicts or issues that require attention. To maintain proper use of trail facilities, volunteers could be used to patrol the trails, particularly on the

most popular trails and on days of heavy use. The volunteer patrol can report any suspicious or unlawful activity, as well as answer any questions a trail user may have. The volunteer patrol could be a responsibility of the pedestrian advocacy group. When users of the pedestrian network witness unlawful activities, they should have a simple way of reporting the issue to police. A hot line should be created, which would compliment trail patrol programs. People could call in and talk to a live operator or to leave a voice mail message about the activity they witnessed. Accidents could also be reported to this hot line. Accident locations could then be mapped to prioritize and support necessary facility improvements.

Figure 4.6 Law enforcement and traffic patrol officials can help educate and enforce. On left is bicycle police in Greenville, SC. Photo on right courtesy of Christa Greene.

Enforcement Actions

• Target and enforce all illegal motorist and pedestrian behavior that may jeopardize the success of the Pedestrian Network, especially speed limit enforcement.

• Require all crossing guards to complete an NCDOT Crossing Guard Training Program

• Establish a crossing guard program for peak school hours

• Establish a local "Trail Patrol"

• Establish an enforcement hot line

Enforcement Resources

NCDOT School Crossing Guard Program
http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/crossing.html

NCDOT's A Guide to North Carolina Bicycle and Pedestrian Laws.
http://ncdot.org/transit/bicycle/laws/laws_bikelaws.html and http://www.ncdot.org/transit/bicycle/laws/resources/BikePedLawsGuidebook-Full.pdf
For an online resource guide on laws related to pedestrian and bicycle safety (provided by the National Highway Traffic Safety Administration), visit www.nhtsa.dot.gov/people/injury/pedbimot/bike/resourceguide/index.html

4.2 Policy Recommendations

While the physical recommendations described in this Plan represent an overall pedestrian network, strong pedestrian-oriented policies and regulations are also necessary to ensure these facilities are developed, especially when new development takes place. All recommended policy statements would help the City of Conover achieve its vision of becoming one of the most walkable areas in the region. City planning staff should become familiar with these policies and regulations to ensure the full suite of policy tools are used and enforced. Further tools to initiate pedestrian development are described in Chapter 5 and Appendix E.

This section outlines existing pedestrian-related policies in the City of Conover and recommends additional policy statements for adoption into City regulations. Specifically, this section is divided into specific revisions to the city ordinance, additions to the ordinance, strategic new policy recommendations, and Complete Streets policy.

Policy statements that require pedestrian facilities with development must be somewhat flexible and practical within regulations for physical restrictions (including policy recommendations in this section). All decisions need to be environmentally sensitive. Sidewalk locations and widths may need to be modified on a case-by-case basis. There must be a proven environmental constraint for pedestrian modifications.

Several high priority requirements for pedestrian facilities are listed below. Many recommendations are based on guidelines for sidewalk installation found in the FHWA document "Designing Sidewalks and Trails for Access" (http://www.fhwa.dot.gov/environment/sidewalk2/index.htm). These requirements create a safer and more convenient environment for pedestrian transportation and should be integrated into all policy documents for the City of Conover. They apply to all new roadway construction and roadway reconstruction projects in the downtown, suburban, and rural areas, as appropriate (e.g., areas where new developments are being constructed).

The top priority policies to initiate are described in detail later but listed below in brief:

- *Mandatory dedication of sidewalk for all land uses.*
- *Mandatory pedestrian connectivity of cul-de-sacs.*
- *Fee-in-lieu of dedication option for sidewalk.*
- *Mandatory dedication of greenways.*
- *Greenways considered a part of official, multi-functional City infrastructure.*
- *Traffic calming and driveway access management*

Specific Revisions to the City Ordinance

Chapter 15 Motor Vehicles and Traffic
Article IV. Parking, Standing, and Stopping*
Sec. 15-70. Stop required when emerging from alley, driveway or building.
Recommended addition/revisions in red, brackets, and italics:
"The driver of a vehicle emerging from an alley, driveway or building shall stop such vehicle immediately prior to driving onto a sidewalk or into the sidewalk areas extending across any alleyway and [*shall yield the right-of-way to pedestrians.*] Upon entering the roadway, [*the driver*] shall yield the right-of-way to all vehicles approaching on such roadway."

Chapter 15 Motor Vehicles and Traffic
Article IV. Parking, Standing, and Stopping*
Sec. 37.3. Off-street loading, signs, dimensional requirements and buffer requirements.
Recommended addition/revisions in brackets and italics:
"37.3.6 Sidewalks are to be built along the frontage for any new building or expansion of a building. With respect to design, sidewalks constructed shall conform to the design [*standards set forth in the City of Conover Pedestrian Transportation Plan*]. ~~in the immediate and connecting area, and if there is no connecting area then the nearest area. Construction shall be done in accordance with a commonly accepted engineering practice in the area with respect to design and construction standards~~ The construction plan shall be subject to the approval of the city engineer or public works director and the work shall be inspected for approval by the city engineer or public works director before acceptance by the city."

Chapter 19: Streets and Sidewalks
Article IV. Street Improvement Policy
Sec. 19-45. Petition required.
Recommended addition/revisions in brackets and italics:
"The city council will not consider the paving of any street, not already accepted into the street system, or the construction or reconstruction of a sidewalk unless and until a petition, on form furnished by the city clerk, shall be submitted requesting such improvements signed by the property owners for at least fifty (50) percent of all the linear feet of frontage of the property abutting upon the street…"

"Participation by the city for existing accepted city streets will generally be one-third (1/3) of the total cost including engineering costs. Petitioners will be furnished an estimated cost of the project prior to its undertaking, with assessment by the city being based upon actual cost of the project…" [*Participation by the city will generally be higher for sidewalks that are recommended in Map 3.1 of the City of Conover Pedestrian Transportation Plan.*]

Chapter 19: Streets and Sidewalks
Article V. Sidewalk Improvements
Sec. 19-60. Thoroughfare sidewalks.
Recommended addition/revisions in brackets and italics:
"All development and new construction projects shall construct thoroughfare sidewalks along the thoroughfare roads as **[***recommended in Map 3.1 of the Conover Pedestrian Transportation Plan***]** ~~shown on the city sidewalk plan~~ as adopted by the city council. Sidewalks shall be built to **[***standards set forth by the***]** City of Conover [Pedestrian Transportation Plan], North Carolina Department of Transportation (NCDOT), and the Americans with Disabilities Act (ADA) ~~standards~~."
(Ord. No. 20-01, § 1, 6-4-01)

Chapter 19: Streets and Sidewalks
Article V. Sidewalk Improvements
Sec. 19-63. Neighborhood sidewalk priorities.
Recommended addition/revisions in brackets and italics:
"Within existing residential developments, neighborhood sidewalks as shown on **[***Map 3.1 of the Conover Pedestrian Transportation Plan***]** ~~the city sidewalk plan~~ shall have priority for construction."
(Ord. No. 20-01, § 1, 6-4-01)

Appendix A: Zoning; Division 12. Traditional Neighborhood Development
Sec. 312.6. Streets.
312.6.5Street design:
Recommended addition/revisions in brackets and italics:
"(a) Specifications. Designs should permit comfortable use of the street by motorists, pedestrians, and bicyclists. Pavement widths, design speeds, and the number of motor travel lanes should be minimized to enhance safety for motorists and non-motorists alike. The specific design of any given street must consider the building types which have frontage and the relationship of the street to the overall town street network. The following specifications apply to street design:
1. Street trees and sidewalks are required on both sides of streets for commercial streets [, *mixed-use***]** and ~~one (1) side for~~ residential streets. Planting area for street trees should be a minimum of five (5) feet in width and sidewalks should also be a minimum of five (5) feet in width. On streets which serve as main business streets, sidewalks should be a minimum of seven (7) feet in width. Generally, canopy trees shall be planted at a spacing not to exceed forty (40) feet on center. Where overhead utility lines preclude the use of canopy trees, small maturing trees may **be substituted, planted thirty (30) feet on center."**

Appendix B: Subdivision Ordinance
Article VII. Section 82
Recommended addition/revisions in brackets and italics:
"Pedestrian crosswalks shall be **[***six to ten feet wide in most circumstances and up to fifteen feet in areas of Downtown and schools as described in the Design Guidelines of the Conover Pedestrian Transportation Plan***]** ~~at least fifteen feet wide~~." **[***Curb ramps should be fully contained within the markings***].**

Appendix B: Subdivision Ordinance
Article VIII. Improvements Required and Minimum Design Standards
86.1. Multi-family.
Recommended addition/revisions in brackets and italics:
"Sidewalks are required on both sides of all public and private streets and for pedestrian access to all units in subdivisions developed for multi-family housing and in planned unit developments. Outer boundaries of the subdivision and/or planned unit development bordering on public streets (other than controlled access facilities) shall have sidewalks. When the sidewalk is constructed in the right-of-way of a street controlled (or to be controlled) by NCDOT the sidewalk shall meet at least minimum NCDOT standards of design and construction. If constructed outside the right-of-way of a street controlled (or to be controlled) by NCDOT it shall meet at least minimum NCDOT standards of design and construction to the extent NCDOT standards are applicable, and when such standards are not applicable the design and construction shall be in accordance with **[***standards set forth in the City of Conover Pedestrian Transportation Plan***]** ~~good sidewalk design and construction practices as determined by the city~~. Sidewalks shall be concrete **[***and a minimum of five feet (5') in width. Sidewalk connectivity shall be provided through cul-de-sacs.***]**"

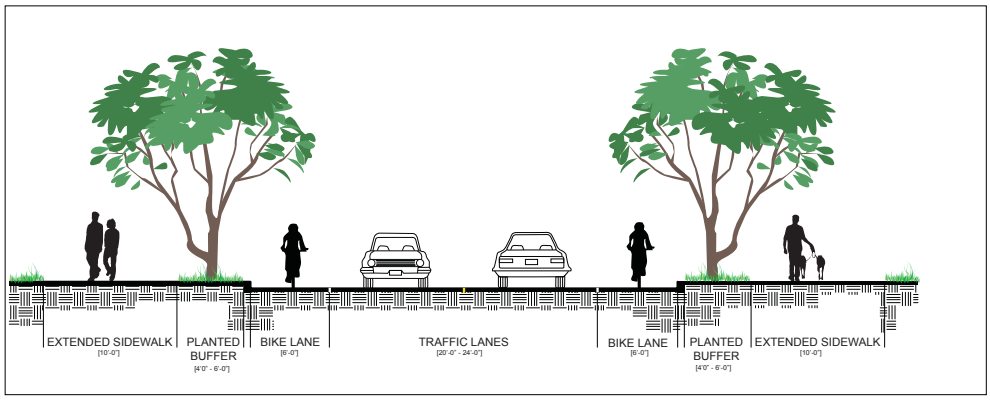


Figure 4.7 Cross section for a complete street, providing facilities for bicyclists and pedestrians with wide sidewalks and planted buffers. See Chapter 6 - Design Guidelines for guidance in determining facility characteristics per each land use and roadway. It is preferred to have sidewalks on both sides of the road in all land uses with a buffer between the sidewalk and roadway.

Appendix B: Subdivision Ordinance
Article VIII. Improvements Required and Minimum Design Standards
86.2. Single-family.
Recommended addition/revisions in brackets and italics:
In single-family subdivisions [*with a density of 4 d.u./acre or greater, sidewalks are required on both sides of all public streets. In single-family subdivisions with a density of less than 4 d.u./acre,*] sidewalks are required on one (1) side of all public streets. Outer boundaries of the subdivision bordering on public streets (other than controlled access facilities) shall have sidewalks. When the sidewalk is constructed in the right-of-way of a street controlled (or to be controlled) by NCDOT the sidewalk shall meet at least minimum NCDOT standards of design and construction. If constructed outside the right of way of a street controlled (or to be controlled) by NCDOT it shall meet at least minimum NCDOT standards of design and construction to the extent NCDOT standards are applicable, and when such standards are not applicable the design and construction shall be in accordance with [*standards set forth in the City of Conover Pedestrian Transportation Plan*] ~~good sidewalk design and construction practices as determined by the city.~~ [*When only one side of the street is required to have sidewalks,*] the side of the street within the subdivision upon which the sidewalk is to be constructed shall: provide for maximum continuous flow of pedestrian traffic, minimize street crossings, be connected so as to create a continuous flow without doubling back, can be connected to existing streets in the area, and fit into the sidewalk plan for the area to the extent possible. The city shall make the final determination on which side of the street the sidewalk will be constructed, taking into account the herein mentioned standards and good practices of subdivision sidewalk design. Sidewalks shall be concrete [*and a minimum of five feet (5') in width. Sidewalk connectivity shall be provided through cul-de-sacs*]." (Ord. No. 28-00, § 1, 9-5-00)

Figure 4.8 Connectivity between cul-de-sacs is displayed in this graphic.

Additions to City Ordinance

Subdivision Regulations are a key element to ensuring pedestrian-friendly communities and connectivity to the overall pedestrian network. Several methods of sidewalk and greenway acquisition and development are also described in Appendix E-Acquisition, with a focus on specific items that are commonplace to subdivision regulations.

Dedication and Maintenance of Open Space and Greenways
In any case in which a greenway or sidewalk is indicated on an adopted plan of the City of Conover as being located on lands proposed for development, such greenway or sidewalk should be dedicated and developed. These developed lands for open space, greenways, and sidewalks would be dedicated to the City as park land to form a connected pedestrian network. Local communities across North Carolina have included similar requirements in development ordinances related lot design and/or public place reservation. This can come in the form of a simple mandatory dedication (development of greenway, park, or sidewalk), a fee-in-lieu of a mandatory dedication (see below), or an impact fee (another form of fee required

that developers can pay on a unit-by-unit basis). If dedication does not occur, fees are an excellent means for the City of Conover to pool monies for sidewalk and greenway development. These three methods are described in more detail in Appendix E.

Examples of ordinance text for greenway dedication are provided below:

Town of Chapel Hill, NC
(http://www.municode.com/resources/gateway.asp?pid=19952&sid=33)

"For sites that abut or include areas designated as future greenways on the town's comprehensive plan, the town council may require that a dedicated public pedestrian and non-motorized vehicle easement along all such areas be the recreation space provided under this ordinance."

City of Raleigh, NC
(http://www.municode.com/resources/gateway.asp?pid=10312&sid=33)

"Sec. 10-3022. GREENWAY DEDICATION AND REIMBURSEMENT.
(a) Required greenway dedication.
Subject to the limitations of subsection (c) below, whenever a tract of land included within any proposed residential subdivision or residential site plan embraces any part of a greenway, so designated on the current City Comprehensive Plan after such plan or part of it has been adopted by the proper authority, such part of such proposed greenway shall be platted and dedicated as a greenway easement. "

City of Winston-Salem, NC
(http://www.municode.com/resources/gateway.asp?pid=84486&sid=33)

"(e) Where a proposed greenway, park, playground, school or other public use as shown on plans of the jurisdiction is located within a preliminary subdivision plat, the Planning Board may require reservation of such area or dedication of an easement for such use of an area within the subdivision in those cases in which the jurisdiction deems this requirement to be reasonable and acceptable for public use."

City of Cary, NC
(http://www.municode.com/resources/gateway.asp?pid=13841&sid=33)

8.1.2 Dedication Land for Parks and Greenways
(A) General Provisions
The subdivider of land for residential or non-residential purposes shall be required to dedicate a portion of land or pay a fee in lieu thereof, for public park and/or greenway development, to serve the recreational needs of the residents of the subdivision or development. The dedication of land shall consist of two categories:

parks and greenways.

(2) Greenway Dedication
Lands granted for public greenway development will be required for both residential and non-residential development for those locations recommended in the most recently approved Town of Cary's Parks, Recreation and Cultural Resources Department master plan for park and greenway development (or any proceeding plan addendum's).

Fee-in-Lieu for Sidewalk Dedication
An amendment should be made to Chapter 19 of the City Ordinance (Streets and Sidewalks, Article V) that allow commercial developers the option of building a sidewalk or paying a fee-in-lieu of the mandatory dedication of sidewalks. The amount of the fee should be 80-90% of the sidewalk cost that would have otherwise been constructed. Such fees should be collected into an account specifically dedicated to the construction of priority sidewalk improvements as identified in the City of Conover Pedestrian Transportation Plan. Option of the fee-in-lieu should be determined by City Council, and should only be granted when the dedicated portion of sidewalk would not likely connect to the overall pedestrian network in the near future.

Strategic Policy Recommendations

More recommended policy statements and paragraphs by category are provided below that facilitate specific changes. These recommendations are presented here to further guide policy decisions and revisions to future local ordinances and regulations to achieve a more pedestrian-friendly environment. These policy categories and recommendations should become integral components of future planning, ordinance, and development efforts. The categories include pedestrian network and connectivity, safety, aesthetics, land use and development, and greenways.

Pedestrian Network and Connectivity
Goal: Create and maintain a pedestrian route network that provides direct connections between downtown, trip attractors, schools, and residential/commercial areas.
• To the maximum extent possible, make walkways accessible to people with physical disabilities.
• Develop a system of informational and directional signage for pedestrian facilities and greenways.
• All roads surrounding schools should have sidewalks on both sides of the road with safe crosswalks.
• Pedestrian access should be provided through cul-de-sacs and large parking lots, which are typical obstacles to pedestrian connectivity.

• Pedestrians and bicyclists should be accommodated on roadway bridges, underpasses, and interchanges and on any other roadways that are impacted by a bridge, underpass, or interchange project (except on roadways where they are prohibited by law). All new bridges should be constructed with bicycle lanes and wide sidewalks.
• Sidewalks and greenways should be developed in order of priority where possible as listed in Appendix B - Prioritization. These segments facilitate immediate improvements and connections to major trip attractors within the City of Conover.

Safety
Goal: Strive to maintain a complete, safe sidewalk network free of broken or missing sidewalks, curb cuts, or curb ramps and that include safety features such as traffic calming, lighting, and sidewalk repairs.

• Raised medians or pedestrian refuge islands should be provided, where practical, at crosswalks on streets with more than three lanes, especially on streets with high volumes of traffic. They should be six- to ten-feet wide.
• Identify pedestrian facilities that are not ADA-compliant including missing, damaged, or non-compliant curb ramps, stairs, or sidewalk segments of inadequate width and create a plan for improving them.
• Develop a traffic calming program to slow traffic through downtown and on major corridors, making them aware that they share the corridors with pedestrians.
• Make pedestrian crossings a priority and initiate improvements recommended in Chapter 3. Consider variations in pavement texture and clear delineation of crosswalks. Also, ensure that crosswalks are properly lit at night.
• Implement pedestrian-scale lighting at regular intervals in areas of high pedestrian activity to promote pedestrian safety and discourage criminal activity.
• Develop and expand the City's maintenance program of sidewalk repairs, debris removal, and trimming of encroaching vegetation.
• The buffer space between the sidewalk and the curb and gutter should be maximized within the available right-of-way. 4' is suggested as a minimum on major thoroughfares, but could be decreased in areas with slower and lower volume automobile traffic. Larger buffers are preferred for street tree health and pedestrian comfort. Suggested width is flexible related to environmental constraint.
• Improve existing public transit stops and ensure future stops provide adequate pedestrian accommodations including sidewalk connectivity, benches, shelters, trash bins, and proper lighting.

Aesthetics
Goal: Encourage the inclusion of art, historic, and nature elements along with street furniture, landscaping, and lighting in pedestrian improvement projects.

• Develop street design guidelines to incorporate recommendations of this plan (See Chapter 6 - Design Guidelines)

• Require street trees and planting buffers between the sidewalk and the street along all new roadways and sidewalk construction. Keep all vegetation trimmed.
• Encourage and/or require private owners (of residences and businesses) to keep their area in and around the sidewalk free of debris and litter.

Land Use and Development
Goal: Promote land uses and site designs that make walking convenient, safe, and enjoyable.

• Develop driveway access management policy limiting number and size of driveway entrances, creating fewer conflict zones for pedestrians on sidewalks.
• Use building and zoning codes to encourage a mix of uses, connect entrances and exits to sidewalks, and eliminate "blank walls" to promote street level activity.
• Sidewalks should have a minimum width of five feet but should be wider where pedestrian traffic is higher, including near schools, senior centers, and commercial areas or where sidewalks connect or overlap with recommended on-road greenway connections.
• Applicable buildings should be required to build to the sidewalk. Also, parking lots should be prohibited in front of buildings where possible to develop pedestrian oriented areas.
• Promote parking and development policies that encourage multiple destinations within an area to be connected by pedestrian trips. Specifically, promote the connectivity of parking lots between businesses for increased safety and avoidance of roadway traffic.
• Parked vehicles shall not block pedestrian walkways.
• Require benches, shelters, sheltered transit stops, trees, and other features to facilitate the convenience and comfort of pedestrians.

Greenways
• 'Greenways' should be defined as part of the City of Conover's public infrastructure. Greenways are public infrastructure that provide important functions to not only offer transportation alternatives, but to protect public health safety and welfare. Within flood prone landscapes, greenways offer the highest and best use of floodplain land, mitigate the impacts from frequent flooding and offer public utility agencies access to floodplains for inspection, monitoring and management. Greenways filter pollutants from stormwater and provide an essential habitat for native vegetation that serves to cleanse water of sediment. Greenway trails provide viable routes of travel for cyclists and pedestrians and serve as alternative transportation corridors for urban and suburban commuters. Greenways serve the health and wellness needs of our community, providing close-to-home and close-to-work access to quality outdoor environments where residents can participate in doctor prescribed or self-initiated health and wellness programs. All of these functions make greenways a vital part of community infrastructure.

• Encourage utility corridor development practices that allow for maximum compatibility with pedestrian and bikeway corridors. Land and easements purchased for the purpose of providing utilities (such as water and sewer) can serve a greater community benefit if developed to accommodate a multi-use trail.

• Subdividers are required to provide natural buffers along both sides of all perennial streams. Public greenway trails with limited disturbance along perennial and intermittent streams are excellent uses for these spaces and should be dedicated during the subdivision process.

Supporting Policies within the City Ordinance

The following policies are listed here for reference only; no changes are recommended.

Chapter 15 Motor Vehicles and Traffic
Article IV. Parking, Standing, and Stopping*
Sec. 15-66. Prohibited in specified places.
"No person shall stop, stand or park a vehicle, except when necessary to avoid a conflict with other traffic or in compliance with the directions of a police officer or traffic-control device, in any of the following places:
1. On the sidewalks."

Chapter 19: Streets and Sidewalks
Article V. Sidewalk Improvements
Sec. 19-61. New residential development.
"All new residential development is required to build sidewalks as provided by Appendix B, "Subdivisions," Section 86, "Sidewalks.""
(Ord. No. 20-01, § 1, 6-4-01)

Chapter 19: Streets and Sidewalks
Article V. Sidewalk Improvements
Sec. 19-62. Alternative improvements.
"In such cases as a sidewalk is impractical to be constructed due to topographic, wetland, infrastructure or other instances, alternative improvements may be acceptable. These alternatives include bikeways, street markings, and greenways as examples, but are not limited to these improvements. Alternative improvements shall be approved by city council and be in accordance with good engineering and design standards."
(Ord. No. 20-01, § 1, 6-4-01)

Appendix B: Subdivision Ordinance
Article VII. Section 70-72 Sketch Plan, Preliminary, and Final Plat.
Sketch plans must show proposed street, sidewalk, and lot layout.
"Preliminary Plans must show any proposed riding trails, natural buffers,

pedestrian, bicycle, or other rights-of-way, utility or other easements, their location, width, and purposes. All proposed streets and sidewalks must be shown including those of properties adjoining the subdivision."

Appendix B: Subdivision Ordinance
Article VIII. Improvements Required and Minimum Design Standards
86. Sidewalks.
"All subdivisions must provide pedestrian access and convenience."

Complete Streets Policy

This section provides information, guidance, and sample policies for Complete Streets, a movement that is growing nationally towards integrating bicycling, walking, and transit as a routine element of highway and transit projects. The City of Conover should examine these policies when updating its own local street policies.

Complete Streets and the "Safe and Complete Streets Act of 2008"
'Complete streets' are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street. Complete streets policies require transportation planners to take the needs of all users into account in all upcoming transportation projects so the road network can be gradually improved for everyone.

The "Safe and Complete Streets Act of 2008" was introduced into the U.S. House of Representatives in May 2008, along with the Senate version of the bill, S2686 (As of the adoption of this Plan, these bills are pending). This legislation would ensure that future transportation investments made by state Departments of Transportation and Metropolitan Planning Organizations create appropriate and safe transportation facilities for all those using the road – motorists, transit vehicles and riders, bicyclists, and pedestrians of all ages and abilities. More than 50 jurisdictions spanning all regions of the country have adopted complete streets policies that direct transportation planners to consider the needs of all users when transportation investment decisions are made (including the State of South Carolina and the City of Charlotte, North Carolina). The City of Conover should develop and pursue a local complete street policy, regardless of whether or not the Safe and Complete Streets Act of 2008 passes at the Federal level. Below are elements of a 'good' complete streets policy, according to http://completestreets.org :

- Specifies that 'all users' includes pedestrians, bicyclists, transit vehicles and users, and motorists, of all ages and abilities.

- Aims to create a comprehensive, integrated, connected network.
- Recognizes the need for flexibility: that all streets are different and user needs will be balanced.
- Is adoptable by all agencies to cover all roads.
- Applies to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire right of way.
- Makes any exceptions specific and sets a clear procedure that requires high-level approval of exceptions.
- Directs the use of the latest and best design standards.
- Directs that complete streets solutions fit in with context of the community.
- Establishes performance standards with measurable outcomes.

An effective complete streets policy should prompt transportation agencies to:

- Restructure their procedures to accommodate all users on every project.
- Re-write their design manuals to encompass the safety of all users.
- Re-train planners and engineers in balancing the needs of diverse users.
- Create new data collection procedures to track how well the streets are serving all users.

Examples of Complete Streets Policies

- Seattle's Complete Streets Policy (2007)
http://clerk.ci.seattle.wa.us/~scripts/nph-brs.exe?d=CBOR&s1=115861.cbn.&Sect6=HITOFF&l=20&p=1&u=/~public/cbor2.htm&r=1&f=G

- Charlotte's Complete Streets Policy Summary (2007)
http://www.charmeck.org/Departments/Transportation/Urban+Street+Design+Guidelines.html

Other Information

- NCDOT's Traditional Neighborhood Development Street Design Guidelines (http://www.ncdot.org/doh/preconstruct/altern/value/manuals/tnd.pdf)
These guidelines are available for proposed TND developments and permits 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.

Footnotes

1 NCDOT Division of Bicycle and Pedestrian Transportation. "Walk a Child to School Initiative." http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/walk2school_intro.html

5. Implementation

5.0 Overview

Successful implementation requires the dedication of City staff and the continued support of Steering Committee members and local advocates. This chapter will serve as a simple guide with key action steps, top priority projects, staffing recommendations, an evaluation and monitoring process, methods of pedestrian facility development and greenway acquisition.

5.1 Action Steps

These following steps are integral to achieving the goals and vision of this Plan. As guiding recommendations and the clearest representation of specific items to accomplish, they should be referred to often. With the exception of the first step, there is no particular order in which these should be addressed.

1. Adopt this Plan.
Through adoption, the Plan becomes a legitimate planning document of the City. Adoption shows that the City of Conover has undergone a successful, supported planning process. The City can then use this document to receive funding through NCDOT and other resources. The City Council and Planning staff should become knowledgeable of this Plan and support ordinance amendments and policy recommendations.

This document should also be accepted and integrated into the Comprehensive Transportation Plan for the Greater Hickory Metropolitan Planning Organization. The development of this Plan is scheduled to begin in the Fall of 2008. This Plan should also be integrated into the Conover Land Development Plan Update.

2. Begin Top Priority Projects.
The prioritization of pedestrian facility development provides a list of the most important projects to improve connectivity and safety. The prioritization matrix, found in Appendix B, lists the improvements in order of importance. Top priority projects are pulled from this matrix and described in the next section. Steering Committee input, public input, and criteria such as sidewalk gap closure and proximity to schools and other trip attractors were used to develop this list. Immediate attention to the high priorities will instantly have a large impact on pedestrian conditions in Conover. These high priority projects should be supported by local funding and part of the local Capital Improvement Program (CIP).

3. Create Pedestrian-Friendly Landscape with Broyhill Development
A new mixed-use infill development project in the Downtown area, this project creates a tremendous opportunity to integrate public greenspace and pedestrian connectivity within and away from the site. This site also presents opportunity along the railroad for a multi-modal transportation site, including a regional rail stop. The development of this site, if done correctly, can provide an enormous economic impact. It would become a destination and a means of ushering pedestrians into the Downtown. Pedestrian-scale buildings, lighting, and passive space could create a unique, highly-visited space for pedestrians. The City should work closely with the developer to ensure high quality design.

Figure 5.1: Broyhill Development presents a tremendous economic opportunity for the City of Conover. Pedestrian design and connectivity within and away from the area should be a high priority for the City.

4. Improve and Enforce City Regulations.
To ensure future development provides pedestrian facilities and improves pedestrian friendliness, regulations should be updated and enforced. These policy recommendations are provided in more detail in Chapter 4. It should be the goal of the Planning Department to update land use and subdivision regulations as soon as possible and to enforce these.

Top Priority Policies:
- *Mandatory dedication of sidewalk for all land uses.*
- *Mandatory pedestrian connectivity of cul-de-sacs.*
- *Fee-in-lieu of dedication option for sidewalk.*
- *Mandatory dedication of greenways.*
- *Greenways considered a part of official, multi-functional City infrastructure.*
- *Traffic calming and driveway access management*

5. Create a Bicycle/Pedestrian/Greenway Commission
The City of Conover would benefit from having an active Commission advocating for pedestrian and bicycle improvements throughout the City. Many communities across the State have commissions for this purpose. This Commission would take on the role of on-road bicycle and pedestrian planning to provide a network of off-road and on-road facilities that connects people to places. This board should help coordinate and oversee the implementation of this Plan, develop programs, continue to listen to community needs, promote the pedestrian network, and keep positive momentum going.

This Commission can also help monitor the progress of the City and NCDOT as they develop new facilities and programs. This group also can push for additional improvements to build upon the recommendations of this plan. Coordination with NCDOT, specifically the Division of Bicycle and Pedestrian Transportation, the Transportation Planning Branch, and the Division 12 office will prove critical if this plan is to be implemented successfully.

6. Take What You Can Get.
While it is ideal to develop pedestrian facilities in order of priority, it is wise to also create facilities when opportunity arises. Some of the most cost-effective opportunities to provide pedestrian facilities are during routine roadway construction, reconstruction, and repaving projects. A new commercial development or a roadway widening project, for instance, would provide the means to build sidewalks or trails as a component of an existing effort, saving costs.

7. Seek multiple funding sources and facility development options.
Multiple approaches should be taken to support pedestrian facility development and programming. Based on comment form results, significant amounts of residents support the use of state and federal grants (68%), existing local taxes (61%), and a capital improvements bond (46%) for pedestrian improvements. It is important to secure the funding necessary to undertake the short-term, top priority projects but also to develop a long term funding strategy to allow continued development of the overall system. Capital and Powell Bill funds for sidewalk, crosswalk, and greenway construction should be set aside for each year. A variety of local, state, and federal options and sources exist and should be pursued. These funding options are described in Appendix D along with additional guidance for seeking funds. Other methods of pedestrian facility development and greenway acquisition that are efficient and cost-effective are described later in this chapter.

8. Develop pedestrian programming.
The City should implement at least one program within the first year of this Plan's adoption. Programming such as Safe Routes to School and others described in Chapter 4 can help educate and encourage users. The highest priority program is Safe Routes to School which offers a number of school workshop and planning

opportunities and construction funding for improvements around schools. Public events and media involvement should also be considered when announcing new walkways and upcoming projects. Enforcement strategies such as speed limit enforcement and proper pedestrian behavior enforcement should be considered in high pedestrian areas.

Top Priority Programs:
- **Safe Routes to School. Work with surrounding municipalities and apply for grants**
- **Conover/Downtown Walking Map.**
- **Recognize Walk to Work Day with events**
- **Enforce and educate proper pedestrian and motorist behaviors Downtown**

9. Ensure planning efforts are integrated regionally.
Regional efforts such as those described in Chapter 3, Section 3.5 (Regional Connectivity) are opportunities for the City of Conover. Combining resources and efforts with surrounding municipalities, regional entities, and stakeholders is mutually beneficial. Regional, long-distance trails often spark the most excitement, use, and tourism. The City should remain coordinated with the Western Piedmont Council of Governments (WPCOG) on regional trail initiatives. It is important to stay aware and communicative with other municipality, county, state, and NCDOT efforts to ensure the City takes advantage of funding opportunities and support.

10. Take maintenance steps.
Sidewalks should be evaluated and fully described in terms of condition in a database. Information such as sidewalk width, condition, date built, curb cuts, and public transit stops should be documented for the existing system and updated when new sidewalk is developed. This will allow for more effective and pro-active maintenance of existing facilities. In order to conduct more timely and effective sidewalk updates, this database will assist in identifying facilities in need of improvement. Currently, the City of Conover Public Works Department handles sidewalk repair and maintenance. According to this Plan's comment form, 50% of respondents noted deficient sidewalks as a legitimate discourager of walking.

11. Work with NCDOT Division 12
The City of Conover should remain in constant communication with Division 12 and build a working relationship. Cooperation can help fund such items as crosswalks. The Division receives enhancement funding which may be available for the City of Conover. The Conover Planning Department should stay aware of all the latest pedestrian policy and design guideline modifications to ensure the highest quality pedestrian treatments are installed during NCDOT and City projects. The City can also work with the MPO and NCDOT to apply for TIP funding for top priority pedestrian improvements.

12. Apply for an NCDOT Bicycle Planning Grant.
The City of Conover should pursue another grant for bicycle planning. During public input efforts, it was clear that there is also a desire for improved bicycle friendliness. With increasing gas prices, both walking and bicycling are becoming more valid and important transportation means.

13. Integrate pedestrian facility design guidelines
Design guidelines, provided in Chapter 6, should be incorporated into overall engineering and street design guidelines and standards. This will ensure that future roadways be developed incorporating pedestrian-friendly facilities.

5.2 Top Priority Projects

Corridor	From	To
US 70/1st St East	Thornburg	1st Ave South
NC 16/1st Ave North	Thornburg	8th St NE
1st Ave South	1st St West	Boundary
Thornburg	NC 16	US 70
US 70/Conover Blvd W	1st St East	1st Ave South
7th St Pl SW	1st Ave South	US 70/Conover Blvd West
Emmanuel Church/1st St SE	Fox	McLin Creek
County Home	Northern	10th
1st St West	Punch Loop/10th St	1st Ave South
1st Ave N/NC 16	County Home	1st St West
1st Ave North	8th St	1st St East

As generated, listed, and mapped (Map B.1) in the Appendix B Prioritization Matrix, the top pedestrian projects in Conover are ones that create significant and immediate improvements to connectivity and safety. These are projects that should occur in the short-term (0-5 year period) to have an immediate, positive impact. These projects should be incorporated into the City's Capital Improvement Program (CIP) and/or State Transportation Improvement Program (TIP). In order to make the State TIP list or the Priority Needs List, the City of Conover will have to work directly to submit needs through the Greater Hickory Metropolitan Planning Organization.

As described in Chapter 3, there are three pedestrian facility types recommended: sidewalks, greenways, and crossing improvements. Sidewalk corridors are prioritized in matrix format in Appendix B. Some prioritized sidewalk segments contain existing sidewalk. In all sidewalk corridor segments, a comprehensive approach to pedestrian improvements should be taken including sidewalk maintenance, crosswalk enahancements, and traffic calming measures. The high priority greenway is the middle section of the Lyle Creek Greenway (Chapter 3, page 3-16) because of its important connections and feasibility due to existing stretches of dedicated land. Crossing improvement recommendations are provided in Section 3.4, all of which are high priority.

Cost estimates for priority sidewalks and greenway corridors are provided in Appendix C. Per unit costs for intersection improvements are also provided.

5.3 Staffing

The proper staffing for implementation, operation, and maintenance tasks described above should be coordinated and shared by several departments. In addition, City Council and Planning Board members should strive to become familiar with the goals and recommendations of this Plan.

Planning and Economic Development Department
First and foremost is the need for the City to create a Pedestrian Coordinator task list to deliver to a current City planner with the capacity to task of implementing this Plan. The Coordinator would lead the effort to apply for funding, oversee planning, design, and construction of pedestrian facilities. The Coordinator would lead and assign tasks such as coordinating programming, leading public outreach, staff training on pedestrian issues, monitoring the use of and demand for pedestrian facilities, reporting to the planning department, and proposing future alternative routes. The coordinator would also ensure coordination with surrounding municipalities and with regional trail connections.

The planning and development department would have other important roles. These include being responsible for initiating the Bicycle/Pedestrian/Greenway Commission. It also includes site plan review to ensure pedestrian-friendliness, particularly in large residential and commercial development. Also, pedestrian-related GIS and mapping should be maintained, consolidated, and updated by GIS staff as new greenways and sidewalks are constructed. It is recommended that coordination occur between departments to construct a single, maintained pedestrian GIS layer (sidewalk and greenways) for the City with informative attributes that include sidewalk width, length, material, current condition, etc.

Because there is no Parks and Recreation Department, the Planning Department would be responsible for carrying out greenway recommendations for this Plan, applying for funding, and overseeing all park and greenway facilities. This includes updating and publishing new maps, creating and updating GIS layers of all greenway facilities, proposing future alternative routes, and working with adjacent communities/counties to coordinate linkages to other greenways. Within current parks, future parks, and recreation centers sho**uld be education and encouragement program opportunities.**

Public Works Department
The Public Works Director participates in the construction and maintenance of all trail and pedestrian facilities. The Public Works section devoted to Streets should also be devoted to future recommendations for the pedestrian networks, discussed earlier in this plan. Public Works would handle facility development and construction (including posting pedestrian signs) among other responsibilities

including upgrades of public transit stops. The Public Works Department should also assist the Planning Department in updating the GIS sidewalk database in terms of new sidewalk and current sidewalk condition.

North Carolina Department of Transportation
NCDOT Division Twelve maintains some pedestrian facilities within the roadway rights-of-way that are owned by the State. This includes crosswalks, signage, and pedestrian signals. The City of Conover is responsible for the maintenance of ALL sidewalks through the City.

The City can utilize annual Powell Bill allocations toward repair and construction of sidewalks (See Appendix D).

Police Department
The Conover Police Department plays a vital role in pedestrian safety and works very hard to assist the schools during peak school traffic hours and in policing City streets, parks and greenways. All local police officers should be educated about North Carolina's pedestrian laws to promote positive interactions between pedestrians and motorists. The Guide to North Carolina Bicycle and Pedestrian Laws (described in Chapter 4, page 4-11), written by the NCDOT Division of Bicycle and Pedestrian Transportation, should be distributed to local law enforcement. Programs such as the Safe Routes to School grants, offer the opportunity for the Police Department to partner with other City Departments to improve pedestrian safety.

Volunteers
Services from volunteers, student labor, and seniors, or donations of material and equipment may be provided in-kind, to offset construction and maintenance costs. Formalized maintenance agreements, such as adopt-a-trail/greenway or adopt-a-highway can be used to provide a regulated service agreement with volunteers. Other efforts and projects can be coordinated as needed with senior class projects, scout projects, interested organizations, clubs or a neighborhood's community service to provide for the basic needs of the proposed networks. Advantages of utilizing volunteers include reduced or donated planning and construction costs, community pride and personal connections to the City's greenway and pedestrian networks.

5.4 Performance Measures (Evaluaton & Monitoring)

The City of Conover should establish performance measures to benchmark progress towards achieving the goals of this Plan. These performance measures can be stated in an official report within one to three years after the Plan is adopted. Baseline data should be collected as soon as the performance measures are established. The performance measures address the following aspects of pedestrian transportation

and recreation in Conover:

- Safety. Measures of pedestrian crashes or injuries.
- Usage. Measures of how many people walking on on-road and off-road facilities.
- Facilities. Measures of how many pedestrian facilities are available and the quality of these facilities.
- Education/Enforcement. Measures of the number of people educated or number of people ticketed as a part of a pedestrian safety campaign.
- Institutionalization. Measures of the total budget spent on pedestrian and greenway projects and programs or the number of municipal employees receiving pedestrian facility design training.

When establishing performance measures, the City should consider utilizing data that can be collected cost-effectively and be reported at regular intervals, such as in a performance measures report that is published every two to three years. As the process of collecting and reporting pedestrian and greenway data is repeated over time, it will become more efficient. The data will be useful for identifying trends in non-motorized transportation usage and conditions.

Land use, transportation, development, and the overall landscape will continue to change as Conover grows resulting in a dynamic area. Also new opportunities or input from an on-going monitoring and evaluation process may emerge, leading to the need to adapt and update the recommendations of this Plan.

5.5 Pedestrian Facility Development

This section describes different construction methods for the proposed pedestrian facilities outlined in Chapter 3 of this Plan.

Note that many types of transportation facility construction and maintenance projects can be used to create new pedestrian facilities. It is much more cost-effective to provide pedestrian facilities during roadway and transit construction and re-construction projects than to initiate the improvements later as "retrofit" projects.

To take advantage of upcoming opportunities and to incorporate pedestrian facilities into routine transportation and utility projects, the assigned "Pedestrian Coordinator" should keep track of the City's projects and any other local and NCDOT transportation improvements. While doing this, he/she should be aware of the different procedures for state and local roads and interstates. More detail on facility design and treatment can be found in Chapter 6.

NCDOT Transportation Improvement Program (TIP) Process

The Transportation Improvement Program (TIP) is an ongoing program at NCDOT which includes a process asking localities to present their transportation needs to state government. Pedestrian facility and safety needs are an important part of this process. Every other year, a series of TIP meetings are scheduled around the state. Following the conclusion of these meetings, all requests are evaluated. Pedestrian improvement requests, which meet project selection criteria, are then scheduled into a four-year program as part of the state's long-term transportation program.

There are two types of projects in the TIP: incidental and independent. Incidental projects are those that can be incorporated into a scheduled roadway improvement project. Independent are those that can standalone such as a greenway, not related to a particular roadway.

The City of Conover, guided by the Pedestrian Coordinator (as recommended in the prior Staffing section), should strongly consider important pedestrian projects along State roads to present to the Greater Hickory Metropolitan Planning Organization and State. Local requests for small pedestrian projects, such as sidewalk links, can be directed to the MPO or relevant NCDOT Highway Division office. Further information, including the criteria evaluated can be found at: http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html

Local Roadway Construction and Reconstruction

Pedestrians should be accommodated any time a new road is constructed or an existing road is reconstructed. All new roads with moderate to heavy motor vehicle traffic should have sidewalks and safe intersections. The City of Conover should take advantage of any upcoming construction projects, including roadway projects outlined in local comprehensive and transportation plans. Also, case law surrounding the ADA has found that roadway resurfacing constitutes an alteration, which requires the addition of curb ramps at intersections where they do not exist.

Residential and Commercial Development

As detailed in Chapter 4, the construction of sidewalks and safe crosswalks should be required during development. Construction begins on a blank slate and the development of pedestrian facilities that corresponds with site construction is more cost-effective than retro-fitting. In commercial development, emphasis should also be focused on safe pedestrian access into, within, and through large parking lots. This ensures the future growth of the pedestrian network and the development of safe communities.

Retrofit Roadways with New Pedestrian Facilities

There may be critical locations in the proposed Pedestrian Network that have pedestrian safety issues or are essential links to destinations. In these locations, it

may be justified to add new pedestrian facilities before a roadway is scheduled to be reconstructed or utility/sewer work is scheduled.

In some places, it may be relatively easy to add sidewalk segments to fill gaps, but other segments may require removing trees, relocating landscaping or fences, regrading ditches or cut and fill sections.

Bridge Construction or Replacement
Provisions should always be made to include a walking facility as a part of vehicular bridges, underpasses, or tunnels, especially if the facility is part of the Pedestrian Network. All new or replacement bridges should accommodate pedestrians with wide sidewalks on both sides of the bridge (example NC 16 bridge over I-40 and all I-40 bridges when replacement occurs). Even though bridge replacements do not occur regularly, it is important to consider these in longer-term pedestrian planning. NCDOT bridge policy states that sidewalks shall be included on new NCDOT road bridges with curb and gutter approach roadways. A determination of providing sidewalks on one or both sides is made during the planning process. Sidewalks across a new bridge shall be a minimum of five to six feet wide with a minimum handrail height of 42″.

Signage and Wayfinding Projects
Signage along specific routes or throughout an entire community can be updated to make it easier for people to find destinations. Pedestrian route and greenway signs are one example of these wayfinding signs, and they can be installed along routes independently of other signage projects or as a part of a more comprehensive wayfinding improvement project.

Existing City Easements
The City of Conover may have existing utility easements throughout City offering an opportunity for greenway facilities. Sewer easements are very commonly used for this purpose. This avoids the difficulties of acquiring land. Often times, these corridors are already graded and accessed. For example, graded sewer easements exist along the Lyle Creek in several locations.

5.6 Greenway Acquisition

Land acquisition is an important component of greenway development. It will be necessary to work with some landowners and potentially deal with future development. Land acquisition and resource protection methods should be strategic, efficient, and respectful. Non-profit land protection agencies, land trusts, or environmental organizations can assist when attempting to acquire or manage property. These entities often have a great deal of experience selling the greenway benefits of conservation. Because these types of organizations do not have the

power to condemn land or the power to tax, they often have excellent personal and professional relations with local landowners. Many options are available to obtain different degrees of control and different ownership relationships to regulate resource use. Providing educational material to local landowners and developers about the benefits of greenways and land/easement donations is an excellent means to stimulate greenway acquisition. The following is a list of potential conservation tools, developing partnerships, development regulations, land management techniques, and acquisition/donation. A more detailed look at each of these tools is provided in Appendix E - Acquisition Strategies.

Land Acquisition / Conservation Tools

Partnerships
Partnerships with land trusts, local developers, and private land managers can assist the City of Conover in developing greenway facilities.

- Land Trusts
- Private Land Managers

Regulatory Methods
This type of resource protection is used to shape the use and development of the land without transferring or selling the land. The rules for this type of tool are established and enforced by a governing body.

- Exactions (Development/Impact Fee, Mandatory Dedications, Fee in Lieu)
- Growth Management Measures (Adequate Public Facilities Ordinances/ Concurrency)
- Performance Zoning
- Incentive Zoning (Dedication or Density Transfers)
- Conservation Zoning (Buffer or Transition Zones)
- Overlay Zoning
- Negotiated Dedications
- Reservation of Land
- Planned Unit Development
- Cluster Development

Land Management
This type of resource protection refers to developing agreements and/or management plans for public use and greenway easements through private property. This method helps conserve the resources of an open space or greenway parcel or easement.

- Management Plans

- Conservation Easement
- Preservation Easement
- Public Use Easement

Acquisition

Land acquisition is a method used to acquire property rights to protect resources or to allow access and free movement of users on a property. This type of method is permanent. Acquisition methods can be divided into two categories: 1) landowners retain ownership of the land and preserve a resource through an easement or other mutual agreement, or 2) land ownership and management is transferred or donated from a landowner to a conservation agency (local government, land trust, or other preservation organization.)

- Donation (Tax Incentives)
- Fee Simple Purchase
- Easement Purchase
- Lease Back Purchase
- Bargain Sale
- Installment Sale
- Right of First Refusal
- Purchase of Development Rights
- Land Banking
- Condemnation
- Eminent Domain

6. Design Guidelines

6.0 Overview

These recommended guidelines originate from and adhere to national design standards as defined by the American Association of State Highway Transportation Officials (AASHTO), the Americans with Disabilities Act (ADA), the Federal Highway Administration (FHWA) Pedestrian Facilities Users Guide, the Manual on Uniform Traffic Control Devices (MUTCD), and the NCDOT. Should the national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions. For example, the 2009 update to MUTCD provides new guidance. Likewise, all cost information provided is relevant only at or around the date of this report (June 2008) and is provided in Appendix C. A qualified engineer or landscape architect should be consulted for the most up to date and accurate cost estimates.

The sections below serve as an inventory of pedestrian design elements/treatments and provide guidelines for their development. These treatments and design guidelines are important because they represent minimum standards for creating a pedestrian-friendly, safe, accessible community, and have been tailored to meet the specific facility development needs of Conover's pedestrian system. The guidelines are not, however, a substitute for a more thorough evaluation by a landscape architect or engineer upon implementation of facility improvements. Some improvements may also require cooperation with the NCDOT for specific design solutions.

6.1 Pedestrian Walkways

Sidewalks and Walkways

Sidewalks and walkways are extremely important public right-of-way components often times adjacent to, but separate from automobile traffic. In many ways, they act as the seam between private residences, stores, businesses, and the street. They are spaces where children play, neighbors meet and talk, shoppers meander casually, parents push strollers, and commuters walk to transit stops or directly to work. Because of the social importance of these spaces, great attention should be paid to retrofit and renovate areas with disconnected, dangerous, or otherwise malfunctioning walkways.

There are a number of options for different settings, both urban and rural. From a European style promenade to, in the case of a more rural environment, a simple

asphalt or crushed stone path next to a secondary road, walkway form and topography can vary greatly. In general, sidewalks are constructed of concrete although there are some successful examples where other materials such as asphalt, crushed stone, or other slip resistant material have been used. The width of the walkways should correspond to the conditions present in any given location (i.e. level of pedestrian traffic, building setbacks, or other important natural or cultural features). FHWA (Federal Highway Administration) and the Institute of Transportation Engineers both suggest five feet as the minimum width for a sidewalk. This is considered ample room for two people to walk abreast or for two pedestrians to pass each other. Often downtown areas, near schools, transit stops, or other areas of high pedestrian activity call for much wider sidewalks.

Figure 6(a): Well designed residential sidewalk[1].

Sidewalks are typically built in curb and gutter sections but can also be planned in coordination with ditches or planted swales. They need to be kept completely free of obstructions such as utility poles. A four to eight foot buffer zone parallel to the sidewalk or walkway is recommended to separate pedestrian traffic from automobile traffic and to keep the sidewalk free of light pole obstructions. Much like the sidewalk and walkway itself, the form and topography of this buffer will vary greatly. Native street tree plantings have historically proven to work successfully within these buffer zones. They regulate micro-climate, create a desirable sense of enclosure, promote a local ecological identity and connection to place, and can act as a pleasant integration of nature into an urban environment. In the event that vegetation is not possible, a row of parked cars, bike lane, or street furniture can be used to create this buffer.

Figure 6(b): Sidewalk with a vegetated buffer zone. Notice the sense of enclosure created by the large canopy street trees[1].

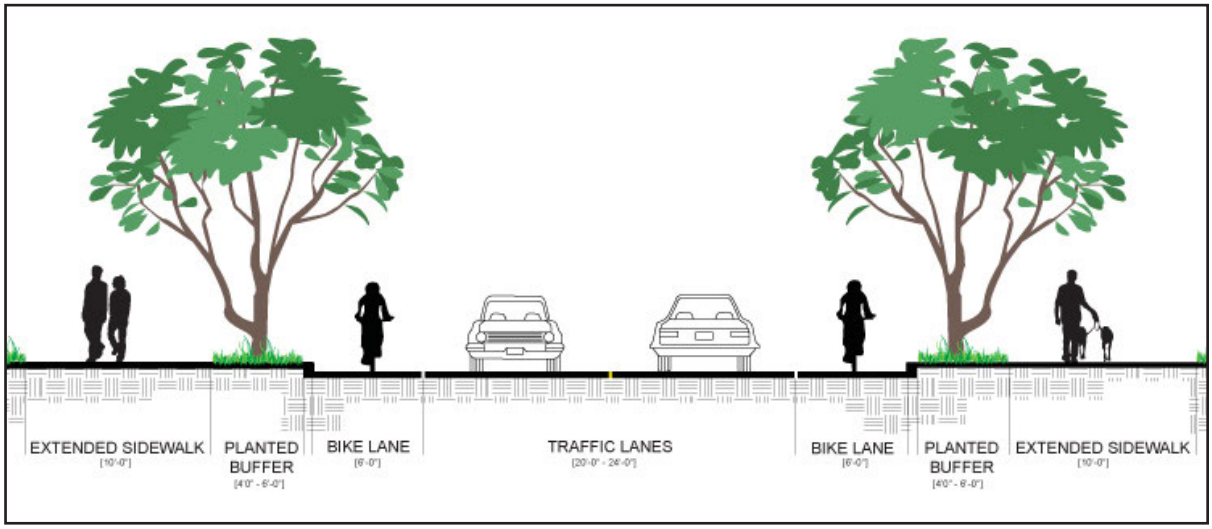


Figure 6(c): Typical street with bike lanes and adjacent sidewalk.

Guidelines[3,9]:

- Concrete is preferred surface, providing the longest service life and requiring the least maintenance. Permeable pavement such as porous concrete may be considered to improve water quality.
- Sidewalks should be built as flat as possible to accommodate all pedestrians;

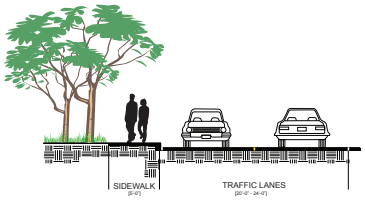


Figure 6(d): Where space and topography are limiting, this cross section may be applied.

they should have a running grade of five percent or less; with a two percent maximum cross-slope.

- Concrete sidewalks should be built to minimum depth of four inches; six inches at driveways.
- Sidewalks should be a minimum of five feet wide; eight to ten feet wide within Downtown; ten feet can also be considered in other areas of heavy pedestrian traffic. When sidewalk abuts storefronts, an additional two feet of space from walls is recommended.
- Buffer zone of two to four feet in local or collector streets; five to six feet in arterial or major streets and up to eight feet in busy streets and Downtown to provide space for light poles and other street furniture. See the Landscaping section later in this chapter for shade and buffer opportunities of trees and shrubs.
- Motor vehicle access points should be kept to minimum.
- Sidewalks must be constructed with maximum cross slope of 2% (particularly important at driveway aprons).
- In Conover, a sidewalk with buffer on both sides is not always feasible due to right-of-way or topographical constraints. Still, a sidewalk on one side is better than no facility. Each site should be examined in detail to determine placement options.

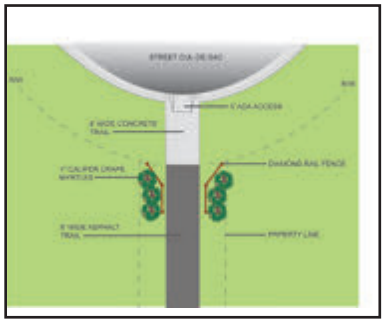


Figure 6(e): Ideal connection between cul-de-sacs.

Greenway Trail

A greenway is defined as a linear corridor of land that can be either natural, such as rivers and streams, or manmade, such as abandoned railroad beds and utility corridors. Most greenways contain trails. Greenway trails can be paved or unpaved, and can be designed to accommodate a variety of trail users, including bicyclists, walkers, hikers, joggers, skaters, horseback riders, and those confined to wheelchairs. They may exist as multi-use sidepaths paralleling roadways (similar to Gateway sidewalk in Conover).

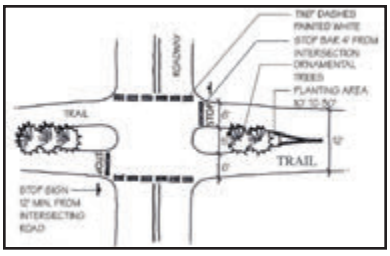


Figure 6(f): Typical greenway trail approach to a roadway

Single-tread, multi-use trails are the most common trail type in the nation. These trails vary in width and can accommodate a wide variety of users. The minimum width for two-directional trails is 10', however 12'-14' widths are preferred where heavy traffic is expected. There should be 8' to 10' ft. of vertical clearance under bridges and other structures. Centerline stripes should be considered for paths that generate substantial amounts of pedestrian traffic. Possible conflicts between user groups must be considered during the design phase, as cyclists often travel at a faster speed than other users. Radii minimums should also be considered depending on the different user groups.

While the vegetative clearing needed for these trails varies with the width of the trail. The minimum width for clearing and grubbing a 14' wide trail is 16'. Selective thinning increases sight lines and distances and enhances the safety of the trail user. This practice includes removal of underbrush and limbs to create open pockets within a forest canopy, but does not include the removal of the forest canopy itself.

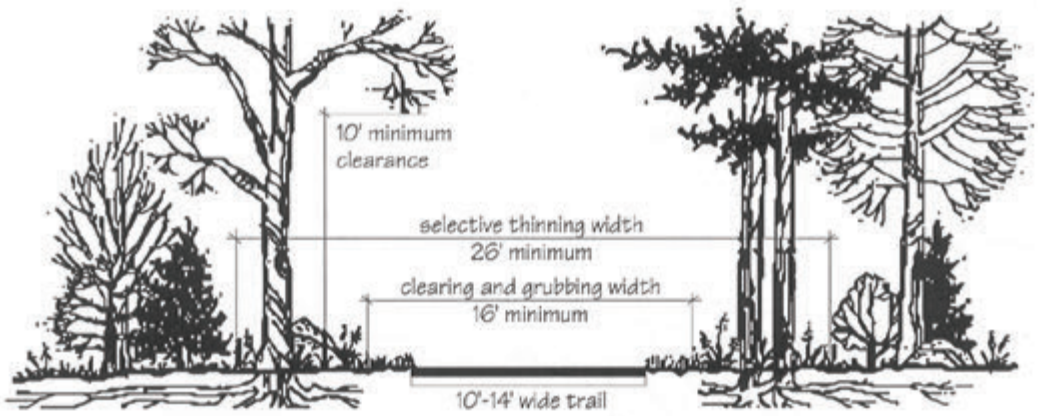


Figure 6(g):
Vegetation clearing guidelines

Typical pavement design for a paved, off-road, multi-use trail should be based upon the specific loading and soil conditions for each project. These asphalt or concrete trails should be designed to withstand the loading requirements of occasional maintenance and emergency vehicles.

Concrete: In areas prone to frequent flooding, it is recommended that concrete be used because of its excellent durability. Concrete surfaces are capable of withstanding the most powerful environmental forces. They hold up well against the erosive action of water, root intrusion and subgrade deficiencies such as soft soils. Most often, concrete is used for intensive urban applications. Of all surface types, it is the strongest and has the lowest maintenance requirement, if it is properly installed.

Asphalt: Asphalt is a flexible pavement and can be installed on virtually any slope. One important concern for asphalt trails is the deterioration of trail edges. Installation of a geotextile fabric beneath a layer of aggregate base course (ABC) can help to maintain the edge of a trail. It is important to provide a 2′ wide graded shoulder to prevent trail edges from crumbling.

Trail and Roadway Intersections: The images to the right present detailed specifications for the layout of intersections between trail corridors and roadways. Signage rules for these sorts of intersections are available in the MUTCD as well.

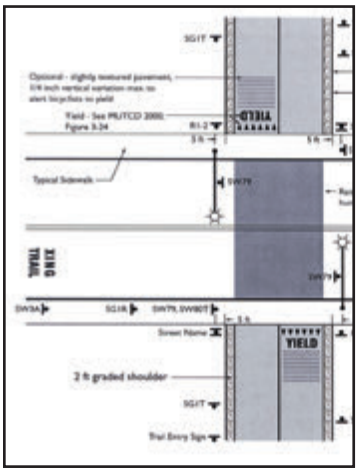


Figure 6(h):
Typical greenway trail crossing a roadway

Trail and Roadway Intersection Guidelines:

- Crossings should be a safe enough distance from neighboring intersections to not interfere (or be interfered) with traffic flow.
- A roadway with flat topography is desirable to increase motorist visibility of the path crossing.
- Motorists and trail users should be warned, such as with signage (including trail stop signs), changes in pavement texture, flashing beacons, raised crossings, striping, etc.
- A refuge is needed where crossing distance is excessive and in conditions

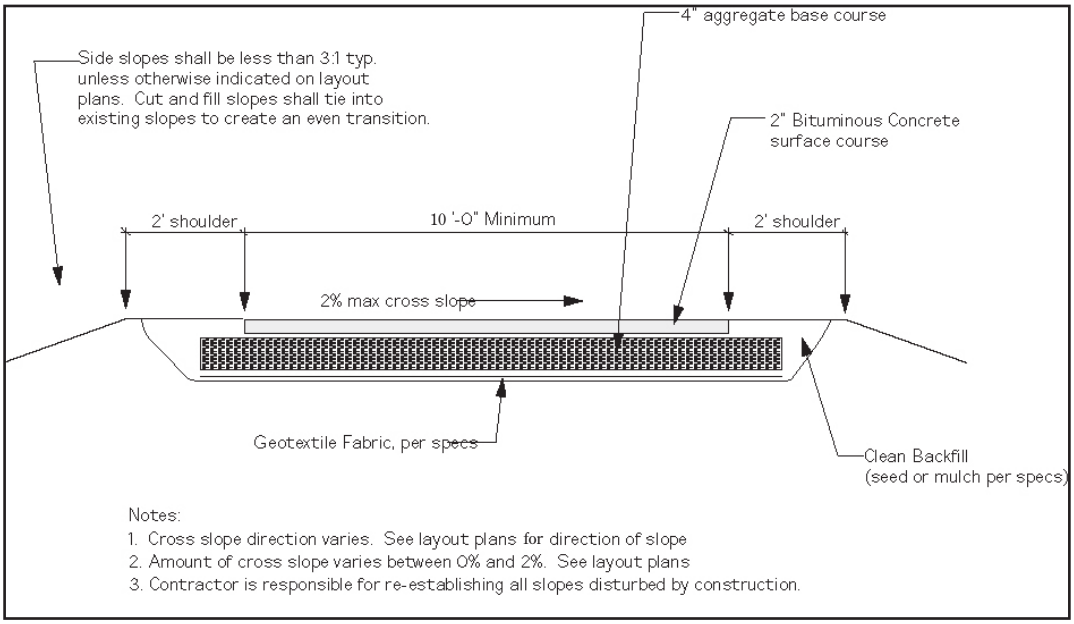
exhibiting high volumes/speeds and where the primary user group crossing the roadway requires additional time, such as school children and the elderly.

- The crossing should occur as close to perpendicular (90 degrees) to the roadway as possible.
- If possible, it may be desirable to bring the path crossing up to a nearby signalized crossing in situations with high speeds/ADT and design and/or physical constraints.
- Signalized crossings may be necessary on trails with significant usage when intersecting with demanding roadways, but MUTCD warrants must be met for the installation of a signalized crossing.
- Sidepaths should be constructed along corridors with relatively few intersections and driveways, reducing conflict points.

(Left) Figure 6(i): Typical asphalt path section

(Right) Figure 6(j): Typical natural surface trail section

Figure 6(k): Asphalt pavement construction detail



6.2 Pedestrian Facility Elements

Marked Crosswalks

A marked crosswalk designates a pedestrian right-of-way across a street. It is often installed at controlled intersections or at key locations along the street (a.k.a. mid-block crossings) and in this Plan are prescribed for the Downtown, school areas, and key residential and commercial areas where pedestrian activity is greatest. Although marked crosswalks provide strong visual clues to motorists that pedestrians are present, it is important to consider the use of these elements in conjunction with other traffic calming devices to fully recognize low traffic speeds and enhance pedestrian safety. In general, "marked crosswalks should not be installed in an uncontrolled environment where speeds exceed 40 mph"[3]. Every attempt should be made to install crossings in places where pedestrians are most likely to cross. A well-designed traffic calming location is not effective if pedestrians are using other unmodified and potentially dangerous locations to cross the street.

Figure 6(l): Notice the wide, well marked crosswalk with a crossing island in the middle. The crosswalk size and street furniture decoration make this a safe and visible pedestrian crossing[1].

Marked pedestrian crosswalks may be used under the following conditions: 1) At locations with stop signs or traffic signals, 2) At non-signalized street crossing locations in designated school zones, and 3) At non-signalized locations where engineering judgment dictates that the use of specifically designated crosswalks are desirable[9].

There is a variety of form, pattern, and materials to choose from when creating a marked crosswalk. It is important however to provide crosswalks that are not slippery, are free of tripping hazards, or are otherwise difficult to maneuver by any person including those with physical mobility or vision impairments. Although attractive materials such as inlaid stone or certain types of brick may provide character and aesthetic value, the crosswalk can become slippery. Also, as it degrades from use or if it is improperly installed, it may become a hazard for the mobility or vision impaired.

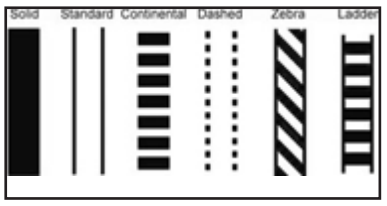


Figure 6(m): Illustration of all the variety of patterns possible in designating a crosswalk[1].

A variety of color or texture may be used to designate crossings. These materials should be smooth, skid-resistant, and visible[3]. Reflective paint is inexpensive but is considered more slippery than other devices such as inlay tape or thermoplastic. A variety of patterns may be employed as detailed in Figure 6(l). In areas with a high volume of pedestrian traffic, particularly at mid-block crossings, a crosswalk can be raised to create both a physical impediment for automobiles and a reinforced visual clue to the motorist. These can be provided on top of a speed table.

An engineering study may need to be performed to determine the appropriate width of a crosswalk at a given location, however marked crosswalks should not be less than six feet in width. In downtown areas or other locations of high pedestrian traffic, a width of ten feet or greater should be considered.

Guidelines[3, 9]:

- Should not be installed in an uncontrolled environment where speeds exceed 40 mph.
- Mid-block crosswalks should not be installed within 300 ft. of another signalized crossing point.
- Crosswalks alone may not be enough and should be used in conjunction with other measures to improve pedestrian crossing safety, particularly on roads with average daily traffic (ADT) above 10,000.
- Width of marked crosswalk should be at least six feet wide; ideally ten feet or wider in Downtown areas.
- Curb ramps and other sloped areas should be fully contained within the markings.
- Crosswalk markings should extend the full length of the crossings.
- Crosswalk markings should be white per MUTCD.
- Either the 'continental' or 'ladder' patterns are recommended for intersection improvements in Conover for aesthetic and visibility purposes. Lines should be one to two feet wide and spaced one to five feet apart.
- Mid-block crossings should utilize advanced warning signs.
- Raised crosswalks are typically used on two-lane streets with less than 35 MPH speed limit.
- NCDOT typically requires pedestrian facilities (sidewalks) on both sides of a roadway when placing crosswalks.

Advance Stop Bars

Moving the vehicle stop bar 15–30 feet back from the pedestrian crosswalk at signalized crossings and mid-block crossings increases vehicle and pedestrian visibility. Advance stop bars are 1–2 feet wide and they extend across all approach lanes at intersections. The time and distance created allows a buffer in which the pedestrian and motorist can interpret each other's intentions. Studies have shown that this distance translates directly into increased safety for both motorist and pedestrian. One study in particular claims that by simply adding a "Stop Here for Pedestrians" sign reduced pedestrian motorist conflict by 67%. When this was used in conjunction with advance stop lines, it increased to 90%[1].

Figure 6(n): Curb ramps shown have two separate ramps at the intersection[1].

Curb Ramps

Curb ramps are critical features that provide access between the sidewalk and roadway for wheelchair users, people using walkers, crutches, or handcarts, people pushing bicycles or strollers, and pedestrians with mobility or other physical impairments. In accordance with the 1973 Federal Rehabilitation Act and to comply with the 1990 Federal ADA requirements, curb ramps must be installed at all intersections and mid-block locations where pedestrian crossings exist[1]. In addition,

these federal regulations require that all new constructed or altered roadways include curb ramps. Although the federally prescribed maximum slope for a curb ramp is 1:12 or 8.33% and the side flares of the curb ramp must not exceed a maximum slope of 1:10 or 10.0%, it is recommended that much less steep slopes be used whenever possible.

It is also recommended that two separate curb ramps be provided at each intersection (Figure 6(n)). With only one large curb ramp serving the entire corner, there is not safe connectivity for the pedestrian. Dangerous conditions exist when the single, large curb ramp inadvertently directs a pedestrian into the center of the intersection, or in front of an unsuspecting, turning vehicle.

Finally, truncated domes are an important component of the curb ramp design. Truncated domes are small domes with flattened tops within curb ramps used as tactile warning. They enable people with visual disabilities to determine the boundary between the sidewalk and street.

For additional information on curb ramps see Accessible Rights-of-Way: A Design Guide, by the U.S. Access Board and the Federal Highway Administration, and Designing Sidewalks and Trails for Access, Parts I and II, by the Federal Highway Administration. Visit: www.access-board.gov for the Access board's right-of-way report[1].

Guidelines[9]:

- Two separate curb ramps, one for each crosswalk, should be provided at corner of an intersection.
- Curb ramp should have a slope no greater than 1:12 (8.33%). Side flares should not exceed 1:10 (10%).

Raised or Lowered Medians

Medians are barriers in the center portion of a street or roadway[1]. When used in conjunction with mid-block or intersection crossings, they can be used as a crossing island to provide a place of refuge for pedestrians. They also provide opportunities for landscaping that in turn can help to slow traffic. A center turn lane can be converted into a raised or lowered median thus increasing motorist safety.

Figure 6(o): An attractive lowered median landscaped to appear raised[3].

A continuous median can present several problems when used inappropriately. If all left-turn opportunities are removed, there runs a possibility for increased traffic speeds and unsafe U-turns at intersections. Additionally, the roadway width occupied by the median may be taking up room that could be used for bike lanes or other treatments discussed in this chapter. An alternative to the continuous median is to create a segmented median with left turn opportunities.

Raised or lowered medians are best suited for high-volume, high-speed roads, and they should provide ample cues for people with visual impairments to identify the boundary between the crossing island and the roadway.

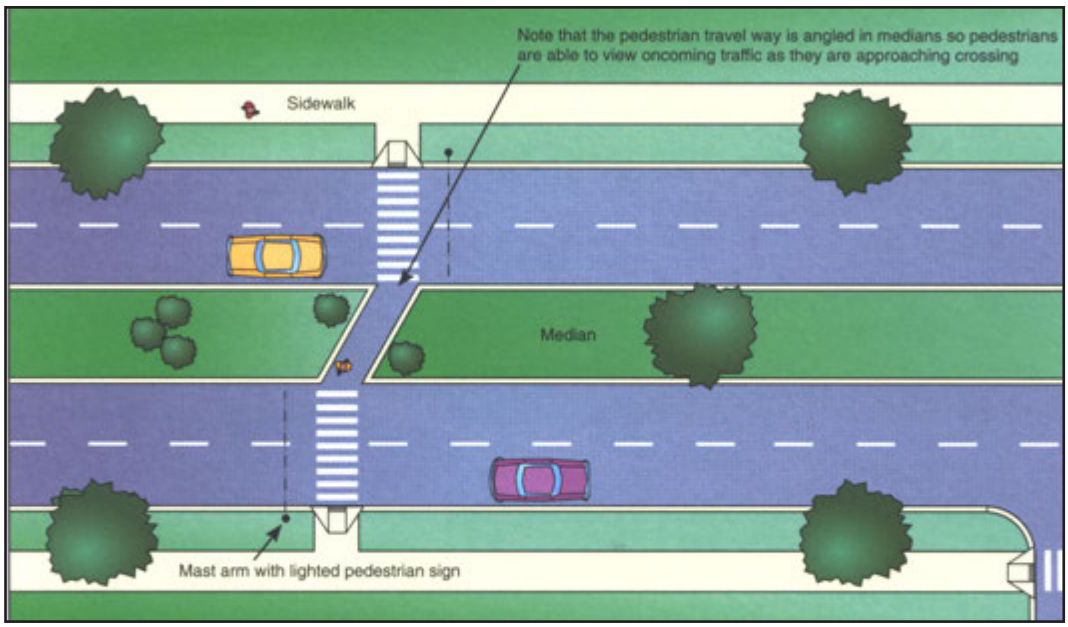


Figure 6(p): A lowered median can be used to filter storm water and provide refuge for pedestrians crossing a roadway[3].

Guidelines[3, 9]:

- Median pedestrian refuge islands should be provided as a place of refuge for pedestrians crossing busy or wide roadways at either mid-block locations or intersections. They should be utilized on high speed and high volume roadways.
- Medians should incorporate trees and plantings to change the character of the street and reduce motor vehicle speed.
- Landscaping should not obstruct the visibility between motorists and pedestrians.
- Median crossings should provide ramps or cut-throughs for ease of accessibility for all pedestrians
- Median crossings should be at least 6 feet wide in order to accommodate more than one pedestrian, while a width of 10 feet (where feasible) should be provided for bicycles, wheelchairs, and groups of pedestrians
- Median crossings should possess a minimum of a 4 foot square level landing to provide a rest point for wheelchair users.
- Pedestrian pushbuttons should be located in the median of all signalized mid-block crossings, where the roadway width is in excess of 60 feet.

Bulb-outs and Curb Extensions (Curb Radius Reduction)

A bulb-out, or curb extension, is a place where the sidewalk extends into the parking or driving lane of a street, thus reducing curb radii. Because these curb extensions physically narrow the roadway, a pedestrian's crossing distance and consequently the time spent in the street is reduced. Also, bulb-outs at intersections can greatly reduce turning speed, especially if curb radii are set as tight as possible[1]. Finally, bulb-outs also reduce travel speeds when used in mid-block crossings because of the reduced street width. They can be placed either at mid-block crossings or at intersections.

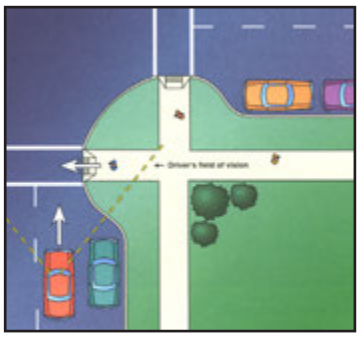


Figure 6(q): By reducing a pedestrian's crossing distance, less time is spent in the roadway, and pedestrian vehicle conflicts are reduced[3].

Sightlines and pedestrian visibility are reduced when motor vehicle parking encroaches too close to corners creating a dangerous situation for pedestrians. When placed at an intersection, bulb-outs preclude vehicle parking too close to a crosswalk.

Curb extensions may be used simply to reduce the curb radius. Complete bulb-out facilities may be utilized where there is an existing on-street parking lane. In this case, the bulb-out would not encroach into travel lanes, bike lanes, or shoulders[1].

Figure 6(r): Attempting to separate pedestrians from the street is often problematic. As shown here, given the opportunity, many choose to cross at street level[1].

Guidelines[10] :

- Bulb-outs should be used on crosswalks in heavy pedestrian areas where parking may limit the driver's view of the pedestrian.
- Where used, sidewalk bulb-outs should extend into the street for the width of a parking lane (a minimum five feet) in order to provide for a shorter crossing width, increased pedestrian visibility, more space for pedestrian queuing, and a place for sidewalk amenities and planting.
- Curb extensions should be used on mid-block crossing where feasible.
- Curb extensions may be inappropriate for use on corners where frequent right turns are made by trucks or buses.

Pedestrian Overpass/Underpass

Pedestrian overpasses and underpasses efficiently allow for pedestrian movement across busy thoroughfares[1]. These types of facilities are problematic in many regards and should only be considered under suitable circumstances or where no other solution is possible. Perhaps the best argument for using them sparingly is that research proves pedestrians will avoid using such a facility if they perceive the ability to cross at grade as taking about the same amount of time[1].

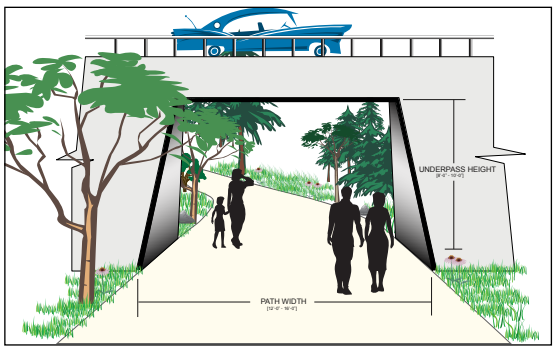


Figure 6(s): Typical underpass dimensions.

The other areas of contention arise with the high cost of construction. There are also ADA requirements for stairs, ramps, and elevators that in many cases once complied with result in an enormous structure that is visually disruptive and difficult to access.

Overpasses work best when existing topography allows for smooth transitions. Underpasses as well work best with favorable topography when they are open and

accessible, and exhibit a sense of safety[1]. Each should only be considered with rail lines, high volume traffic areas such as freeways, and other high volume arteries[1].

Guidelines[10] :

- Over and underpasses should be considered only for crossing arterials with greater than 20,000 vehicle trips per day and speeds 35 - 40 mph and over.
- Minimum widths for over and underpasses should follow the guidelines for sidewalk width.
- Underpasses should have a daytime illuminance minimum of 10 fc achievable through artificial and/or natural light provided through an open gap to sky between the two sets of highway lanes, and a night time level of 4 foot-candle.
- Consider acoustics measures within underpasses to reduce noise impacts to pedestrians and bicyclists.

Roundabouts

A roundabout is a circular intersection that maneuvers traffic around in a counterclockwise direction so that cars make a right-hand turn onto a desired street[1]. Vehicles from approaching streets are generally not required to stop although approaching vehicles are required to yield to motorists in the roundabout. It is believed that this system eliminates certain types of crashes at traditional intersections.

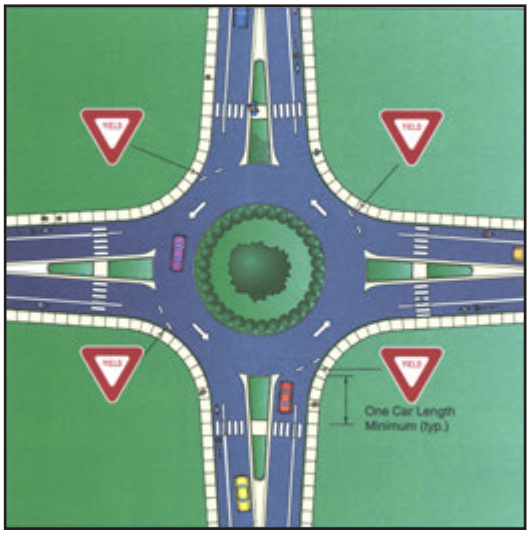


Figure 6(t): Typical roundabout[3].

Roundabout design can become quite problematic in dealing with pedestrian and bicycle use. Every effort must be made to prompt motorists to yield to pedestrians crossing the roundabout. A low design speed is required to improve pedestrian safety. Splitter islands and single lane approaches both lend to pedestrian safety as well as other urban design elements discussed in this chapter.

Problems also arise with the vision-impaired because there are not proper audible cues associated with when to cross. Studies are underway to develop and test solutions. Auditory accessible pedestrian signals placed on sidewalks and splitter islands are one solution, but again there is no research to prove their efficacy[1].

Guidelines[11] :

- The recommended maximum entry design speed for roundabouts ranges from 15 mph for 'mini-roundabouts' in neighborhood settings, to 20 mph for single-lane roundabouts in urban settings, to 25 mph for single-lane roundabouts in rural settings.
- Refer to roundabout diagram for typical crosswalk placement.
- Please refer to FHWA's report, Roundabouts, an Information Guide, available online through: www.tfhrc.gov The report provides information on general design principles, geometric elements, and provides detailed specifications for the various types of roundabouts.

Signalization

Traffic Signals

Traffic signals assign the right of way to motorists and pedestrians and produce openings in traffic flow, allowing pedestrians time to cross the street[1 4]. When used in conjunction with pedestrian friendly design, proper signalization should allow for an adequate amount of time for an individual to cross the street. The suggested amount of pedestrian travel speed recommended in the Manual on Uniform Traffic Control Devices (MUTCD) is 4ft/sec; however, this does not address the walking speed of the elderly or children. Therefore, it is suggested that a lower speed of 3.5ft/sec be used whenever there are adequate numbers of elderly and children using an area.

Engineering, as well as urban design judgment, must be used when determining the location of traffic signals and the accompanying timing intervals. Although warrants for pedestrian signal timing have been produced by the MUTCD, each site must be analyzed for factors including new facility and amenity construction (i.e. a popular new park or museum) to allow for potential future pedestrian traffic volume. In addition, creating better access to existing places may in fact generate a higher pedestrian volume[1].

Fixed timed sequencing is often used in high traffic volume commercial or downtown areas to allow for a greater efficiency of traffic flow. In such instances, the pedestrian speed must be carefully checked to ensure safety.

Pedestrian Signals

There are a host of possible traffic signal enhancement opportunities that can greatly improve the safety and flow of pedestrian traffic. Some include: international symbols for WALK and DON'T WALK, providing large traffic signals, the positioning of traffic signals so that those waiting at a red-light cannot see the opposing traffic signal and anticipate their own green-light, installing countdown signals to provide pedestrians information on how long they have remaining in the crossing interval, automatic pedestrian sensors, and selecting the proper signal timing intervals[1].

New federal policy requires all new pedestrian signals to be of the countdown variety. All existing signals must be updated to countdown within 10 years (of 2008). It has been proven to be an effective means of crash reduction.

According to the MUTCD, international pedestrian signal indication should be used at traffic signals whenever warranted[1]. As opposed to early signalization that featured "WALK" and "DON'T WALK", international pedestrian symbols should be used on all new traffic signal installations as illustrated in Figure 6(u). Existing "WALK" and "DON'T WALK" signals should be replaced with international

Figure 6(u): International symbols used in a crosswalk to designate WALK and DON'T WALK[1].

symbols when they reach the end of their useful life.

Symbols should be of adequate size, clearly visible, and, in some circumstances, accompanied by an audible pulse or other messages to make crossing safe for all pedestrians. Consideration should be paid to the noise impact on the surrounding neighborhoods when deciding to use audible signals[1]. For additional information on accessible pedestrian signals, please visit: www.walkinginfo.org/aps.

Countdown signals are pedestrian signals that show how many seconds the pedestrian has remaining to cross the street. As mentioned previously, all new signals must be of the countdown variety. The countdown can begin at the beginning of the WALK phase, perhaps flashing white or yellow, or at the beginning of the clearance, or DON'T WALK phase, flashing yellow as it counts down. Audible cues can also be used to pulse along with a countdown signal.

Figure 6(v): Audible cues can be used along with a countdown signal for pedestrians.

The timing of these or other pedestrian signals needs to be adapted to a given situation. There are three types of signal timing generally used: concurrent, exclusive, and leading pedestrian interval (LPI). The strengths and weaknesses of each will be discussed with an emphasis on when they are best employed.

Concurrent signal timing refers to a situation where motorists running parallel to the crosswalk are allowed to turn into and through the crosswalk, left or right, after yielding to pedestrians. This condition is not considered as safe as some of the latter options; however, this type of signal crossings generally allows for more pedestrian crossing opportunities and less wait time. In addition, traffic is allowed to flow a bit more freely. Concurrent signal timing is best used where lower volume turning movements exist[1].

Where there are high-volume turning situations that conflict with pedestrian movements, the exclusive pedestrian interval is the preferred solution. The exclusive pedestrian intervals stop traffic in all directions. In order to keep traffic flowing regularly, there is often a greater pedestrian wait time associated with this system. Although it has been shown that pedestrian crashes have been reduced by 50% in some commercial or downtown areas by using these intervals, the long wait times can encourage some to attempt a cross when there is a perceived lull in traffic[1]. These types of crossings are dangerous and may negate the use of the system. A problem is also created for those with visual impairments when the audible cues of the passing parallel traffic is eliminated. Often an audible signal will have to accompany a WALK signal[1].

A proven enhancement that prevents many of the conflicts addressed under either of the former methods is LPI. An LPI works in conjunction with a concurrent

signal timing system and simply gives the pedestrian a few seconds head start on the parallel traffic. An advance walk signal is received prior to a green light for motorists. This creates a situation where the pedestrian can better see traffic, and more importantly, the motorists can see and properly yield to pedestrians[1]. Long-term research has shown that this system has worked well in places like New York City (where it has been used for 20 years) at reducing motorist and pedestrian conflict[1]. As with the exclusive pedestrian interval, an audible cue will need to accompany the WALK signal for the visually impaired.

The use of infrared or microwave pedestrian detectors has increased in many cities worldwide. Theses devices replace the traditional push-button system. Although still experimental, they appear to be improving pedestrian signal compliance as well as reducing the number of pedestrian and vehicle conflicts[1]. Perhaps the best use of these devices is when they are employed to extend crossing time for slower moving pedestrians. Whether these devices are used or the traditional push-button system is employed, it is best to provide instant feedback to pedestrians regarding the length of their wait. This is thought to increase and improve pedestrian signal compliance.

Guidelines[3,9] :

- Pedestrian signals should be placed in locations that are clearly visible to all pedestrians.
- Pedestrian signals should be automatic in areas of anticipated high pedestrian activity; Pedestrian-activated signals should only be installed in those areas where usage is infrequent.
- Larger pedestrian signals should be utilized on wider roadways, to ensure readability.
- Pedestrian signal pushbuttons should be well-signed and visible.
- Pedestrian signal pushbuttons should clearly indicate which crossing direction they control.
- Pedestrian signal pushbuttons should be reachable from a flat surface, at a maximum height of 3.5 feet and be located on a level landing to ensure ease of operation by pedestrians in wheelchairs.
- Walk intervals should be provided during every cycle, especially in high pedestrian traffic areas.
- NCDOT does not have established guidelines for the placement of pedestrian signals, but they generally use MUTCD and AASHTO warrants for the installation of traffic signals (which partly relate to pedestrian traffic).

Figure 6(w):
A low cost sign that restricts right-hand turns at a red light[1].

Figure 6(x):
Landscaping used on the Sea Street in Seattle, Washington shows how stormwater treatment can be tied to aesthetically pleasing plantings[7].

Figure 6(y):
Street trees buffer and soften often harsh urban environments in a number of psychological, physical, and ecological ways[10].

Right Turn on Red Restrictions

Introduced in the 1970's as a fuel saving technique, the Right Turn on Red (RTOR) law is thought to have had a detrimental effect on pedestrians[1]. The issue is not the law itself but rather the relaxed enforcement of certain caveats within the law such as coming to a complete stop and yielding to pedestrians. Often motorists will either nudge into a crosswalk to check for oncoming traffic without looking for pedestrians or slow, but not stop, for the red-light while making the turn.

There is legitimate concern that eliminating an RTOR will only increase the number of right-turn-on-green conflicts where all of the drivers who would normally have turned on red, now are anxious to turn on green. As discussed in the prior section, LPI or exclusive pedestrian intervals my help to alleviate this problem. Eliminating RTOR should be considered on a case-by-case basis and only where there are high pedestrian volumes. This can be done by simple sign postings as illustrated in Figure 6(w).

Landscaping

The introduction of vegetation in an urban environment can provide a welcomed intervention of nature into a place that is otherwise hardened from buildings, concrete, and asphalt. It can be used to provide a separation buffer between pedestrians and motorists, reduce the width of a roadway, calm traffic by creating a visual narrowing of the roadway, enhance the street environment, and help to generate a desired aesthetic.

Street trees and other plantings provide comfort, a sense of place, and a more natural and inviting setting for pedestrians. Landscaping and the aforementioned street furniture make people feel welcome.

There are also some instances where islands of vegetation are created to collect and filter stormwater from nearby streets and buildings. These islands are referred to as constructed wetlands, rain gardens, and/or bioswales. When these devices are employed, the benefits listed above are coupled with economic and ecologic benefits of treating stormwater at its source. There are many examples of this in Oregon and Washington, particularly Seattle's Green Streets Program. Using thoughtful design to treat stormwater as an amenity rather than waste to be disposed of in an environmentally harmful manner is gaining popularity nationwide.

An issue with this or any landscaping treatment is that of ongoing maintenance. The responsibility often falls on local municipalities although there are instances where local community groups have provided funding and volunteers for maintenance. The best way to address the maintenance issue is to design using native plant material that is already adapted to the local soil and climate. Growth pattern and

space for maturation, particularly with larger tree plantings, are important to avoid cracking sidewalks and other pedestrian obstructions.

Guidelines[3]:

- Buffer zone plantings should be maintained at no higher than three feet to allow sight distance for motorists and pedestrians.
- Trees with large canopies planted between the sidewalk and street should generally be trimmed to keep branches at least seven feet above the sidewalk.
- Plants and trees should be chosen to match character of area.

Roadway Lighting Improvements

Proper lighting in terms of quality, placement, and sufficiency can greatly enhance a nighttime urban experience as well as create a safe environment for motorists and pedestrians. Two-thirds of all pedestrian fatalities occur during low-light conditions[3]. Attention should be paid to crossings so that there is sufficient ambience for motorists to see pedestrians. To be most effective, lighting should be consistent, adequately spaced, and distinguished, providing adequate light.

In most cases, roadway street lighting can be designed to illuminate the sidewalk area as well. The visibility needs of both pedestrian and motorist should be considered. In commercial or downtown areas and other areas of high pedestrian volumes, the addition of lower level, pedestrian-scale lighting to streetlights with emphasis on crossings and intersections may be employed to generate a desired ambiance. A variety of lighting choices include mercury vapor, incandescent, or less expensive high-pressure sodium lighting for pedestrian level lighting[1]. Roadway streetlights can range from 20-40 feet in height while pedestrian-scale lighting is typically 10-15 feet.

It is important to note that every effort should be made to address and prevent light pollution. Also known as photo pollution, light pollution is "excess or obtrusive light created by humans"[4]. Whenever urban improvements are made where lighting is addressed, a qualified lighting expert should be consulted early in the process. This individual should not only create a safe and attractive ambiance, but will do so with the minimum of fixtures, an awareness of the importance of minimizing photo pollution, and with a focus on minimizing future energy use. A thoughtful plan of how and where to light will reap benefits not only in potential reduced infrastructure cost, but future energy costs as well.

Guidelines[9]:

- Ensure pedestrian walkways and crossways are sufficiently lit.
- Consider adding pedestrian-level lighting in areas of higher pedestrian volumes, Downtown, and at key intersections.

- Install lighting on both sides of streets in commercial districts.
- Use uniform lighting levels.

Street Furniture and Walking Environment

As part of a comprehensive sidewalk and walkway design, all street furniture should be placed in a manner that allows for a safe, pleasurable, and accessible walking environment. Good-quality street furniture will show that the community values its public spaces and is more cost-effective in the long run. Street furniture includes benches, trash bins, signposts, newspaper racks, water fountains, bike racks, restaurant seating, light posts, and other ornaments that are found within an urban street environment. Street furniture should mostly be considered in the Downtown area and other important pedestrian-active areas.

Figure 6(z): The street furniture shown here is placed in such a manner so as to create a safe, pleasurable, and accessible walking environment[1].

In addition to keeping areas free of obstruction from furniture, a walking environment should be clean and well maintained. Attention to removing debris, trimming vegetation, allowing for proper stormwater drainage, providing proper lighting and sight angles, and repairing or replacing broken or damaged paving material can make an enormous difference in pedestrian perception of safety and aesthetics. Special attention should be paid to the needs of the visually impaired so that tripping hazards and low hanging obstructions are removed.

Guidelines[3]:

- Ensure proper placement of furniture; do not block pedestrian walkway or curb ramps or create sightline problems.
- Wall mounted Objects = not to protrude more than 4″ from a wall between 27″ and 7′ from the ground
- Single post mounted Objects = not to protrude more than 4″ from each side of the post between 27″ and 7′ from the ground
- Multiple Post Mounted Objects = lowest edge should be no higher than 27″ and no lower than 7′
- Place street furniture at the end of on-street parking spaces rather than in middle to avoid vehicle-exiting conflict.

Transit Stop Treatments

Currently the City of Conover is served by the Western Piedmont Regional Transit Authority. It is appropriate to consider some of the basic elements of a well designed, accessible, and functional transit stop.

Bus or other transit stops should be located in places that are most suitable for the passengers. For example, stops should be provided near higher density residential

areas, commercial or business areas, and schools, and connected to these areas by sidewalk. Some of the most important elements to consider are the most basic: sidewalk connectivity to the stops, proper lighting, legible and adequate transit stop signage, shelter, seating, trash bins, bicycle and even car parking. Transit stops create an area of activity and may generate additional business and pedestrian traffic. Therefore, an opportunity is created to provide adequate sidewalks and other pedestrian oriented design elements. At a minimum, marked crosswalks (especially at mid-block stops), curb ramps, and proper sidewalk widths should be considered.

As with any human scale design element discussed, safety is an important factor to consider when locating bus stops. In the case of a bus stop, special attention should be paid to the number of lanes and direction of traffic when deciding to locate a stop on the near or far side of an intersection. Also special consideration must be paid to the wheelchair lifts in terms of how and where the mobility impaired will exit and enter the bus.

Figure 6(aa): This typical transit stop has all of the key features of shelter, ample seating, bicycle parking, landscaping, and trash bins[1].

Pedestrian Signs and Wayfinding

Signage provides important safety and wayfinding information to motorist and pedestrian residents and tourists. From a safety standpoint, motorists should be given advance warning of upcoming pedestrian crossings or of traffic calming areas. Signage of any type should be used and regulated judiciously. An inordinate amount of signs creates visual clutter. Under such a condition, important safety or wayfinding information may be ignored resulting in confusion and possible pedestrian vehicle conflict. Regulations should also address the orientation, height, size, and sometimes even style of signage to comply with a desired local aesthetic.

Regulatory signage are used to inform motorists or pedestrians of a legal requirement and should only be used when a legal requirement is not otherwise apparent[3].

Warning signage are used to inform motorists and pedestrians of unexpected or unusual conditions. When used, they should be placed to provide adequate response times. These include school warning signs and pedestrian crossing signs[3].

Informational and wayfinding signage can provide information providing guidance to a location along a trail or other pedestrian facility. Wayfinding signage should orient and communicate in a clear, concise and functional manner. It should enhance pedestrian circulation and direct visitors and residents to important destinations. In doing so, the goal is to increase the comfort of visitors and residents while helping to convey a local identity[5].

Maintenance of signage is as important as walkway maintenance. Clean, graffiti free, and relevant signage enhances guidance, recognition, and safety for pedestrians.

Figure 6(bb): Sidewalks or multi-use trails should be included as part of vehicular bridge designs.

Bridges

Provisions should always be made to include a walking facility as a part of vehicular bridges, underpasses, or tunnels, especially if the facility is part of the Pedestrian Network. All new or replacement bridges, other than those for controlled access roadways, should accommodate pedestrians with wide sidewalks on both sides of the bridge. Even though bridge replacements do not occur regularly, it is important to consider these in longer-term pedestrian planning.

It is NCDOT bridge policy that within Urban Area boundaries, sidewalks shall be included on new bridges with curb and gutter approach roadways with no controlled access. Sidewalks should not be included on controlled access facilities. A determination on whether to provide sidewalks on one or both sides of new bridges will be made during the planning process according to the NCDOT Pedestrian Policy Guidelines. When a sidewalk is justified, it should be a minimum of five to six feet wide with a minimum handrail height of 42".

It is also NCDOT bridge policy that bridges within the Federal-aid urban boundaries with rural-type roadway sections (shoulder approaches) may warrant special consideration. To allow for future placement of ADA acceptable sidewalks, sufficient bridge deck width (at least 7.5 feet) should be considered on new bridges in order to accommodate the placement of sidewalks.

Additional Information:

http://www.ncdot.org/doh/construction/altern/value/manuals/RDM2001/part1/chapter6/pt1ch6.pdf

http://www.ncdot.org/doh/construction/altern/value/manuals/bpe2000.doc

Guidelines:

- Sidewalks should be included on roadway bridges with no controlled access with curb and gutter approach in Urban Areas.
- Sufficient bridge deck width should be considered on new bridges with rural-type shoulder approaches for future placement of sidewalks.
- Sidewalk should be 5' to 6' wide.
- Minimum handrail height should be 42"

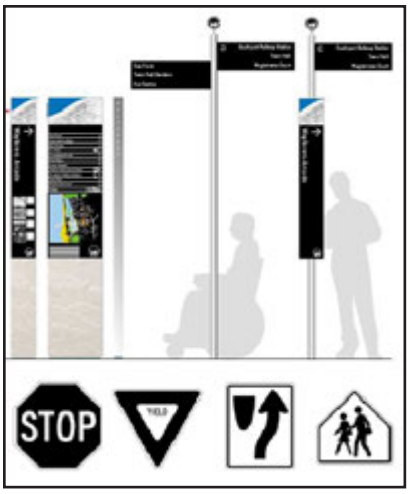


Figure 6(cc): Wayfinding signs promote aesthetics as well as provide important information[6]. Below are typical traffic signs found around pedestrian friendly places[1].

Figure 6(dd): In-roadway pedestrian crossing sign shown here at Concordia Lutheran School in Conover [1].

Regulatory Signs

R1-5 z R1-6 R1-6a R5-10b R5-10c R9-1 R9-2

R9-3a R9-4 R9-4a R9-6 R10-4b

School, Warning, and Informational Signs

S1-1 S3-1 W11-2 W15-1 I-4

Sign	MUTCD Code	MUTCD Section	Conventional Road	
Yield here to Peds	R1-5	2B.11	450x450 (18x18)	Regulatory
Yield here to Peds	R1-5a	2B.11	450x600 (18x24)	
In-Street Ped Crossing	R1-6, R1-6a	2B.12	300x900 (12x36)	
Peds and Bikes Prohibited	R5-10b	2B.36	750x450 (30x18)	
Peds Prohibited	R5-10c	2B.36	600x300 (24x12)	
Walk on Left Facing Traffic	R9-1	2B.43	450x600 (18x24)	
Cross only at Crosswalks	R9-2	2B.44	300x450 (12x18)	
No Ped Crossing	R9-3a	2B.44	450x450 (18x18)	
No Hitch Hiking	R9-4	2B.43	450x600 (18x24)	
No Hitch Hiking (symbol)	R9-4a	2B.43	450x450 (18x18)	
Bikes Yield to Peds	R9-6	9B.10	300x450 (12x18)	
Ped Traffic Symbol	R10-4b	2B.45	225x300 (9x12)	
School Advance Warning	S1-1	7B.08	900x900 (36x36)	School, Warning, informational
School Bus Stop Ahead	S3-1	7B.10	750x750 (30x30)	
Pedestrian Traffic	W11-2	2C.41	750x750 (30x30)	
Playground	W15-1	2C.42	750x750 (30x30)	
Hiking Trail	I-4	--	600x600 (24x24)	

1. Larger signs may be used when appropriate.
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height.
3. First dimension in millimeters; dimensions in parentheses are in inches.
4. All information in table taken directly from MUTCD.

Footnotes

1 Walkinginfo.org. [Internet]. Chapel Hill, NC: Pedestrian and Bicycle Information Center . (cited 2005 May 2). Available from http://www.walkinginfo.org/

2 Georgia Department of Transportation. (2003). Pedestrian Streetscape and Guide

3 Association of State Highway and Transportation Offi cials. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

4 The Free Dictionary. [Internet]. Huntingdon Valley, PA: Farlex, Inc. (cited 2005 May 1). Available from http://encyclopedia.thefreedictionary.com/light%20pollution

5 City of Portland, Offi ce of Transportation. [Internet]. Portland OR: The City of Portland. (cited 2005 May 3). Available from http://www.portlandonline.com/transportation/?c=eafaa

6 Sefton Council. [Internet]. Sefton, UK: Sefton Council. (cited 2006 May 4) . Available from http://www.sefton.gov.uk/images/new%20sign%20proposals.jpg

7 Seattle.gov. [Internet]. Seattle, WA: Seattle Public Utilities. (cited 2006 May 4). Available from http://www.ci.seattle.wa.us/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/Street_Edge_Alternatives/COS_004467.asp

8 American Planning Association . 2006. Planning and urban design standards. Hooken, NJ: John Wiley & Sons, Inc. 719 p.

9 Metro [Internet]. Portland, Oregon: Transportation Information Center . (cited 2005 May 2). Guidebook available from http://www.metro-region.org/article.cfm?ArticleID=262

10 Photo courtesy of www.image03.webshots.com

Appendix A: Public Input

A.0 Overview

Significant public input was gathered from multiple efforts throughout the planning process, which helped shape the outcome of a majority of the recommendations in this Plan. Public input was solicited via two public workshops, public outreach, paper opinion forms, and an online interactive version of the opinion form. A Steering Committee, composed of Conover officials and residents, was created to guide and foster the development of this Plan. The variety and depth of public input sought to ensure that a range of citizens from all areas of Conover were expressed and represented.

A.1 Public Workshops

Two public workshops were conducted during the planning process, each drawing significant comment, suggestion, support and awareness for the project. Newsletters were created and distributed at each Public Workshop, to keep the public abreast of the planning process. Copies of these newsletters can be found later in this appendix.

The initial public workshop was held in February 2008 at the YMCA and introduced the project to the public. Base maps of the Conover area were provided to gather input on desired walking routes, problem areas, areas of opportunity and existing pedestrian facility identification. Approximately 40 people provided input through map markups, direct conversation with Client and consultant, and comment forms.

The second public workshop was held in May of 2008, during the final phases of the project. Preliminary network maps were presented at the YMCA and people were solicited for comments. Approximately 50 people provided input through map markups, direct conversation with Client and consultant, and comment forms.

A.2 Public Comment Form

An online comment form was created for the Conover Pedestrian Transportation Plan. The consultant worked with the City of Conover to prepare questions and tabulate the results of this survey that received 114 online and paper responses. The online survey link was made available on the City of Conover's website, distributed to nu-

merous local email listserves, and publicized at each of the public workshops. The survey contained 18 questions related to walking and demographics.
A variety of respondents completed the survey including a wide range of age groups and user groups. In general, most respondents supported the concept of a more walkable community. People wanted to walk to a number of locations including greenways/trails, parks, and shopping. The leading factor that discouraged respondents from walking was a lack of pedestrian facilities, especially sidewalks and crosswalks. Overall, there was interest in improvement of pedestrian conditions throughout the whole of Conover.

A.3 Public Comment Form Results

Questions 7, 11, 12, and 14 were open-ended and are presented at the end of this section.

1. How important to you is the goal of creating a walkable community? (select one)

	Response Percent	Response Count
very important	**84.7%**	94
somewhat important	14.4%	16
not important	0.9%	1
answered question		**111**
skipped question		**3**

2. How often do you walk now? (select one)

	Response Percent	Response Count
never	4.5%	5
few times per month	24.5%	27
few times per week	**49.1%**	54
5+ times per week	21.8%	24
answered question		**110**
skipped question		**4**

3. Should public funds be used to improve pedestrian options and facilities?		
	Response Percent	Response Count
Yes	**96.4%**	107
No	3.6%	4
answered question		**111**
skipped question		**3**

4. What types of funds should be used? (Choose all that apply)		
	Response Percent	Response Count
Capital improvements bond or other financing strategy	46.4%	52
Existing local taxes	60.7%	68
New local taxes	8.0%	9
State and federal grants	**67.9%**	76
Other (please specify)	5.4%	6
answered question		**112**
skipped question		**2**

5. For what purposes do you walk most now and/or would you want to walk for in the future? Select all that apply.		
	Response Percent	Response Count
Fitness or recreation	**88.1%**	96
Transportation to some destination	33.9%	37
Social visits	33.0%	36
Walking the dog	44.0%	48
Walking the baby / pushing a stroller	18.3%	20
answered question		**109**
skipped question		**5**

6. Which of the following factors play a role in whether or not you walk to a destination? (Check as many as apply)			
		Response Percent	Response Count
Availability of a safe route		**86.0%**	92
Availability of an aesthetically pleasing route		32.7%	35
Costs of other travel modes		23.4%	25
Availability of other travel options		7.5%	8
Need for exercise		73.8%	79
Weather		52.3%	56
Travel time/length of trip		33.6%	36
Other (please specify)		2.8%	3
	answered question		**107**
	skipped question		**7**

8. What walking destinations would you most like to get to? Select all that apply.

	Response Percent	Response Count
Place of work	16.7%	17
School	19.6%	20
Restaurants	52.0%	53
Public Transportation	13.7%	14
Shopping	52.9%	54
Parks	**64.7%**	66
Entertainment	31.4%	32
Trails and greenways	59.8%	61
Libraries or recreation centers	51.0%	52
	answered question	**102**
	skipped question	**12**

9. What factors discourage walking? Select all that apply.

	Response Percent	Response Count
Lack of sidewalks and trails	**77.6%**	83
Unsafe crossings	67.3%	72
Traffic	58.9%	63
Pedestrian unfriendly streets and land uses	47.7%	51
Lack of interest	5.6%	6
Lack of time	15.0%	16
Aggressive motorist behavior	36.4%	39
Deficient sidewalks	46.7%	50
Lack of nearby destinations	39.3%	42
	answered question	**107**
	skipped question	**7**

10. What actions do you think are most needed to increase walking in the community? Select all that apply.

	Response Percent	Response Count
New sidewalks	**73.3%**	77
Crossing improvements	59.0%	62
Education for pedestrians and drivers	22.9%	24
Promotional efforts	16.2%	17
Repairing old sidewalks	41.0%	43
Replacing deficient sidewalks	40.0%	42
Improved public transportation	14.3%	15
Improved greenway trail systems	46.7%	49
Planting street trees	17.1%	18
More pedestrian friendly land-uses	58.1%	61
	answered question	**105**
	skipped question	**9**

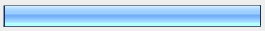
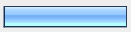
13. Please order this list according to the importance you place on each item. Rank the options below from 1 (highest importance) to 4 (lowest importance).

	#1	#2	#3	#4	Rating Average	Response Count
Maximizing safety for pedestrians across the entire community.	**71.8% (61)**	14.1% (12)	7.1% (6)	7.1% (6)	1.49	85
Perfecting a few major travel corridors for pedestrians.	16.1% (14)	35.6% (31)	**36.8% (32)**	11.5% (10)	2.44	87
Maximizing pedestrian opportunities in certain hubs or nodes around the community.	14.3% (12)	33.3% (28)	**38.1% (32)**	14.3% (12)	2.52	84
Improving aesthetic quality of existing pedestrian facilities.	7.2% (6)	18.1% (15)	13.3% (11)	**61.4% (51)**	3.29	83
				answered question		**95**
				skipped question		**19**

15. What is your gender?		
	Response Percent	Response Count
M	43.6%	44
F	**56.4%**	57
	answered question	**101**
	skipped question	**13**

16. What is your age?		
	Response Percent	Response Count
0-18	5.9%	6
19-25	13.7%	14
26-35	20.6%	21
36-45	**22.5%**	23
46-55	21.6%	22
56-65	11.8%	12
65 and older	3.9%	4
	answered question	**102**
	skipped question	**12**

17. Where do you live?		Response Percent	Response Count
Conover		**74.5%**	76
Newton		10.8%	11
Hickory		4.9%	5
Claremont		6.9%	7
Other		2.9%	3
	answered question		**102**
	skipped question		**12**

18. What is your living and work status in Conover?		Response Percent	Response Count
Live in Conover only		**47.6%**	49
Work in Conover only		13.6%	14
Live and work in Conover		22.3%	23
Neither live nor work in Conover		16.5%	17
	answered question		**103**
	skipped question		**11**

7. Are there places you would like to be able to walk that you cannot at this time?

Roadway Corridor	Number of Responses
Downtown	9
Wal Mart	8
YMCA	5
Shuford Elementary	2
KMart	2
Food Lion	2
CVS	2

11. What do you think are the top roadway corridors most needing sidewalk or trail improvements?

Roadway Corridor	Number of Responses
NC 16 - North to WalMart	21
Conover Blvd. (US 70)	13
NC 16 - South to Newton	8
County Home	7
Rock Barn Road	5
Thornburg	4
10th St. NW	4
Emmanuel Church Rd	3
Five Points intersection	3

12. Do you have suggestions about specific programming or pedestrian related policies that you would like to see enacted?

- Bike Greenway
- Bike greenways!
- Bike safety/ walk to work Pedestrian friendly bus stops- Holiday Inn- Hwy 70 needs bus stop bench. Would like a dog park.
- city should build more sidewalks
- crack down on aggressive drivers during the day
- dog walking areas with proper clean-up (bags and waste containers) along the route.
- Painted crosswalks in areas outside the immediate downtown

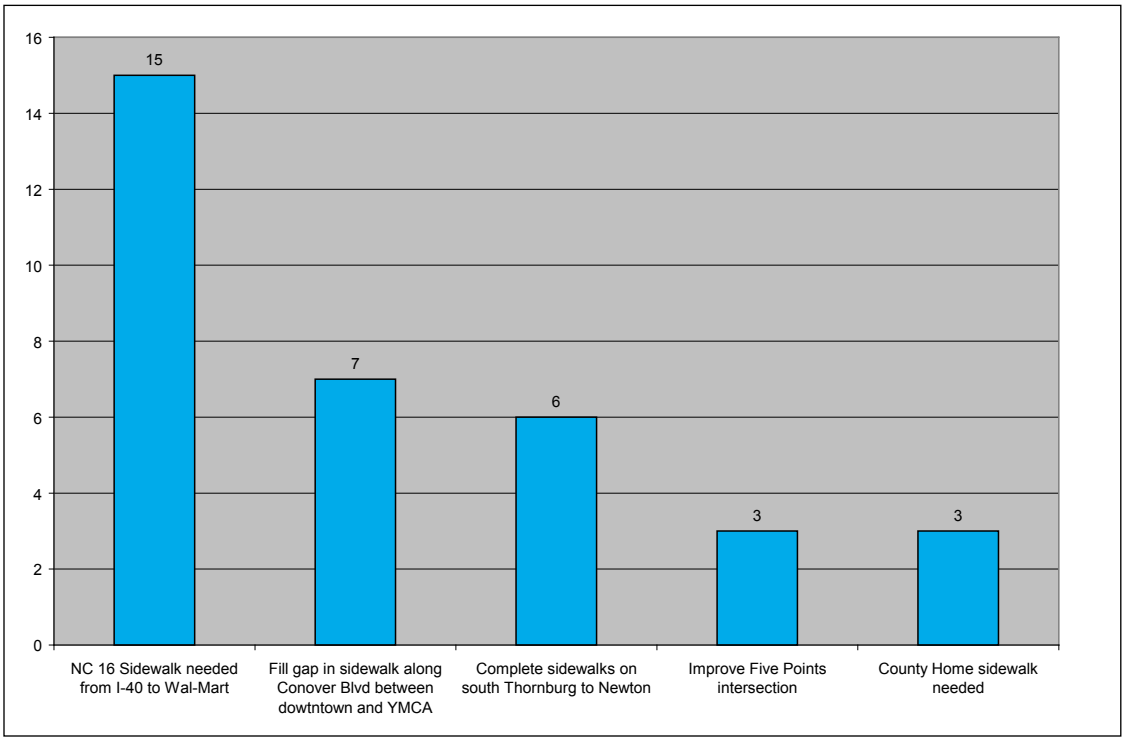
• FROM THE DOWNTOWN AREA TO K-MART THE SPEED LIMIT SHOULD BE NO MORE THAN TWENTY MPH. THEY WILL RUN OVER YOU TRYING CROSS OVER TO GET TO THE WALKING TRAIL AND THERE SHOULD BE BETTER LIGHTING FOR SAFETY!
• I would like to see sidwalks placed on Rock Barn Road fom Old oak apartments to Thornburg Drive and to Cvs, We have alot of residents that walk to CVS and to Thornburg drive for exercise and to walk there dogs.walking with the traffic on Rockbarn is dangerous.
• I'd like to see greenways and trails for recreational walking, running and biking.
• I'd like to see new businesses, especially restaurants and cafes, be geared more toward walking patrons and those that would like the option to relax outside.
• In addition to adding sidewalks to new development, plan to add sidewalks to existing residential neighborhoods
• Incentives/rewards,keeping track of miles walked daily. Medical, insurance, pharmacy involvement.
• Install sidewalk from Rock Barn Rd to HWY 16 ext.
• Just more Walkways
• Just to consider combination walking/bike capable paths
• Mile markers
• Need more sidewalks/trails like the ones up to K Mart. Keep grass mowed!
• Need to install speed humps in high traffic residential areas as in Hickory (e.g. in the Lenoir-Rhyne College area). This is a proven method to reduce speeding in prone areas. Speeding is a major problem in residential neighborhoods. Residential neighborhood limits should be uniformly reduced to 25mph.
• NO- I prefer to criticize + offer no solutions
• Northwest Conover needs better pedestrian access through to center of town.
• I walk and run with a stroller and get very upset when sidewalks are filled with garbage cans, leaves and sticks, most often leaving me to walk into the street.

14. What is your zip code?

28613 - 70
28658 - 11
28610 - 4
28601 - 3
28602 - 2

A.4 Map Markup Results

This section presents all map markups that were provided by respondents at both public workshops. A tally graph of the most common responses can be seen below with a listing of all map markup responses following.



Conover Map #1 (Public Workshop #1), 2/12/08

- Need sidewalk along Rock Barn
- Regional connection to Catawba River
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Improve Five Points intersection
- Improve Five Points intersection
- Improve Five Points intersection
- Provide greenway along Lyle Creek
- Provide greenway along easement parallel to County Home
- Provide sidewalk along County Home south of I-40
- Provide sidewalk along Fourth from Coutny Home to First
- Fill gap in sidewalk on Fourth to downtown

- Fill gap in sidewalk along Conover Blvd between downtown and YMCA
- Fill gap in sidewalk along Conover Blvd between downtown and YMCA
- Fill gap in sidewalk along Conover Blvd between downtown and YMCA
- Fill gap in sidewalk along Conover Blvd between downtown and YMCA
- Fill gap in sidewalk along Conover Blvd between downtown and YMCA
- Fill gap in sidewalk along Conover Blvd between downtown and YMCA
- Fill Gap in sidewalk along McLin Creek
- Complete sidewalks along Thornburg south of YMCA
- Regional connection to Newton south of Thornburg
- Regional connection to Newton south of Thornburg
- Provide greenways along creeks, including a connection to Lyle Creek Elementary

Conover Map #2 (Public Workshop #2),5/20/08

- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Provide sidewalk along NC 16 from I-40 to Wal-Mart
- Put sidewalks on all roads
- Fill gaps in exisitng sidewalk
- More sidewalks in L'echo Park subdivision
- Put sidewalk on County Home
- Provide sidewalk along Conover Blvd from downtown to YMCA
- Extend sidewalk along Thornburg south to Newton
- Extend sidewalk along Thornburg south to Newton
- Extend sidewalk along Thornburg south to Newton
- Need sidewalk along Emmanuel Church Rd
- Need sidewalks near Riverbend Park
- Extend sidewalks on East end of town

Figure A.1: Pictures from the first public workshop in February 2008.

Figure A.2: Pictures from the second public workshop in May 2008.

Figure A.3: Map markups from both public workshops.

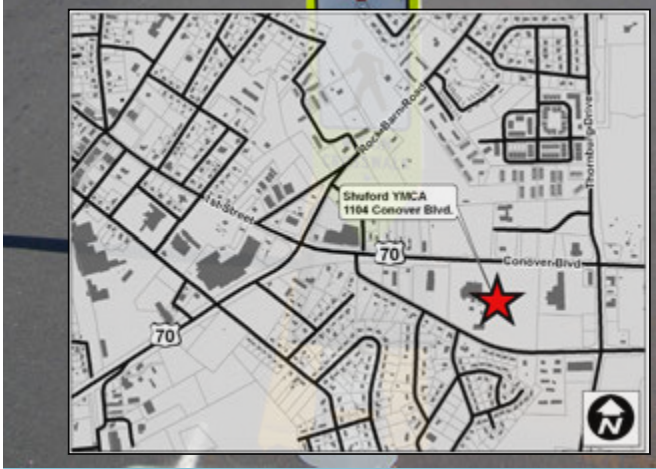
CONOVER PEDESTRIAN TRANSPORTATION PLAN

PUBLIC WORKSHOP

The *Conover Pedestrian Transportation Plan* is early in its development and we need your input! One of the major goals is providing a safe, integrated, connected pedestrian system to serve destinations around Conover. Improvements can include sidewalks, multi-use paths, and safer intersection crossings.

Are there places you would like to access by foot around town? Are there areas that you think are unsafe? What types of pedestrian facilities do you prefer?

Come help shape the future of your community!



FEBRUARY 12, 2008, 5-7PM

SHUFORD YMCA

For more information, please contact Lance Hight, Interim Planning Director, City of Conover, 828-464-1191.

Figure A.4: Flyer advertising the first public meeting. Two flyers were produced during this planning process (one for each workshop).

Figure A.5: Page 1 of May project newsletter. Two newsletters were developed during this planning process.

CONOVER PEDESTRIAN TRANSPORTATION PLAN

PROJECT NEWSLETTER

The City of Conover's Pedestrian Transportation Plan is in Draft form, awaiting public review. Since the beginning of the project in late 2007, those involved have been studying the City's current conditions for pedestrians, and have been exploring ways in which improvements could be made.

The Pedestrian Plan is part of a statewide matching grants program from NCDOT that is designed to support local communities in their efforts to plan for bicycle and pedestrian improvements.

The first public input opportunity took place in February, at the Shuford YMCA. Local residents provided input by identifying places they want to walk to and from; places in need of safety improvements; and potential trail linkages. Residents also filled out comment forms, on which they indicated their position on many pedestrian-related issues, including (but not limited to) safety, connectivity, active living, and specific intersections and roadways in need of improvement.

^ The sidepath along 1st is an excellent facility bringing pedestrians across I-40 safely.

^ The first public workshop was successful, as the City heard from residents where improvements are needed.

There are still several ways to help shape the future of Conover in terms of walkability and connectivity. High levels of public participation will make this plan more effective for implementation and more relevant for the particular needs of local residents:

1. Online Survey: The survey will take about five minutes and can be found at:

http://www.ci.conover.nc.us/

The on-line survey questions are designed to get a better understanding of how often residents currently walk; the barriers to walking in your community; desired future walking opportunities; and priorities for future improvements.

2. 2nd Public Input Opportunity:
May 20, 2008; 5:00-7:00 PM; Shuford YMCA fields. Drop in anytime between 5:00 and 7:00 PM to talk with Steering Committee members, City staff, and

PROJECT NEWSLETTER #2 MAY 2008 CITY OF CONOVER, NC

Photo renderings, such as the one illustrated here at Conover School, help visualize how small improvements can make a big difference.

project consultants and learn about the main components and recommendations of the Draft Plan. This is also an opportunity to view the Plan maps and write and/or draw your comments on them.

3. Support the Adoption of the Final Plan:
In the summer of 2008, the Final Plan will be ready for adoption by the City of Conover. It is critical that the Plan be officially adopted in order for its recommendations to be carried-out. Also, the adoption of the Plan will send a clear message to outside funding sources that the City of Conover has a well thought-out and planned set of pedestrian improvements, making them more likely to fund projects. Be sure to write a letter of support to the City Council, or show up to support the Plan when it goes before the Council this summer.

Lance Hight
Planning Director
Conover City Hall
101 1st Street East
Conover, NC 28613
(828) 464-1191
lance.hight@conovernc.gov

PROJECT SNAPSHOT

The goals of this Plan are as follows:

- *Improve connectivity*
- *Improve intersection crossing for pedestrians*
- *Provide strategies for improvements in underserved areas*
- *Prioritize the pedestrian facility improvements*
- *Update current policies*
- *Enhance community programming*
- *Design roadways and sidewalks to encourage walking*
- *Create awareness of economic and health benefits of walking*

Figure A.6: Page 2 of May project newsletter. Two newsletters were developed during this planning process.

Appendix B: Prioritization

B.0 Overview

The prioritization process began by making a list of all the roadways in the study area that make up the overall pedestrian network. The corridors were then broken down into segments at logical points, such as major intersections. Most segments are under a mile long, with several just over a mile.

The total list of segments consists of nearly sixty recommend improvements for pedestrian facilities, specifically sidewalks. Segments for recommended trails were considered separately and are described briefly below. All crossing improvement projects have high priority because of the direct interaction between motorists and pedestrians in these spaces.

The criteria used to rank each segment is custom designed for Conover, based on public input, steering committee input, and data collected pertaining to Conover's existing conditions. Furthermore, the criteria were weighted based on an averaging of Steering Committee member weighting. Specifically, the following criteria and weights were used:

- Top 10 "Most in Need of Improvement" from Public Survey (5 points)
- Direct Access to a School (5 points each)
- School Proximity (1/2 mile radius) (5 points each)
- Direct Access to/from an Existing Trail (4 points each)
- Connections to Downtown (4 points each)
- Direct Access to/from an Existing (or funded) sidewalk facility (4 points each)
- Parks/Rec/Playground Proximity (1/2 mile radius) (3 points each)
- Direct Access to/from YMCA (3 points each)
- Regional Connection and/or Interstate Highway Crossing (3 points each)
- Integrates with Bus Route Network (3 points)
- Direct Access to/from Proposed Rail Transit (3 points)
- Direct Access to/from Higher Density Residential Areas (3 points)
- Direct Access to/from Future Development (2 points)
- Direct Access to Commercially Zoned Areas (2 points)
- Direct Access to Mixed-Use Areas (2 points each)
- Direct Access to/from a Proposed Greenway (2 points each)

- Route with Reported Pedestrian Accident (1 point each)

Some priority segments have sections of existing sidewalk while others have none. Even though sidewalk may exist for some priority segments, crosswalks and sidewalk maintenance should become a priority because of the segment's importance in the overall network.

As described in Chapter 3, the Lyle Creek corridor is a tremendous opportunity for a greenway corridor as development continues. The natural first phase, higher priority segment is shown on page 3-16 and runs from County Home/10th to the back of Wal-Mart. Opportunity is great here with existing, dedicated open space and a sewer easement corridor. This entire corridor should be developed into a greenway when opportunity arises such as new development. With the great potential of providing recreation and transportation, this greenway should be a priority of the City.

B.1 Prioritization Table

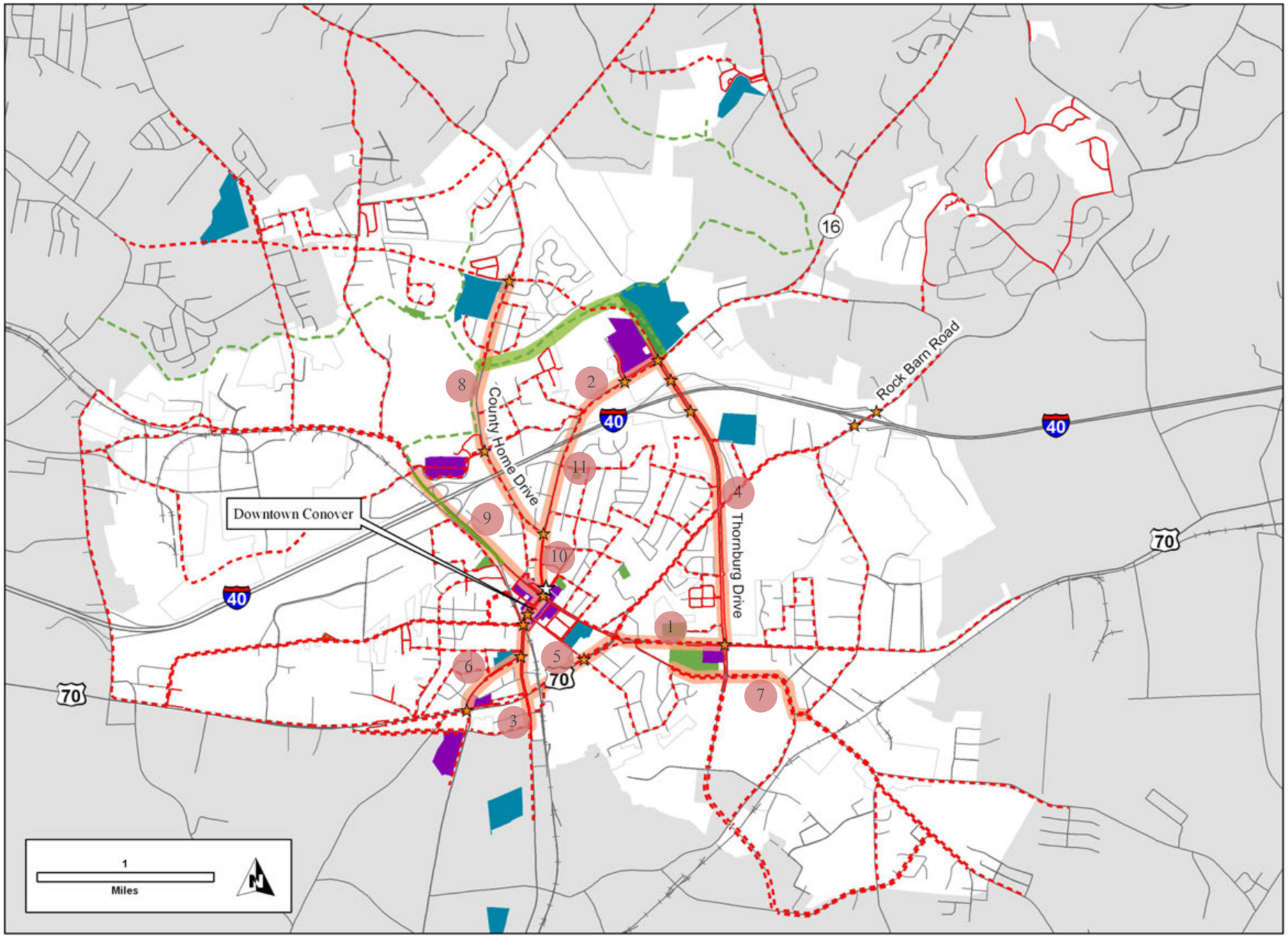
The following page contains the prioritization table for pedestrian corridors. While these rankings represent where there is need, pedestrian facilities should be built when opportunity arises, regardless of their ranking here.

Corridor	From	To	Top 1-5 Public Requested	Top 6-10 Public Requested	Direct Access to/from a School	School Proximity (1/2 mile radius)	Direct Access to/from an Existing (or funded) Greenway	Connections to Downtown or Central Business Zoning	Direct Access to/from an existing (or funded) sidewalk facility	Parks/Rec/Playgrounds Proximity (1/2 mile radius)	Direct Access to/from YMCA	Regional Connection and/or Interstate Highway Crossing	Integrates with Bus Route Network	Direct Access to/from Proposed Rail Transit	Direct Access to/from Higher Density Residential Areas	Direct Access to/from Future Development	Direct Access to Commercially Zoned Areas	Direct Access to Mixed-Use Areas	Direct Access to/from a proposed Greenway	Route with a Reported Pedestrian Accident	Totals	Map ID
			5	5	5	5	4	4	4	3	3	3	3	3	3	2	2	2	2	1	59	
US 70/1st St East	Thornburg	1st Ave South	5	5	5	5	0	4	4	3	3	3	3	0	3	0	2	0	0	1	46	1
NC 16/1st Ave North	Thornburg	8th St NE	5	0	5	5	0	0	4	3	0	3	3	0	3	0	2	0	2	1	36	2
1st Ave South	1st St West	Boundary	0	0	5	5	0	4	4	3	0	3	3	3	3	0	2	0	0	1	36	3
Thornburg	NC 16	US 70	0	5	5	5	0	0	4	3	3	3	3	0	3	0	2	0	0	0	36	4
US 70/Conover Blvd W	1st St East	1st Ave South	5	0	0	5	0	4	4	3	0	3	3	0	3	0	2	0	2	0	34	5
7th St Pl SW	1st Ave South	US 70/Conover Blvd W	0	0	5	5	0	4	4	3	0	3	3	0	3	0	2	0	0	2	34	6
Emmanuel Church/1st St SE	Fox	McLin Creek	0	5	0	5	0	4	4	3	3	0	3	0	3	0	2	0	0	1	33	7
County Home	Northern	10th	5	0	5	5	0	0	4	3	0	0	3	0	3	0	2	0	2	1	33	8
1st St West	Punch Loop/10th St	1st Ave South	0	0	0	5	4	4	4	3	0	3	3	0	0	0	2	0	2	3	33	9
1st Ave N/NC 16	County Home	1st St West	5	0	0	5	0	4	4	3	0	3	3	0	3	0	2	0	0	1	33	10
1st Ave North	8th St	1st St East	5	0	0	5	0	4	4	3	0	3	3	0	3	0	2	0	0	1	33	11
NC 16	C and B Farm	Thornburg	5	0	5	5	0	0	4	0	0	3	3	0	0	0	2	2	2	1	32	
3rd St SE	1st Ave South	13th Ave SE	0	0	5	5	0	4	4	3	0	3	3	0	3	0	2	0	0	0	32	
5th Ave SE/NE	3rd St SE	2nd St NE	0	0	5	5	0	4	4	3	0	3	3	0	3	0	2	0	0	0	32	
US 70	McLin Creek	Thornburg	5	0	0	0	0	4	4	3	3	3	3	0	3	0	2	0	0	0	30	
C and B Farm	Skyhawk	NC 16	0	0	5	5	0	0	4	0	0	3	3	0	3	2	0	2	2	0	29	
6th St SW	1st Ave South	Eastway	0	0	5	5	0	4	4	3	0	0	3	0	3	0	2	0	0	0	29	
2nd	1st St West	8th St NE	0	0	0	5	0	4	4	3	0	3	3	0	3	0	2	0	0	1	28	
6th St	Thornburg	US 70	0	0	0	5	0	4	4	3	0	3	3	0	3	0	2	0	0	0	27	
Thornburg	US 70	Keisler	0	5	0	0	0	4	4	3	3	3	3	0	0	0	2	0	0	0	27	
3rd St/Fox/St David's	US 70	Emmanuel Church	0	0	0	5	0	4	4	3	3	3	0	0	3	0	2	0	0	0	27	
County Home	Herman Sipe	Northern	5	0	5	5	0	0	4	3	0	0	0	0	3	0	0	0	0	2	27	
4th St SW	"Hines Park"	Main	0	0	0	5	0	4	4	3	0	0	3	3	3	0	2	0	0	0	27	
Reese/4th St Pl SW	4th St SW	4th St SW	0	0	0	5	0	4	4	3	0	0	3	3	3	0	2	0	0	0	27	
8th Ave SW/2nd St Pl SW	Reese	4th St Pl SW	0	0	0	5	0	4	4	3	0	0	3	0	3	0	2	0	0	3	27	
3rd Ave NW	1st St West	County Home	0	0	0	5	0	4	4	3	0	3	3	0	3	0	2	0	0	0	27	
3rd Ave NE	1st St East	5th St NE	0	0	0	5	0	4	4	3	0	3	3	0	3	0	2	0	0	0	27	
Rock Barn	McLin Creek	Thornburg	5	0	0	5	0	4	4	0	0	0	3	0	3	0	2	0	0	0	26	
County Home	10th	NC 16	5	0	0	0	0	0	4	3	0	3	3	0	3	0	2	0	2	1	26	
10th St Pl NW	NC 16	1st St West	0	5	0	0	4	0	4	3	0	3	3	0	0	0	2	0	2	0	26	
US 70/Conover Blvd W	1st St East	Boundary	5	0	0	5	0	0	4	0	0	3	3	0	3	0	2	0	0	1	26	
Rock Barn	St John's Church	McLin Creek	5	0	0	5	0	4	0	0	0	3	0	0	3	0	2	0	2	1	25	
3rd St NE	1st Ave North	5th Ave NE	0	0	0	5	0	0	4	3	0	3	3	0	3	0	0	0	0	1	22	
Hunsucker	Thornburg	Rock Barn	0	0	5	5	0	0	4	0	0	0	3	0	3	0	0	0	0	0	20	
Boundary	US 70/Conover Blvd West	N Main Ave	0	0	0	5	0	0	4	0	0	3	3	0	3	0	2	0	0	0	20	
2nd St. NE	2nd Ave. NE	5th Ave. NE	0	0	0	5	0	4	4	3	0	0	0	0	3	0	0	0	0	1	20	
Section House	Webb Murray Elementary	Wagner	0	0	5	5	0	0	4	0	0	0	0	0	3	0	0	0	0	0	17	
N Main Ave	Boundary	20th St	0	0	0	5	0	0	4	0	0	0	3	0	3	0	2	0	0	0	17	
Northwest Blvd	US 70/Conover Blvd West	20th St W	0	0	0	5	0	0	4	0	0	3	0	0	3	0	2	0	0	0	17	
St John's Church	NC 16	Rock Barn	0	0	0	5	0	0	0	0	0	3	3	0	3	0	0	0	2	0	16	
Emmanuel Church	McLin Creek	Burris	0	5	0	0	0	0	0	0	0	0	3	0	3	0	2	0	0	3	16	
8th Ave NW/15thSt NW	County Home	County Home	0	0	5	5	0	0	0	0	0	0	3	0	3	0	0	0	2	1	16	
8thStNE/3rdAveNE/7thStPlNE/6thAveNE/6thStNE	NC 16	Rock Barn	0	0	0	5	4	0	4	3	0	0	0	0	0	0	0	0	0	0	16	
US 70	McLin Creek	City Limits	5	0	0	0	0	0	4	0	0	3	0	0	3	0	0	0	0	0	15	
Herman Sipe	Northern	1st	0	0	0	5	0	0	0	3	0	0	0	0	3	0	2	0	2	0	15	
US 70A	Section House	10th/Punch Loop	0	0	0	0	4	4	0	0	0	0	3	0	0	0	2	0	2	0	15	
4th St SW	US 70	"Hines Park"	0	0	0	0	0	0	4	3	0	3	3	0	0	0	2	0	0	0	15	
Oak Leaf/Newhall/Eastover	Section House	Herman Sipe	0	0	0	5	0	0	4	3	0	0	0	0	3	0	0	0	0	0	15	
McLin Creek	Rock Barn	US 70	0	0	0	5	0	4	0	0	0	3	0	0	0	0	2	0	0	0	14	
8th Ave SW	US 70	6th Ave. Dr. SW	0	0	0	5	0	0	4	3	0	0	0	0	0	0	2	0	0	0	14	
4th St	6th St	Thornburg	0	0	0	0	0	0	4	3	0	0	3	0	3	0	0	0	0	0	13	
Northern/Indian Springs	Herman Sipe	Herman Sipe	0	0	0	5	0	0	0	3	0	0	0	0	3	0	0	0	2	0	13	
5th Ave NE	1st Ave North	3rd Ave NE	0	0	0	0	0	0	4	3	0	3	0	0	3	0	0	0	0	0	13	
13th St NW	County Home	Road's End	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	2	1	13	
20th St	N Main Ave	McLin Creek	0	0	0	5	0	0	0	0	0	0	3	0	3	0	0	0	0	1	12	
Fairgrove Church	US 70A	US 70	0	0	0	0	0	0	0	0	0	3	3	0	3	0	2	0	0	0	11	
2nd Ave. Dr. NE/5th St.Pl.NE/4th Ave.NE/6th St. NE	5th St. NE	Rock Barn	0	0	0	5	0	0	0	3	0	0	0	0	3	0	0	0	0	0	11	
Rock Barn	St John's Church	Shook	5	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	10	
Herman Sipe	Northern	County Home	0	0	0	0	0	0	4	3	0	0	0	0	3	0	0	0	0	0	10	
Rock Bridge	St John's Church	Golf	0	0	0	0	0	0	4	0	0	0	0	0	3	0	0	0	2	0	9	
11thStNW/3rdAv/11thStPlNW/2ndAvNW	County Home	NC 16	0	0	0	0	0	0	4	0	0	3	0	0	0	0	0	0	2	0	9	
4th Ave. NE	5th St. NE	7th St. Pl. NE	0	0	0	5	0	0	0	3	0	0	0	0	0	0	0	0	0	0	8	
Mooreland/2nd/Bolick/4th/Deal/5th/Parlier	US 70	US 70	0	0	0	0	0	0	4	0	0	3	0	0	0	0	0	0	0	0	7	
Section House	Wagner	1st	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	2	0	7	
McLin Creek	US 70	Keisler	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	1	7	
7th Ave. SW/8th St. SW	US 70	4th Ave. SW	0	0	0	5	0	0	0	0	0	0	0	0	0	0	2	0	0	0	7	
NC 16	Angle	C and B Farm	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	6	
Fairway Dr. SW	US 70	Eastway Lane SW	0	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	6	
Keisler/Keisler Dairy	Emmanuel Church	Heart	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	0	0	1	6	
NC 16	Thornburg	Burris	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	6	
Lee Cline	County Home	Stafford	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	5	
US 70A	Highland	Section House	0	0	0	0	0	0	0	0	0	3	0	0	0	0	2	0	0	0	5	
Burris	NC 16	Emmanuel Church	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	
Travis	Emmanuel Church	Burris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	3	

Some priority segments have sections of existing sidewalk while others have none. Even though sidewalk may exist for some priority segments, crosswalks and sidewalk maintenance should become a priority because of the segment's importance in the overall network. See map on the following page for priority corridors and existing/recommended pedestrian facilities. The Top 11 are labeled in the map on the following page.

B.2 Prioritization map

The following map contains the Top 11 priority sidewalk segments (as designated above), top priority greenway segment, and all crossing improvement projects. All crossings are high priority as these spaces feature direct interaction between motorists and pedestrians.



Prioritization Map

Map B.1

Legend

- Intersection Improvement
- City Hall
- Top 10 Priority Corridors
- Top Greenway Priority
- Sidewalk - Proposed
- Sidewalk - Existing
- Crosswalk - Existing
- Greenway Trail - Existing
- Greenway Trail - Proposed
- Major Road
- Local Road
- School Property
- Park Land
- Commercial Area
- Conover ETJ

Appendix C: Cost Estimates

C.0 Cost Considerations[1]

The actual cost of providing sidewalks is different for each region of the country and varies with the season. Actual bid prices are also influenced by how busy contractors are at the time of construction. The cost of constructing concrete sidewalks alone is approximately $11 per square foot, while adding concrete curb and gutter to a project can add as much as $15 per linear foot.[2]

Factors to consider when calculating the cost of sidewalks

1. Presence of curb and gutter
The costs of providing curb and gutter, which presumes the need to also provide a street drainage system, run much higher than the cost of sidewalk alone.

2. Number of driveways
To comply with ADA, many existing driveways must be replaced with ones that provide a level passage at least 0.9m (3 ft) wide. It can also be advantageous to inventory all existing driveways to see if any can be closed, resulting in a cost-savings.

3. Number of intersections
While intersections represent a reduction in the sidewalk length, the cost of curb ramps and additional traffic control at each intersection should be considered.

4. Obstacles to be removed
The cost for moving or removing obstacles such as utility poles, signposts, and fire hydrants vary too much to be itemized here; however, they are required to be moved if they obstruct access. These costs must be calculated individually for each project.

5. Structures
While minor sidewalk projects rarely involve new structures such as a bridge, many projects with significant cuts and fills may require retaining walls and/or culvert extensions. The costs of retaining walls must be calculated individually for each project.

6. Right-of-way
Most sidewalk projects can be built within existing rights-of-way (especially infill

projects); some projects may require limited acquisition of additional right-of-way easement. An alternative to acquiring right-of-way is to narrow the roadway, which should also consider the needs of bicyclists (e.g., through bike lanes or shoulders, at a minimum of 1.5 m (5 ft)).

7. Miscellaneous factors
Planters, irrigation, benches, decorative lampposts, and other aesthetic improvements cost money, but they are usually worthwhile if the impetus for the project is to create a more pleasant and inviting walking environment.

When project costs appear to be escalating due to one or more of the above-listed items, especially retaining walls or acquiring right-of-way, consideration may be given to narrowing the sidewalk in constrained areas as a last resort. The full sidewalk width should be resumed in non-constrained areas—this is preferable to providing a narrow sidewalk throughout, or dropping the project because of one difficult section.

Tips to Reduce Total Costs

1. Stand-alone vs. integrated within another project
Sidewalks should always be included in road construction projects. Stand-alone sidewalk projects cost more than the same work performed as part of a larger project. Sidewalks can be piggybacked to projects such as surface preservation, water or sewer lines, or placing utilities underground. Besides the monetary savings, the political fallout is reduced, since the public doesn't perceive an agency as being inefficient (it is very noticeable if an agency works on a road, then comes back to do more work later). The reduced impacts on traffic are a bonus to integration.

2. Combining Projects
A cost-savings can be achieved by combining several small sidewalk projects into one big one. This can occur even if the sidewalks are under different jurisdictions, or even in different localities, if they are close to each other. The basic principle is that bid prices drop as quantities increase.

C.1 Cost Estimates

Table C.1 uses the amount of $11/square foot to provide an estimate for each segment of the Top 10 priorities of the Proposed Pedestrian Network. $11/square foot was chosen to be conservative but this number is likely to increase. Some pedestrian network segments in Conover already have sections of existing sidewalk. Existing sections of sidewalk were subtracted from the overall construction length of each respective network segment. This was all taken into consideration when developing the following cost estimates.

Ancillary facilities were taken into consideration when known for the corridor. Per unit cost estimates of pedestrian facilities are provided in Table C.3.

Tables C.1 & C.2 list top priority sidewalk and greenway projects that should be incorporated into the local Capital Improvements Program (CIP).

Corridor	From	To	Segment Length (linear foot)	Existing Sidewalk Single Side (linear foot)	Existing Sidewalk Double Side (linear foot)	Sidewalk Recommendation
US 70/1st St East	Thornburg	1st Ave South	5808	4300	1422	Double
NC 16/1st Ave North	Thornburg	8th St NE	4440	200	0	Single
1st Ave South	1st St West	Boundary	4500	4500	3700	Single
Thornburg	NC 16	US 70	8980	8980	8980	Built*
US 70/Conover Blvd W	1st St East	1st Ave South	3116	0	0	Single/Double
7th St Pl SW	1st Ave South	US 70/Conover Blvd West	2424	1396	1302	Single
Emmanuel Church/1st St SE	Fox	McLin Creek	4801	0	0	Double
County Home	Northern	1st Ave North	8400	500	0	Single (Greenway for segment)
1st St West	Punch Loop/10th St	1st Ave South	5370	5370	0	Built*
1st Ave N/NC 16	County Home	1st St West	1975	1975	1975	Built*
1st Ave North	8th St	County Home	2095	2095	0	Built*

Corridor	From	To	Sidewalk Needed (linear foot)	Unit Cost (per sq. foot)	Width (5')	Total Estimated Cost
US 70/1st St East	Thornburg	1st Ave South	5894	$11	5	$324,170.00
NC 16/1st Ave North	Thornburg	8th St NE	4240	$11	5	$233,200.00
1st Ave South	1st St West	Boundary	800	$11	5	$44,000.00
Thornburg	NC 16	US 70	0	$11	5	$0.00
US 70/Conover Blvd W	1st St East	1st Ave South	4232	$11	5	$232,760.00
7th St Pl SW	1st Ave South	US 70/Conover Blvd West	1028	$11	5	$56,540.00
Emmanuel Church/1st St SE	Fox	McLin Creek	9602	$11	5	$528,110.00
County Home	Northern	1st Ave North	5600 (SW); 2100 (greenway)	$11	Sidewalk(5'); Greenway (10')	$539,000.00
1st St West	Punch Loop/10th St	1st Ave South	0	$11	5	$0.00
1st Ave N/NC 16	County Home	1st St West	0	$11	5	$0.00
1st Ave North	8th St	County Home	0	$11	5	$0.00

(Table Cont. From Above).

*Table C.1 - * Indicates a Top Priority Project segment that already contains existing sidewalk facilities. Still, crossing elements, surface condition, and other pedestrian elements should be considered due to the segment's importance in the overall network.*

From	To	Segment Length (linear foot)	Greenway Needed (linear foot)	Unit Cost (per mile)	Total Estimated Cost
Thornburg	1st Ave South	6700	6700	$700,000	$889,000

Table C.2 - Estimate for top priority Lyle Creek Greenway segment. Estimated unit cost per mile includes site preparation (clearing, grubbing, erosion control) and construction of a 10' multi-use paved trail with 2' wide gravel shoulder. Unit cost does not include design costs or additional amenities such as bridges, boardwalk, or culverts.

Table C.3 presents per unit costs of other pedestrian facilities that are recommended for portions of Conover (see Chapter 3).

Facility	Cost per unit
Marked crosswalk	$408
Countdown signal	$1,006
Raised/planted pedestrian refuge island	$12,250
Curb ramp	$538

Table C.3 - These costs were developed by averaging multiple sources including similar North Carolina projects and State bids.

Footnotes:

1 "Recommended Guidelines/Priorities for Sidewalks and Walkways." http://www.walkinginfo.org/pedsafe/moreinfo_sidewalks.cfm#cost. US Department of Transportation, Federal Highway Administration.

2 "Sidewalks and Walkways" http://www.walkinginfo.org/engineering/roadway-sidewalks.cfm. Pedestrian and Bicycle Information Center.

Appendix D: Funding

D.0 Overview

The primary purpose of this appendix is to define and describe possible funding sources that could be used to support the planning, design and development of pedestrian and greenway improvements.

Implementing the recommendations of this plan will require a strong level of local support and commitment through a variety of local funding mechanisms. Perhaps most important is the addition of sidewalk and greenway recommendations from this Plan into the City's Capital Improvement Program (CIP). Pedestrian improvements should become a high priority and be supported through the CIP and local bonds.

The City should also seek a combination of funding sources that include local, state, federal, and private money. Fortunately, the benefits of protected greenways are many and varied. This allows programs in Conover to access money earmarked for a variety of purposes including water quality, hazard mitigation, recreation, air quality, alternate transportation, wildlife protection, community health, and economic development. Competition is almost always stiff for state and federal funds, so it becomes imperative that local governments work together to create multi-jurisdictional partnerships and to develop their own local sources of funding. These sources can then be used to leverage outside assistance. The long term success of this plan will almost certainly depend on the dedication of a local revenue stream for greenways and sidewalks. An important key to obtaining funding is for Conover to have adopted plans for greenway, bicycle, pedestrian or trail systems in place prior to making an application for funding.

For the past two decades, a variety of funding has been used throughout North Carolina to support the planning, design and construction of urban and rural pedestrian and greenway projects. The largest single source of funding for these projects has come from the Surface Transportation Act, first the Intermodal Surface Transportation Efficiency Act (ISTEA) in the early to mid 1990's; then its successor, Transportation Equity Act for the Twenty-First Century (TEA-21) through the early part of 2002; and now the Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The North Carolina Department of Transportation manages and distributes the majority of federal funds that are derived from the Act to

support the development of bicycle/pedestrian/trail development.

The majority of federal funding is distributed to states in the form of block grants and is then distributed throughout a given state for specific projects. State funding programs in North Carolina also support the creation of greenways. North Carolina has developed a broad array of funding sources that address land acquisition, green infrastructure development, and trail facility development.

Additionally, there are many things that the City of Conover can do to establish their own funding for sidewalk and greenway initiatives. For the most part, it takes money to get money. For Conover, it will be necessary to create a local funding program through one of the methods that is defined within this report. Financing will be needed to administer the continued planning and implementation process, acquire parcels or easements, and manage and maintain facilities.

This appendix is organized by first addressing the state sources of funding, then addresses separate federal and local government funding sources. It is by no means an exhaustive list as there are hundreds of additional funding sources available that should be researched and pursued as well.

Greenways Incorporated advises the City of Conover to pursue a variety of funding options and establish pedestrian recommendations from this Plan as a priority in its Capital Improvement Program (CIP). This appendix identifies a list of some of the pedestrian and greenway funding opportunities that have typically been pursued by other communities. Creative planning and consistent monitoring of funding options will likely turn up new opportunities not listed here.

D.1 High Priority Funding Options

While there are a number of funding sources provided in the following pages, these sources should be the highest priority in order to achieve successful implementation. It is critical for local government to step up given the competitiveness and changing, finite availabilities of most funding sources. Details about the following sources are found later in this appendix.

- Local Capital Improvements Program (CIP)
- Local Bond
- Local Fees
- State Transportation Improvement Program (TIP)
- State Powell Bill Funds
- State Safe Routes to School Program
- State Parks and Recreation Trust Fund (PARTF)

- State Health and Wellness Trust Fund (HWTF)
- Private Sources

D.2 State Funding Sources

The most direct source of public-sector funding for the City of Conover will come from state agencies in North Carolina. Generally, these funds are made available to local governments based on grant-in-aid formulas. The single most important key to obtaining state grant funding is for local governments to have adopted plans for greenway, open space, bicycle, pedestrian or trail systems in place prior to making an application for funding. Unfortunately, there is no direct correlation between any of the programs listed and a constant stream of funding for greenway or trail projects and all projects are funded on the basis of grant applications. There is no specific set aside amount that is allocated for greenway and trail development within a given program. Funding is based solely on need and the need has to be expressed and submitted in the form of a grant application. Finally, all of these programs are geared to address needs across the entire state, so all of the programs are competitive and must allocate funding with the needs of the entire state in mind.

The Powell Bill Program is an annual state allocation to municipalities for use in street system maintenance and construction activities. There is considerable local control over Powell Bill Funds (It is not a grant application process). In the past, the State allocated a considerable portion of these revenues for construction purposes. However, budgetary constraints since 2001 have led to a shift of new Powell Bill funds to cover maintenance and operations activities.

Both the Powell Bill reserves and the 2000 Transportation Bond funds are limited funding sources that will eventually be depleted. Further, federal highway funds can be expected to provide only a portion of the future resource needs of the sidewalk construction program. For this reason, the development of future state transportation bond initiatives will be critical for continuing implementation of the sidewalk construction program in the future.

In North Carolina, the Department of Transportation, Division of Bicycle and Pedestrian Transportation (DBPT) has been the single largest source of funding for bicycle, pedestrian and greenway projects, including non-construction projects such as brochures, maps, and public safety information for more than a decade. DBPT offers several programs in support of bicycle and pedestrian facility development. The following information is from NCDOT's interactive web site (www.ncdot.org). Contact the NCDOT, Division of Bicycle and Pedestrian Transportation at 919-807-0777 for more information.

North Carolina programs are listed below. A good starting website with links to many of the following programs is http://www.enr.state.nc.us/html/tax_credits.html.

North Carolina Department of Transportation

Bicycle and Pedestrian Independent Projects Funded Through the Transportation Improvement Program (TIP):

In North Carolina, the Department of Transportation, Division of Bicycle and Pedestrian Transportation (DBPT) manages the Transportation Improvement Program (TIP) selection process for bicycle and pedestrian projects.

Projects programmed into the TIP are independent projects – those which are not related to a scheduled highway project. Incidental projects – those related to a scheduled highway project – are handled through other funding sources described in this section.

The division has an annual budget of $6 million set aside for the construction of bicycle improvements that are independent of scheduled highway projects in communities throughout the state. Eighty percent of these funds are from STP-Enhancement funds, while the State Highway Trust provides the remaining 20 percent of the funding.

Each year, the DBPT regularly sets aside a total of $200,000 of TIP funding for the department to fund projects such as training workshops, pedestrian safety and research projects, and other pedestrian needs statewide. Those interested in learning about training workshops, research and other opportunities should contact the DBPT for information.

A total of $5.3 million dollars of TIP funding is available for funding various bicycle and pedestrian independent projects, including the construction of multi-use trails, the striping of bicycle lanes, and the construction of paved shoulders, among other facilities. Prospective applicants are encouraged to contact the DBPT regarding funding assistance for bicycle and pedestrian projects. For a detailed description of the TIP project selection process, visit: http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html.

Another $500,000 of the division's funding is available for miscellaneous projects.

Incidental Projects – Bicycle and pedestrian accommodations such as bike lanes, widened paved shoulders, sidewalks and bicycle-safe bridge design are frequently included as incidental features of highway projects. In addition, bicycle-safe drainage grates are a standard feature of all highway construction. Most bicycle and pe-

destrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of National Highway System funds and State Highway Trust Funds.

Sidewalk Program – Each year, a total of $1.4 million in STP-Enhancement funding is set aside for sidewalk construction, maintenance and repair. Each of the 14 highway divisions across the state receives $100,000 annually for this purpose. Funding decisions are made by the district engineer. Prospective applicants are encouraged to contact their district engineer for information on how to apply for funding.

Governor's Highway Safety Program (GHSP) – The mission of the GHSP is to promote highway safety awareness and reduce the number of traffic crashes in the state of North Carolina through the planning and execution of safety programs. GHSP funding is provided through an annual program, upon approval of specific project requests. Amounts of GHSP funds vary from year to year, according to the specific amounts requested. Communities may apply for a GHSP grant to be used as seed money to start a program to enhance highway safety. Once a grant is awarded, funding is provided on a reimbursement basis. Evidence of reductions in crashes, injuries, and fatalities is required. For information on applying for GHSP funding, visit: www.ncdot.org/programs/ghsp/.

Funding Available Through North Carolina Metropolitan Planning Organizations (MPOs)

MPOs in North Carolina which are located in air quality nonattainment or maintenance areas have the authority to program Congestion Mitigation Air Quality (CMAQ) funds. CMAQ funding is intended for projects that reduce transportation related emissions. Some NC MPOs have chosen to use the CMAQ funding for bicycle and pedestrian projects. Local governments in air quality nonattainment or maintenance area should contact their MPO for information on CMAQ funding opportunities for bicycle and pedestrian facilities.

Transportation Enhancement Call for Projects, EU, NCDOT

The Enhancement Unit administers a portion of the enhancement funding set-aside through the Call for Projects process. In North Carolina the Enhancement Program is a federally funded cost reimbursement program with a focus upon improving the transportation experience in and through local North Carolina communities either culturally, aesthetically, or environmentally. The program seeks to encourage diverse modes of travel, increase benefits to communities and to encourage citizen involvement. This is accomplished through the following twelve qualifying activities:

1. Bicycle and Pedestrian Facilities
2. Bicycle and Pedestrian Safety

3. Acquisition of Scenic Easements, Scenic or Historic Sites
4. Scenic or Historic Highway Programs (including tourist or welcome centers)
5. Landscaping and other Scenic Beautification
6. Historic Preservation
7. Rehabilitation of Historic Transportation Facilities
8. Preservation of Abandoned Rail Corridors
9. Control of Outdoor Advertising
10. Archaeological Planning and Research
11. Environmental Mitigation
12. Transportation Museums

Funds are allocated based on an equity formula approved by the Board of Transportation. The formula is applied at the county level and aggregated to the regional level. Available fund amount varies. In previous Calls, the funds available ranged from $10 million to $22 million.

The Call process takes place on even numbered years or as specified by the Secretary of Transportation. The Next Call is anticipated to take place in 2008, barring financial constraints related to federal recissions resulting from the war on terror and Hurricane Katrina. For more information, visit: www.ncdot.org/financial/fiscal/Enhancement/

Bicycle and Pedestrian Planning Grant Initiative, managed by NCDOT, DBPT

To encourage the development of comprehensive local bicycle plans and pedestrian plans, the NCDOT Division of Bicycle and Pedestrian Transportation (DBPT) and the Transportation Planning Branch (TPB) have created a matching grant program to fund plan development. This program was initiated through a special allocation of funding approved by the North Carolina General Assembly in 2003 along with federal funds earmarked specifically for bicycle and pedestrian planning by the TPB. The planning grant program was launched in January 2004, and it is currently administered through NCDOT-DBPT and the Institute for Transportation Research and Education (ITRE) at NC State University. Over the past three grant cycles, 48 municipal plans have been selected and funded from 123 applicants. A total of $ 1,175,718 has been allocated. Funding is secured for 2007 at $400,000. Additional annual allocations will be sought for subsequent years. For more information, visit www.itre.ncsu.edu/ptg/bikeped/ncdot/index.html

Safe Routes to School Program, managed by NCDOT, DBPT

The NCDOT Safe Routes to School Program is a federally funded program that was initiated by the passing of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, which establishes a national SRTS program to distribute funding and institutional support to implement SRTS programs in states and communities across the country. SRTS programs facilitate

the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. The Division of Bicycle and Pedestrian Transportation at NCDOT is charged with disseminating SRTS funding.

The state of North Carolina has been allocated $15 million in Safe Routes to School funding for fiscal years 2005 through 2009 for infrastructure or non-infrastructure projects. All proposed projects must relate to increasing walking or biking to and from an elementary or middle school. An example of a non-infrastructure project is an education or encouragement program to improve rates of walking and biking to school. An example of an infrastructure project is construction of sidewalks around a school. Infrastructure improvements under this program must be made within 2 miles of an elementary or middle school. The state requires the completion of a competitive application to apply for funding. For more information, visit www.ncdot.org/programs/safeRoutes/ or contact Leza Mundt at DBPT/NCDOT, (919) 807-0774.

Recreational Trails Program (RTP)
The Recreational Trails Program (RTP) is a grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. This program's intent is to meet the trail and trail-related recreational needs identified by the Statewide Comprehensive Outdoor Recreation Plan. Grant applicants must be able contribute 20% of the project cost with cash or in-kind contributions. The program is managed by the State Trails Program, which is a section of the N.C. Division of Parks and Recreation.

The grant application is available and instruction handbook is available through the State Trails Program website at http://ils.unc.edu/parkproject/trails/home.html. Applications are due during the month of February. For more information, call (919) 715-8699.

Powell Bill Program
Annually, State street-aid (Powell Bill) allocations are made to incorporated municipalities which establish their eligibility and qualify as provided by statute. This program is a state grant to municipalities for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Funding for this program is collected from fuel taxes. Amount of funds are based on population and mileage of town-maintained streets. For more information, visit www.ncdot.org/financial/fiscal/ExtAuditBranch/Powell_Bill/powellbill.html.

North Carolina's Clean Water Management Trust Fund (CWMTF)
This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection. At the end of each fiscal year, 6.5 percent of the unreserved credit balance in North Carolina's General Fund, or a minimum of $30 million, is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies and conservation non-profits to help finance projects that specifically address water pollution problems. CWMTF funds may be used to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits. The fund has provided funding for land acquisition of numerous greenway projects featuring trails, both paved and unpaved. For a history of awarded grants in North Carolina and more information about this fund and applications, visit www.cwmtf.net/.

North Carolina Parks and Recreation Trust Fund (PARTF)
The fund was established in 1994 by the North Carolina General Assembly and is administered by the Parks and Recreation Authority. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. Applicable projects require a 50/50 match from the local government. Grants for a maximum of $500,000 are awarded yearly to county governments or incorporated municipalities. The fund is fueled by money from the state's portion of the real estate deed transfer tax for property sold in North Carolina.

The trust fund is allocated three ways:

- 65 percent to the state parks through the N.C. Division of Parks and Recreation.
- 30 percent as dollar-for dollar matching grants to local governments for park and recreation purposes.
- 5 percent for the Coastal and Estuarine Water Access Program.

For information on how to apply, visit:: www.partf.net/learn.html

Land and Water Conservation Fund – North Carolina (LWCF)
The Land and Water Conservation Fund (LWCF) program is a reimbursable, 50/50 matching grants program to states for conservation and recreation purposes, and through the states to local governments to address "close to home" outdoor recreation needs. LWCF grants can be used by communities to build a trail within one park site, if the local government has fee-simple title to the park site. Grants for a maximum of $250,000 in LWCF assistance are awarded yearly to county governments, incorporated municipalities, public authorities and federally recognized Indian tribes. The local match may be provided with in-kind services or cash. The program's funding comes primarily from offshore oil and gas drilling receipts, with an authorized expenditure of $900 million each year. However, Congress generally

appropriates only a small fraction of this amount. The allotted money for the year 2007 is $632,846.

The Land and Water Conservation Fund (LWCF) has historically been a primary funding source of the US Department of the Interior for outdoor recreation development and land acquisition by local governments and state agencies. In North Carolina, the program is administered by the Department of Environment and Natural Resources. Since 1965, the LWCF program has built a permanent park legacy for present and future generations. In North Carolina alone, the LWCF program has provided more than $63 million in matching grants to protect land and support more than 800 state and local park projects. More than 37,000 acres have been acquired with LWCF assistance to establish a park legacy in our state. For more information, visit: http://ils.unc.edu/parkproject/lwcf/home1.html

North Carolina Farmland Preservation Trust Fund
Established in 1986, the Farmland Preservation Trust Fund was funded by appropriations from the General Assembly. Managed by the N.C. Department of Agriculture and Consumer Services and contracted to the Conservation Trust for N.C (CTNC). The General Assembly has appropriated $2.65 M since 1998. The 2002 General Assembly appropriated $200K; 2003 General Assembly, $0. NCDACS has awarded grants to help local land trusts and counties with farmland protection programs work with farm families to arrange permanent conservation easements on over 4270 acres and large parts of 30 farms. These grants have leveraged over $20 M from other private and public funding sources and donations of development rights from farm owners. Contact CTNC at 919-828-4199. E-mail: info@ctnc.org or Web site: http://www.ctnc.org

Any county that has established by ordinance a farmland preservation program or a qualified, private, non-profit land conservation organization, is eligible to apply for a grant. Grants may be submitted for reimbursement of up to 70% of real costs for transactional expenses in acquiring agricultural conservation easements through donation or purchase, including--but not limited to--documented costs for environmental audits, legal fees, appraisals, surveys, purchase options, personnel expenses for project preparation, and long-term easement monitoring and enforcement costs. Grant requests cannot exceed a maximum of $25,000 per project.

Contact: Conservation Trust for North Carolina, 1028 Washington St, Raleigh, NC 27605. 919-828-4199. Web site: www.ctnc.org. E-mail: info@ctncc.org.

Agriculture Cost Share Program
Established in 1984, this program assists farmers with the cost of installing best management practices (BMPs) that benefit water quality. The program covers as much

as 75 percent of the costs to implement BMPs. The NC Division of Soil and Water Conservation within the NC Department of Environment and Natural Resources administers this program through local Soil and Water Conservation Districts (SWCD). For more information, visit www.enr.state.nc.us/DSWC/pages/agcostshareprogram.html or call 919-733-2302.

North Carolina Natural Heritage Trust Fund
This trust fund, managed by the NC Natural Heritage Program, has contributed millions of dollars to support the conservation of North Carolina's most significant natural areas and cultural heritage sites. The NHTF is used to acquire and protect land that has significant habitat value. Some large wetland areas may also qualify, depending on their biological integrity and characteristics. Only certain state agencies are eligible to apply for this fund, including the Department of Environment and Natural Resources, the Wildlife Resources Commission, the Department of Cultural Resources and the Department of Agriculture and Consumer Services. As such, municipalities must work with State level partners to access this fund. Additional information is available from the NC Natural Heritage Program. For more information and grant application information, visit www.ncnhtf.org/.

North Carolina Adopt-a-Trail Grants
Operated by the Trails Section of the NC Division of State Parks, annual grants are available to local governments for trail and facility construction. Grants are generally capped at about $5,000 per project and do not require a match. The Adopt-A-Trail grant program awards $135,000 annually to local governments, nonprofit organizations and private trail groups for trails projects. The funds can be used for trail building, trail signage and facilities, trail maintenance, trail brochures and maps, and other related uses. Applications for funding may be obtained by contacting a regional trails specialist or the State Trails Program at (919) 715-8699. Applications are due for the each year's funding cycle at the end of February.

Contact: Darrell McBane, State Trails Coordinator, 12700 Bayleaf Church Road, Raleigh, NC 27614 (919) 846-9991. Web site: http://ils.unc.edu/parkproject/trails/grant.html. E-mail: darrell.mcbane@ncmail.net.

North Carolina Division of Water Quality - 319 Program Grants
By amendment to the Clean Water Act Section in 1987, the Section 319 Grant program was established to provide funding for efforts to curb non-point source (NPS) pollution, including that which occurs though stormwater runoff. The U.S. Environmental Protection Agency provides funds to state and tribal agencies, which are then allocated via a competitive grant process to organizations to address current or potential NPS concerns. Funds may be used to demonstrate best management practices

(BMPs), establish Total Maximum Daily Load (TMDL) for a watershed, or to restore impaired streams or other water resources. In North Carolina, the 319 Grant Program is administered by the Division of Water Quality of the Department of Environment and Natural Resources. Each fiscal year North Carolina is awarded nearly $5 million dollars to address non-point source pollution through its 319 Grant program. Thirty percent of the funding supports ongoing state non-point source programs. The remaining seventy percent is made available through a competitive grants process. At the beginning of each year (normally by mid-February), the NC 319 Program issues a request for proposals with an open response period of three months. Approximately $880,000 will be available statewide for distribution to grant recipients.

Grants are divided into two categories: Base and Incremental. Base Projects concern research-oriented, demonstrative, or educational purposes for identifying and preventing potential NPS areas in the state, where waters may be at risk of becoming impaired. Incremental projects seek to restore streams or other portions of watersheds that are already impaired and not presently satisfying their intended uses. State and local governments, interstate and intrastate agencies, public and private nonprofit organizations, and educational institutions are eligible to apply for Section 319 monies. An interagency workgroup reviews the proposals and selects those of merit to be funded.

Contact: North Carolina DWQ, 512 N. Salisbury St. Raleigh, NC 27604. (919) 733-7015
Web site: www.h2o.enr.state.nc.us/nps/Section_319_Grant_Program.htm. E-mail: kimberly.nimmer@ncmail.net.

Small Cities Community Development Block Grants
State level funds are allocated through the NC Department of Commerce, Division of Community Assistance to be used to promote economic development and to serve low-income and moderate-income neighborhoods. Greenways that are part of a community's economic development plans may qualify for assistance under this program. Recreational areas that serve to improve the quality of life in lower income areas may also qualify. Approximately $50 million is available statewide to fund a variety of projects. For more information, visit www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/ or call 919-733-2853.

North Carolina Ecosystem Enhancement Program
Developed in 2003 as a new mechanism to facilitate improved mitigation projects for NC highways, this program offers funding for restoration projects and for protection projects that serve to enhance water quality and wildlife habitat in NC. Information on the program is available by contacting the Natural Heritage Program in the NC Department of Environment and Natural Resources (NCDENR). For more information, visit www.nceep.net/pages/partners.html or call 919-715-0476.

North Carolina Wetlands Restoration Program (NCWRP)
This is a non-regulatory program established by the NC General Assembly in 1996. The goals of the NCWRP are to:

• Protect and improve water quality by restoring wetland, stream and riparian area functions and values lost through historic, current and future impacts.
• Achieve a net increase in wetland acreage, functions and values in all of North Carolina's major river basins.
• Promote a comprehensive approach for the protection of natural resources.
• Provide a consistent approach to address compensatory mitigation requirements associated with wetland, stream, and buffer regulations, and to increase the ecological effectiveness of compensatory mitigation projects.

Additional information about the program and potential funding assistance with the restoration or creation of wetlands can be found at www.h2o.enr.state.nc.us/wrp Contact: Tad Boggs, Ecosystem Enhancement Program Coordinator, NC Wetlands Restoration Program, 1619 Mail Service Center, Raleigh, NC 27699-1619. (919) 715-2227. E-mail: tad.boggs@ncmail.net.

Conservation Reserve Enhancement Program (CREP)
This program is a joint effort of the North Carolina Division of Soil and Water Conservation, the NC Clean Water Management Trust Fund, the Ecosystem Enhancement Program (EEP), and the Farm Service Agency - United States Department of Agriculture (USDA) to address water quality problems of the Neuse, Tar-Pamlico and Chowan river basins as well as the Jordan Lake watershed area.

CREP is a voluntary program that seeks to protect land along watercourses that is currently in agricultural production. The objectives of the program include: installing 100,000 acres of forested riparian buffers, grassed filter strips and wetlands; reducing the impacts of sediment and nutrients within the targeted area; and providing substantial ecological benefits for many wildlife species that are declining in part as a result of habitat loss. Program funding will combine the Federal Conservation Reserve Program (CRP) funding with State funding from the Clean Water Management Trust Fund, Agriculture Cost Share Program, and North Carolina Wetlands Restoration Program.

The program is managed by the NC Division of Soil and Water Conservation. For more information, visit www.enr.state.nc.us/dswc/pages/crep.html

Urban and Community Forestry Assistance Program
The program operates as a cooperative partnership between the NC Division of For-

est Resources and the USDA Forest Service, Southern Region. It offers small grants that can be used to plant urban trees, establish a community arboretum, or other programs that promote tree canopy in urban areas. To qualify for this program, a community must pledge to develop a street-tree inventory, a municipal tree ordinance, a tree commission, and an urban forestry-management plan. All of these can be funded through the program.

Greenways are a specific category within the program "Naturalization Projects or Greenway Development." These types of projects can be combined with tree planting, where native species are used and environmental benefits to the community are emphasized. Planning and development, assessments and studies, maps and drawings, promotional and educational materials may be eligible for funding when matched with a solid volunteer and in-kind staffing match. Forest buffers, connecting corridors between fragmented wooded areas, riparian buffers/protection, or reduction of mowing maintenance in municipal parks through edge naturalization, are some naturalization projects that will be considered for grants. Approximately $200,000 is available each year for grant recipients.

For more information and a grant application, contact the NC Division of Forest Resources and/or visit http://www.dfr.state.nc.us/urban/urban_grantprogram.htm.

Water Resources Development Grant Program
The NC Division of Water Resources offers cost-sharing grants to local governments on projects related to water resources. Of the seven project application categories available, the category which relates to the establishment of greenways is "Land Acquisition and Facility Development for Water-Based Recreation Projects." Applicants may apply for funding for a greenway as long as the greenway is in close proximity to a water body. For more information, see: www.ncwater.org/Financial_Assistance or call 919-733-4064.

North Carolina Health and Wellness Trust Fund (HWTF)
The NC Health and Wellness Trust Fund was created by the General Assembly as one of 3 entities to invest North Carolina's portion of the Tobacco Master Settlement Agreement. HWTF receives one-fourth of the state's tobacco settlement funds, which are paid in annual installments over a 25-year period.

Fit Together, a partnership of the NC Health and Wellness Trust Fund (HWTF) and Blue Cross and Blue Shield of North Carolina (BCBSNC) announces the establishment of Fit Community, a designation and grant program that recognizes and rewards North Carolina communities' efforts to support physical activity and healthy eating initiatives, as well as tobacco-free school environments. Fit Community is one

component of the jointly sponsored Fit Together initiative, a statewide prevention campaign designed to raise awareness about obesity and to equip individuals, families and communities with the tools they need to address this important issue.

All North Carolina municipalities and counties are eligible to apply for a Fit Community designation, which will be awarded to those that have excelled in supporting the following:
• physical activity in the community, schools, and workplaces
• healthy eating in the community, schools, and workplaces
• tobacco use prevention efforts in schools

Designations will be valid for two years, and designated communities may have the opportunity to reapply for subsequent two-year extensions. The benefits of being a Fit Community include:
• heightened statewide attention that can help bolster local community development and/or
• economic investment initiatives (highway signage and a plaque for the Mayor's or County Commission Chair's office will be provided)
• reinvigoration of a community's sense of civic pride (each Fit Community will serve as a model for other communities that are trying to achieve similar goals)
• use of the Fit Community designation logo for promotional and communication purposes.

The application for Fit Community designation is available on the Fit Together Web site:
www.FitTogetherNC.org/FitCommunity.aspx.

Fit Community grants are designed to support innovative strategies that help a community meet its goal to becoming a Fit Community. Eight to nine, two-year grants of up to $30,000 annually will be awarded to applicants that have a demonstrated need, proven capacity, and opportunity for positive change in addressing physical activity and/or healthy eating.

The North Carolina Conservation Tax Credit (managed by NCDENR)
This program, managed by the North Carolina Department of Environment and Natural Resources, provides an incentive (in the form of an income tax credit) for landowners that donate interests in real property for conservation purposes. Property donations can be fee simple or in the form of conservation easements or bargain sale. The goal of this program is to manage stormwater, protect water supply watersheds, retain working farms and forests, and set-aside greenways for ecological communities, public trails, and wildlife corridors. For more information, visit: www.enr.state.nc.us/conservationtaxcredit/.

D.3 Federal Funding Sources

Most federal programs provide block grants directly to states through funding formulas. For example, if a North Carolina community wants funding to support a transportation initiative, they would contact the North Carolina Department of Transportation and not the US Department of Transportation to obtain a grant. Despite the fact that it is rare for a local community to obtain a funding grant directly from a federal agency, it is relevant to list some additional federal programs below.

Community Block Development Grant Program (HUD-CBDG)
The U.S. Department of Housing and Urban Development (HUD) offers financial grants to communities for neighborhood revitalization, economic development, and improvements to community facilities and services, especially in low and moderate-income areas. Several communities have used HUD funds to develop greenways, including the Boulding Branch Greenway in High Point, North Carolina. Grants from this program range from $50,000 to $200,000 and are either made to municipalities or non-profits. There is no formal application process. For more information, visit: www.hud.gov/offices/cpd/communitydevelopment/programs/.

Wetlands Reserve Program
This federal funding source is a voluntary program offering technical and financial assistance to landowners who want to restore and protect wetland areas for water quality and wildlife habitat. The US Department of Agriculture's Natural Resource Conservation Service (USDA-NRCS) administers the program and provides direct payments to private landowners who agree to place sensitive wetlands under permanent easements. This program can be used to fund the protection of open space and greenways within riparian corridors. For more information on all SAFETEA-LU programs, visit http://www.fhwa.dot.gov/safetealu/.

The National Endowment of the Arts
Many organizations seek ways to incorporate more of their community into their pedestrian, and greenway planning. One way to do this is to celebrate the cultural and historic uniqueness of communities. There are some funding opportunities for these types of projects. The National Endowment of the Arts funds arts-related programs through the Design Arts Program Assistance, and provides many links to other federal departments and agencies that offer funding opportunities for arts and cultural programs.

USDA Rural Business Enterprise Grants
Public and private nonprofit groups in communities with populations under 50,000

are eligible to apply for grant assistance to help their local small business environment. $1 million is available for North Carolina on an annual basis and may be used for sidewalk and other community facilities. For more information from the local USDA Service Center, visit: http://www.rurdev.usda.gov/rbs/busp/rbeg.htm

Rivers Trails and Conservation Assistance Program (RTCA)
The Rivers, Trails, and Conservation Assistance Program, also known as the Rivers & Trails Program or RTCA, is the community assistance arm of the National Park Service. RTCA staff provide technical assistance to community groups and local, State, and federal government agencies so they can conserve rivers, preserve open space, and develop trails and greenways. The RTCA program implements the natural resource conservation and outdoor recreation mission of the National Park Service in communities across America.

Although the program does not provide funding for projects, it does provide valuable on-the-ground technical assistance, from strategic consultation and partnership development to serving as liaison with other government agencies. Communities must apply for assistance. For more information, visit: www.nps.gov/ncrc/programs/rtca/ or call Chris Abbett, Program Leader, at 404-562-3175 ext. 522.

Public Lands Highways Discretionary Fund
The Federal Highway Administration administers discretionary funding for projects that will reduce congestion and improve air quality. The FHWA issues a call for projects to disseminate this funding. The FHWA estimates that the PLHD funding for the 2007 call will be $85 million. In the past, Congress has earmarked a portion of the total available funding for projects. For information on how to apply, visit: http://www.fhwa.dot.gov/discretionary/

D.4 Local Funding Sources

The City of Conover will need to create independent, local funding sources to be used to match federal and state grants for pedestrian facility and greenway development. Local support and funding is the most integral component of successful pedestrian facility implementation. This section provides a list of funding options that each of the local governments should consider for future greenway development, sidewalk development, and open space protection.

Municipalities often plan for the funding of pedestrian facilities or improvements through development of Capital Improvement Programs (CIP). In Raleigh, for example, the greenways system has been developed over many years through a dedi-

cated source of annual funding that has ranged from $100,000 to $500,000, administered through the Recreation and Parks Department. CIPs should include all types of capital improvements (water, sewer, buildings, streets, etc.) versus programs for single purposes. This allows municipal decision-makers to balance all capital needs. Typical capital funding mechanisms include the following: capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. Each of these categories are described below.

Capital Reserve Fund
Municipalities have statutory authority to create capital reserve funds for any capital purpose, including pedestrian facilities. The reserve fund must be created through ordinance or resolution that states the purpose of the fund, the duration of the fund, the approximate amount of the fund, and the source of revenue for the fund. Sources of revenue can include general fund allocations, fund balance allocations, grants and donations for the specified use.

Capital Project Ordinances
Municipalities can pass Capital Project Ordinances that are project specific. The ordinance identifies and makes appropriations for the project.

Municipal Service District
Municipalities have statutory authority to establish municipal service districts, to levy a property tax in the district additional to the citywide property tax, and to use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts.

Bonds/Loans
Bonds have been a very popular way for communities across the country to finance their open space and greenway projects. A number of bond options are listed below. If local government decides to pursue a bond issue, consideration should be given to combining the needs of Conover into a single bond proposal. Contracting with a private consultant to assist with this program may be advisable. Since bonds rely on the support of the voting population, an education and awareness program should be implemented prior to any vote.

Revenue Bonds
Revenue bonds are bonds that are secured by a pledge of the revenues from a certain local government activity. The entity issuing bonds, pledges to generate sufficient revenue annually to cover the program's operating costs, plus meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceilings of general obligation bonds, but they are generally

more expensive than general obligation bonds.

General Obligation Bonds
Local governments generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. In this case, the local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. G.O. bonds distribute the costs of open space acquisition and make funds available for immediate purchases. Voter approval is required.

Special Assessment Bonds
Special assessment bonds are secured by a lien on the property that benefits by the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners in the assessment area.

State Revolving Fund (SRF) Loans
Initially funded with federal and state money, and continued by funds generated by repayment of earlier loans, State Revolving Funds (SRFs) provide low-interest loans for local governments to fund water pollution control and water supply related projects including many watershed management activities. These loans typically require a revenue pledge, like a revenue bond, but carry a below market interest rate and limited term for debt repayment (20 years).

Taxes
Many communities have raised money through self-imposed increases in taxes and bonds. For example, Pinellas County residents in Florida voted to adopt a one-cent sales tax increase, which provided an additional $5 million for the development of the overwhelmingly popular Pinellas Trail. Sales taxes have also been used in Allegheny County, Pennsylvania, and in Boulder, Colorado to fund open space projects. A gas tax is another method used by some municipalities to fund public improvements. A number of taxes provide direct or indirect funding for the operations of local governments. Some of them are:

Sales Tax
In North Carolina, the state has authorized a sales tax at the state and county levels. Local governments that choose to exercise the local option sales tax (all counties currently do), use the tax revenues to provide funding for a wide variety of projects and activities. Any increase in the sales tax, even if applying to a single county, must gain approval of the state legislature. In 1998, Mecklenburg County was granted authority to institute a one-half cent sales tax increase for mass transit.

Property Tax
Property taxes generally support a significant portion of local government activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance open space system acquisitions. Because of limits imposed on tax rates, use of property taxes to fund open space could limit the county's or a municipality's ability to raise funds for other activities. Property taxes can provide a steady stream of financing while broadly distributing the tax burden. In other parts of the country, this mechanism has been popular with voters as long as the increase is restricted to parks and open space. Note, other public agencies compete vigorously for these funds, and taxpayers are generally concerned about high property tax rates.

Excise Taxes
Excise taxes are taxes on specific goods and services. These taxes require special legislation and the use of the funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation related activities.

Occupancy Tax
The NC General Assembly may grant towns the authority to levy occupancy tax on hotel and motel rooms. The act granting the taxing authority limits the use of the proceeds, usually for tourism-promotion purposes.

Fees and Service Charges
Several fee options that have been used by other local governments are listed here:

Impact Fees
Impact fees, which are also known as capital contributions, facilities fees, or system development charges, are typically collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth. The intent of these fees is to avoid burdening existing customers with the costs of providing capacity to serve new growth ("growth pays its own way"). Park and greenway impact fees are designed to reflect the costs in-

curred to provide sufficient capacity in the system to meet the additional open space needs of a growing community. These charges are set in a fee schedule applied uniformly to all new development. Communities that institute impact fees must develop a sound financial model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements.

Pursuing park and greenway impact fees will require enabling legislation to authorize the collection of the fees.

In-Lieu-Of Fees
As an alternative to requiring developers to dedicate on-site open space that would serve their development, some communities provide a choice of paying a front-end charge for off-site open space protection. Payment is generally a condition of development approval and recovers the cost of the off-site greenway or open space land acquisition or the development's proportionate share of the cost of a regional parcel serving a larger area. Some communities prefer in-lieu-of fees. This alternative allows community staff to purchase land worthy of protection rather than accept marginal land that meets the quantitative requirements of a developer dedication but falls a bit short of qualitative interests.

Exactions
Exactions are similar to impact fees in that they both provide facilities to growing communities. The difference is that through exactions it can be established that it is the responsibility of the developer to build the greenway or pedestrian facility that crosses through the property, or adjacent to the property being developed.

Streetscape Utility Fees
Streetscape Utility Fees could help support streetscape maintenance of the area between the curb and the property line through a flat monthly fee per residential dwelling unit. Discounts would be available for senior and disabled citizens. Non-residential customers would be charged a per foot fee based on the length of frontage on streetscape improvements. This amount could be capped for non-residential customers with extremely large amounts of street frontage. The revenues raised from Streetscape Utility fees would be limited by ordinance to maintenance (or construction and maintenance) activities in support of the streetscape.

Stormwater Utility Fees
Greenway sections may be purchased with stormwater fees, if the property in question is used to mitigate floodwater or filter pollutants.

Stormwater charges are typically based on an estimate of the amount of impervious surface on a user's property. Impervious surfaces (such as rooftops and paved areas) increase both the amount and rate of stormwater runoff compared to natural conditions. Such surfaces cause runoff that directly or indirectly discharge into public storm drainage facilities and creates a need for stormwater management services. Thus, users with more impervious surface are charged more for stormwater service than users with less impervious surface. The rates, fees, and charges collected for stormwater management services may not exceed the costs incurred to provide these services. The costs that may be recovered through the stormwater rates, fees, and charges includes any costs necessary to assure that all aspects of stormwater quality and quantity are managed in accordance with federal and state laws, regulations, and rules.

Installment Purchase Financing

As an alternative to debt financing of capital improvements, communities can execute installment/ lease purchase contracts for improvements. This type of financing is typically used for relatively small projects that the seller or a financial institution is willing to finance or when up-front funds are unavailable. In a lease purchase contract the community leases the property or improvement from the seller or financial institution. The lease is paid in installments that include principal, interest, and associated costs. Upon completion of the lease period, the community owns the property or improvement. While lease purchase contracts are similar to a bond, this arrangement allows the community to acquire the property or improvement without issuing debt. These instruments, however, are more costly than issuing debt.

Tax Increment Financing

Tax increment financing is a tool to use future gains in taxes to finance the current improvements that will create those gains. When a public project, such as the construction of a greenway, is carried out, there is an increase in the value of surrounding real estate. Oftentimes, new investment in the area follows such a project. This increase sit value and investment creates more taxable property, which increases tax revenues. These increased revenues can be referred to as the "tax increment." Tax Increment Financing dedicates that increased revenue to finance debt issued to pay for the project. TIF is designed to channel funding toward improvements in distressed or underdeveloped areas where development would not otherwise occur. TIF creates funding for public projects that may otherwise be unaffordable to localities. The large majority of states have enabling legislation for tax increment financing.

Partnerships

Another, often overlooked, method of funding pedestrian systems and greenways is to partner with public agencies and private companies and organizations. Partner-

ships engender a spirit of cooperation, civic pride and community participation. The key to the involvement of private partners is to make a compelling argument for their participation.

Major employers and developers should be identified and provided with a "Benefits of Walking"-type handout for themselves and their employees. Very specific routes which make those critical connections to place of business would be targeted for private partners' monetary support, but only after a successful master planning effort. People rarely fund issues before they understand them and their immediate and direct impact. Potential partners include major employers which are located along or accessible to pedestrian facilities such as multi-use paths or greenways. Name recognition for corporate partnerships would be accomplished through signage trail heads or interpretive signage along greenway systems.

Utilities often make good partners and many trails now share corridors with them. Money raised from providing an easement to utilities can help defray the costs of maintenance. It is important to have a lawyer review the legal agreement and verify ownership of the subsurface, surface or air rights in order to enter into an agreement.

Other Local Options

Local Capital Improvements Program

As discussed in Chapter 5 and the beginning of this appendix, a strong local Capital Improvements Program (CIP) commitment, dedicated to sidewalk and greenway development, is critical for long-term implementation. A prioritized table of sidewalk/greenway projects can be found in Chapter 5 to be added to the City's CIP. Currently, $15,000 is allocated for greenway development each year in Black Mountain, NC. In Raleigh, the greenways system has been developed over many years through a dedicated source of annual funding that has ranged from $100,000 to $500,000, administered through the Parks and Recreation Department. In Graham, NC, $100,000 is allocated towards sidewalk development each year.

Facility Maintenance Districts

Facility Maintenance Districts (FMDs) can be created to pay for the costs of on-going maintenance of public facilities and landscaping within the areas of the City where improvements have been concentrated and where their benefits most directly benefit business and institutional property owners. An FMD is needed in order to assure a sustainable maintenance program. Fees may be based upon the length of lot frontage along streets where improvements have been installed, or upon other factors such as the size of the parcel. The program supported by the FMD should include regular maintenance of streetscape of off road trail improvements. The municipality can initiate public outreach efforts to merchants, the Chamber of Commerce, and

property owners. In these meetings, City staff will discuss the proposed apportionment and allocation methodology and will explore implementation strategies.

The municipality can manage maintenance responsibilities either through its own staff or through private contractors.

Local Trail Sponsors

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Types of gifts other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

Volunteer Work

It is expected that many citizens will be excited about the development of a greenway corridor or a new park or canoe access point. Individual volunteers from the community can be brought together with groups of volunteers form church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

Private Foundations and Corporations

Many communities have solicited greenway funding assistance from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available.

Foundation for the Carolinas

Established in 1958, the Foundation for the Carolinas is the one of the largest community foundations in the South. Building A Better Future, the foundation's major grantmaking program, awards grants only to organizations located in or serving the greater Charlotte area. The foundation's specialized grants programs include the African American Community Endowment Fund (Charlotte-Mecklenburg and surrounding communities), HIV/AIDS Consortium Grants (13 Charlotte-area counties), and the Medical Research Grants program (North and South Carolina). The foundation's Web site features information for potential donors; program information, guidelines, and deadlines; listings of senior management and board members; an electronic form for requesting copies of the foundation's publications; and contact information. Web site: http://www.fftc.org/

Land for Tomorrow Campaign
Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals and community groups committed to securing support from the public and General Assembly for protecting land, water and historic places. The campaign is asking the North Carolina General Assembly to support issuance of a bond for $200 million a year for five years to preserve and protect its special land and water resources. Land for Tomorrow will enable North Carolina to reach a goal of ensuring that working farms and forests; sanctuaries for wildlife; land bordering streams, parks and greenways; land that helps strengthen communities and promotes job growth; historic downtowns and neighborhoods; and more, will be there to enhance the quality of life for generations to come. Website: http://www.landfortomorrow.org/

The Robert Wood Johnson Foundation
The Robert Wood Johnson Foundation was established as a national philanthropy in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

- To assure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

For more specific information about what types of projects are funded and how to apply, visit http://www.rwjf.org/applications/.

North Carolina Community Foundation
The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for nonprofit organizations and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina, that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. The foundation also manages various scholarship programs statewide. Web site: http://nccommunityfoundation.org/

Z. Smith Reynolds Foundation
This Winston-Salem-based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. They have

two grant cycles per year and generally do not fund land acquisition. However, they may be able to support Conover in other areas of open space and greenways development. More information is available at www.zsr.org.

Bank of America Charitable Foundation, Inc.
The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to greenways is the Community Development Programs, and specifically the Program Related Investments. This program targets low and moderate income communities and serves to encourage entrepreneurial business development. Visit the web site for more information: www.bankofamerica.com/foundation.

Duke Energy Foundation
Funded by Duke Energy shareholders, this non-profit organization makes charitable grants to selected non-profits or governmental subdivisions. Each annual grant must have:

- An internal Duke Energy business "sponsor"
- A clear business reason for making the contribution

The grant program has three focus areas: Environment and Energy Efficiency, Economic Development, and Community Vitality. Related to this project, the Foundation would support programs that support conservation, training and research around environmental and energy efficiency initiatives. Web site: http://www.duke-energy.com/community/foundation.asp.

American Greenways Eastman Kodak Awards
The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants ($250 to $2,000) to stimulate the planning, design and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying land, holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, and building trails. Grants cannot be used for academic research, institutional support, lobbying or political activities. For more information visit The Conservation Fund's website at: www.conservationfund.org.

National Trails Fund
American Hiking Society created the National Trails Fund in 1998, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. 73 million people enjoy foot trails annually, yet many of our favorite trails need major

repairs due to a $200 million backlog of badly needed maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than $240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project.

Projects the American Hiking Society will consider include:
• Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements.
• Building and maintaining trails which will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage.
• Constituency building surrounding specific trail projects - including volunteer recruitment and support.
Web site: www.americanhiking.org/alliance/fund.html.

The Conservation Alliance
The Conservation Alliance is a non-profit organization of outdoor businesses whose collective annual membership dues support grassroots citizen-action groups and their efforts to protect wild and natural areas. One hundred percent of its member companies' dues go directly to diverse, local community groups across the nation - groups like Southern Utah Wilderness Alliance, Alliance for the Wild Rockies, The Greater Yellowstone Coalition, the South Yuba River Citizens' League, RESTORE: The North Woods and the Sinkyone Wilderness Council (a Native American-owned/operated wilderness park). For these groups, who seek to protect the last great wild lands and waterways from resource extraction and commercial development, the Alliance's grants are substantial in size (about $35,000 each), and have often made the difference between success and defeat. Since its inception in 1989, The Conservation Alliance has
contributed $4,775,059 to grassroots environmental groups across the nation, and its member companies are proud of the results: To date the groups funded have saved over 34 million acres of wild lands and 14 dams have been either prevented or removed-all through grassroots community efforts.

The Conservation Alliance is a unique funding source for grassroots environmental groups. It is the only environmental grantmaker whose funds come from a potent yet largely untapped constituency for protection of ecosystems - the non-motorized outdoor recreation industry and its customers. This industry has great incentive to protect the places in which people use the clothing, hiking boots, tents and backpacks it sells. The industry is also uniquely positioned to educate outdoor enthusiasts about threats to wild places, and engage them to take action. Finally, when it comes to decision-makers - especially those in the Forest Service, National Park

Service, and Bureau of Land Management, this industry has clout - an important tool that small advocacy groups can wield.

The Conservation Alliance Funding Criteria: The Project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation. We're not looking for mainstream education or scientific research projects, but rather for active campaigns. All projects should be quantifiable, with specific goals, objectives and action plans and should include a measure for evaluating success. The project should have a good chance for closure or significant measurable results over a fairly short term (one to two years). Funding emphasis may not be on general operating expenses or staff payroll.
Web site: www.conservationalliance.com/index.m. E-mail: john@conservationalliance.com.

National Fish and Wildlife Foundation (NFWF)
The National Fish and Wildlife Foundation (NFWF) is a private, nonprofit, tax-exempt organization chartered by Congress in 1984. The National Fish and Wildlife Foundation sustains, restores, and enhances the Nation's fish, wildlife, plants and habitats. Through leadership conservation investments with public and private partners, the Foundation is dedicated to achieving maximum conservation impact by developing and applying best practices and innovative methods for measurable outcomes.

The Foundation awards matching grants under its Keystone Initiatives to achieve measurable outcomes in the conservation of fish, wildlife, plants and the habitats on which they depend. Awards are made on a competitive basis to eligible grant recipients, including federal, tribal, state, and local governments, educational institutions, and non-profit conservation organizations. Project proposals are received on a year-round, revolving basis with two decision cycles per year. Grants generally range from $50,000-$300,000 and typically require a minimum 2:1 non-federal match.

Funding priorities include bird, fish, marine/coastal, and wildlife and habitat conservation. Other projects that are considered include controlling invasive species, enhancing delivery of ecosystem services in agricultural systems, minimizing the impact on wildlife of emerging energy sources, and developing future conservation leaders and professionals. Website: http://www.nfwf.org/AM/Template.cfm?Section=Grants where additional grant programs are described.

The Trust for Public Land
Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve

land for recreation and spiritual nourishment and to improve the health and quality of life of American communities. TPL's legal and real estate specialists work with landowners, government agencies, and community groups to:
• Create urban parks, gardens, greenways, and riverways
• Build livable communities by setting aside open space in the path of growth
• Conserve land for watershed protection, scenic beauty, and close-to home recreation safeguard the character of communities by preserving historic landmarks and landscapes.

The following are TPL's Conservation Services:
• Conservation Vision: TPL helps agencies and communities define conservation priorities, identify lands to be protected, and plan networks of conserved land that meet public need.
• Conservation Finance: TPL helps agencies and communities identify and raise funds for conservation from federal, state, local, and philanthropic sources.
• Conservation Transactions: TPL helps structure, negotiate, and complete land transactions that create parks, playgrounds, and protected natural areas.
• Research & Education: TPL acquires and shares knowledge of conservation issues and techniques to improve the practice of conservation and promote its public benefits.

Since 1972, TPL has worked with willing landowners, community groups, and national, state, and local agencies to complete more than 3,000 land conservation projects in 46 states, protecting more than 2 million acres. Since 1994, TPL has helped states and communities craft and pass over 330 ballot measures, generating almost $25 billion in new conservation-related funding. For more information, visit http://www.tpl.org/.

Appendix E: Acquisition Strategies

E.0 Overview

There are many different ways for the City of Conover to secure trail right-of-way for its greenway system. It will be necessary to work with some landowners to secure trail right-of-way when it does not exist. The following text provides a list of options that should be considered in securing right-of-way. Funding sources for acquiring right-of-way and trail development are described and provided in Appendix D of this Plan.

The following sections detail a list of specific strategies including the formation of partnerships and a toolbox of acquisition options.

E.1 Partnerships

The City of Conover should pursue partnerships with land trusts and land managers to make more effective use of their land acquisition funds and strategies. The following offers recommendations on how these partnerships could be strengthened

Land Trusts

Land trust organizations, such as the Catawba Lands Conservancy, are valuable partners when it comes to acquiring land and rights-of-way for greenways. These groups can work directly with landowners and conduct their business in private so that sensitive land transactions are handled in an appropriate manner. Once the transaction has occurred, the land trust will usually convey the acquired land or easement to a public agency, such as a town or county for permanent stewardship and ownership.

Private Land Managers

Another possible partnership that could be strengthened would be with the utility companies that manage land throughout the Hickory-Conover region. Trails and greenways can be built on rights-of-ways that are either owned or leased by electric and natural gas companies. Electric utility companies have long recognized the value of partnering with local communities, non-profit trail organizations, and private land owners to permit their rights-of-ways to be used for trail development. This has occurred all over the United States and throughout North Carolina.

The City of Conover should actively update and maintain relationships with private utility and land managers to ensure that community wide bicycle, pedestrian and greenway system can be accommodated within these rights-of-way. The respective municipalities will need to demonstrate to these companies that maintenance will be addressed, liability will be reduced and minimized and access to utility needs will be provided.

E.2 Greenway Acquisition Tools

The following menu of tools describe various methods of acquisition that can be used by landowners, land conservation organizations, the City of Conover, Catawba County, and other surrounding municipalities to acquire greenway lands.

Government Regulation

Regulation is defined as the government's ability to control the use and development of land through legislative powers. Regulatory methods help shape the use of land without transferring or selling the land. The following types of development ordinances are regulatory tools that can meet the challenges of projected suburban growth and development as well as conserve and protect greenway resources.

Exactions: An exaction is a condition of development approval that requires development to provide or contribute to the financing of public facilities at their own expense. For example, a developer may be required to build a greenway on-site as a condition of developing a certain number of units because the development will create the need for new parks or will harm existing parks due to overuse. This mechanism can be used to protect or preserve greenway lands, which are then donated to the City of Conover. Consideration should be given to include greenway development in future exaction programs. Most commonly, exactions are in the form of mandatory dedications of lands for parks and infrastructure, fees in lieu of mandatory dedication, or impact fees.

Mandatory Dedication

This is a type of exaction where subdivision regulations require a developer to dedicate or donate improved land to the public interest. A dedication may involve the fee simple title to the land, an easement, or some other property interest. Sometimes, the construction of an improvement itself is required such as a park or greenway.

Fee-in-Lieu

An exaction can take the form of a fee-in-lieu of mandatory dedication. It can also complement negotiated dedications (described below). Based on the density of

development, this program allows a developer the alternative of paying money for the development/protection of open space and greenways in lieu of dedicating greenway and park lands. Payments are made representing the value of the site or improvement that would have been dedicated or provided. This allows local governments to pool fees from various subdivisions to finance facilities like parks and greenways. This money can be used to implement greenway management programs or acquire additional open space.

Impact Fee
A final type of exaction, an impact fee can fund a broader range of facilities that serve the public interest. They are commonly imposed on a per unit rather than a build out basis, making them more flexible and keeping developers from having to pay large up front costs. These do not have to be directly tied to any requirements for improvements or dedications of land. They can be more easily applied to off-site improvements.

Growth Management Measures (Concurrency): Concurrency-based development approaches to growth management simply limit development to areas with adequate public infrastructure. This helps regulate urban sprawl, provides for quality of life in new development, and can help protect open space. In the famous case with the Town of Ramapo (1972), the Town initiated a zoning ordinance making the issue of a development permit contingent on the presence of public facilities such as utilities and parks. This was upheld in Court and initiated a wave of slow-growth management programs nationwide. This type of growth management can take the form of an adequate public facilities ordinance.

Performance Zoning: Performance zoning is zoning based on standards that establish minimum requirements or maximum limits on the effects or characteristics of a use. This is often used for the mixing of different uses to minimize incompatibility and improve the quality of development. For example, how a commercial use is designed and functions determines whether it could be allowed next to a residential area or connected to a greenway.

Incentive Zoning (Dedication/Density Transfers): Also known as incentive zoning, this mechanism allows greenways to be dedicated for density transfers on development of a property. The potential for improving or subdividing part or all of a parcel can be expressed in dwelling unit equivalents or other measures of development density or intensity. Known as density transfers, these dwelling unit equivalents may be relocated to other portions of the same parcel or to contiguous land that is part of a common development plan. Dedicated density transfers can also be conveyed to subsequent holders if properly noted as transfer deeds.

Conservation Zoning: This mechanism recognizes the problem of reconciling different, potentially incompatible land uses by preserving natural areas, open spaces, waterways, and/or greenways that function as buffers or transition zones. It can also be called buffer or transition zoning. This type of zoning, for example, can protect waterways by creating buffer zones where no development can take place. Care must be taken to ensure that the use of this mechanism is reasonable and will not destroy the value of a property.

Overlay Zoning: An overlay zone and its regulations are established in addition to the zoning classification and regulations already in place. These are commonly used to protect natural or cultural features such as historic areas, unique terrain features, scenic vistas, agricultural areas, wetlands, stream corridors, and wildlife areas.

Negotiated Dedications: This type of mechanism allows municipalities to negotiate with landowners for certain parcels of land that are deemed beneficial to the protection and preservation of specific stream corridors. This type of mechanism can also be exercised through dedication of greenway lands when a parcel is subdivided. Such dedications would be proportionate to the relationship between the impact of the subdivision on community services and the percentage of land required for dedication-as defined by the US Supreme Court in Dolan v Tigard.

Reservation of Land: This type of mechanism does not involve any transfer of property rights but simply constitutes an obligation to keep property free from development for a stated period of time. Reservations are normally subject to a specified period of time, such as 6 or 12 months. At the end of this period, if an agreement has not already been reached to transfer certain property rights, the reservation expires.

Planned Unit Development: A planned unit development allows a mixture of uses. It also allows for flexibility in density and dimensional requirements, making clustered housing and common open space along with addressing environmental conditions a possibility. It emphasizes more planning and can allow for open space and greenway development and connectivity.

Cluster Development: Cluster development refers to a type of development with generally smaller lots and homes close to one another. Clustering can allow for more units on smaller acreages of land, allowing for larger percentages of the property to be used for open space and greenways.

Land Management

Management is a method of conserving the resources of a specific greenway parcel by an established set of policies called management plans for publicly owned greenway land or through easements with private property owners. Property owners who grant easements retain all rights to the property except those which have been described in the terms of the easement. The property owner is responsible for all taxes associated with the property, less the value of the easement granted. Easements are generally restricted to certain portions of the property, although in certain cases an easement can be applied to an entire parcel of land. Easements are transferable through title transactions, thus the easement remains in effect perpetually.

Management Plans: The purpose of a management plan is to establish legally binding contracts which define the specific use, treatment, and protection for publicly owned greenway lands. Management plans should identify valuable resources; determine compatible uses for the parcel; determine administrative needs of the parcel, such as maintenance, security, and funding requirements; and recommend short-term and long-term action plans for the treatment and protection of greenway lands.

Conservation Easement: This type of easement generally establishes permanent limits on the use and development of land to protect the natural resources of that land. When public access to the easement is desired, a clause defining the conditions of public access can be added to the terms of the easement. Dedicated conservation easements can qualify for both federal income tax deductions and state tax credits. Tax deductions are allowed by the Federal government for donations of certain conservation easements. The donation may reduce the donor's taxable income.

Preservation Easement: This type of easement is intended to protect the historical integrity of a structure or important elements in the landscape by sound management practices. When public access to the easement is desired, a clause defining the conditions of public access can be added to the terms of the easement. Preservation easements may qualify for the same federal income tax deductions and state tax credits as conservation easements.

Public Access Easements: This type of easement grants public access to a specific parcel of property when a conservation or preservation easement is not necessary. The conditions of use are defined in the terms of the public access easement.

Acquisition

Acquisition requires land to be donated or purchased by a government body, public agency, greenway manager, or qualified conservation organization.

Donation or Tax Incentives: In this type of acquisition, a government body, public agency, or qualified conservation organization agrees to receive the full title or a conservation easement to a parcel of land at no cost or at a "bargain sale" rate. The donor is then eligible to receive a federal tax deduction of up to 30 to 50 percent of their adjusted gross income. Additionally, North Carolina offers a tax credit of up to 25 percent of the property's fair market value (up to $5000). Any portion of the fair market value not used for tax credits may be deducted as a charitable contribution. Also, property owners may be able to avoid any inheritance taxes, capital gains taxes, and recurring property taxes.

Fee Simple Purchase: This is a common method of acquisition where a local government agency or private greenway manager purchases property outright. Fee simple ownership conveys full title to the land and the entire "bundle" of property rights including the right to possess land, to exclude others, to use land, and to alienate or sell land.

Easement Purchase: This type of acquisition is the fee simple purchase of an easement. Full title to the land is not purchased, only those rights granted in the easement agreement. Therefore the easement purchase price is less that the full title value.

Purchase / Lease Back: A local government agency or private greenway organization can purchase a piece of land and then lease it back to the seller for a specified period of time. This lease may contain restrictions regarding the development and use of the property.

Bargain Sale: A property owner can sell property at a price less than the appraised fair market value of the land. Sometimes the seller can derive the same benefits as if the property were donated. Bargain Sale is attractive to sellers when the seller wants cash for the property, the seller paid a low cash price and thus is not liable for high capital gains tax, and/or the seller has a fairly high current income and could benefit from the donation of the property as an income tax deduction.

Installment Sale: An installment sale is a sale of property at a gain where at least one payment is to be received after the tax year in which the sale occurs. These are valuable tools to help sellers defer capital gains tax. This provides a potentially attractive option when purchasing land for open space from a possible seller.

Option / First Right of Refusal: A local government agency or private organization establishes an agreement with a public agency or private property owner to provide the right of first refusal on a parcel of land that is scheduled to be sold. This

form of agreement can be used in conjunction with other techniques, such as an easement to protect the land in the short-term. An option would provide the agency with sufficient time to obtain capital to purchase the property or successfully negotiate some other means of conserving the greenway resource.

Purchase of Development Rights: A voluntary purchase of development rights involves purchasing the development rights from a private property owner at a fair market value. The landowner retains all ownership rights under current use, but exchanges the rights to develop the property for cash payment.

Land Banking: Land banking involves land acquisition in advance of expanding urbanization. The price of an open space parcel prior to development pressures is more affordable to a jurisdiction seeking to preserve open space. A Town or County might use this technique to develop a greenbelt or preserve key open space or agricultural tracts. The jurisdiction should have a definite public purpose for a land banking project.

Condemnation: The practice of condemning private land for use as a greenway is viewed as a last resort policy. Using condemnation to acquire property or property rights can be avoided if private and public support for the greenway program is present. Condemnation is seldom used for the purpose of dealing with an unwilling property owner. In most cases, condemnation has been exercised when there has been an absentee property ownership, when the title of the property is not clear, or when it becomes apparent that obtaining the consent for purchase would be difficult because there are numerous heirs located in other parts of the United States or different countries.

Eminent Domain: The right of exercising eminent domain should be done so with caution by the community and only if the following conditions exist: 1) the property is valued by the community as an environmentally sensitive parcel of land, significant natural resource, or critical parcel of land, and as such has been defined by the community as irreplaceable property; 2) written scientific justification for the community's claim about the property's value has been prepared and offered to the property owner; 3) all efforts to negotiate with the property owner for the management, regulation, and acquisition of the property have been exhausted and that the property owner has been given reasonable and fair offers of compensation and has rejected all offers; and 4) due to the ownership of the property, the timeframe for negotiating the acquisition of the property will be unreasonable, and in the interest of pursu-

ing a cost effective method for acquiring the property, the community has deemed it necessary to exercise eminent domain.

Appendix F: Glossary

F.0 Overview

The material in this glossary is largely taken from the International Pedestrian Lexicon available online at: http://user.itl.net/~wordcraf/lexicon.html#a. Other definitions came from a variety of other sources.

F.1 Definitions

AASHTO – American Association of State Highway and Transportation Officials: a nonprofit, nonpartisan association representing highway and transportation departments of all transportation modes in the 50 states, the District of Columbia and Puerto Rico.

ADA – American Disabilities Act of 1991: The Act gives civil rights protections to individuals with disabilities including equal opportunities in public accommodations, employment, transportation, state and local government services, and telecommunications.

Advance Stop lines - applies to a stop line placed prior to a crosswalk, to either prevent motor vehicle encroachment, or to improve visibility. It plays an important safety role especially in multi-lane roads.

Alternative Transportation Network – a connected system for travel using transportation other than private cars, such as walking, bicycling, rollerblading, carpooling and transit

Arterial Connections – interconnected corridors designed to accommodate a large volume of through traffic

Bargain Sale – the sale of a property at less than the fair market value. The difference between a bargain sale price and fair market value often qualifies as a tax-deductible charitable contribution. Commonly used to acquire land or easements for greenways or multi-use paths.

Bicycle Facilities – a general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling. Examples include, but are not limited to bicycle parking/storage facilities, shared roadways not specifically designated for bicycle use, bicycle lanes, paved shoulders, and sidepaths.

Blank Walls – relatively large walls of empty surface that provide opportunity for vandalism with graffiti. Set backs, special lighting, and aesthetic architectural interruptions are possible blank wall treatments.

Blighted Building – a structure whose condition within the town, neighborhood or city is detrimental to the physical, social, and/or economic well-being of that community

Bridge Culvert – a sewer or drain crossing used for the transference of surface water from a bridge

Buffer Zone - an area of land specifically designed to separate one zoning use from another

Bulb-out - extended pavement to narrow roadway, or pinch through fare, or provide space for bus stop, bench, etc. Commonly used as a traffic calming measure.

Collector Streets – a public road designed to flow traffic from small neighborhood streets and connect to larger thoroughfares

Concurrent Signal Timing - motorists running parallel to a crosswalk are allowed to turn into and through the crosswalk (left or right) after yielding to pedestrians

Condemnation - the taking of private property for public use, with adequate compensation to the owner, under the right of eminent domain

Connectivity - the logical and physical interconnection of functionally related points so that people can move among them

Conservation Easement - a legally binding agreement not to develop part of a property, but to leave it "natural" permanently or for some designated very long period of time regardless of ownership transfer

Corridor - a spatial link between two or more destinations

Crosswalk - a designated point on a road at which some means are employed to assist pedestrians who wish to cross a roadway or intersection. They are designed to

keep pedestrians together where they can be seen by motorists, and where they can cross most safely with the flow of vehicular traffic.

Curb Cut – interruption in the curb, as for a driveway

Curb Extension - a section of sidewalk at an intersection or mid-block crossing that reduces the crossing width for bicyclists and pedestrians and is intended to slow the speed of traffic and increase driver awareness

Curb Ramp - a ramp leading smoothly down from a sidewalk, greenway or multiuse path to an intersecting street, rather than abruptly ending with a curb

Driveway Apron – the section of a driveway between a sidewalk or greenway and the curb

Eminent Domain – the acquisition of property by the government which is deemed to be necessary for the completion of a public project from an owner that is unwilling to negotiate a price for its sale.

EPA – Environmental Protection Agency

Fee Simple Purchase – an outright purchase of the land by municipality

FHWA – Federal Highway Administration

First Right of Refusal - the right specified in an agreement to have the first opportunity to purchase or lease a given property before it is offered to others

Fitness Trail - a pathway upon which users jog or walk from station to station to perform various exercise tasks

GIS – (Geographic Information System) a system for collecting, analyzing and displaying spatial information

Greenway - a linear open space; a corridor composed of natural vegetation. Greenways can be used to create connected networks of open space that include traditional parks and natural areas.

High Volume Artery – an important transportation corridor that is used by large traffic levels

Hydrologic Resources – stream and sewer corridors and buffer zones that can be

used to facilitate the building of greenways

Incentive Zoning - a system by which zoning incentives are provided to developers on the condition that specific physical, social, or cultural benefits are provided to the community

Intersection - an area where two or more pathways or roadways join together.

Islands of Vegetation - a landscaping feature that is planted with flora chosen for its ability to remove pollution and toxins. These spaces manage stormwater runoff from impervious surfaces; the water is slowed down, preventing erosion and allowing water to be absorbed into the ground.

Leaseback - the process of selling a property and also entering into a lease to continue using that property

Linear Stream Corridor - generally consists of the stream channel, floodplain, and transitional upland fringe aligned linearly

LPI – Leading pedestrian interval. Pedestrians are given the signal to begin crossing before parallel traffic.

LRTP – Long Range Transportation Plan

Median - a barrier, constructed of concrete, asphalt, or landscaping and separates two directions of traffic.

Median Refuge Island - island in the median, that offers a stopping or halfway point for a pedestrian

Mixed Use Area – a term used to describe a specific area that posses a combination of different land use types, such as residential, commercial, and recreation

Mode Share - a term used to describe percentage splits in transportation options

MPO – Metropolitan Planning Organization

MUTCD – Manual of Uniform Traffic Control Devices: National standards guidebook on signage and pavement marking for roadways

Municipal Boundary – the limit of municipal jurisdiction

Nature Trail - a marked trail designed to lead people through a natural environment, which highlights and protects resources

NCDOT – North Carolina Department of Transportation

Negotiated Dedications - a local government may ask a landowner to enter into negotiations for certain parcels of land that are deemed beneficial to the protection and preservation of specific parcel of land

On-Road Pedestrian Facility – any sidewalk, curb, median refuge or crosswalk designed for pedestrian use.

Off-Road Trail – paths or trails in areas not served by the street system, such as parks and greenbelt corridors. Off-street paths are intended to serve both recreational uses and other trips, and may accommodate other non-motorized travel modes, such as bicycles in addition to walking.

Open Space - empty or vacant land which is set aside for public or private use and will not be developed. The space may be used for passive or active recreation, or may be reserved to protect or buffer natural areas.

Overlay Zone - a zone or district created by the local legislature for the purpose of conserving natural resources or promoting certain types of development. Overlay zones are imposed over existing zoning districts and contain provisions that are applicable in addition to those contained in the zoning law.

Pedestrian - a person on foot or a person on roller skates, roller blades, child's tricycle, non-motorized wheelchair, skateboard, or other non-powered vehicles (excluding bicycles)

Pedestrian Corridor – long distance corridor comprised of on-road sidewalks, crosswalks and related pedestrian facilities.

Planned Unit Development (PUD) - a project or subdivision that includes common property that is owned and maintained by a homeowners' association for the benefit and use of the individual PUD unit owners

Pocket Park - a small area accessible to the general public that is often of primarily environmental, rather than recreational, importance; they can be urban, suburban or rural and often feature as part of urban regeneration plans in inner-city areas to provide areas where wild life can establish a foothold.

Preservation Easement – a voluntary legal agreement that protects historic, archaeological, or cultural resources on a property. The easement provides assurance to the property owner that intrinsic values will be preserved through subsequent ownership. In addition, the owner may obtain substantial tax benefits.

Public Access Easement – a voluntary legal agreement which grants a municipality a perpetual right-of-way and easement for public access and public benefit

Quality of Life - a measure of the standard of living which considers non-financial factors such as health, functional status and social opportunities that are influenced by disease, injury, treatment or social and political policy

Retrofit - the redesign and reconstruction of an existing facility or subsystem to incorporate new technology, to meet new requirements, or to otherwise provide performance not foreseen in the original design.

Right Turn Cut-Off - the channel created in larger intersection by a very long turning radius and the construction of a pedestrian island, to which the pedestrian must cross before being in the formal intersection that is controlled by lights. The right-turn cut-off allows continuous right turns at fairly high speeds without stopping but the drivers who are meant to but at times do not yield to pedestrians.

Roundabout - traffic calming device at which traffic streams circularly around a central island after first yielding to the circulating traffic

ROW (right of way) - an easement held by the local jurisdiction over land owned by the adjacent property owners that allows the jurisdiction to exercise control over the surface and above and below the ground of the right-of-way; usually designated for passage

RTOR – Right turn on red

Safe Routes to School (SRTS) – a federal program that provides funding to encourage and facilitate the planning and implementation of bicycle and pedestrian projects near schools.

SAFETEA-LU - Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

Shoulder - The portion of the roadway contiguous with the traveled way for the accommodation of stopped vehicles, for emergency use, and for lateral support of sub-base, base, and surface courses. Paved shoulders can be used for pedestrian and

bicycle travel as well.

Shared Use Path (Multi Use Path/Sidepath) - A bikeway physically separated from motorized vehicular traffic by an open space or barrier and located either within the highway right-of-way (often termed "parallel shared use path") or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users. In some cases shared use paths also accommodate equestrians.

Sidewalk - an improved facility intended to provide for pedestrian movement; usually, but not always, located in the public right-of-way adjacent to a roadway. Typically constructed of concrete, but can be made with asphalt, bricks, stone, wood, and other materials.

Speed Table - Speed tables are flat-topped speed humps often constructed with brick or other textured materials on the flat section. Speed tables are typically long enough for the entire wheelbase of a passenger car to rest on the flat section. Their long flat fields give speed tables higher design speeds than Speed Humps. The brick or other textured materials improve the appearance of speed tables, draw attention to them, and may enhance safety and speed-reduction. Speed tables are good for locations where low speeds are desired but a somewhat smooth ride is needed for larger vehicles.

Thoroughfare - a public road from one place to another, designed for high traffic volumes and essential connections

TND (traditional neighborhood development) - an area of land developed in a planned fashion for a compatible mixture of residential units for various income levels and nonresidential commercial and workplace uses, with a high priority placed on access to open spaces

Traffic Calming - a range of measures that reduce the impact of vehicular traffic on residents, pedestrians and cyclists - most commonly on residential streets, but also now on commercial streets

Trip Attractor - a location which, because of what it contains, generates itself as a destination for people

Village Center - an area in a community where people naturally congregate.

Appendix G: Federal and State Policies

G.0 Overview

A number of federal and state pedestrian policies have been developed in recent years . This appendix covers a number of these policies that are intended to better integrate walking and bicycling into transportation infrastructure.

G.1 United States Department of Transportation Bicycle and Pedestrian Policy

A United States Department of Transportation (US DOT) policy statement regarding the integration of bicycling and walking into transportation infrastructure recommends that, "bicycling and walking facilities will be incorporated into all transportation projects" unless exceptional circumstances exist. The Policy Statement was drafted by the U.S. Department of Transportation in response to Section 1202 (b) of the Transportation Equity Act for the 21st Century (TEA-21) with the input and assistance of public agencies, professional associations and advocacy groups. USDOT hopes that public agencies, professional associations, advocacy groups, and others adopt this approach as a way of committing themselves to integrating bicycling and walking into the transportation mainstream. The full statement reads as follows, with some minor adjustments for applicability in Conover:

1. Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more of three conditions are met:

- Bicyclists and pedestrians are prohibited by law from using the roadway. In this instance, a greater effort may be necessary to accommodate bicyclists and pedestrians elsewhere within the right of way or within the same transportation corridor.
- The cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined as exceeding twenty percent of the cost of the larger transportation project.
- Where sparsity of population or other factors indicate an absence of need. For example, on low volume, low speed residential streets, or streets with severe topographic or natural resource constraints.

2. In rural areas, paved shoulders should be included in all new construction and reconstruction projects on roadways used by more than 1,000 vehicles per day. Paved shoulders have safety and operational advantages for all road users in addition to providing a place for bicyclists and pedestrians to operate. Rumble strips are not recommended where shoulders are used by bicyclists unless there is a minimum clear path of four feet in which a bicycle may safely operate.

3. Sidewalks, shared use paths, street crossings (including over- and undercrossings), pedestrian signals, signs, street furniture, transit stops and facilities, and all connecting pathways shall be designed, constructed, operated and maintained so that all pedestrians, including people with disabilities, can travel safely and independently.

4. The design and development of the transportation infrastructure shall improve conditions for bicycling and walking through the following additional steps:

- Planning projects for the long-term. Transportation facilities are long-term investments that remain in place for many years. The design and construction of new facilities that meet the criteria in item 1) above should anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements. For example, a bridge that is likely to remain in place for 50 years, might be built with sufficient width for safe bicycle and pedestrian use in anticipation that facilities will be available at either end of the bridge even if that is not currently the case.
- Addressing the need for bicyclists and pedestrians to cross corridors as well as travel along them. Even where bicyclists and pedestrians may not commonly use a particular travel corridor that is being improved or constructed, they will likely need to be able to cross that corridor safely and conveniently. Therefore, the design of intersections and interchanges shall accommodate bicyclists and pedestrians in a manner that is safe, accessible and convenient.
- Getting exceptions approved at a senior level. Exceptions for the non-inclusion of bikeways and walkways shall be approved by a senior manager and be documented with supporting data that indicates the basis for the decision.
- Designing facilities to the best currently available standards and guidelines. The design of facilities for bicyclists and pedestrians should follow design guidelines and standards that are commonly used, such as the AASHTO Guide for the Development of Bicycle Facilities, AASHTO's A Policy on Geometric Design of Highways and Streets, and the ITE Recommended Practice "Design and Safety of Pedestrian Facilities. (Many of these guidelines are summarized in Chapter 6: Design Guidelines)

(Retrieved from http://www.fhwa.dot.gov/environment/bikeped/design.htm on 5/6/2008)

G.2 FHWA Memorandum on Mainstreaming Bicycle and Pedestrian Projects

(See pages G-4 through G-6)

U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: ACTION: Transmittal of Guidance on Bicycle and Pedestrian Provisions of the Federal-aid Program

Date: February 24, 1999

From: Kenneth R. Wykle
Federal Highway Administrator

In reply, refer to: HEPH-30

To:
Division Administrators
Federal Lands Highway Division Engineers

This memorandum transmits the Federal Highway Administration's (FHWA) Guidance on the Bicycle and Pedestrian Provisions of the Federal-aid Program and reaffirms our strong commitment to improving conditions for bicycling and walking. The nonmotorized modes are an integral part of the mission of FHWA and a critical element of the local, regional, and national transportation system. Bicycle and pedestrian projects and programs are eligible for but not guaranteed funding from almost all of the major Federal-aid funding programs. We expect every transportation agency to make accommodation for bicycling and walking a routine part of their planning, design, construction, operations and maintenance activities.

The Transportation Equity Act for the 21st Century (TEA-21) continues the call for the mainstreaming of bicycle and pedestrian projects into the planning, design, and operation of our Nation's transportation system. Under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), Federal spending on bicycle and pedestrian improvements increased from $4 million annually to an average of $160 million annually. Nevertheless, the level of commitment to addressing the needs of bicyclists and pedestrians varies greatly from State to State.

The attached guidance explains how bicycle and pedestrian improvements can be routinely included in federally funded transportation projects and programs. I would ask each division office to pass along this guidance to the State DOT and to meet with them to discuss ways of expediting the implementation of bicycle and pedestrian projects. With the guidance as a basis for action, States can then decide the most appropriate ways of mainstreaming the inclusion of bicycle and pedestrian projects and programs.

Bicycling and walking contribute to many of the goals for our transportation system we have at FHWA and at the State and local levels. Increasing bicycling and walking offers the potential for cleaner air, healthier people, reduced congestion, more liveable communities, and more efficient use of precious road space and resources. That is why funds in programs such as Congestion Mitigation and Air Quality Improvement, Transportation Enhancements, and the National Highway System, are eligible to be used for bicycling and

walking improvements that will encourage use of the two modes.

We also have a responsibility to improve the safety of bicycling and walking as the two modes represent more than 14 percent of the 41,000 traffic fatalities the nation endures each year. Pedestrian and bicycle safety is one of FHWA's top priorities and this is reflected in our 1999 Safety Action Plan. As the attached guidance details, TEA-21 has opened up the Hazard Elimination Program to a broader array of bicycle, pedestrian, and traffic calming projects that will improve dangerous locations. The legislation also continues funding for critical safety education and enforcement activities under the leadership of the National Highway Traffic Safety Administration. If we are successful in improving the real and perceived safety of bicyclists and pedestrians, we will also increase use.

You will see from the attached guidance that the Federal-aid Program, as amended by TEA-21, offers an extraordinary range of opportunities to improve conditions for bicycling and walking. Initiatives such as the Transportation and Community and System Preservation Pilot Program and the Access to Jobs program offer exciting new avenues to explore.

Bicycling and walking ought to be accommodated, as an element of good planning, design, and operation, in all new transportation projects unless there are substantial safety or cost reasons for not doing so. Later this year (1999), FHWA will issue design guidance language on approaches to accommodating bicycling and pedestrian travel that will, with the cooperation of AASHTO, ITE, and other interested parties, spell out ways to build bicycle and pedestrian facilities into the fabric of our transportation infrastructure from the outset. We can no longer afford to treat the two modes as an afterthought or luxury.

The TEA-21 makes a great deal possible. However, in the area of bicycling and walking in particular, we must work hard to ensure good intentions and fine policies translate quickly and directly into better conditions for bicycling and walking. While FHWA has limited ability to mandate specific outcomes, I am committed to ensuring that we provide national leadership in three critical areas.

- The FHWA will encourage the development and implementation of bicycle and pedestrian plans as part of the overall transportation planning process. Every statewide and metropolitan transportation plan should address bicycling and walking as an integral part of the overall system, either through the development of a separate bicycle and pedestrian element or by incorporating bicycling and walking provisions throughout the plan. Further, I am instructing each FHWA division office to closely monitor the progress of projects from the long-range transportation plans to the STIPs and TIPs. In the coming months, FHWA will disseminate exemplary projects, programs, and plans, and we will conduct evaluations in selected States and MPOs to determine the effectiveness of the planning process.

- The FHWA will promote the availability and use of the full range of streamlining mechanisms to increase project delivery. The tools are in place for States and local government agencies to speed up the delivery of bicycle and pedestrian projects - it makes no sense to treat installation of a bicycle rack or curb cut the same way we treat a new Interstate highway project - and our division offices must take a lead in promoting and administering these procedures.

- The FHWA will help coordinate the efforts of Federal, State, metropolitan, and other relevant agencies to improve conditions for bicycling and walking. Once again, our division offices must ensure that those involved in implementing bicycle and pedestrian projects at the State and local level are given maximum opportunity to get their job done, unimpeded by regulations and red tape from the Federal level. I am asking each of our division offices to facilitate a dialogue among each State's bicycle and pedestrian coordinator, Transportation Enhancements program manager, Recreational Trails Program administrator, and their local and FHWA counterparts to identify and remove obstacles to the implementation of bicycle and pedestrian projects and programs.

In less than a decade, bicycling and walking have gone from being described by my predecessor Tom Larson as "the forgotten modes" to becoming a serious part of our national transportation system. The growing acceptance of bicycling and walking as modes to be included as part of the transportation mainstream started with passage of ISTEA in 1991 and was given a considerable boost by the Congressionally-mandated National Bicycling and Walking Study. That study, released in 1994, challenges the U.S. Department of Transportation to double the percentage of trips made by foot and bicycle while simultaneously reducing fatalities and injuries suffered by these modes by 10 percent - and we remain committed to achieving these goals.

The impetus of ISTEA and the National Bicycling and Walking Study is clearly reinforced by the bicycle and pedestrian provisions of the TEA-21. The legislation confirms the vital role bicycling and walking must play in creating a balanced, accessible, and safe transportation system for all Americans.

FHWA Guidance (1999) - Bicycle and Pedestrian Provisions of Federal Transportation Legislation

To provide Feedback, Suggestions, or Comments for this page contact Gabe Rousseau at gabe.rousseau@dot.gov.

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FHWA

United States Department of Transportation - **Federal Highway Administration**

G.3 North Carolina Department of Transportation Board of Transportation Resolution: Bicycling and Walking in North Carolina. A Critical Part of the Transportation System (Adopted by the Board of Transportation on September 8, 2000)

The North Carolina Board of Transportation strongly reaffirms its commitment to improving conditions for bicycling and walking, and recognizes nonmotorized modes of transportation as critical elements of the local, regional, and national transportation system.

WHEREAS, increasing bicycling and walking offers the potential for cleaner air, healthier people, reduced congestion, more liveable communities, and more efficient use of road space and resources; and

WHEREAS, crashes involving bicyclists and pedestrians represent more than 14 percent of the nation's traffic fatalities; and

WHEREAS, the Federal Highway Administration (FHWA) in its policy statement "Guidance on the Bicycle and Pedestrian Provisions of the Federal-Aid Program" urges states to include bicycle and pedestrian accommodations in its programmed highway projects; and

WHEREAS, bicycle and pedestrian projects and programs are eligible for funding from almost all of the major Federal-aid funding programs; and

WHEREAS, the Transportation Equity Act for the 21st Century (TEA-21) calls for the mainstreaming of bicycle and pedestrian projects into the planning, design and operation of our Nation's transportation system;

NOW, THEREFORE, BE IT RESOLVED, the North Carolina Board of Transportation concurs that bicycling and walking accommodations shall be a routine part of the North Carolina Department of Transportation's planning, design, construction, and operations activities and supports the Department's study and consideration of methods of improving the inclusion of these modes into the everyday operations of North Carolina's transportation system; and

BE IT FURTHER RESOLVED, North Carolina cities and towns are encouraged to make bicycling and pedestrian improvements an integral part of their transportation planning and programming.

G.4 North Carolina Department of Transportation Administrative Action to Include Local Adopted Greenways Plans in the NCDOT Highway Planning Process (Adopted January 1994)

In 1994 the NCDOT adopted administrative guidelines to consider greenways and greenway crossings during the highway planning process. This policy was incorporated so that critical corridors which have been adopted by localities for future greenways will not be severed by highway construction. Following are the text for the Greenway Policy and Guidelines for implementing it.

In concurrence with the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Board of Transportation's Bicycle Policy of 1978 (updated in 1991) and Pedestrian Policy of 1993, the North Carolina Department of Transportation recognizes the importance of incorporating local greenways plans into its planning process for the development and improvement of highways throughout North Carolina.

NCDOT Responsibilities: The Department will incorporate locally adopted plans for greenways into the ongoing planning processes within the Statewide Planning (thoroughfare plans) and the Planning and Environmental (project plans) Branches of the Division of Highways. This incorporation of greenway plans will be consistent throughout the department. Consideration will be given to including the greenway access as a part of the highway improvement.

Where possible, within the policies of the Department, within the guidelines set forth in provisions for greenway crossings, or other greenway elements, will be made as a part of the highway project or undertaken as an allowable local expenditure.

Local Responsibilities: Localities must show the same commitment to building their adopted greenway plans as they are requesting when they ask the state to commit to providing for a certain segment of that plan. It is the responsibility of each locality to notify the Department of greenway planning activity and adopted greenway plans and to update the Department with all adopted additions and changes in existing plans.

It is also the responsibility of each locality to consider the adopted transportation plan in their greenways planning and include its adopted greenways planning activities within their local transportation planning process. Localities should place in priority their greenways construction activities and justify the transportation nature of each greenway segment. When there are several planned greenway crossings of a proposed highway improvement, the locality must provide justification of each and place the list of crossings in priority order.

Where crossings are planned, transportation rights of way should be designated or acquired separately to avoid jeopardizing the future transportation improvements.

GUIDELINES FOR NCDOT TO COMPLY WITH ADMINISTRATIVE DECISION TO INCORPORATE LOCAL GREENWAYS INTO HIGHWAY PLANNING PROCESS

- Thoroughfare plans will address the existence of greenways planning activity, which has been submitted by local areas. Documentation of mutually agreed upon interface points between the thoroughfare plan and a greenway plan will be kept, and this information will become a part of project files.

- Project Planning Reports will address the existence of locally adopted greenways segment plans, which may affect the corridor being planned for a highway improvement. It is, however, the responsibility of the locality to notify the Department of the adopted greenways plans (or changes to its previous plans) through its current local transportation plan, as well as its implementation programs.

- Where local greenways plans have not been formally adopted or certain portions of the greenways plans have not been adopted, the Department may note this greenway planning activity but is not required to incorporate this information into its planning reports.

- Where the locality has included adopted greenways plans as a part of its local transportation plan and a segment (or segments) of these greenways fall within the corridor of new highway construction or a highway improvement project, the feasibility study and/or project planning report for this highway improvement will consider the effects of the proposed highway improvement upon the greenway in the same manner as it considers other planning characteristics of the project corridor, such as archeological features or land use.

- Where the locality has justified the transportation versus the leisure use importance of a greenway segment and there is no greenway alternative of equal importance nearby, the project planning report will suggest inclusion of the greenway crossing, or appropriate greenway element, as an incidental part of the highway expenditure.

- Where the locality has not justified the transportation importance of a greenway segment, the greenway crossing, or appropriate greenway element, may be included as a part of the highway improvement plan if the local government covers the cost.

- A locality may add any appropriate/acceptable greenway crossing or green-

way element at their own expense to any highway improvement project as long as it meets the design standards of the NCDOT.

- The NCDOT will consider funding for greenway crossings, and other appropriate greenway elements only if the localities guarantee the construction of and/or connection with other greenway segments. This guarantee should be in the form of inclusion in the local capital improvements program or NCDOT/municipal agreement.

- If the state pays for the construction of a greenway incidental to a highway improvement and the locality either removes the connecting greenway segments from its adopted greenways plans or decides not to construct its agreed upon greenway segment, the locality will reimburse the state for the cost of the greenway incidental feature. These details will be handled through a municipal agreement.

- Locality must accept maintenance responsibilities for state-built greenways, or portions thereof. Details will be handled through a municipal agreement.

G.5 NCDOT Pedestrian Policy Guidelines

(See pages G-11 through G-12)

DEPARTMENT OF TRANSPORTATION
PEDESTRIAN POLICY GUIDELINES
EFFECTIVE OCTOBER 1, 2000

These guidelines provide an updated procedure for implementing the Pedestrian Policy adopted by the Board of Transportation August 1993 and the Board of Transportation Resolution September 8, 2000. The resolution reaffirms the Department's commitment to improving conditions for bicycling and walking, and recognizes non-motorized modes of transportation as critical elements of the local, regional, and national transportation system. The resolution encourages North Carolina cities and towns to make bicycling and pedestrian improvements an integral part of their transportation planning and programming.

REQUIREMENTS FOR DOT FUNDING:

REPLACEMENT OF EXISTING SIDEWALKS:

The Department will pay 100% of the cost to replace an existing sidewalk that is removed to facilitate the widening of a road.

TIP INCIDENTAL PROJECTS:

DEFINED: Incidental pedestrian projects are defined as TIP projects where pedestrian facilities are included as part of the roadway project.

REQUIREMENTS:

1. The municipality and/or county notifies the Department in writing of its desire for the Department to incorporate pedestrian facilities into project planning and design. Notification states the party's commitment to participate in the cost of the facility as well as being responsible for all maintenance and liability. Responsibilities are defined by agreement. Execution is required prior to contract let.

   The municipality is responsible for evaluating the need for the facility (ie: generators, safety, continuity, integration, existing or projected traffic) and public involvement.

2. Written notification must be received by the **Project Final Field Inspection (FFI) date**. Notification should be sent to the Deputy Highway Administrator - Preconstruction with a copy to the Project Engineer and the Agreements Section of the Program Development Branch. Requests received after the project FFI date will be incorporated into the TIP project, if feasible, and only if the requesting party commits by agreement to pay 100% of the cost of the facility.

3. The Department will review the feasibility of including the facility in our project and will try to accommodate all requests where the Department has acquired appropriate right of way on curb and gutter sections and the facility can be installed in the current project berm width. The standard project section is a 10-ft berm (3.0-meter) that accommodates a 5-ft sidewalk. In accordance with

AASHTO standards, the Department will construct 5-ft sidewalks with wheelchair ramps. Betterment cost (ie: decorative pavers) will be a Municipal responsibility.

4. If the facility is not contained within the project berm width, the Municipality is responsible for providing the right of way and/or construction easements as well as utility relocations, at no cost to the Department. This provision is applicable to all pedestrian facilities including multi-use trails and greenways.

5. A cost sharing approach is used to demonstrate the Department's and the municipality's/county's commitment to pedestrian transportation (sidewalks, multi-use trails and greenways). The matching share is a sliding scale based on population as follows:

MUNICIPAL POPULATION	DOT PARTICIPATION	LOCAL PARTICIPATION
> 100,000	50%	50%
50,000 to 100,000	60%	40%
10,000 to 50,000	70%	30%
< 10,000	80%	20%

Note: The cost of bridges will not be included in the shared cost of the pedestrian installation if the Department is funding the installation under provision 6 - pedestrian facilities on bridges.

6. For bridges on streets with curb and gutter approaches, the Department will fund and construct sidewalks on both sides of the bridge facility if the bridge is less than 200 feet in length. If the bridge is greater than 200 feet in length, the Department will fund and construct a sidewalk on one side of the bridge structure. The bridge will also be studied to determine the costs and benefits of constructing sidewalks on both sides of the structure. If in the judgement of the Department sidewalks are justified, funding will be provided for installation. The above provision is also applicable to dual bridge structures. For dual bridges greater than 200 ft in length, a sidewalk will be constructed on the outside of one bridge structure. The bridges will also be studied to determine if sidewalks on the outside of both structures are justified.

7. FUNDING CAPS are no longer applicable.

8. This policy does not commit the Department to the installation of facilities in the Department's TIP projects where the pedestrian facility causes an unpractical design modification, is not in accordance with AASHTO standards, creates an unsafe situation, or in the judgement of the Department is not practical to program.

INDEPENDENT PROJECTS

DEFINED: The DOT has a separate category of funds for all independent pedestrian facility projects in North Carolina where installation is unrelated to a TIP roadway project. An independent pedestrian facility project will be administered in accordance with Enhancement Program Guidelines.

G.6 NCDOT Online Pedestrian Planning and Design Resources List

Developing a Pedestrian Safety Action Plan Workshop *June 2008*

Useful On-Line Pedestrian Planning and Design Resources

NCDOT Division of Bicycle & Pedestrian Transportation	***http://www.ncdot.org/transit/bicycle/***
Board of Transportation Resolution on Mainstreaming	*http://www.ncdot.org/transit/bicycle/laws/laws_resolution.html*
NCDOT Pedestrian Policy Guidelines	*http://www.ncdot.org/transit/bicycle/laws/ped_guide.pdf*
NCDOT Greenways - Administrative Process	*http://www.ncdot.org/transit/bicycle/laws/laws_greenway_admin.html*
Funding	*http://www.ncdot.org/transit/bicycle/funding/funding_intro.html*
Project Types	*http://www.ncdot.org/transit/bicycle/projects/project_types/bpt_intro.html*
Crash Data	*http://www.ncdot.org/transit/bicycle/safety/safety_crashdata.html*
DBPT Long Range Plan	*http://www.ncdot.org/transit/bicycle/projects/intro/projects_long_range.html*
Safe Routes to School Program	*http://www.ncdot.org/transit/bicycle/saferoutes/SafeRoutes.html*
NCDOT Division of Highways	***http://www.ncdot.org/doh/***
Alternative Delivery Unit – Publications for Download	***http://www.ncdot.org/doh/preconstruct/altern/value/manuals/***
Bridge Policy 2000	*http://www.ncdot.org/doh/preconstruct/altern/value/manuals/bpe2000.doc*
Curb Cuts & Ramps for Disabled Persons	*http://www.ncdot.org/doh/preconstruct/altern/value/manuals/handi.pdf*
Traditional Neighborhood Development Manual	*http://www.ncdot.org/doh/preconstruct/altern/value/manuals/tnd.pdf*
ADA – Detectable Warnings	*http://www.ncdot.org/doh/preconstruct/ps/std_draw/06english/08/default.html*
Highway Design Branch – Design Manual	*http://www.ncdot.org/doh/preconstruct/altern/value/manuals/designmanual.html*
Policy and Procedure Manual (See Section 28)	*http://www.ncdot.org/doh/preconstruct/altern/value/manuals/ppm/*
Policy on Street & Driveway Access	*http://www.ncdot.org/doh/preconstruct/altern/value/manuals/pos.pdf*
Traffic Engineering and Safety Systems Branch	***http://www.ncdot.org/doh/preconstruct/traffic/***
NC Supplement to the Manual on Uniform Traffic Control Devices	*http://www.ncdot.org/doh/preconstruct/traffic/MUTCD/*
Crosswalks/Mid-Block Signing and Pavement Markings	*http://www.ncdot.org/doh/preconstruct/traffic/teppl/Topics/C-36/C-36.html*

UNC Highway Safety Research Center	***http://www.hsrc.unc.edu***
Pedestrian & Bicycle Information Center	***http://www.pedbikeinfo.org/index.htm***
Walking	*http://www.walkinginfo.org/*
Engineer Pedestrian Facilities	*http://www.walkinginfo.org/engineering*
Pedestrian Safety Guide & Countermeasure Selection System (PEDSAFE)	*http://www.walkinginfo.org/pedsafe/*
Develop Plans and Policies	*http://www.walkinginfo.org/develop*
National Center for Safe Routes to School	*http://www.saferoutesinfo.org*
Federal Highway Administration Bicycle & Pedestrian Program	***http://www.fhwa.dot.gov/environment/bikeped/***
Bicycle and Pedestrian Provisions of Federal Transportation Legislation	*http://www.fhwa.dot.gov/environment/bikeped/bp-guid.htm*
Bicycle & Pedestrian Programs	*http://www.fhwa.dot.gov/environment/bikeped/overview.htm*
Program & Design Guidance	*http://www.fhwa.dot.gov/environment/bikeped/guidance.htm*
Links to Other Resources	*http://www.fhwa.dot.gov/environment/bikeped/bipedlink.htm*
Publications	*http://www.fhwa.dot.gov/environment/bikeped/publications.htm*
Pedestrian Safety	*http://safety.fhwa.dot.gov/ped_bike/ped/index.htm*
Pedestrian & Bicycle Safety Research Page	*http://www.tfhrc.gov/safety/pedbike/index.htm*
National Highway Traffic Safety Administration – Traffic Safety: Pedestrians	***http://www.nhtsa.gov/portal/site/nhtsa/menuitem.dfedd570f698cabbbf30811060008a0c/***
National Center for Bicycling & Walking	***http://www.bikewalk.org/***

Appendix H: FHWA Crash Reduction Factors

H.0 Overview

A recent September 2007 publication from the USDOT Federal Highway Administration provides estimates of the crash reduction that might be expected if a specific countermeasure is implemented with respect to crashes at intersections and roadway corridors. An entire section is devoted to pedestrian crash reduction factors and displayed below in the tables. Additional pedestrian crash reduction factors were extracted from other parts of the document as well that were not included in the pedestrian-specific section. For example, the installation of pedestrian countdown signals showed a 25% crash reduction rate. A number of these particular treatments are recommended in Chapter 3 for specific intersections.

Desktop Reference for Crash Reduction Factors

Report No. FHWA-SA-07-015
U.S. Department of Transportation
Federal Highway Administration

September 2007

Tables for Pedestrian Crash Reduction Factors

U.S. Department of Transportation
Federal Highway Administration

Table 10: Signalization Countermeasures

U.S. Department of Transportation
Federal Highway Administration

Desktop Reference for Crash Reduction Factors — Pedestrian Crashes

Countermeasures	Crash Type	Crash Severity	Area Type	Ref	Obs	Effectiveness				
						Crash Reduction Factor / Function	Std Error	Range		Study Type
								Low	High	
SIGNALIZATION COUNTERMEASURES										
Add exclusive pedestrian phasing	Pedestrian	All		28		34		7	60	
Improve signal timing [to intervals specified by the ITE *Determing Vehicle Change Intervals: A Proposed Recommended Practice (1985)]*	All	Fatal/Injury		49		12	9			Experimental Design (Case-Control Study)
	Pedestrian	Fatal/Injury		49		37				Experimental Design (Case-Control Study)
Install pedestrian countdown signal heads	Pedestrian	Fatal/Injury	Urban (San Francisco)	32		25				
Install pedestrian signal	All	All		15		20				
	Pedestrian	All		15		53				
	Pedestrian	All		5		0				
	All	All		15		25				
	All	All		15		15				
	Pedestrian	All		15		55				
	Pedestrian	All		15		50				
Modify signal phasing (implement a leading pedestrian interval)	Pedestrian	All		28		5				
Remove unwarranted signals (one-way street)	Pedestrian	All		46		17				Comparison Group Before-After

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Table 11: Geometric Countermeasures

U.S. Department of Transportation
Federal Highway Administration

Desktop Reference for Crash Reduction Factors — Pedestrian Crashes

Countermeasures	Crash Type	Crash Severity	Area Type	Ref	Obs	Effectiveness: Crash Reduction Factor / Function	Effectiveness: Std Error	Effectiveness: Range Low	Effectiveness: Range High	Study Type
GEOMETRIC COUNTERMEASURES										
Convert unsignalized intersection to roundabout	Pedestrian	Fatal/Injury	Urban	11		**27**	12	44	3	
Convert intersection to roundabout	Pedestrian	All		55		89				
Install pedestrian overpass/underpass	Pedestrian	All		15		86				
	Pedestrian	All		1	14	90		60	95	
	Pedestrian	Fatal/Injury		15		90				
	Pedestrian	PDO		15		90				
	Pedestrian	All		15		100				
	Pedestrian	All		15		67				
	Pedestrian	All		15		5				
	Pedestrian	All		15		90				
Install pedestrian overpass/underpass (unsignalized intersection)	Pedestrian	All		28		13				
Install raised median	Pedestrian	All		15		25				
Install raised median (marked crosswalk)	Pedestrian	All		60		46				
Install raised median (unmarked crosswalk)	Pedestrian	All		60		39				
Install raised median (unsignalized intersection)	Pedestrian	All		28		69				
Install raised pedestrian crossing	All	All		5		30	67			Meta-analysis
	All	Fatal/Injury		5		36	54			Meta-analysis
	Pedestrian	All		28		8				
Install refuge islands	Pedestrian	All		28		56				
Install sidewalk (to avoid walking along roadway)	Pedestrian	All		15		74				
	Pedestrian	All		36		88		43	99	Case-Control Study

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Desktop Reference for Crash Reduction Factors — Pedestrian Crashes

Countermeasures	Crash Type	Crash Severity	Area Type	Ref	Obs	Effectiveness				
						Crash Reduction Factor / Function	Std Error	Range		Study Type
								Low	High	
Install sidewalk (to avoid walking along roadway) (cont'd)	Pedestrian	All		15		75				
	Pedestrian	All		15		89				
	Pedestrian	All		15		65				
	Pedestrian	All		15		65				
Provide shoulder (paved)	Pedestrian	All		15		71				

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U.S. Department of Transportation
Federal Highway Administration

Table 12: Signs / Markings / Operational Countermeasures

Desktop Reference for Crash Reduction Factors — Pedestrian Crashes

Countermeasures	Crash Type	Crash Severity	Area Type	Ref	Obs	Effectiveness				
						Crash Reduction Factor / Function	Std Error	Range		Study Type
								Low	High	
SIGNS / MARKINGS / OPERATIONAL COUNTERMEASURES										
Convert two-way to all-way STOP control	Pedestrian	All		15		39				
	Pedestrian	All		21	69	19				Before-After with Likelihood Functions
	Pedestrian	All	Urban	30		39				Simple Before-After
Improve lighting at intersections	Pedestrian	Fatal		13		78	87			Meta-analysis
	Pedestrian	Injury		13		**42**	18			Meta-analysis
Improve pavement friction	Pedestrian	All		15		10				
Improve pavement friction (skid treatment with overlay)	Pedestrian	Fatal/Injury		15		3				
Increase enforcement to reduce speed	Pedestrian	All		28		70				
Install far-side bus stops (signalized intersection)	Pedestrian	All		28		1				
Install object markers	Pedestrian	All		15		29				
Install school zone warning signs	All	All		15		18				
	All	All		15		15				
	All	All		15		20				
	All	All		15		15				
	All	All		15		20				

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Desktop Reference for Crash Reduction Factors — Pedestrian Crashes

Countermeasures	Crash Type	Crash Severity	Area Type	Ref	Obs	Effectiveness				
						Crash Reduction Factor / Function	Std Error	Range		Study Type
								Low	High	
Permit right-turn-on-red	Pedestrian	All	New Orleans	5		-81	88			Simple Before-After
	Pedestrian	All	New York	5		-43	24			Simple Before-After
	Pedestrian	All	Ohio	5		-57	31			Simple Before-After
	Pedestrian	All	Wisconsin	5		-108	51			Simple Before-After
Prohibit left-turns	Pedestrian	All		15		10				
Remove marked unprotected crosswalks from arterial intersections	Pedestrian	All	Urban	5		73				
Restrict parking near intersections (to off-street)	Pedestrian	All		15		30				

Desktop Reference for Crash Reduction Factors — Intersection Crashes

Countermeasure(s)	Crash Type	Crash Severity	Area Type	Config	Control	Major Daily Traffic Volume (veh/day)	Minor Daily Traffic Volume (veh/day)	Ref	Obs	Effectiveness: Crash Reduction Factor / Function	Effectiveness: Std Error	Effectiveness: Range Low	Effectiveness: Range High	Study Type
Provide protected left-turn phase (cont'd)	Left-turn	All			Signal	>5,000/lane(Total)		15		46				Simple Before-After
	Left-turn	All			Signal			15		35				Simple Before-After
	Left-turn	All			Signal			15		70				Cross-section
	Left-turn	All			Signal			15		48				
	Left-turn	Fatal/Injury	Urban		Signal			31	30	**16**	2			EB Before-After
	Right-angle	Fatal/Injury	Urban		Signal			31	30	**19**	2			EB Before-After
	Overturn	All			Signal	<5,000/lane(Total)		15		27				Simple Before-After
	Overturn	All			Signal	>5,000/lane(Total)		15		35				Simple Before-After
	Overturn	All			Signal			15		31				
	Ped	All			Signal			28		5				
	Rear-end	All			Signal	<5,000/lane(Total)		15		27				Simple Before-After
	Rear-end	All			Signal	>5,000/lane(Total)		15		35				Simple Before-After
	Rear-end	All			Signal			15		31				
	Right-angle	All			Signal	<5,000/lane(Total)		15		54				Simple Before-After
	Right-angle	All			Signal	>5,000/lane(Total)		15		56				Simple Before-After
	Right-angle	All			Signal			15		80				Simple Before-After
	Right-angle	All			Signal			15		63				

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Desktop Reference for Crash Reduction Factors — Intersection Crashes

Countermeasure(s)	Crash Type	Crash Severity	Area Type	Config	Control	Major Daily Traffic Volume (veh/day)	Minor Daily Traffic Volume (veh/day)	Ref	Obs	Effectiveness: Crash Reduction Factor / Function	Effectiveness: Std Error	Effectiveness: Range Low	Effectiveness: Range High	Study Type
SIGNS														
Install double stop signs	All	All			No signal			28		11				
	Right-angle	All			No signal			47	10	55	52	-38	100	Simple Before-After
	Right-angle	All			No signal			28		36				
Install flashing beacons as advance warning	All	All		3-Leg				15		70				Simple Before-After
	All	All		4-Leg				15		39				Simple Before-After
	All	All			Signal			28		27		25	28	
	All	All						15		25				
	All	All						15		25				Cross-section
	All	All						15		27				Simple Before-After
	All	All						15		25				Simple Before-After
	Left-turn	Fatal/Injury						15		67				Simple Before-After
	Left-turn	PDO						15		79				Simple Before-After
	Rear-end	All		4-Leg	Signal			39		36				
	Right-angle	All		4-Leg	Signal			39		62				
	Right-angle	Fatal/Injury						15		73				Simple Before-After
	Right-angle	Fatal/Injury						15		73				Simple Before-After
	Right-angle	PDO						15		62				Simple Before-After
Install larger stop signs	All	All			Stop	>5,000/lane(Total)		15		19				Simple Before-After
Install pedestrian signing	All	All						15		4				
	Ped	All						15		15				

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Desktop Reference for Crash Reduction Factors — Intersection Crashes

Countermeasure(s)	Crash Type	Crash Severity	Area Type	Config	Control	Major Daily Traffic Volume (veh/day)	Minor Daily Traffic Volume (veh/day)	Ref	Obs	Effectiveness: Crash Reduction Factor / Function	Effectiveness: Std Error	Effectiveness: Range Low	Effectiveness: Range High	Study Type
Install advance warning signs (positive guidance)	All	All	All					1		35				
	All	All			Signal			28		22		3	40	
	All	All	Urban					15		30				Cross-section
	All	All	Rural					15		40				
	Right-angle	All			Signal			47	11	35		20	100	Simple Before-After
	Right-angle	All			Signal			28		35				
Provide overhead lane-use signs	Rear-end	All						51		10				
	Sidewipe	All						51		20				
PAVEMENT MARKINGS/MODIFICATIONS														
Add centerline and move STOP bar to extended curb lines	All	All			No signal			28		29				
	Right-angle	All			No signal			28		24				
Add centerline and move STOP bar to extended curb lines, double stop signs	All	All			No signal			28		9				
	Right-angle	All			No signal			28		0				
Add centerline and STOP bar, replace 24-inch with 30-inch stop signs	Right-angle	All			No signal			47		67	11	27	100	Simple Before-After
	Right-angle	All			No signal			28		67				
Improve pavement friction (groove)	All	All						28		25				
	Wet	All						28		59		42	75	
Improve/install pedestrian crossing	All	All						15		25				
	Ped	All						15		25				
Install pedestrian crossing	Ped	All						15		25				
	Ped	All						15		25				
	Ped	Fatal/Injury	Rural					38		60				EB Before-After
Install pedestrian crossing (raised)	All	All						5		30	67			Meta-analysis
	All	Fatal/Injury						5		36	54			Meta-analysis
	Ped	All						28		8				

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Desktop Reference for Crash Reduction Factors — Intersection Crashes

Countermeasure(s)	Crash Type	Crash Severity	Area Type	Config	Control	Major Daily Traffic Volume (veh/day)	Minor Daily Traffic Volume (veh/day)	Ref	Obs	Effectiveness: Crash Reduction Factor / Function	Effectiveness: Std Error	Effectiveness: Range Low	Effectiveness: Range High	Study Type
Install far-side bus stops	Ped	All						28		1				
Install flashing red/yellow signal (MUTCD: intersection control beacon)	All	All			No signal	<5,000/lane(Total)		15		25				Simple Before-After
	All	All			No signal	>5,000/lane(Total)		15		26				Simple Before-After
	All	All			No signal			15		26				
	All	Fatal/Injury			No signal			15		50				Simple Before-After
	Head-on	All			No signal			15		50				Simple Before-After
	Right-angle	All			No signal	<5,000/lane(Total)		15		35				Simple Before-After
	Right-angle	All			No signal	>5,000/lane(Total)		15		36				Simple Before-After
	Right-angle	All			No signal			15		36				
Install pedestrian crossing (signed and marked with curb ramps and extensions)	All	All			No signal			28		37		25	48	
Install pedestrian overpass/underpass	Ped	All			No signal			28		13				
Install stop signs at alternate intersections in residential areas	All	All	Urban		Stop			53		50		45	55	
	All	Fatal/Injury	Urban		Stop			53		67		61	72	
Vary frequency of driveways within 250 ft of intersection	All	All	Rural		Signal			6		100(1-EXP(0.046(Nd-3))); Nd=number of driveways on the major road within 250ft of the intersection				
	All	All	Rural		Stop			6		100(1-EXP(0.056(Nd-3))); Nd=number of driveways on the major road within 250ft of the intersection				

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