Final Draft – February 2012

Burlington, NC


Pedestrian Master Plan

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Table of Contents

Chapter 1: Introduction

Chapter 2: Existing Conditions

Chapter 3: Pedestrian Network

Chapter 4: Policy Recommendations

Table of Contents Continued

Chapter 5: Programs

Chapter 6: Implementation

Appendix A: Design Guidelines

Table of Contents Continued

Appendix B: Funding Sources

Appendix C: State and Federal Policies

Appendix D: Public Input Summary

Table of Contents Continued

Appendix E: Intersection Inventory and Recommendations Tables

Appendix F: Sidewalk Network Toolbox

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Burlington, NC *Pedestrian Transportation Plan*

The Burlington, NC Pedestrian Transportation Plan Features:

- A thorough analysis of current conditions for walking in Burlington
- A comprehensive recommended pedestrian network to address connectivity and safety
- Standards and guidelines for the development of pedestrian facilities
- Integration of pedestrian policy into codes and ordinances
- Recommendations for programming and funding

Introduction

Burlington's Pedestrian Plan Vision Statement

The City of Burlington will be a place where pedestrian connectivity and access is provided to people of all ages, abilities, and socio-economic backgrounds; where comprehensive pedestrian design is integrated into all future planning and development; where walking is encouraged and supported through a variety of programs; and where multi-modal transportation improvements create a sustainable and livable Burlington where citizens spend more time outdoors, engage in healthy activities, have a high quality of life, and have fresher air to breathe.

In the spring of 2011, the City of Burlington and the Burlington-Graham Metropolitan Planning Organization (MPO) began developing a Pedestrian Master Plan. This represents the City's first effort to develop a Pedestrian Plan that will provide guidance towards becoming a more walkable community. The City of Burlington has recognized the need to make walkability a higher priority. On the federal transportation level, there is an increased effort to create livable, sustainable communities with multi-modal transportation improvements. On a local level, walkability enhancements create opportunities for pedestrian transportation, recreation, healthy living, and economic development. The purpose of this Pedestrian Master Plan is to provide clear guidance, tools and programs for improving the pedestrian environment in the City of Burlington.

The development of this Plan included an open, participatory process, with area residents providing input through public workshops, stakeholder meetings, the project Steering Committee, social media, and an online comment form.

Measurable Goals for the Master Plan:

- *Reduce Vehicle Miles Traveled (VMTs) and improve air quality by increasing the ratio of pedestrian and bicycle trips to vehicle trips.*
- *Continually reduce the number of pedestrian accidents per year (148 reported pedestrian crashes from 2000-2010).*
- *Increase the miles of sidewalks as a percent of total City roadways.*
- *Fill gaps in the existing sidewalk network.*
- *Increase the percentage of children walking to school.*

Committee members discuss pedestrian needs in Burlington during the kick-off meeting.

Key Implementation Action Steps*:

PHASE 1 (2012-2013)

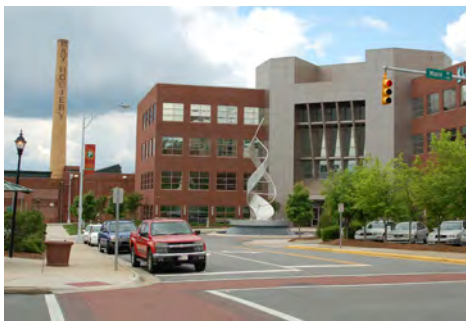
- *Consider adopting this Plan.*
- *Consider the continuation of current, approved sidewalk funding in 2012 and subsequent years to address initial projects in this Plan.*
- *Consider improving policy/ordinance including mandatory requirement for construction of sidewalks and greenways and pedestrian connectivity of residential and commercial areas during all future development (see page 3 and Chapter 4).*
- *Consider ensuring pedestrian facilities are considered as a part of all future roadway reconstruction and resurfacing projects.*
- *Consider seeking multiple funding sources and facility development options.*
- *Consider beginning pedestrian-focused meetings with key project partners to ensure implementation success.*

PHASE 2 (2014-2016)

- *Consider walkability workgroup to provide advocacy, grantwriting, and programmatic support to City staff.*
- *Consider earning a designation for Burlington as a Pedestrian & Bicycle Information Center 'Walk-Friendly Community' by 2014.*
- *Consider increasing education, encouragement, and enforcement programs including Safe Routes to School (SRTS).*

**For more details and additional action steps, see Chapter 6: Implementation.*

Filling gaps in the existing sidewalk network will encourage walking by creating a safer, better connected, and more pleasurable walking experience for pedestrians. Here a pedestrian is walking his dog along Tarleton Avenue.



Improvements to the pedestrian environment, like these crosswalks at Spring St and Maple Avenue, enhance historic downtown Burlington and make it an attractive destination for both residents and visitors.

An example of a walkable segment along O'Neal Street/Rockwood Avenue near Brookwood Avenue.

Pedestrian connectivity to adjacent commercial destinations is needed as evidenced by this footpath on Ireland Street near Church Street.

A footpath has developed from a Mebane St. neighborhood to the existing sidewalk at Wal-Mart.

Key Policy Recommendations

Walkability and livability should be considered with future development and growth decisions. The City of Burlington has not had strong pedestrian-oriented policies. The current Code of Ordinances only requires sidewalk on one side of the road and allows flexibility such as "where required by the City Council," only on thoroughfares, and whenever needed to provide for a high volume of existing pedestrian traffic.

In evaluating North Carolina peer communities, it is evident that Burlington could strengthen many areas including sidewalk requirements and other pedestrian-oriented topics within the context of its development ordinances. Some key observations regarding peer community comparisons are:

- Peer communities and many others across the State require sidewalk construction concurrent with new development on both sides of the street for all street sections and contexts with the exception of the most rural areas, alleys, and cul-de-sacs.
- Peer jurisdictions require a wider sidewalk in commercial, mixed use, or City Center area (from 8' to 16');
- Some peer communities offer a "fee in lieu" program to substitute a payment in lieu of sidewalk construction.
- Peer communities incorporate street connectivity requirements for new development, in which streets and sidewalks must provide connectivity to existing or future adjacent development;
- Peer communities also limit block length, which requires provision of walkable corridors and midblock crossings on longer blocks;
- Peer communities include streetscape requirements to provide physical separation between the sidewalk and street edge.

This plan recommends the following:

- ► *Consider updating the Code of Ordinances as detailed in Table 4.1 (page 61) of this Plan.*
- ► *Consider requiring sidewalks on both sides of the street with all new development (with the exception of rural contexts) and expand the sidewalk width requirement in urban settings.*
- ► *Consider expanding the palette of street sections to incorporate a more context-sensitive approach.*
- ► *Consider requiring street, sidewalk, and greenway connectivity with new development to adjacent land uses.*
- ► *Consider additional requirements such as streetscaping (street trees for example), limiting block length, and crosswalks.*
- ► *Consider additional strategic policies put forward in Chapter 4.*

Benefits of a Walkable City

- ***Economic Impact*** *(Returns on investment such as increased property values and rents, job creation, higher tax revenues, and attracting other investment to the area).*
- ***Quality of Life*** *(Quality of life improvements such as proximity to restaurants, shops, parks, and open spaces; lively sidewalks, paths, and public transportation; all improvements that increase the "value" of a place).*
- ***Environment*** *(When people choose to walk or bike to their destination, improvements can be found in both air quality and water quality).*
- ***Health and Active Living*** *(Access to sidewalks, trails, and safe walking places has been shown to increase exercise which is critical to address health issues such as diabetes).*

Existing Conditions

In order to propose a comprehensive pedestrian system for the City of Burlington, it is critical to fully examine the City's existing environment. The Consultant team conducted a thorough investigation and analysis of existing conditions which included the collection of existing GIS data layers and the development of new data prior to physical site visits in Burlington.

Characteristics of the City such as demographics, land use, trip attractors and current pedestrian conditions are described and analyzed in the Burlington, NC Pedestrian Transportation Plan. The City's geographic and population characteristics significantly affect transportation, the environment, and everyday decisions made by motorists and pedestrians. This existing conditions analysis led to the development of the Pedestrian Network recommendations.

Pedestrian Network Recommendations

The recommended pedestrian network provides a connected system of sidewalks, greenways (multi-use paths), and crossing improvements that connect to schools, parks, community centers, business districts, libraries, shopping centers, and corner grocery stores. The network serves multiple users and interests, and improves access for residents of varying physical capabilities, ages, and skill levels.

Existing Conditions Examined and Analyzed in this Plan

- Demographic and Socioeconomic Characteristics

- Land Use

- Trip Attractors

- Existing Pedestrian Facilities

- Pedestrian Friendly Areas

- Physical Barriers to Walking

- Pedestrian Activity and Behavior

- Perspectives of the Walking Public

- Pedestrian Crashes

- Pedestrian Related Policies and Ordinances

The pedestrian network was generated through a number of inputs including:

- Steering Committee input

- Stakeholder input

- Public input

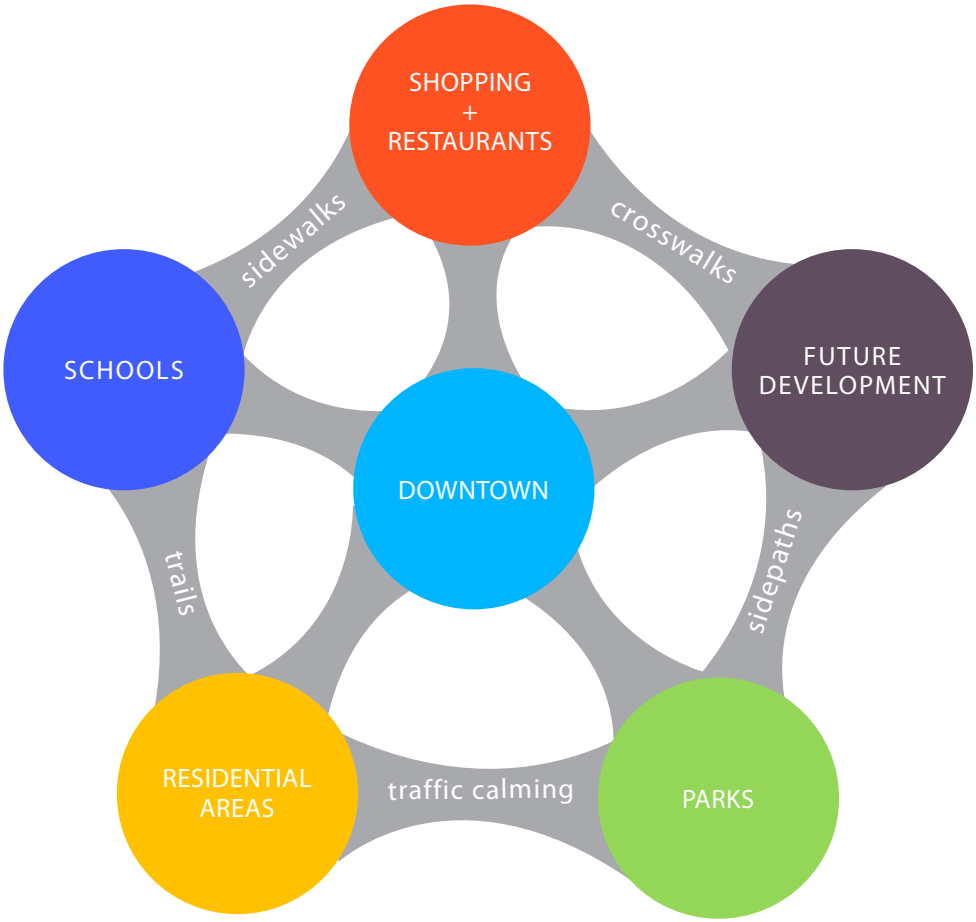
- Fieldwork

- City staff analysis

- GIS data (Pedestrian crashes, demographic data, sidewalk gap analysis)

Safe Routes to School Improvements:

Pedestrian improvements around schools are critical to creating safe environments for children and parents to walk. Many of the recommended sidewalks and crossing facility improvements are located near or adjacent to school properties.



Regional Connectivity:

Regional connections are critical for maintaining pedestrian connectivity to adjacent municipalities. The City of Burlington should work with the City of Graham and Town of Elon to ensure sidewalk connections.

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

The Proposed Pedestrian Network for the City of Burlington consists of three chief types of projects: sidewalks, crossing improvements, and greenways (multi-use trails). The addition of these types of facilities is well documented to improve safety. Many of the treatments recommended in this plan have been proven to reduce crashes, as shown in the 2007 FHWA Crash Reduction Factors Study (http://safety.fhwa.dot.gov). The table below shows some typical countermeasures and associated crash reduction factors from that study.

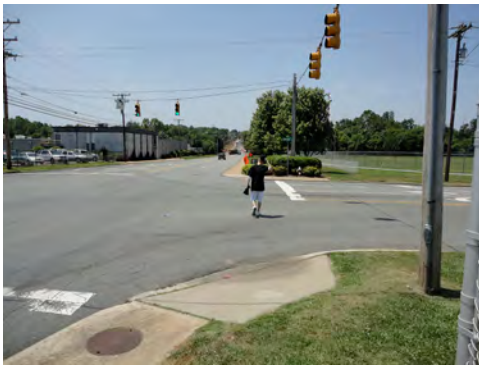
Pedestrian Crash Reduction Factors

Countermeasure	Crash Reduction Factor
Install sidewalk	74%
Install pedestrian countdown signal heads	25%
Install pedestrian refuge islands	56%
Improve/install pedestrian crossings	25%

Photo Visualizations

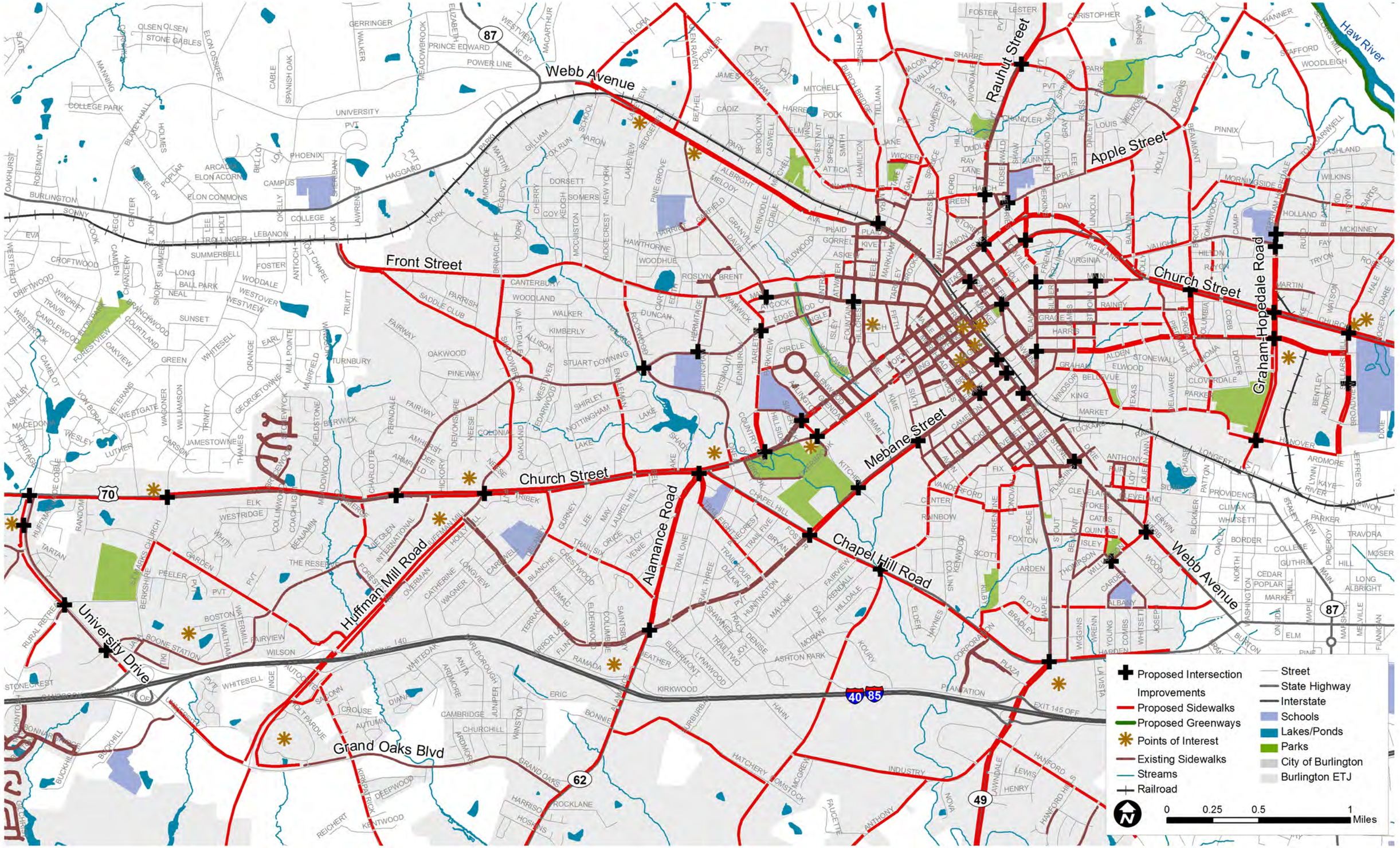
Photo visualizations, or renderings, communicate some of this Plan's recommendations in a powerful, effective, visual manner. The following are two such renderings from the Burlington Pedestrian Transportation Plan:

Sidewalk can be found along the north side of South Mebane but there is no pedestrian crossing at Kitchin Street (with City Park at the opposite corner). The addition of marked crosswalks, curb ramps, and countdown signals would improve the connection to City Park.



A worn footpath can be found along Ireland Street, near the Church Street intersection. The addition of sidewalk would improve the safety of pedestrians.

Pedestrian Network Recommendation Map



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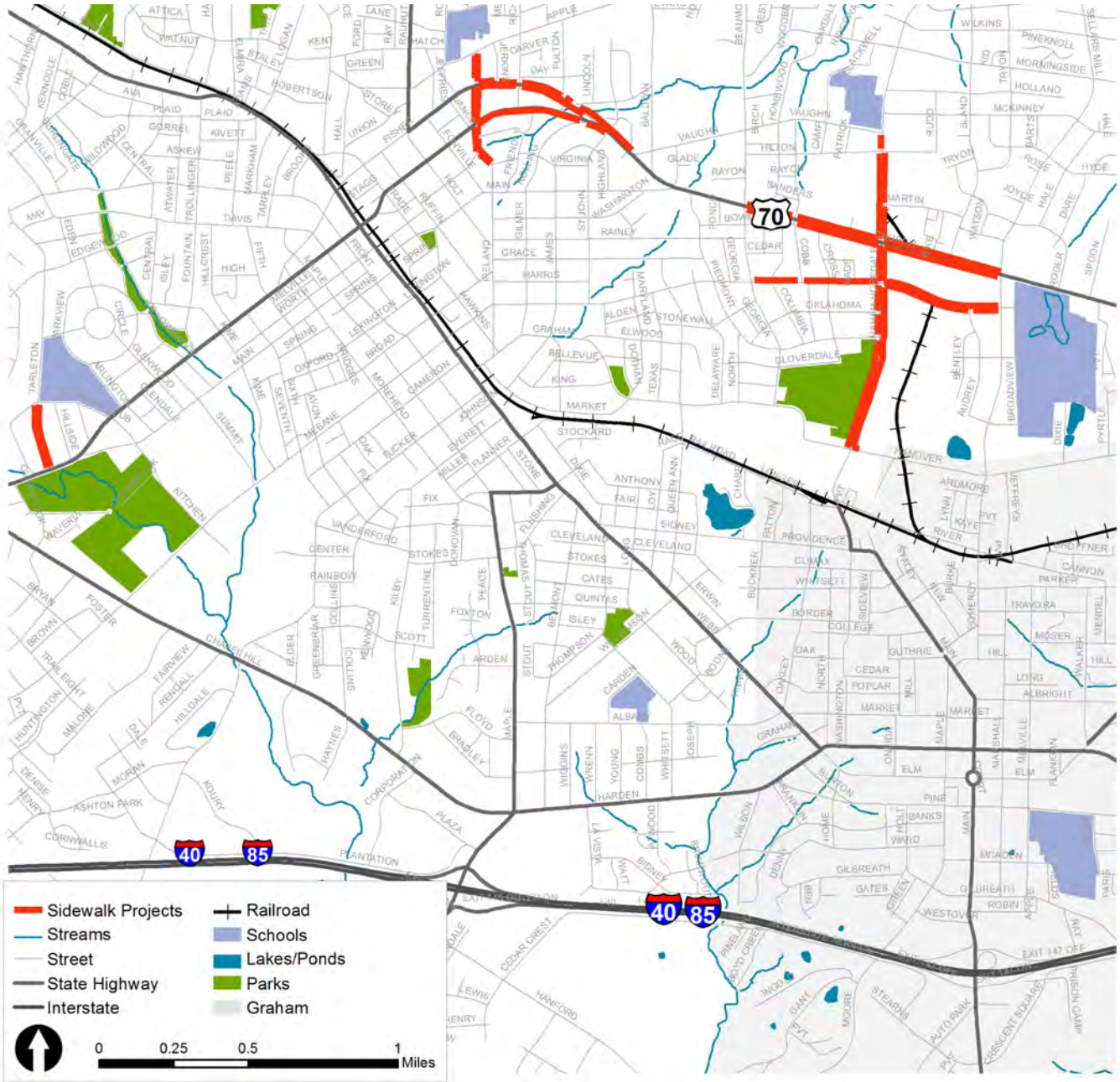
Initial Pedestrian Improvement Projects

A matrix tool was developed to score projects recommended in the pedestrian network. Sidewalk segments were scored based on such factors as presence of a footpath, connectivity to a school, and public input. The matrix is intended to only be one guidance tool as sidewalk construction order should be determined by other factors such as feasibility, cost, development, etc. The initial projects are highlighted in the map below with project cutsheets and cost estimates in Chapter 3. The projects are:

- Graham-Hopedale Road (Mebane St. to Vaughn Rd.)
- Graham-Hopedale Road (Hanover Rd. to Mebane St.)
- Fisher Street (Ireland St. to Church St.)
- Church Street (Graham-Hopedale Rd. to Sellars Mill Rd.)
- Ireland Street (Apple St. to Virginia Ave.)
- Tarleton Avenue (Church St. to Country Club Dr.)
- Mebane Street (Graham-Hopedale Rd. to S. Sellars Mill Rd.)
- Church Street (Ireland St. to N. Fisher St.)
- Mebane Street (Beaumont Ave. to Graham-Hopedale Rd.)
- Church Street (Beaumont Ave. to Graham-Hopedale Rd.)



Above: Pedestrian and Bike Safety Rodeos are a fun and effective way to teach safe, responsible pedestrian behavior to children. Photos courtesy of http://www.childrenshospital.vanderbilt.org/

Program Recommendations and Resources

Meeting the goals of this Plan will not only require new facilities; it also requires implementation of pedestrian-related programs. Pedestrian-related programs fall into three main categories: education, encouragement, and enforcement.

SafeRoutes
National Center for Safe Routes to School

Safe Kids Worldwide
Alamance County

Eat Smart Move More
NORTH CAROLINA ™

Safe Routes to School, Safe Kids Worldwide, Adopt-a-Trail, and Eat Smart Move More are a few examples of existing and recommended programs and resources in the plan.

Implementation

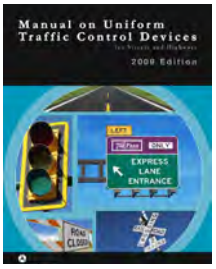
The Burlington Pedestrian Transportation Plan outlines the implementation steps that need to happen to make these recommendations a reality. It provides implementation phasing, key partners in implementation, facility development methods, and over 40 specific action steps.

Pedestrian Design Elements and Treatments Covered in this Plan:

Sidewalks and Walkways
Greenway Trail
Marked Crosswalks
Curb Ramps
Raised or Lowered Medians
Advance Stop Bars
Bulb-Outs
Pedestrian Overpass/ Underpass
Roundabouts
Traffic Signals
Pedestrian Signals
Landscaping
Roadway Lighting Improvements
Street Furniture and Walking Environment
Transit Stop Treatments
Pedestrian Signs and Wayfinding
Bridges
Traffic Calming

Design Guidelines

This section serves as an inventory of pedestrian design elements/ treatments and provides guidelines for their development. The recommended guidelines originate from and adhere to national design standards. These treatments and design guidelines are important because they represent minimum standards for creating a pedestrian-friendly, safe, accessible community.



AASHTO THE VOICE OF TRANSPORTATION

Pedestrian and Bicycle Information Center

The Pedestrian and Bicycle Information Center, AASHTO, the MUTCD, nationally recognized trail standards, and other sources have all informed the Design Guidelines in this Plan.

Funding Sources

Due to the cost of most construction activities, it may be necessary to consider several sources of funding, that when combined, would support full project construction. The Burlington Pedestrian Transportation Plan outlines likely sources of funding for the identified projects at the federal, state, local government level and from the private sector.

Public Input

A significant effort was put into receiving public input during this planning process with the assistance of City staff, Healthy Alamance, and community volunteers. Methods included public workshops (at North Park, Alamance County Health Department, and the Company Shops Market), social media, City of Burlington newsletter, project website, and online/ hardcopy comment form. Some results from the comment form are shown on the following page and a complete summary of public involvement can be found in Appendix D.

Above: Photos from public workshops. Residents provided input on maps and through comment forms.

2. How important to you is improving walking conditions in Burlington? (select one)

	Response Percent	Response Count
Very important	**60.7%**	**266**
Important	32.9%	144
Not important	6.4%	28
answered question		**438**
skipped question		**2**

5. Would you walk more often if more sidewalks, trails, and safe roadway crossings were provided for pedestrians?

	Response Percent	Response Count
Yes	**86.0%**	**376**
No	14.0%	61
answered question		**437**
skipped question		**3**

7. The City of Burlington should require commercial and residential developers to construct sidewalk during development.

	Response Percent	Response Count
Yes	**93.2%**	**399**
No	6.8%	29
answered question		**428**
skipped question		**12**

Above: A sampling of results from the Burlington Pedestrian Plan comment form. For complete results, see Appendix D.

Chapter One: Introduction

Chapter Outline:

Overview

In the spring of 2011, the City of Burlington and the Burlington-Graham Metropolitan Planning Organization (MPO) began developing a Pedestrian Master Plan. This represents the City's first effort to develop a plan that provides guidance towards becoming a more walkable community. On the federal transportation level, there is an increased effort to create livable, sustainable communities with multi-modal transportation improvements. On a local level, walkability enhancements create opportunities for pedestrian transportation, recreation, healthy living, and economic development. The purpose of this Pedestrian Master Plan is to provide clear priorities, tools and programs for improving the pedestrian environment in the City of Burlington.

The development of this Plan included an open, participatory process, with area residents providing input through public workshops, stakeholder meetings, the project Steering Committee, social media, and an online comment form.

This Plan features:

- A thorough analysis of current conditions for walking in Burlington
- A comprehensive recommended pedestrian network to address connectivity and safety
- Standards and guidelines for the development of pedestrian facilities
- A prioritized list of recommended strategic improvements
- Integration of pedestrian policy into codes and ordinances
- Recommendations for programming and funding

Vision and Goals

The following vision statements and goals were confirmed early in the planning process, during initial Committee meetings and public input procedures. The statements below apply to both the Plan itself, and the desired outcome of its implementation:

Burlington's Pedestrian Plan Vision Statement

The City of Burlington will be a place where pedestrian connectivity and access is provided to people of all ages, abilities, and socio-economic backgrounds; where comprehensive pedestrian design is integrated into all future planning and development; where walking is encouraged and supported through a variety of programs; and where multi-modal transportation improvements create a sustainable and livable Burlington where citizens spend more time outdoors, engage in healthy activities, have a high quality of life, and have fresher air to breathe.

Public Benefits of Pedestrian Transportation

When considering the level of dedication of time and valuable resources that it takes to create a walkable community, it is also important to assess the immense value of pedestrian transportation. Henry David Thoreau once said, "Me thinks that the moment my legs begin to move, my thoughts begin to flow." Throughout history, physical exercise has been accepted as an effective way of managing a person's mental, emotional and physical state. Walking, in particular, is one of the most highly recommended types of exercises to incorporate into your daily schedule. Some people enjoy the solitude of walking alone. Other people need the stimulation of interacting with others, such as joining a walking or running group. "Walking is a fundamental activity for physical and mental health, providing physical exercise and relaxation. It is a social and recreational activity. Environments that are conducive to walking are conducive to people" (VTPI 2011 walkability). Walking helps to stimulate the economy, improve people's health and fitness, enhance environmental conditions, decrease traffic congestion, and will contribute to a greater sense of community.

Committee members discuss pedestrian needs in Burlington during the kick-off meeting.

Filling in gaps in the existing sidewalk network will encourage walking by creating a safer, better connected, and more pleasurable walking experience for pedestrians. Here a pedestrian is walking his dog along Tarleton Avenue.

Measurable Goals for the Master Plan:

- *Reduce Vehicle Miles Traveled (VMTs) and improve air quality by increasing the ratio of pedestrian and bicycle trips to vehicle trips.*
- *Continually reduce the number of pedestrian accidents per year (148 reported pedestrian crashes from 2000-2010).*
- *Increase the miles of sidewalks as a percent of total City roadways.*
- *Fill gaps in the existing sidewalk network.*
- *Increase the percentage of children walking to school.*

Key Implementation Action Steps:*

PHASE 1 (2012-2013)

- *Consider adopting this Plan.*
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PHASE 2 (2014-2016)

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- *Consider increasing education, encouragement, and enforcement programs including Safe Routes to School (SRTS).*

**For more details and additional action steps, see Chapter 6: Implementation.*

Economic Benefits

Enhancing walkability can provide three types of economic benefits:

1. Returns on investment such as increased property values and rents, job creation, higher tax revenues, and attracting other investment to the area.

2. Savings on expenditures for households and local government such as reduced costs for transportation time and fuels, infrastructure construction and maintenance, health care, etc.

3. Quality of life improvements such as proximity to restaurants, shops, parks, and open spaces; lively sidewalks, paths, and public transportation; all improvements that increase the "value" of a place.

"Improving neighborhood 'walkability' tends to enhance property values." The web site WalkScore.com rates locations according to a walkability index from 1 to 100. One study found that, in general, every one-point increase in the Walk Score increased a home's value by $700 to $3,000. (Growing Wealthier: Smart Growth, Climate Change and Prosperity, Center for Clean Air Policy 2011)

Return on Investment

There are economic benefits of a walkable community from a real estate standpoint. The study by CEO's for Cities "Walking the Walk: How Walkability Raises Home Values in U.S. Cities" estimates how much market value home buyers implicitly attach to houses with higher "Walk Scores". The study looked at data for more than 90,000 recent home sales in 15 different markets around the Nation. While controlling for key characteristics that are known to influence housing value, the study showed a positive correlation between walkability and housing prices in 13 of the 15 housing markets studied. (CEOs for Cities. (2010) Walking the Walk: How Walkability Raises Home Values in U.S. Cities.)

Trails can play a part in making communities more walkable, and they too have a positive economic impact. In a survey of home buyers by the National Association of Realtors and the National Association of Home Builders, trails ranked as the second most important community amenity out of a list of 18 choices. (National Association of Realtors and National Association of Home Builders. (2002). Consumer's Survey on Smart Choices for Home Buyers.) Additionally, the study found that 'trail availability' outranked 16 other options including security, ball fields, golf courses, parks, and access to shopping or business centers. Findings from the American Planning Association (How Cities Use Parks for Economic Development, 2002), the Rails-to-Trails Conservancy (Economic Benefits of Trails and Greenways, 2005), and the Trust for Public Land (Economic Benefits of Parks and Open Space, 1999) further substantiate

Walking and bicycling infrastructure also has positive economic impacts. According to Rails-to-Trails Conservancy, existing walking and biking trails add $1.4 billion in economic activity nationwide each year in retail and tourism alone, on top of increased real estate values, business profits from bicycle and pedestrian facility improvements, time, savings, and health care cost savings. (Growing Wealthier: Smart Growth, Climate Change and Prosperity, Center for Clean Air Policy 2011)

Appropriate signage can help identify a special place or district, enhancing the character of that place and creating interest for pedestrians.

"Greenways and pedestrian trails have been shown to increase the value of adjacent properties by as much as 5 to 20%. For example, within a new development in Apex, North Carolina, new lots situated on greenways were priced $5,000 higher than comparable lots off the greenway. In Charlotte, national builders typically charge premiums ranging from $1000 to $5000 for $120,000-$200,000 homes bordering open space and greenways" (http://www.charmeck.org/mecklenburg/county/ParkandRec/Greenways/Documents/1benefits.pdf).

In Washington, DC, the Barracks Row Main Street Program sought to revitalize an historic district through investment of about $8 million to better manage parking and public transportation, improve drainage and add street lighting, trees and other greenery. The vision was to create a pedestrian-friendly and ecologically smart urban corridor that would blend in with historic Capitol Hill. As a result of this investment, since 1999, 44 new businesses have opened, including 12 new outdoor cafes; 200 new jobs have been created; and overall economic activity has tripled. (Growing Wealthier: Smart Growth, Climate Change and Prosperity, Center for Clean Air Policy 2011)

the positive connection between walkability and property values across the country.

Improvements to the pedestrian environment, like these crosswalks at Spring St and Maple Avenue, enhance historic downtown Burlington and make it an attractive destination for both residents and visitors.

Savings on Expenditures

Walking is an affordable form of transportation. A walkable community directly affects a citizen's transportation costs. Walking becomes even more attractive from an economic standpoint when the rising price of oil (and decreasing availability) is factored into the equation. The unstable cost of fuel reinforces the idea that local communities should be built to accommodate people-powered transportation, such as walking and biking.

Quality of Life

Many factors go into determining 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, however, 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 with their community. Communities with such amenities can attract new businesses, industries, and in turn, new residents.

Walking is a fundamental social community activity. Mark Twain is quoted as saying, "the true charm of pedestrianism does not lie in the walking, or in the scenery, but in the talking… the scenery and the woodsy smells are good to bear in upon a man an unconscious and unobtrusive charm and solace to eye and soul and sense; but the supreme pleasure comes from the talk." Members of a community who walk to a destination are more likely to meet or make friends or other social or commercial contacts than members of a community who drive to a destination. Provided there are viable alternatives to driving, "Americans are willing to change their travel habits, as the dramatic increases in gas prices in 2008 showed. Every day, more commuters switch to public transportation, bicycling and walking in places where prior infrastructure investments have made these options safe and convenient" (Active Transportation for America: The Case for Federal Investment in Bicycling and Walking. Rails to Trails Conservancy and Bikes Belong Coalition 2008).

Facilitating pedestrian connectivity and creating a pleasurable walking environment has been shown to attract people, generate revenue, and increase property values. (Above: Downtown Burlington)

In a 2011 Community Preference Survey conducted by the National Association of Realtors (NAR), 66% of respondents selected being within walking distance of stores and other

Creating an attractive, well connected pedestrian infrastructure system produces health and social benefits for residents. The City Park Walking Track in Burlington provides a means for recreation and exercise.

community amenities as being important. When given an opportunity to select which community they would most like to live in, a community described as:

> *"A mix of single family detached houses, townhouses, apartments and condominiums on various sized lots, with almost all streets having sidewalks, destinations such as shopping, restaurants, a library, and a school are within a few blocks of your home, and where parking is limited when you decide to drive to local stores, restaurants and other places."*

ranked higher and was found to be more desirable than a community described as:

> *"Only single family houses on large lots, with no sidewalks, destinations such as shopping, restaurants, a library, and a school are within a few miles of your home, limiting your transportation choices to mainly the automobile, but there is enough parking when you drive to these destinations and public transportation, such as bus, subway, light rail, or commuter rail, is distant or unavailable."*

Additionally, the 2011 NAR survey reflected changes in priorities compared to 2004, the last time the survey was conducted. Interest in walkability increased, with 46% saying their community had too few shops and restaurants within easy walking distance, compared to 42% in 2004. In the 2011 survey, 40% said their community needed more sidewalks, compared to 36% in the 2004 survey.

Increased Health and Physical Activity

Transportation investments impact health directly and also indirectly through their impact on land use. According to a 2010 report from the American Public Health Association, "Investments in transit, walking and bicycling facilities support transit use, walking and bicycling directly; they also support the formation of compact, walkable, transit-oriented neighborhoods that in turn support more walking, bicycling and transit and less driving"(American Public Health Association. (2010) The Hidden Health Costs of Transportation).

In Seattle, a 5% increase in the overall level of walkability was associated with a 32% increase in minutes of active transport and about one-quarter-point reduction in BMI. (Growing Wealthier: Smart Growth, Climate Change and Prosperity, Center for Clean Air Policy 2011)

Many people incorporate walking into their daily routines as a way to manage their mental, emotional and physical state. In a December 2010 article published by the Mayo Clinic, it is suggested that, "walking, like other exercise, can help you achieve a number of important health benefits such as:

- Lowered low-density lipoprotein (LDL) cholesterol (the "bad" cholesterol)
- Higher high-density lipoprotein (HDL) cholesterol (the "good" cholesterol)
- Lowered blood pressure
- Reduced risk of or manage type 2 diabetes
- Improved mood
- Feeling strong and fit

Research shows that regular, brisk walking can reduce the risk of heart attack by the same amount as more vigorous exercise, such as jogging." In addition to research by the Mayo Clinic, a growing number of studies show that the design of our communities—including neighborhoods, towns, 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). In short, a diverse trails network will create better opportunities for active lifestyles. The CDC reports that "30 minutes of moderately intense exercise" is equivalent to 1.5 miles of walking, 5 miles of bicycling, or one less slice of pizza.

A similar study in Atlanta found walkability to be a significant factor in explaining the number of minutes per day of moderate physical activity. Residents of the most walkable environments in Atlanta were found to get approximately 37 minutes of moderate activity per day, whereas residents of the least walkable environments got only 18 minutes. (Growing Wealthier: Smart Growth, Climate Change and Prosperity, Center for Clean Air Policy 2011)

The increased rate of disease associated with inactivity reduces quality of life for individuals and increases medical costs for families, companies, and local governments. The CDC determined that creating and improving places to be active could result in a 25% increase in the number of people who exercise at least three times a week (U.S. Department of Health and Human Services, Centers for Disease Control and

Prevention. (2002). Guide to Community Preventive Services). This is significant considering that for people who are inactive, even small increases in physical activity can bring measurable health benefits. The establishment of a safe and reliable network of sidewalks and trails can have a positive impact on the health of nearby residents. The Rails-to-Trails Conservancy puts it simply: "Individuals must choose to exercise, but communities can make that choice easier" (Rails-to-Trails Conservancy. (2006) Health and Wellness Benefits).

Trails and greenways produce positive environmental impacts such as reducing pollution associated with automobile use and linking fragmented plant and animal habitat. The trails through City Park provide a means of enjoying nature.

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.

Trails and greenways are also part of the pedestrian network, conveying their own unique environmental benefits. Greenways protect and link fragmented habitat and provide opportunities for protecting plant and animal species. Aside from connecting places without the use of air-polluting automobiles, trails and greenways also reduce air pollution by protecting large areas of plants that create oxygen and filter air pollutants such as ozone, sulfur dioxide, carbon monoxide and airborne particles of heavy metal. Finally, greenways improve water quality by creating a natural buffer zone that protects streams, rivers and lakes, preventing soil erosion and filtering pollution caused by agricultural and road runoff.

Active Transportation: "Modest Scenario"

Trip Length	Current Share of Trips by Walk or Bike	Future Share of Trips by Walk or Bike	Annual VMT reduction	Annual CO2 Savings
Less than 1 mile	31%	40%	28 billion	21 million tons
1 to 3 miles	4%	10%	21 billion	21 million tons

Table 1.1. *VMT and CO2 savings from Shifting Some Short-distance Trips from Car to Walking or Bicycling (Growing Wealthier: Smart Growth, Climate Change and Prosperity, Center for Clean Air Policy 2011)*

Transportation Benefits

"The civilized man has built a coach, but has lost the use of his feet" (Ralph Waldo Emerson, "Self-Reliance," 1841). According to the U.S. Environmental Protection Agency, fewer children walk or bike to school than did so a generation ago. In 1969, 48% of students walked or biked to school, but by 2001, less than 16% of students between 5 and 15 walked or biked to or from school (U.S EPA. (2003). Travel and Environmental Implications of School Siting).

Improving pedestrian infrastructure can reduce traffic congestion and our dependence on foreign oil by reducing the use of cars for short trips. Here a pedestrian walks home from the store along Delaney Drive.

When residents replace short car trips with walking trips, they have a positive impact on local traffic and congestion. Traffic congestion reduces mobility, increases auto-operating costs, adds to air pollution, and causes stress in drivers. Substituting walking or bicycling for some of these trips relieves the congestion, benefiting all road users. Furthermore, every car trip replaced with a pedestrian trip reduces U.S. dependency on fossil fuels, which is a national goal.

According to the Brookings Institution, the number of older Americans is expected to double [between 2000 and 2025]. (Brookings Institution. 2003. The Mobility Needs of Older Americans: Implications for Transportation Reauthorization). All but the most fortunate seniors will confront an array of medical and other constraints in their mobility even as they continue to seek both an active community life, and the ability to age in place. Trails built as part of the pedestrian transportation network generally do not allow for motor vehicles. However, they do accommodate motorized wheelchairs, which is an important asset for the growing number of senior citizens who deserve access to independent mobility.

In 2010, the American Public Health Association reported that, "investments in transit, walking and bicycling facilities support transit use, walking and bicycling directly; they also support the formation of compact, walkable, transit-oriented neighborhoods that in turn support more walking, bicycling and transit and less driving. These built environments have repeatedly been associated with more walking, bicycling and transit use, more overall physical activity, and lower body weights; lower rates of traffic injuries and fatalities, particularly for pedestrians; lower rates of air pollution and greenhouse gas emissions; and better mobility for non-driving populations"(American Public Health Association. (2010) The Hidden Health Costs of Transportation).

Creating a walkable community provides greater and safer mobility for all residents, especially the non-driving population. According to the U.S. Census Bureau, there are more than 60 million Americans who do not drive because they are not old enough. Another 30 million adults are not licensed to drive for a variety of reasons including economics, age, disability and choice. Eight million Americans above the age of 60 do not have a driver's license, (U.S. DOT "Distribution of Licensed Drivers 2001) and there are other licensed drivers who just choose not to drive. If there are 90+ million non-drivers in the United States and the cost of one mile of sidewalk (5' wide, 4" depth on one side of the road) is about $103,000 and the cost of a rural road, (undivided 2 lane rural road with 5' paved shoulders) is about $1,473,000, then providing sidewalks to increase mobility for these 90+ million historically undeserved citizens will enhance environmental conditions, decrease traffic congestion, improve overall health and contribute to a greater sense of community (estimated construction costs obtained: ftp://ftp.dot.state.fl.us/LTS/CO/Estimates/CPM/summary.pdf).

Plan Components

This Plan document includes the following components:

*This **Introduction** that presents the background, visions and goals, and the benefits of a walkable city (Chapter 1).*

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

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

***Policy Recommendations** that address city policies and pedestrian needs for future development (Chapter 4).*

***Program Recommendations** for education, encouragement, enforcement (Chapter 5).*

***Implementation Recommendations** that outline specific steps for achieving the plan's key elements along with facility development methods (Chapter 6).*

***Design Guidelines** to guide the City of Burlington in current facility design and standards (Appendix A).*

***Appendices** that provide a summary of public input, funding sources, intersection inventory and recommendations, and federal and state policies.*

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Chapter Two: Existing Conditions

Chapter Outline:

Overview

The City of Burlington, North Carolina is a Piedmont community in central North Carolina, located between Greensboro and the Triangle region. The City resides mostly in Alamance County with some western portions in Guilford County. It is the principal city of the Burlington, North Carolina Metropolitan Statistical Area. The City is quickly growing with a 2000 population of 44,917 and a 2010 population of 49,963.

Burlington has grown steadily over the past century with some spikes in population growth. The City has grown by more than 13% each decade since 1990. The Downtown remains a very pedestrian-oriented, walkable area with a prevailing sense of place. Sprawling growth outside the Downtown is largely auto-dominated with fewer pedestrian facilities. There are no public transportation systems in place citywide. Comprehensive pedestrian connectivity is lacking and needed to support a growing population.

In order to propose a comprehensive pedestrian system for the City of Burlington, it is critical to fully examine the City's existing environment. Characteristics of the City such as demographics, land use, trip attractors and current pedestrian conditions will all be described and analyzed in this Chapter. The City's geographic and population characteristics significantly affect transportation, the environment, and everyday decisions made by motorists and pedestrians. This existing conditions analysis led to the development of the Pedestrian Network recommendations.

Demographic and Socioeconomic Characteristics

Needs and demands related to walking can be better understood through an analysis of demographic information. US Census demographic data provide geographic information such as the means of transportation to work and the percent of population not owning a vehicle. The need for greater

pedestrian access and mobility is greater for lower-income communities and high-density areas, where more people would be impacted.

Map 2.1 shows 2010 population density throughout the City. The most densely populated areas are typically multi-use residential areas (apartment complexes, for example). Map 2.2 shows 2010 median household income. Areas in the immediate south and east of Downtown have the lowest income levels, and thus, potentially, more need for pedestrian accommodations. In total, approximately 21.3% of the population were below the poverty line between 2006-2010.

Based on information from the 2010 US Census American Community Survey, approximately 0.8% of the working population over age 16 walked to work. When examined in more detail (by block group as seen in Map 2.3), the block groups clustered in the Downtown core, especially east of the railroad and south of US 70, along with areas adjacent to Elon University have the highest percentage of people walking to work.

Map 2.4 highlights the non-vehicle ownership percentages by block group. These trends show that portions of the Downtown and east of Downtown have the highest rates of zero vehicle ownership.

Commercial development has migrated away from the Downtown core and out to the major roadway corridors. Pictured above is the shopping center at the intersection of University Dr. and Boone Station Dr. in Burlington.

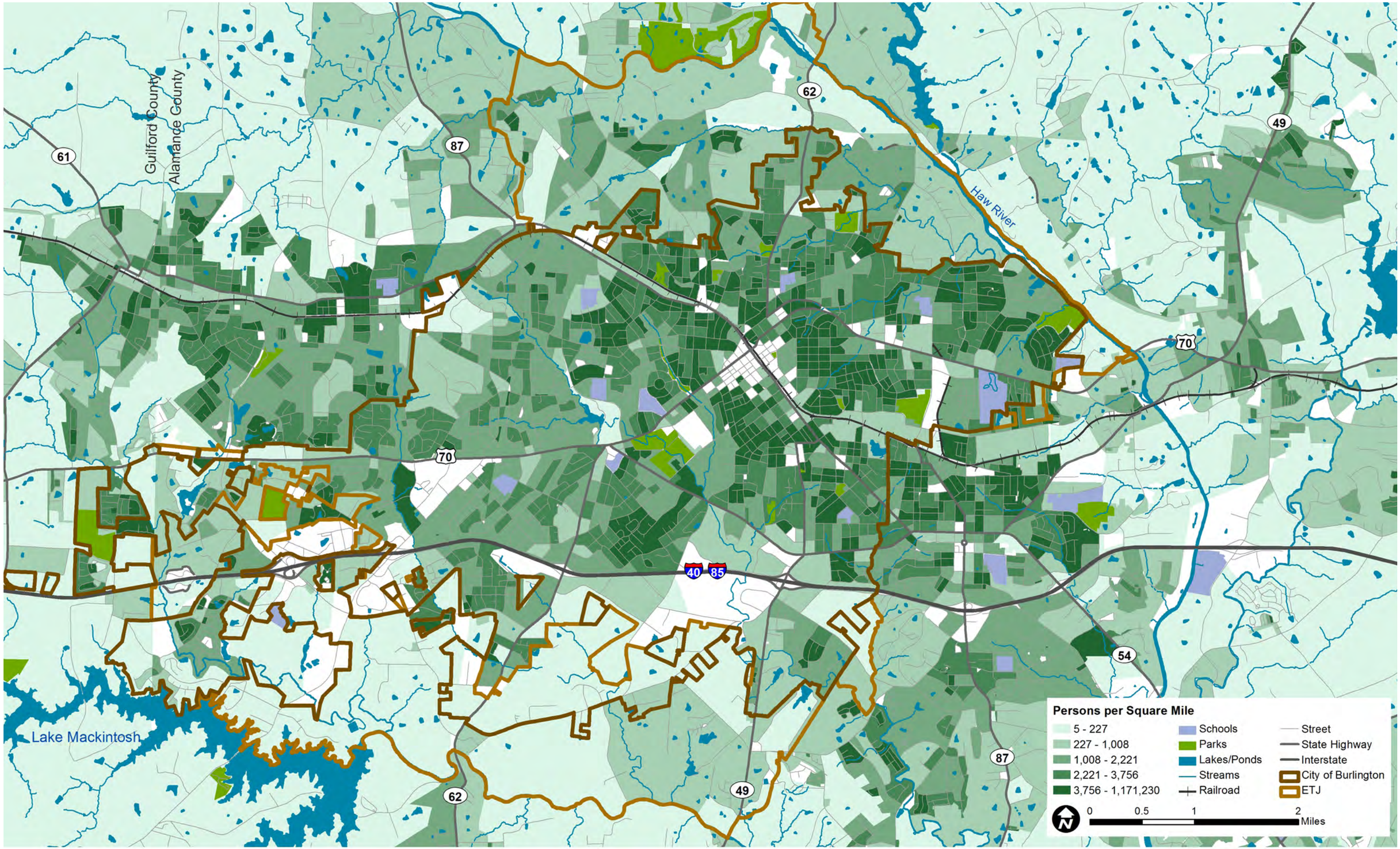
Land Use

Burlington experienced significant growth over the past several decades and quickly grew outward from the Downtown core. The land use patterns that have developed have a significant impact on travel behavior and transportation mode choice.

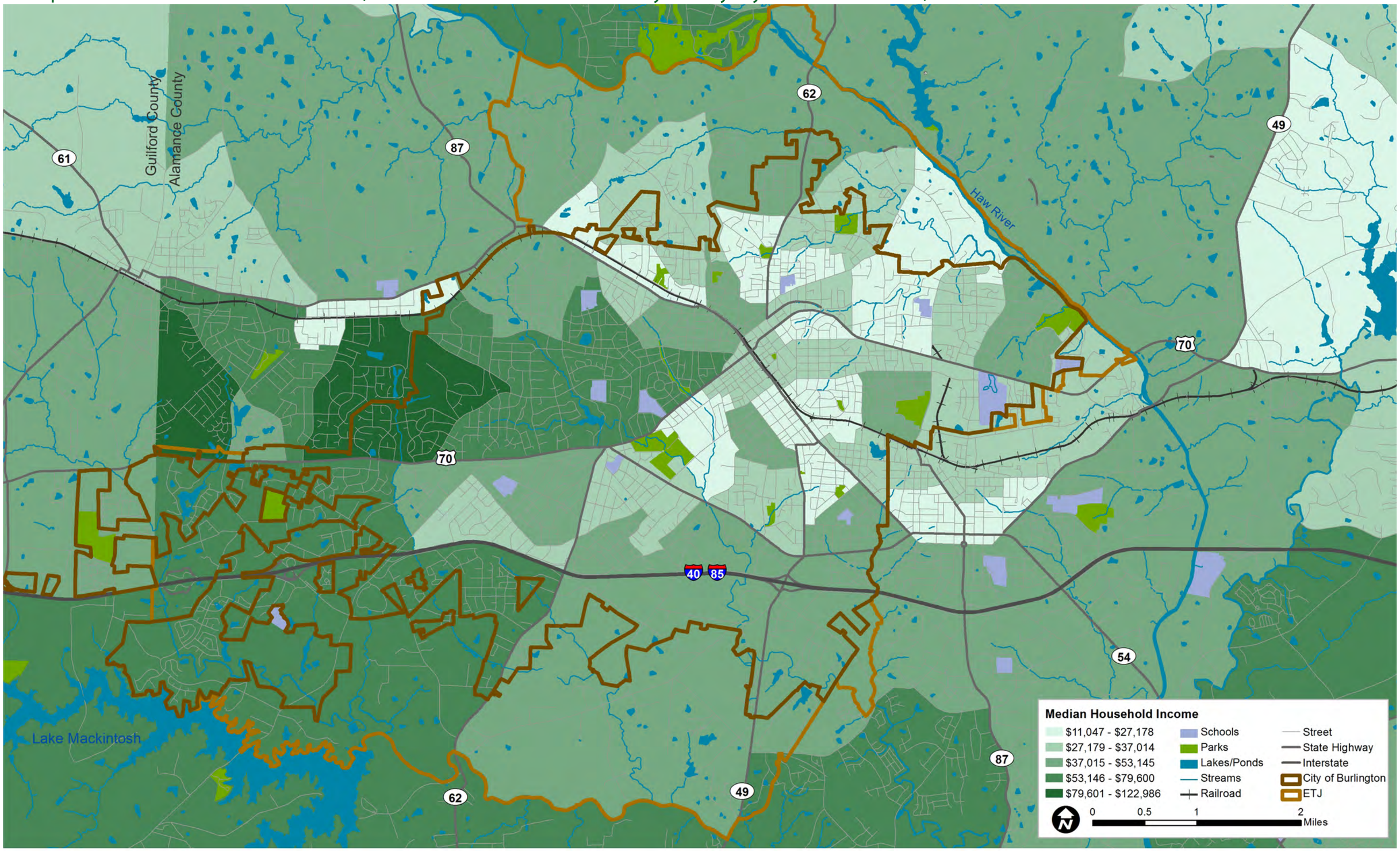
Over time, commercial development, such as retail stores and restaurants, has migrated out to the major roadway corridors (US 70, NC 87, Huffman Mill, and University among others). This migration of development creates an environment in which pedestrian travel for the majority of daily amenities is very limited. However, there is a prevalence of mini-grocery stores and convenient stores, especially in lower-income communities, that are walking distance for many to conduct basic shopping.

There are many barriers to pedestrian travel including major roadways such as I-40/I-85, US 70 (Church Street), and the railroad corridors. I-40 crossings feature vehicle exit and entrance ramps and high-speed traffic making it dangerous for walking. N. Church Street (east of the Downtown) widens to

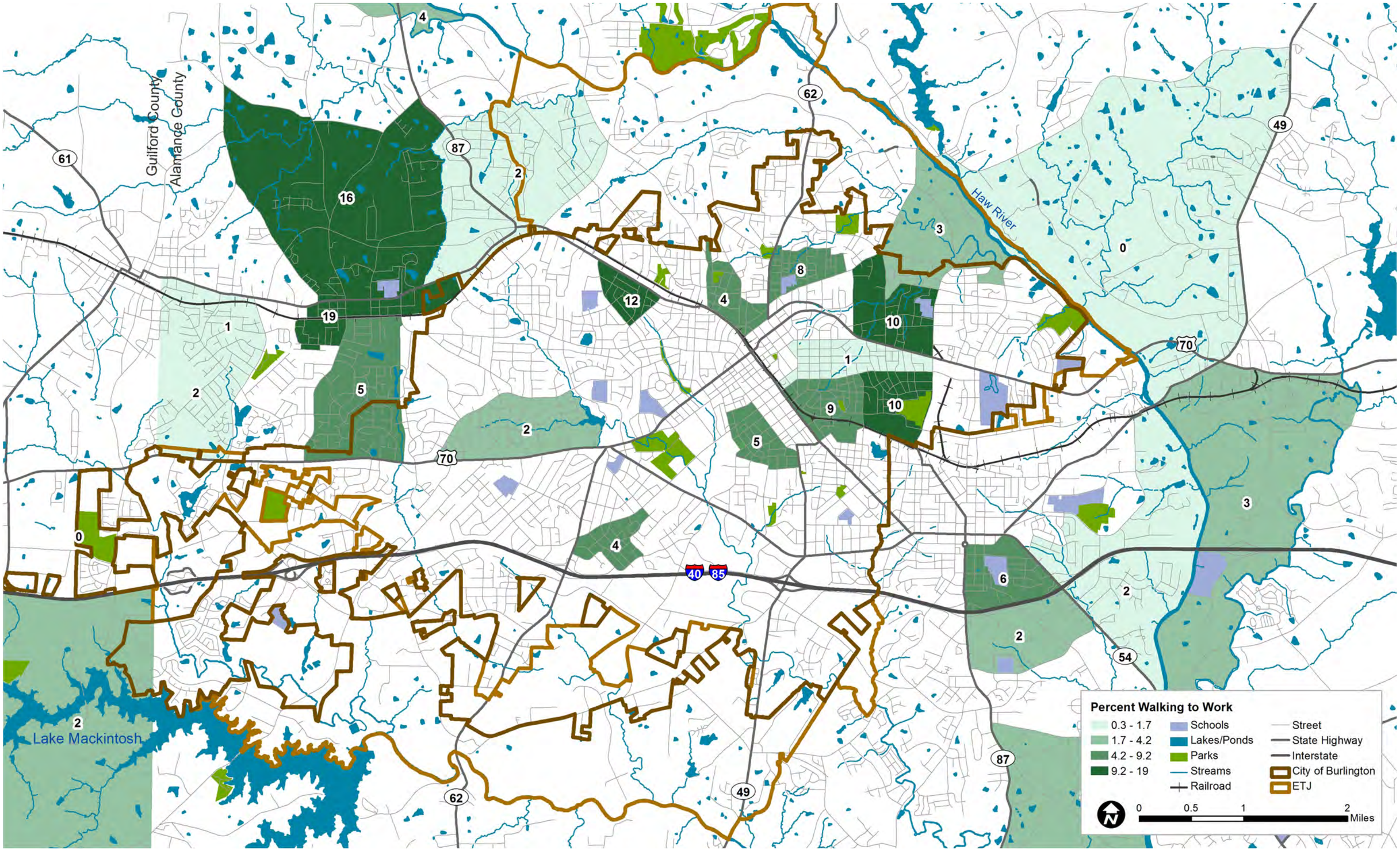
Map 2.1 – Population Density (2010 US Census)



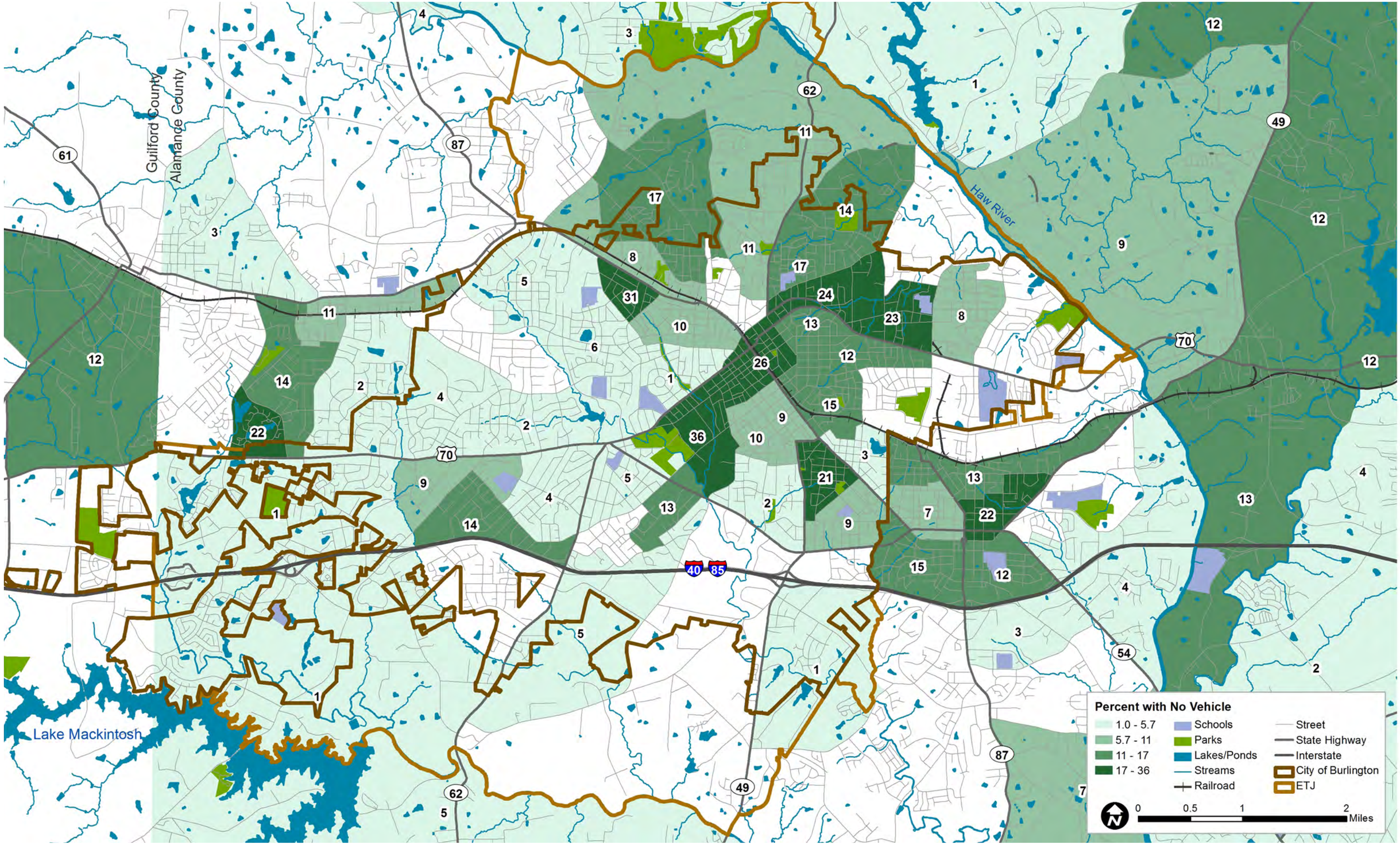
Map 2.2 - Median Household Income (US Census American Community Survey 5-year Estimate 2010)



Map 2.3 – Percent of the Population Walking to Work (US Census American Community Survey 5-year Estimate)



Map 2.4 – Percent of the Population Not Owning a Vehicle (US Census American Community Survey 5-year Estimate 2010)



seven lanes creating a pedestrian barrier. A lack of pedestrian facilities at these crossings makes it difficult and seem unsafe to travel as a pedestrian.

While the City's housing stock is primarily single family, there are many multi-family dwelling units comprised of several housing complexes throughout Burlington. There are also many City-owned Recreation and Parks areas located throughout Burlington's residential neighborhoods.

The Downtown is a safe, comfortable environment for pedestrians. The highest concentration of marked crosswalks and adequate sidewalks is found in Downtown Burlington.

Trip Attractors

Residents of Burlington travel to a variety of destinations by walking, biking or driving. These destination points are referred to as "trip attractors" in this Plan. The following primary trip attractors were reviewed and analyzed when determining locations for the physical pedestrian improvements recommended in Chapter 3.

Primary trip attractors in Burlington are:

- Downtown
- Parks and walking/jogging tracks
- City Park and YMCA
- Grocery stores (local corner markets and chain stores) and shopping centers
- Schools
- Elon University
- Public Libraries
- Churches

Field Work and Analysis

The Consultant team conducted a thorough investigation and analysis of existing conditions. The major categories of work are described in this section. The consultant team collected existing GIS data layers and developed new data prior to physical site visits in Burlington. GIS analysis tasks accomplished include:

- Update/revision of existing trails/pedestrian facilities
- Demographic data and map development
- Pedestrian crash mapping

Trip Attractors

The Town and Country Nature Park *offers passive recreation and trails in the northeast section of Burlington.*

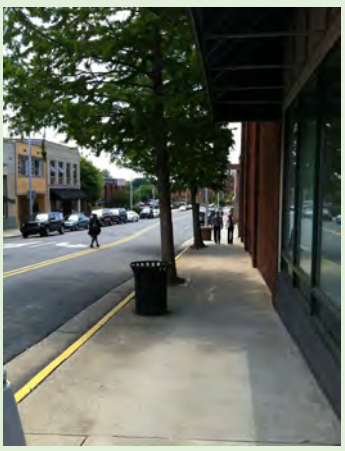
Eastlawn Elementary *is within walking distance from surrounding neighborhoods.*

Walter Williams High School *is a major destination with adjacent sidewalk and residential areas within walking distance.*

While not in Burlington, ***Elon University*** *is a destination within walking and biking distance of some Burlington residences.*

The Tienda Latina *on the corner of Church Street and Ireland Street is a neighborhood destination point for shopping as evidenced by the footpath.*

May Memorial Library *along Spring Street in Downtown is another trip attractor.*



Downtown Burlington *is a major destination with historic buildings, restaurants, shops, and a co-op grocery.*

During fieldwork analysis, special attention was paid to school areas, Downtown areas, crossings, and other destinations. Site visit analysis included:

- 50 intersections were inventoried and photo inventoried for pedestrian crossing facilities. Recommended pedestrian treatments were developed for each intersection.
- Over 100 miles of major and minor roadways were analyzed for possible sidewalk facilities.
- Active pedestrians were monitored and photo-inventoried.
- Existing, exemplary facilities were noted and photo-inventoried.
- Barriers to pedestrian travel were noted.

The results of the field work and GIS analysis are summarized in the pedestrian conditions section of this Chapter. Recommendations have been developed based on these conditions and are presented in Chapter 3.

Pedestrian Conditions

Existing Facilities and Pedestrian Crashes (Map 2.5)

The majority of pedestrian facilities are found in the Downtown core, along some arterial roadways, and in scattered residential developments where walkability was deemed a high priority such as the Mackintosh neighborhood in southwest Burlington. A total of 98.3 miles of sidewalk exist today.

In addition to linear facilities, there are many crossing facilities found at intersections, mostly in the Downtown area. Marked crosswalks and curb ramps can be found in the Downtown core but are largely inconsistent from crossing to crossing. Growth that has occurred outside of Downtown has not always provided connected, safe, pedestrian crossing facilities, leaving gaps between Downtown, trip attractors and residential neighborhoods.

Many areas of the City feature high-quality pedestrian environments. These include the following:

Downtown core: In the immediate Downtown there is a large network of older, wide sidewalks. Due to the grid road network, short blocks, low traffic speeds, and existing sidewalks/crosswalks, the Downtown is a safe, comfortable environment for pedestrians. Tree plantings and curb bulbouts offer a buffer between the street and

Several City parks feature walking/ jogging tracks that encircle the parkland.

the sidewalk and enhance the pedestrian experience. The highest concentration of marked crosswalks and adequate sidewalks is found in Downtown Burlington. Many marked crosswalks are brick pavers outlined with white stripes. Pedestrian countdown signalization has also been installed at many intersections, but more signals are needed to increase pedestrian safety in the Downtown core.

West Davis/Fountain Place Historic District: On the northwest edge of Downtown, this neighborhood features a comprehensive sidewalk network with tree-lined streets and grass buffers between the sidewalk and roadway. Still, crossing treatments need some improvement to enhance pedestrian safety.

O'Neil Street: This roadway features a median island, bicycle lanes, and sidewalk with good pedestrian crossing accommodations at Edgewood Avenue.

Downtown (east of Railroad): This lower-income community features a connected sidewalk network. However, there are a few key gaps in the sidewalk network and crossing improvements are needed at intersections.

Parks (walking/jogging tracks): Several City parks feature walking/jogging tracks that encircle the parkland. The parks with tracks include City Park, Davidson Park, and Burlington Springwood Park.

The sidewalk ends on both sides of the railroad crossing along Gilmer Street near the Webb Avenue intersection without an adequate pedestrian crossing.

Physical Barriers to Walking

In addition to a deficiency of facilities for walking, a number of physical barriers may also deter people from venturing out on foot. The most significant barriers include the following:

Sidewalk connectivity issues: There is a lack of sidewalk connectivity between existing facilities and destinations. Many sidewalks are incomplete, with gaps, and force pedestrians to walk alongside busy roadways. In many cases, worn foot paths can be found indicating the presence of pedestrians. Example key roadways that lack sidewalk along long stretches include:

- Church Street
- Front Street
- Webb Avenue
- Alamance Road
- Huffman Mill Road

Pedestrian Friendly Areas

*Many crossings in the immediate Downtown feature brick paver crosswalks with white stripes. A bulbout with vegetation can also be found at the intersection of **Main Street and Davis Street.***

*LabCorp buildings are connected with highly-visible crosswalks at the intersection of **Spring Street and Maple Avenue.***

*One of the few high-visibility marked crosswalks in Burlington, this crossing of **Church Street at Huffman Mill Road** also features countdown signals.*

*New sidewalk along **Apple Street** creates a safe, separated pedestrian space.*

*A walking/jogging track circles around **City Park** and receives heavy use.*

***O'Neil Street** exhibits bicycle and pedestrian-friendly features.*

*A walking track circles around **Davidson Park** creating a nice opportunity for exercise.*

Physical Barriers to Walking

*A pedestrian walks without a sidewalk along **Tucker Street**, near the Chapel Hill Road intersection.*

*Pedestrians walk their bicycles along **Alamance Road**, just north of the Mebane Road intersection.*

*A pedestrian walks along **Maple Avenue** without a sidewalk available.*

*Footpath along **Apple Street**, across from Sellers Gunn Elementary School.*

*Footpaths are evident along **Ireland Street**, just south of Church Street in a housing development area.*

*Footpaths can be found along several sections of **East Mebane Street**.*

- University Drive
- Chapel Hill Road
- Mebane Street
- Beaumont Avenue
- Graham Hopedale Road
- Sellars Mill Road

Intersections and Inadequate crossing facilities: Numerous intersections in Burlington need some form of improvement. Crosswalks are important because there is much greater risk for a pedestrian when entering the roadway environment. Enhanced crossing conditions are a necessity at intersections and in high pedestrian activity zones such as Downtown, schools and shopping centers.

Outside the Downtown core, the majority of intersection crossings in Burlington lack the following:

- Marked crosswalks
- Countdown signals
- Adequate or complete curb ramps
- Median refuge islands

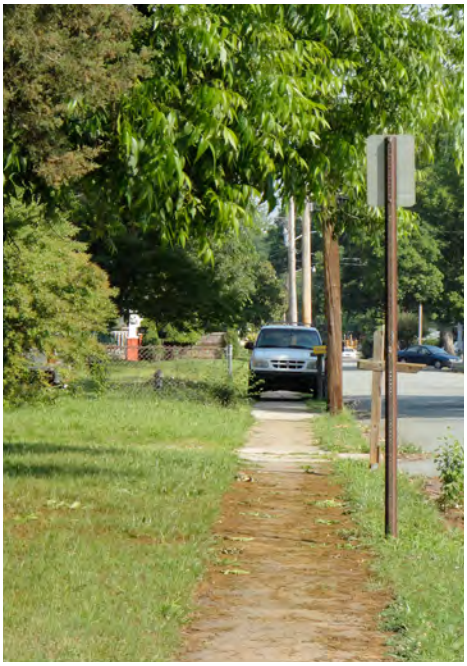
Where sidewalks exist along roadways, marked crosswalks and curb ramps are often missing at intersections with minor roadways. Intersections outside of Downtown are very deficient in pedestrian crossing features, and in many cases the crosswalks are not marked..

Railroad crossing access issues: There is poor access across many railroad tracks. At-grade crossings are the most common type of crossing throughout the Downtown core and surrounding neighborhoods in Burlington. Many of these are dangerous for pedestrians because of the uneven surfaces with the roadway and tracks (not to mention the hazards they cause for people with strollers, wheelchairs, or walkers).

Driveway access management: High frequencies and sizes of driveways and parking lot curb-cuts present hazards to pedestrians as the automobile crosses the pedestrians' path of travel. This is a common issue along major commercial arterial roadways including portions of the following roads:

- Church Street
- Maple Avenue
- East Webb Avenue

Inhospitable commercial areas and connectivity: Some shopping centers and commercial destinations are connected by sidewalk but often lack safe pedestrian access to the building



A car is blocking the sidewalk on Dixie Street, just off Webb Avenue. This is against City policy.

Vegetation has overtaken this sidewalk on Dixie Street, just off Webb Avenue.

Specific sites of most frequent pedestrian crashes in Burlington

Rauhut /Hatch - 3
Mebane/Graham-Hopedale - 3
Rauhut/Shepherd - 2
Webb/Tucker - 2
Webb/Anthony - 2
Webb/Trollinger - 2
Church/Graham-Hopedale - 2
Beaumont/Cedar - 2
Mebane/Beaumont - 2
Church/Beaumont - 2
Alamance/Trail Six - 2
Mebane/Chapel Hill - 2
Lexington/Maple - 2
Mebane/Ireland - 2
Grace/St. John - 2

Burlington roadways with most pedestrian crashes

Webb Avenue/NC 87 - 11
N Church St/US 70 - 9
Graham Hopedale Road - 7
S Church St/US 70 - 7
N Mebane St - 7
Beaumont Ave - 7
Webb Avenue - 6
NC 62/Rauhut St - 6
Hatch St - 4
Tucker Street - 4
Apple Street - 3
Maple Avenue - 3
S Mebane St - 3
Rosenwald St - 3
Durham St - 3
Plantation Dr - 3
Shepherd St - 3
I-40 - 3

Above: While sidewalks are present along most sides of the Mebane Street/Ireland Street intersection, there are no marked crosswalks or pedestrian signals present. A footpath can also be seen along Ireland where there is a gap in the sidewalk network.

front. Expansive parking lots are difficult spaces for pedestrians.

Sidewalk maintenance: Some sidewalk within the City is in need of maintenance due to sidewalk cracking and vegetation issues. Some of these responsibilities fall on the homeowner as well.

Roadways currently designed for automobile only: Many roads were designed around the automobile and need to be redesigned to become more pedestrian friendly. Sweeping, large radii right-turn lanes are commonplace throughout Burlington. Adding traffic calming measures, improved crossings, planted medians, sidewalks, and shade trees would help reduce speeding and the hazards that speeding presents to pedestrians and drivers.

Opposite Top: The Food Lion at Church and Sellars Mill is a destination with sidewalk leading to it along Sellars Mill. Still, pedestrians are left in a parking lot, a good distance from the storefront.

Opposite Center: This section of N. Church St. is seven lanes, lacks sidewalk, and presents a significant obstacle to pedestrian crossing.

Opposite Bottom: Pedestrians are seen frequently at the Rauhut/ Hatch intersection. Many walk to the corner store.

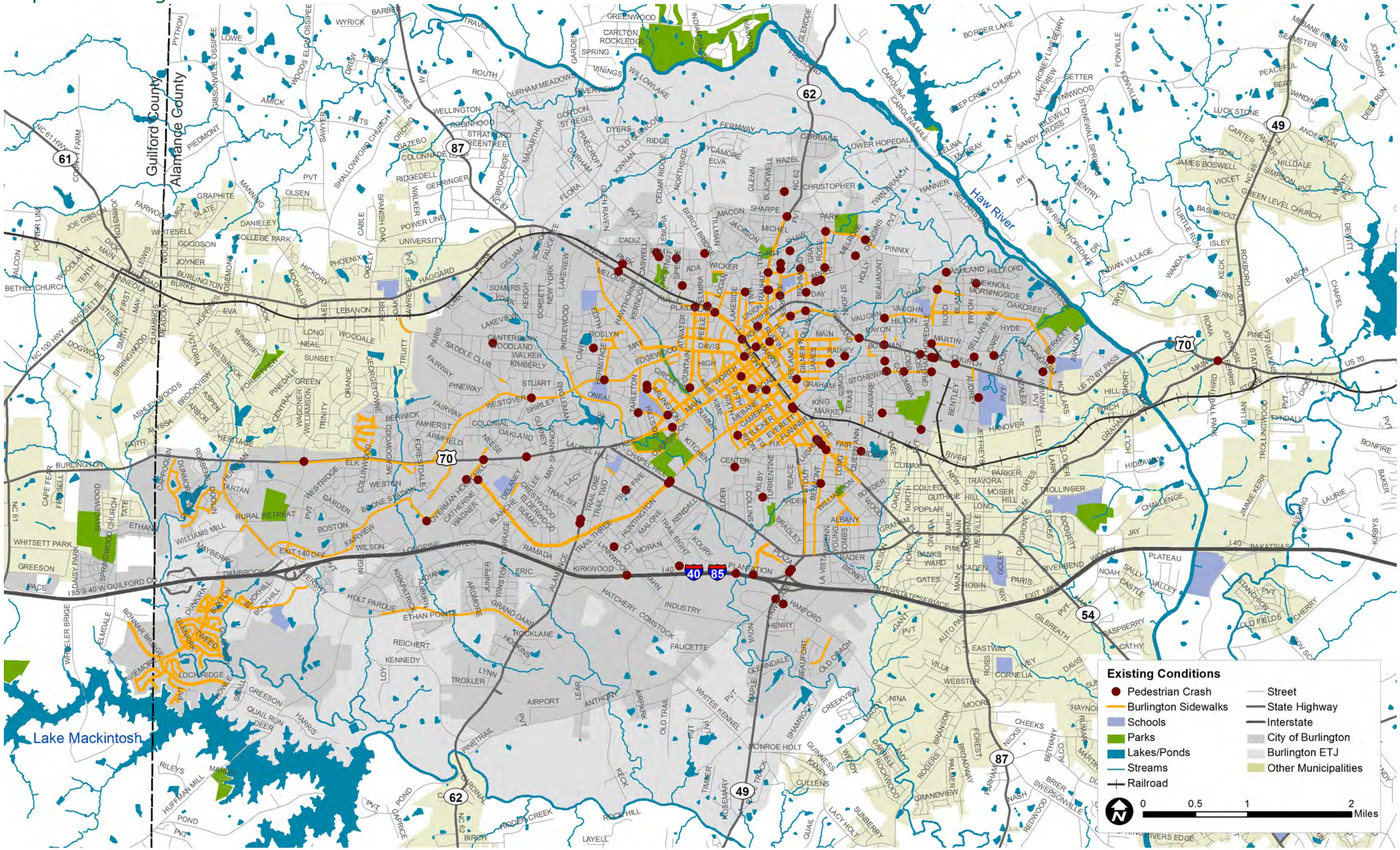
Pedestrian Activity and Behavior

Pedestrian-activity is significant throughout Downtown Burlington and in some residential communities. The areas of highest pedestrian activity include lower-income areas (where walking is a transportation necessity). Specific sites of intense activity include:

- Downtown core
- Ireland Street, especially near the Church intersection
- Rauhut Street, especially near the Hatch intersection
- Local parks/walking tracks
- Local convenient store/mini-grocery stores

Pedestrians were often seen crossing roads not in the designated marked crosswalk. This is due to the pedestrian's decision to

Map 2.5 – Existing Pedestrian Facilities and Pedestrian Crashes



take the shortest route and the pedestrian's false perception that it is safer or more convenient to cross at another location. Footpaths were noticed in numerous locations which indicate a need for more sidewalks in many areas, especially along Mebane Street, Ireland Street, and Church Street.

Perspectives of the Walking Public

Other expressions of existing conditions, need and demand, came from the public involvement process. It is important to remember that there is a lack of public transportation in Burlington so many are dependent completely upon walking. Public input was gathered through several means, including an online comment form. For the full report, see Appendix D. Key pedestrian related results are shown below:

How do you rate present pedestrian conditions in Burlington?

Excellent - 5.7%; Fair - 56.6%; Poor - 37.7%

What factors discourage walking?

Lack of sidewalks and trails - 85.2%;
Lack of crosswalks at traffic signals - 41.0%;
Lack of pedestrian signals at intersections - 30.6%;
Automobile traffic and speed - 71.1%;
Lack of interest - 6.8%;
Lack of time - 15.8%;
Aggressive motorist behavior - 52.2%;
Sidewalks in need of repair - 24.3%;
Lack of nearby destinations - 24.3%;
Criminal activity - 31.1%;
Level of street lighting - 43.0%;
Lack of landscaping between sidewalks and road - 26.7%

What walking destinations would you most like to get to?

Downtown - 60.3%
Place of Work - 25.9%
School - 32.2%
Restaurants - 49.6%
Shopping - 53.0%
Parks - 77.2%
Entertainment - 35.6%
Trails and greenways - 69.5%
Libraries or recreation centers - 52.1%

Pedestrian Crashes

Pedestrian crash data from 2000-2010 was provided by NCDOT's Transportation Mobility and Safety Division and geocoded by the Consultant. 148 pedestrian accidents were mapped and can be seen in Map 2.5. The majority of crashes took place in the Downtown area and northeast Burlington region and along major roadways. This may be a reflection of higher levels of pedestrian activity in these areas, or may be locations of concern for safety improvements.

Policy Review

The Code of Ordinances is the guiding document for planning, policy, and development in the City of Burlington. In general, the code does not adequately address fundamental principles and goals for pedestrians nor does it adequately support the goals of this Plan. Highlights of the Code are shown below with more specific language and recommended changes in Chapter 4.

Key summary points are as follows:

- Definitions of "sidewalk," "pedestrian," and "streets" need broadening to ensure that they include and address all users (pedestrians, bicyclists, and motorists) as well as the range of likely scenarios and facility types. In many locations in the Code, only vehicular traffic is mentioned where pedestrian users could also be identified and their inclusion would change the emphasis of the provision.

- The Code states: Sidewalks shall meet established construction standards as administered by the city engineer (Ref. Chapter 33, Sec. 33-8 (d)). Beyond this, there is little detailed information contained in the Code about the details of the design of sidewalks, greenways, driveways and pedestrian crossings.

- Sidewalk and greenway requirements lack "teeth" in the subdivision regulations and are lacking from commercial development requirements. The text from this section is shown here:

  Chapter 33-8. Design Standards (Subdivision standards)
  (d) Sidewalks:
  (1) Concrete sidewalks shall be required as follows:
  a. Where required by the city council in special circumstances or in accordance with a duly adopted sidewalk plan.
  b. On those streets designated as major thoroughfares, minor thoroughfares and frontage streets on the Burlington Thoroughfare Plan.
  c. Wherever needed to provide for a high volume of pedestrian traffic, especially along streets leading to schools which service the subdivision involved.
  d. Sidewalks shall meet established construction standards as administered by the city engineer.
  e. A public crosswalk or pedestrian way not less than ten (10) feet wide may be required near the center and entirely through excessively long blocks and at the end of culs-de-sac to provide pedestrian access to one (1) of the surrounding streets.

See Table 2.1 for a comparison of Burlington, NC policies to other North Carolina communities.

Table 2.1 - Peer Community Sidewalk Policy Comparison

Topic	Jurisdiction			
	Burlington	**Salisbury**	**Davidson**	**Greensboro**
DEFINITIONS				
Does “Street” definition include pedestrian reference?	No (Part 1 Chapter VI, Subchapter C, Sec. 6.63 - Definitions, Sec. 1-2. - Definitions and rules of construction)	No (Ch. 18 Land Management and Development Ordinance)	Not directly (Planning Ordinance refers to “public travel, mode unspecified)	Yes (Street Design Code, 2008)
Definition of Sidewalk	Part of street to be used for pedestrian traffic	Not included	Not included	An improved surface to facilitate pedestrian access to or along adjacent streets, properties, or structures and which is located within the right of way.
Streetscape	Not included	Included in Street Design tables and sections, and defined as “Street Yard”	Yes (in Planning Ordinance, related to shading sidewalks)	Yes (30-10-4 defines Urban Landscaping Requirements, and Article 15 defines Streetscape)
LOCATION AND COVERAGE				
Sidewalks required during new or redevelopment	“As required” (one side) on all street types	Yes, except in rural context	Yes (in Planning Ordinance)	Yes (both sides, except in rural or cul-de-sac conditions)
Crosswalks and related items required during new or redevelopment	Not explicit	Not explicit	Yes, as deemed necessary by Planning Director	Yes, guidance in Street Design Code
Sidewalks required by roadway type	“As required” (one side) on all street types	Yes, except alleys (none) and residential roads (optional one side), and Parkside Road (one side only)	Yes, except alleys and rural contexts (primarily in ETJ, side multi-use path optional)	Yes, except private drives (per Street Design Guide)
Alternative to Sidewalks	None	“Payment in Lieu” Program	None, although trails can be required in certain contexts	“Payment in Lieu” program
Pedestrian Connectivity Standards	None required	Yes - paths required on center of blocks longer than 1,000’	Yes - “pedestrian passageways” in urban contexts	Yes - if walking or cycling distance can be reduced by 50% and reduced distance is greater than 400’
Cross-Access between adjacent Land Parcels	Not required	Required	Required	Required
DESIGN				
ADA Standards	Not explicit requirement, width concurs with minimums	Not explicit requirements, width concurs with or exceeds minimum	Not explicit requirements, width concurs with or exceeds minimum	Required in Sidewalk Manual
Streetscape (trees, furnishings)	Not required	Street trees required in T-3, T-4, and T-5 transect districts	Trees and/or canopies required for all streets	Pedestrian landscaping required along all street frontages (trees or awnings)
Minimum Sidewalk Width	5’ where required	5’ where required, 8’ in urban districts	5’ where required (6’ if adjacent to curb), 16’ in Town Center	5’ where required, 8’ in commercial or mixed-use areas
Mid-Block Crossings	Not required	Required on blocks >1,000’	Required to provide access to schools, greenways where deemed necessary by Planning Director	Required in accordance with Connectivity Standards
SUPPORTING POLICIES				
Complete Streets Policy	None	No formal policy (although ordinances and guidelines defacto require)	No formal policy (although ordinances and guidelines defacto require)	No formal policy (although ordinances and guidelines defacto require)
Design Manual for Sidewalks	No	No	No	Yes
Street Design Guidelines	Limited (in Subdivision Regulations)	Comprehensive (in Land Development Ordinance)	Comprehensive (in Planning Ordinance)	Comprehensive (in Street Design Guide)
Connectivity Requirements	No	Yes (Link-Node Ratio)	Yes (stub streets and connections to existing adjacent development)	Yes (Link-Node Ratio)

Chapter Three: Pedestrian Network

Chapter Outline:

Overview

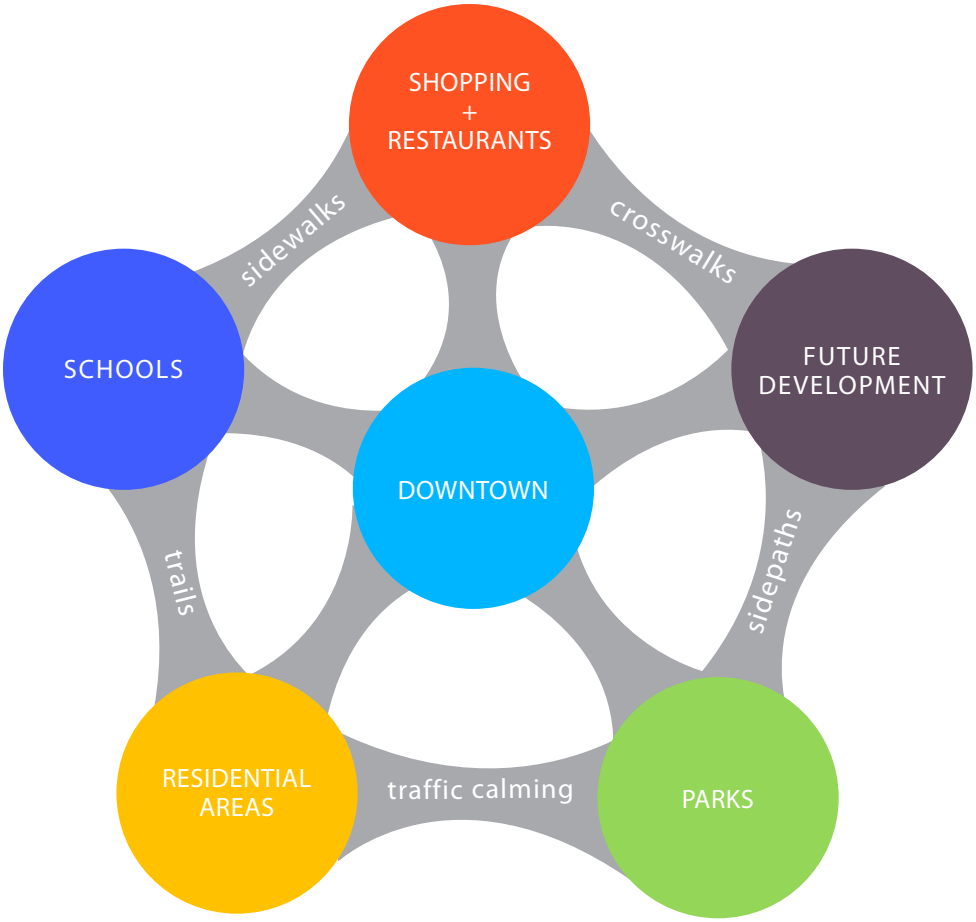
The recommended pedestrian network provides a connected system of sidewalks, greenways (multi-use paths), and crossing improvements that connect to schools, parks, community centers, business districts, libraries, shopping centers, and corner grocery stores. The network serves multiple users and interests, and improves access for residents of varying physical capabilities, ages, and skill levels. This chapter introduces the methodology, facility types, photo visualizations, and maps to describe the pedestrian network. At the conclusion of this chapter, project "cut-sheets" will provide additional planning-level guidance for specific projects.

Methodology

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

The network was generated through a number of inputs including:

- Steering Committee input
- Stakeholder input
- Public input
- Fieldwork
- City staff analysis
- GIS data (Pedestrian crashes, demographic data, sidewalk gap analysis)



Recommended Pedestrian Network

The Proposed Pedestrian System Map (Map 3-1) depicts existing and proposed pedestrian and multi-use path facilities. Proposed improvements include filling major gaps in the existing sidewalk system and providing sidewalks on new streets. Although the map does not depict sidewalks on every street, this plan recommends that the City develop a policy to ultimately require or provide sidewalks on both sides of all major roads and on at least one side of local streets where warranted by density and/or system connectivity (See Chapter 4 for policy recommendations). Other pedestrian system recommendations include multi--use paths and intersection improvements to accommodate safe and convenient pedestrian crossings.

Together these proposed facilities should be developed or improved to create a safe and connected pedestrian network throughout the City of Burlington. On-road and off-road components should be integrated to provide a connected pedestrian transportation and recreation network. All pedestrian facility projects undertaken should aim to meet the highest standards possible when topography and right-of-way allows. Design guidelines in Appendix A provide detailed information regarding facility type and treatments.

All recommendations are developed at a planning level and will need a more detailed project-level review. The conclusions reached through further review may vary from those presented herein.

Pedestrian Network Facility Types

The Proposed Pedestrian Network for the City of Burlington consists of three chief types of projects: sidewalks, crossing improvements, and greenways (multi-use trails). The addition of these types of facilities is well documented to improve safety. Many of the treatments recommended in this chapter have been proven to reduce crashes, as shown in the 2007 FHWA Crash Reduction Factors Study (http://safety.fhwa.dot.gov). The table below shows some typical countermeasures and associated crash reduction factors from that study.

Table 3.1 Pedestrian Crash Reduction Factors

Countermeasure	Crash Reduction Factor
Install sidewalk	74%
Install pedestrian countdown signal heads	25%
Install pedestrian refuge islands	56%
Improve/install pedestrian crossings	25%

The recommended sidewalks aim to expand upon the existing network of sidewalks to provide a more connected system that connects destinations along roadways. To complete the sidewalk network along existing streets, special emphasis should be given to completing sidewalk gaps and providing sidewalks on routes serving major pedestrian destinations. 97 miles of new sidewalk are recommended for the City of Burlington.

Intersection Improvements

This Plan contains an overall strategy to improve intersections and other pedestrian crossings citywide through a variety of treatments (outlined in Appendix A, Design Guidelines). Many intersections throughout Burlington were targeted for enhancements during this study (to improve existing crossing facilities or create new crossing facilities at intersections and midblocks). City staff input, public input, crash data, and fieldwork analysis combined to help identify the 50 locations highlighted on the map as having a relatively high level of

importance. Recommended intersection improvement projects are provided in Appendix E.

Multi-use Paths/Greenways

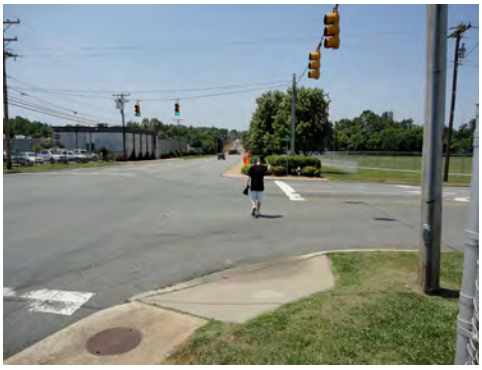
Multi-use paths are proposed for Burlington to provide transportation and recreational alternatives to pedestrian travel. A key greenway corridor is the North Carolina Mountains-to-Sea Trail which will follow the Haw River along the northern side of Burlington. Approximately 13 miles of greenway are recommended.

Photo Visualizations

Photo visualizations, or renderings, communicate some of this Plan's recommendations in a powerful, effective, visual manner. The following are selected renderings throughout the City of Burlington.

While sidewalks are present at Davis Street and Fountain Place, marked crosswalks and curb ramps would make crossing this intersection safer.

Sidewalk can be found along the north side of South Mebane but there is no pedestrian crossing at Kitchin Street (with City Park at the opposite corner). The addition of marked crosswalks, curb ramps, and countdown signals would improve the connection to City Park.



The continuation of sidewalk with an ADA-compliant railroad crossing of Gilmer Street, near Webb Avenue, is critical for safety and connectivity.

The housing development along Ireland Street, just south of Church Street lacks sidewalks. Footpaths are evident and should be upgraded to sidewalks.

The busy intersection of Fisher Street and Rauhut street lacks pedestrian crossing facilities. A raised pork chop island refuge, with marked crosswalk, and countdown signal are recommended.

The intersection of Church Street and Ireland Street supports significant levels of pedestrian travel every day. The addition of sidewalk and clearly designated pedestrian crossings is essential here.

Safe Routes to School Improvements

Pedestrian improvements around schools are critical to creating safe environments for children and parents to walk. Many of the recommended sidewalks and crossing facility improvements are located near or adjacent to school properties. Along school routes, increasing the visibility of pedestrians is crucial. School routes should have a complete sidewalk network along primary routes and high visibility-crosswalks with pedestrian push buttons at signals. Crossing treatments can include in-roadway signage, high-visibility marked crosswalks, speed zone warnings, ADA-accessible curb ramps, and other crossing applications such as curb bulbouts. Crossing guards can also be extremely important.

The City of Burlington should work with the Burlington/Alamance school district to implement a Safe Routes to School Program. Typically, the first phase involves a walkabout (also known as a bicycle and pedestrian audit) to assess walking and bicycling conditions of streets adjacent to elementary and middle schools and create a school travel plan. Parents, students, neighbors, and City planners and/or traffic engineers will be invited to join in the walkabout. Safety concerns, issues, and ideas will be recorded. These walkabouts can build upon the preliminary recommendations shown on the pages that follow.

After the bicycle and pedestrian audit is conducted, maps for each elementary and middle school showing recommended

routes to reach school, along with high-traffic intersections and routes to avoid, can be produced and distributed.

As a final step, a school travel plan should be produced for each school, including cost estimates and a prioritized project list. These infrastructure improvement plans will serve as a blueprint for future investments and can be used to apply for North Carolina Safe Routes to School funding.

Regional Connectivity

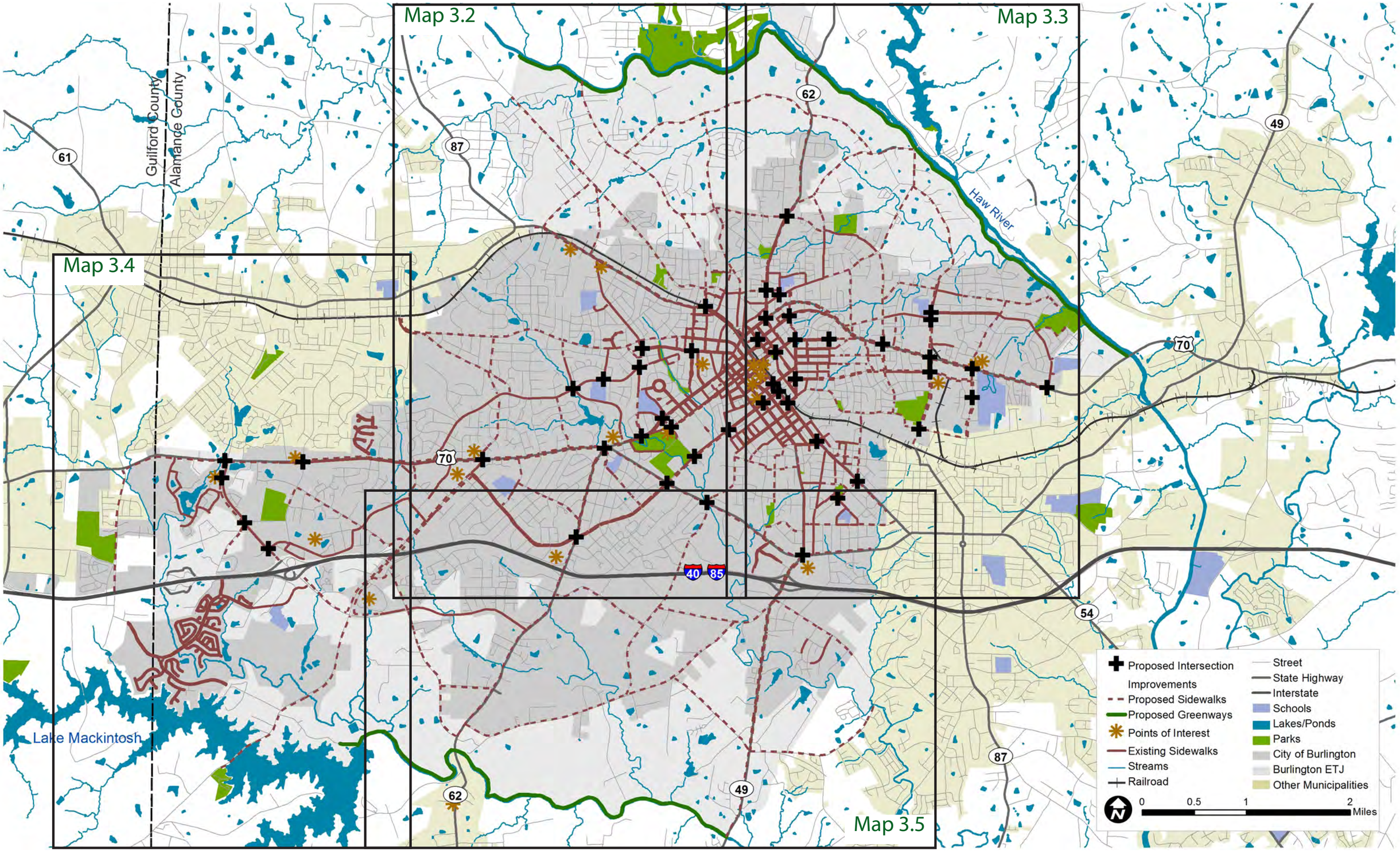
Regional connections are critical for maintaining pedestrian connectivity to adjacent municipalities. The City of Burlington should work with the City of Graham and Town of Elon to ensure sidewalk connections. The City of Graham completed a pedestrian plan in 2006 while the Town of Elon was investigating better overall connectivity along Front Street between Elon University and the City of Burlington during the time of this study. As lead agency of the Burlington-Graham MPO, the City of Burlington should work with these project partners and other jurisdictions to ensure compatibility and connectivity of pedestrian facilities.

As mentioned previously, the North Carolina Mountains-to-Sea Trail (MST) is a statewide trail system that starts at Clingmans Dome in the Great Smoky Mountains and ends at the Outer Banks. The planned trail corridor follows the Haw River along the northern stretches of Burlington's ETJ. The City of Burlington should work with its regional partners and the Friends of the MST to ensure connectivity along and away from the trail corridor. The MST will not only provide a local recreational opportunity but a tourism opportunity for the City of Burlington.

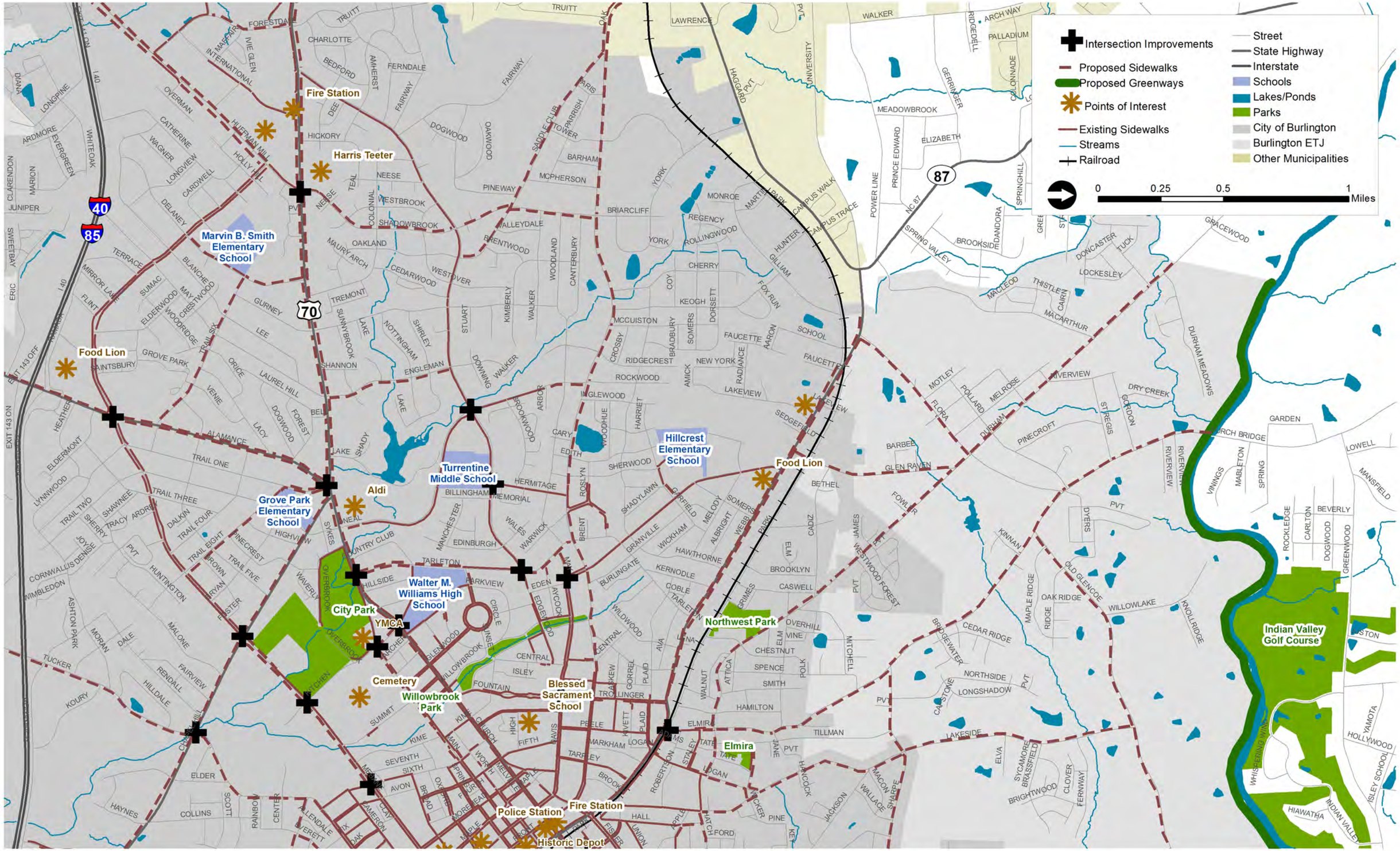
Pedestrian Network Maps

The following maps display the pedestrian network recommendations (sidewalks, greenways, and crossing improvements). For greater document legibility, the City has been divided into four grids and recommendation maps are provided for each of these grids.

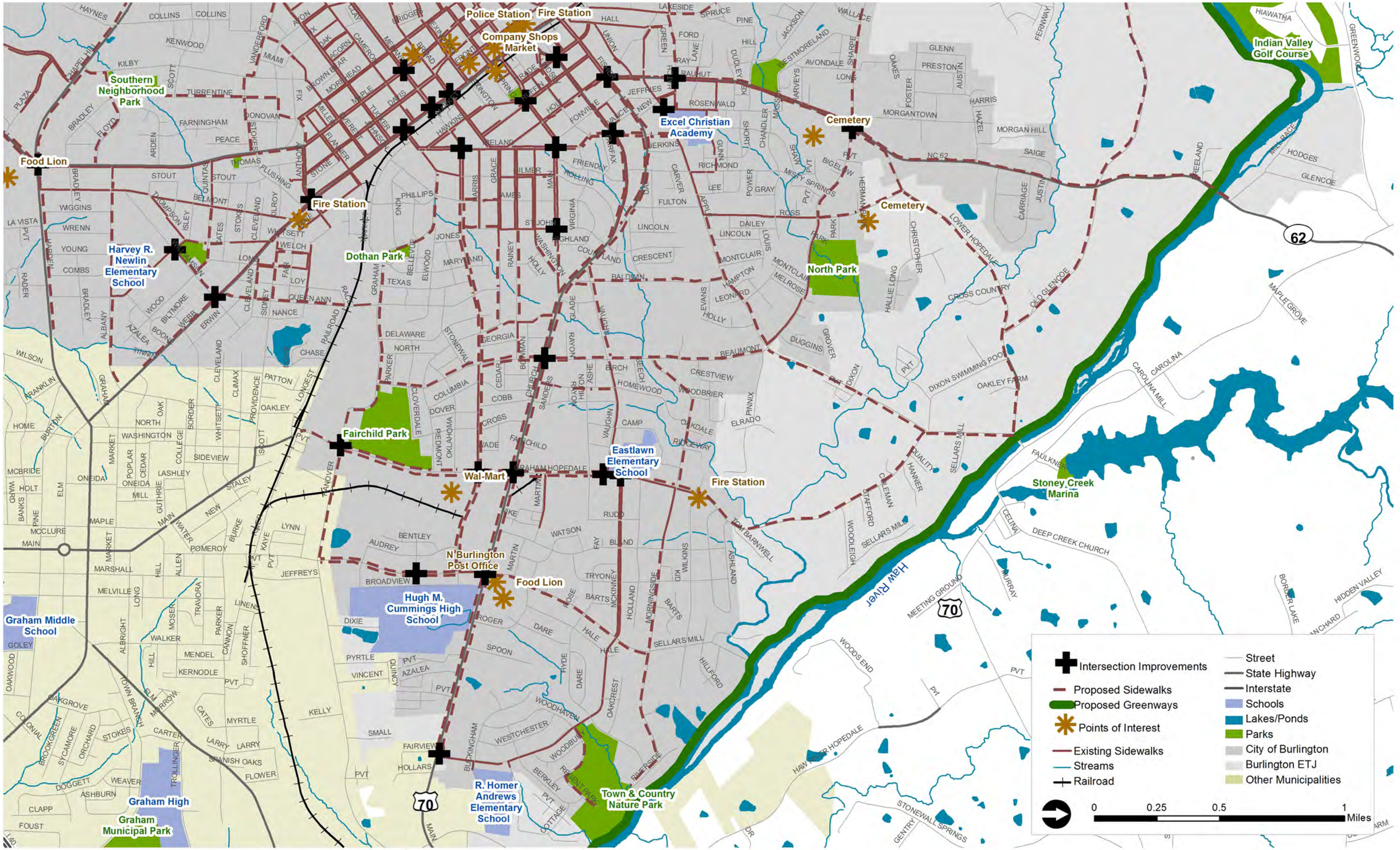
Map 3.1 - Pedestrian Network Recommendation Overview Map



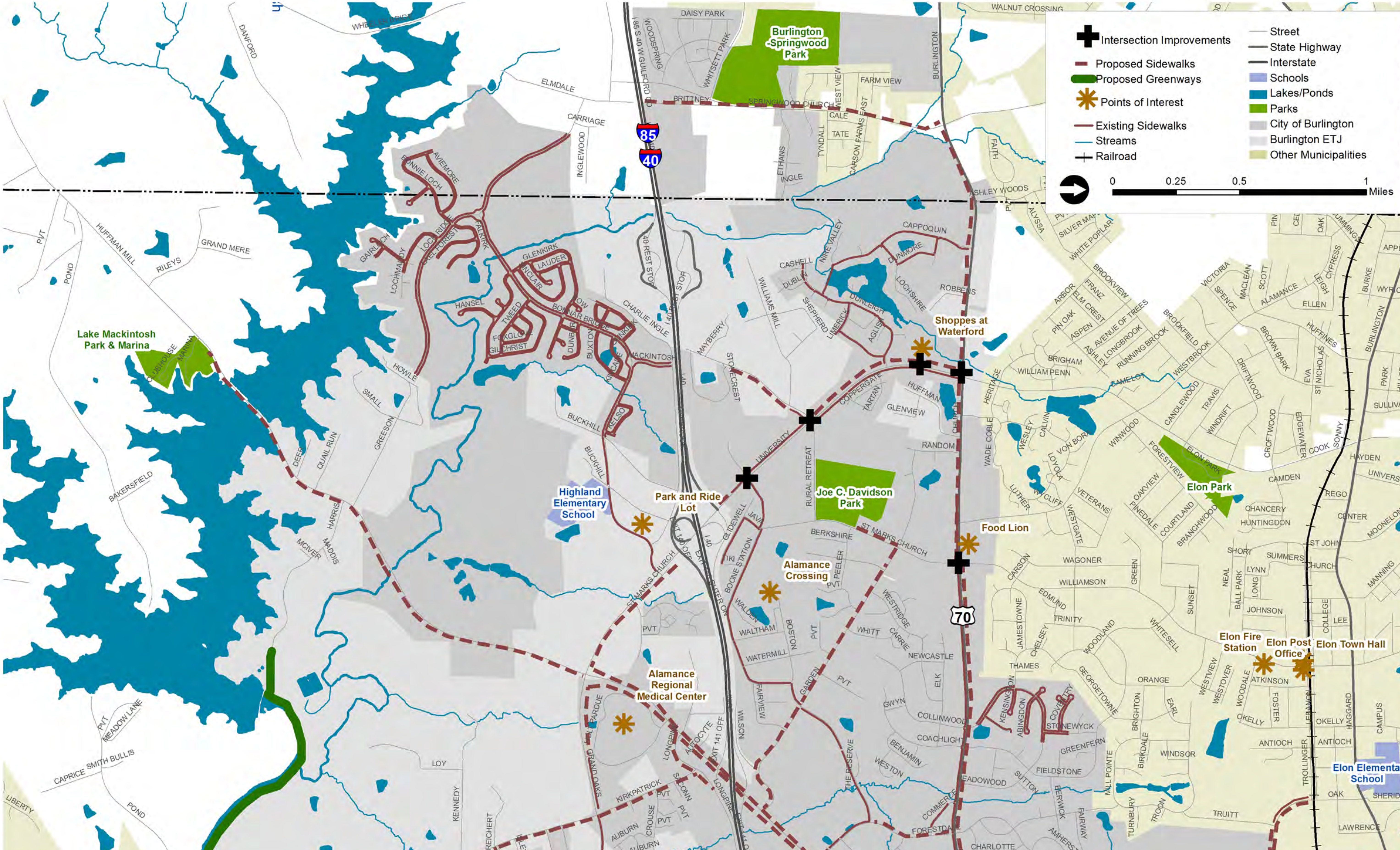
Map 3.2 - Pedestrian Network Recommendation Map, Northwest Grid



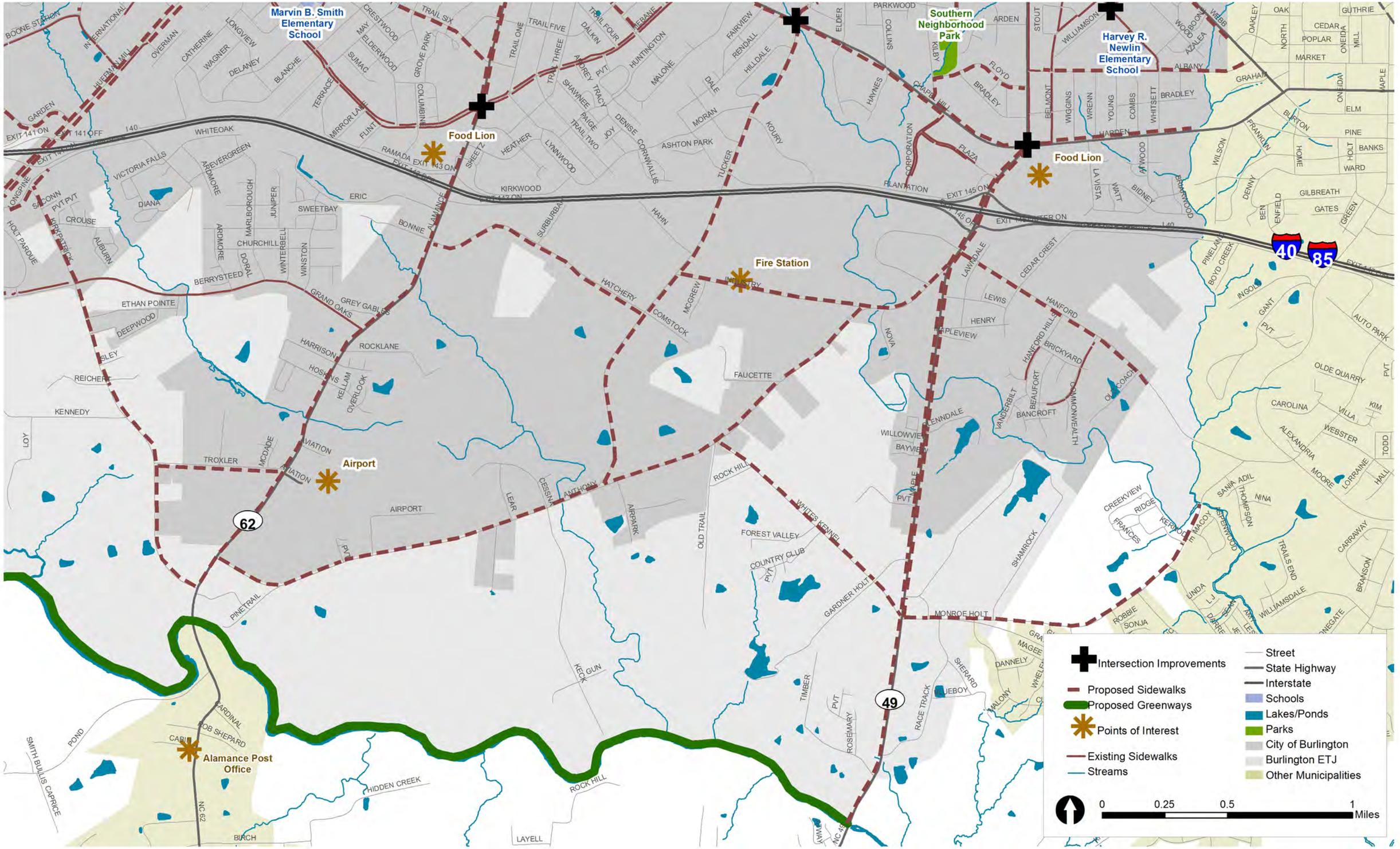
Map 3.3 - Pedestrian Network Recommendation Map, Northeast Grid



Map 3.4 - Pedestrian Network Recommendation Map, Southwest Grid



Map 3.5 - Pedestrian Network Recommendation Map, Southeast Grid



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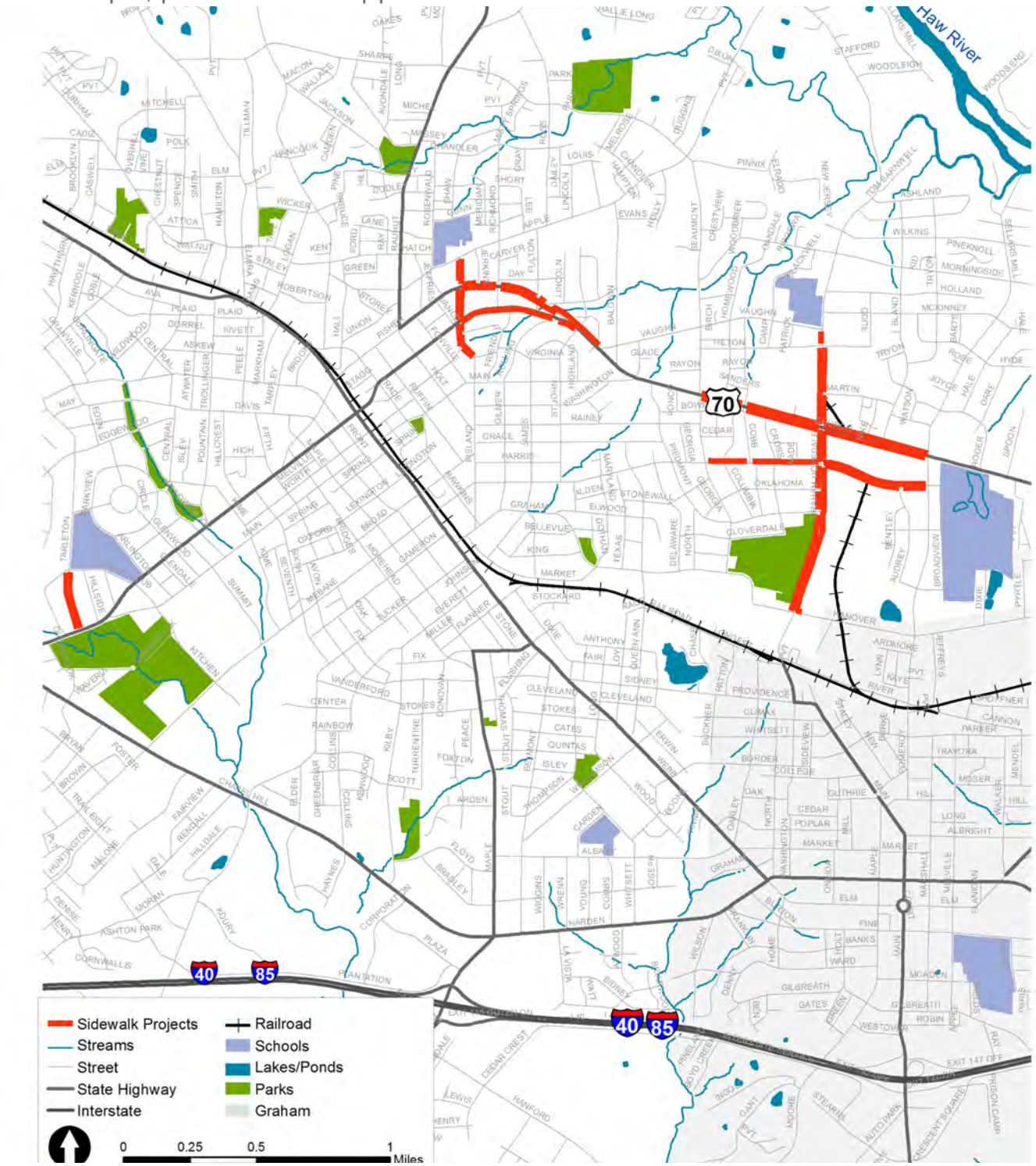
Project Cutsheets

The recommended network was divided into project segments. The segments were scored by factors that fall within the following main categories: online survey results, school proximity, parks and recreation proximity, transportation, and destinations.

The map below shows the general location of the projects that scored the highest. The following pages include a map and brief description of each project.

This project scoring toolbox is for general guidance only. The actual order of construction will vary depending on factors that may change, such as the availability of funding, changes in site conditions, and local development opportunities. For more on this topic, please refer to Appendix F.



Graham-Hopedale Sidewalk I

This sidewalk segment connects multiple land uses together including Eastlawn Elementary School and Wal-Mart.

From: Mebane Street

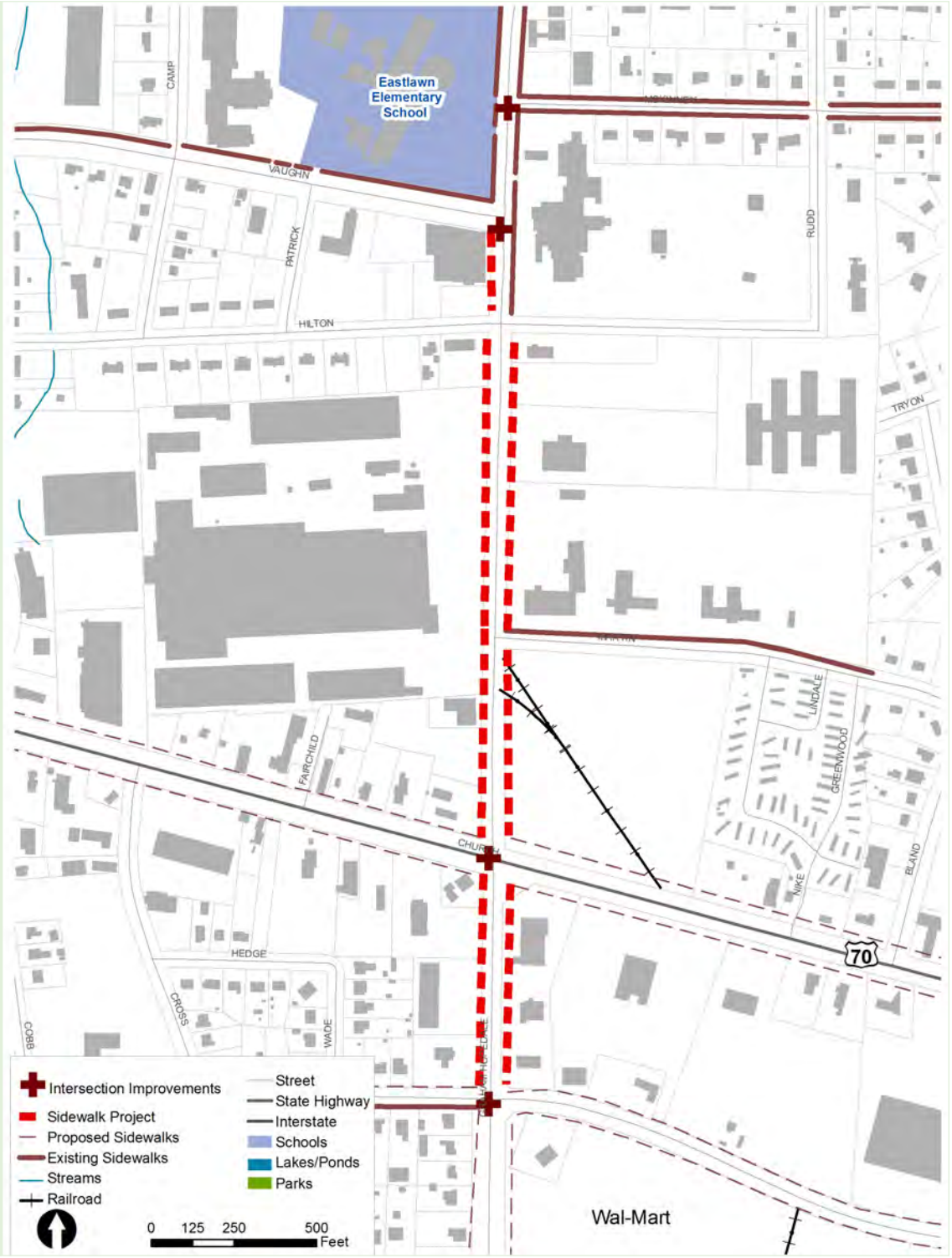
To: Vaughn Street

Sides of Road: 2

Total Distance: 0.8 miles or 4,220 feet

Cost Estimate ($40/ft): $168,960*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*



Graham-Hopedale Sidewalk II

This sidewalk segment connects multiple land uses together including Wal-Mart, Fairchild Park, and residential areas.

From: Mebane Street

To: Hanover Road

Sides of Road: 2

Total Distance: 1.1 miles or 5,800 feet

Cost Estimate ($40/ft): $232,320*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*

Fisher Street Sidewalk

This sidewalk connects residential and commercial destinations along a well-traveled roadway.

From: Ireland Street

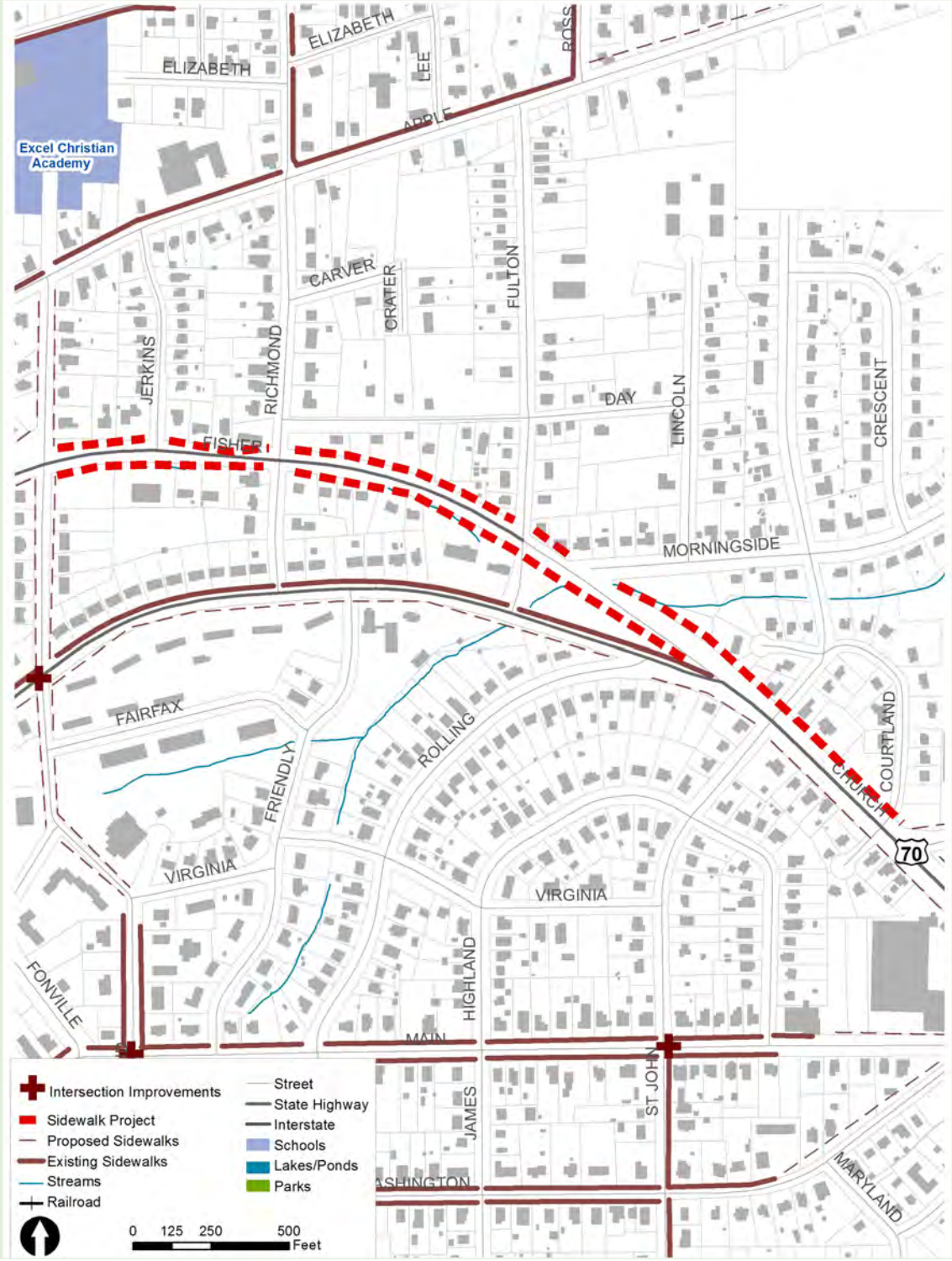
To: Church Street

Sides of Road: 2

Total Distance: 1.0 miles or 5,000 feet

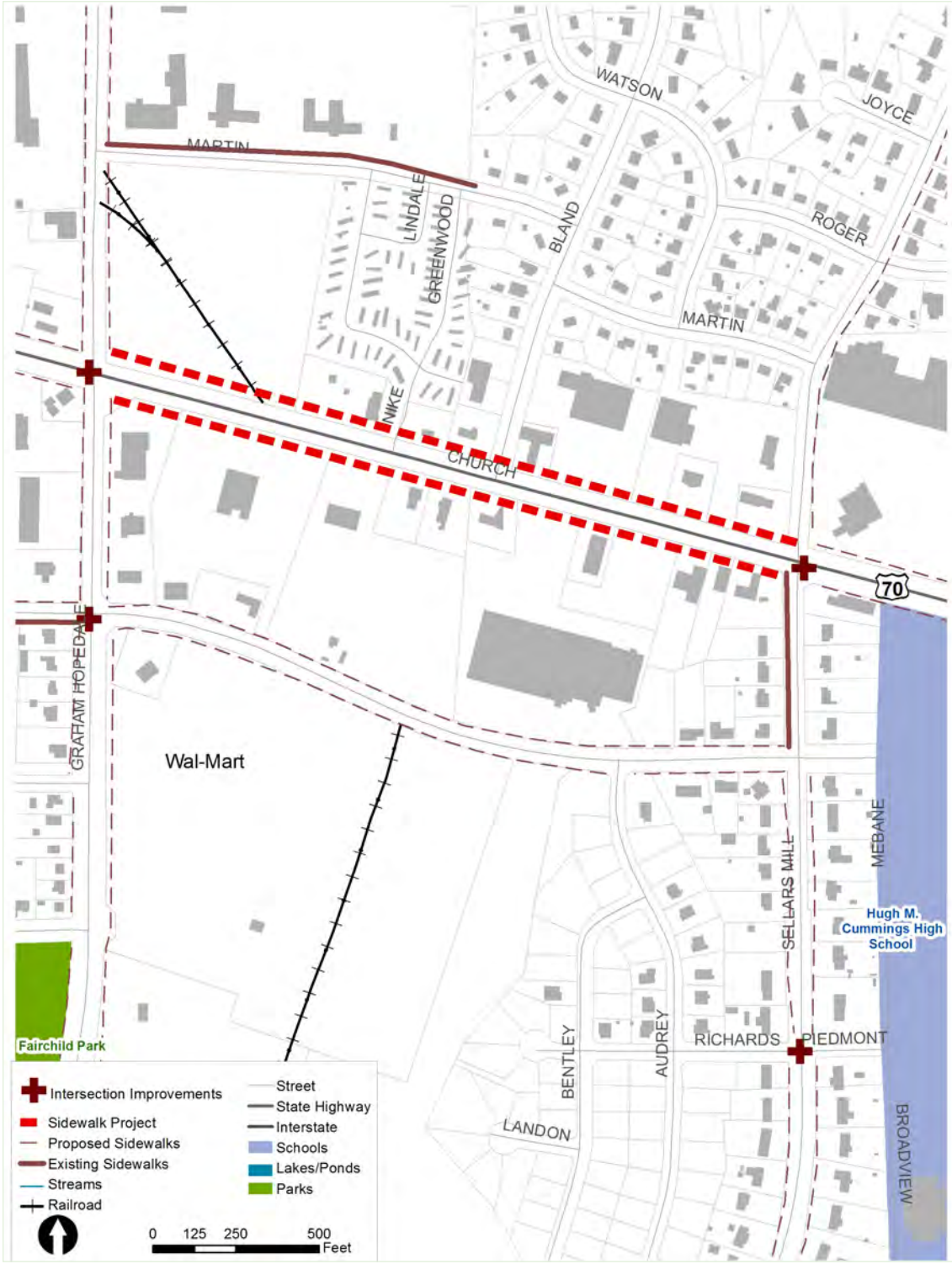
Cost Estimate ($40/ft): $200,000*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*



Church Street Sidewalk

This sidewalk segment follows US 70/Church Street connecting multiple land uses including better connectivity to Hugh Cummings High School.



From: Graham-Hopedale Road

To: Sellars Mill Road

Sides of Road: 2

Total Distance: 0.8 miles or 4,220 feet

Cost Estimate ($40/ft): $168,960*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*

Ireland Street Sidewalk

This sidewalk segment serves a lower-income community and locations where there is a worn footpath. It connects residential areas to the commercial destinations along Church Street.

From: Apple Street

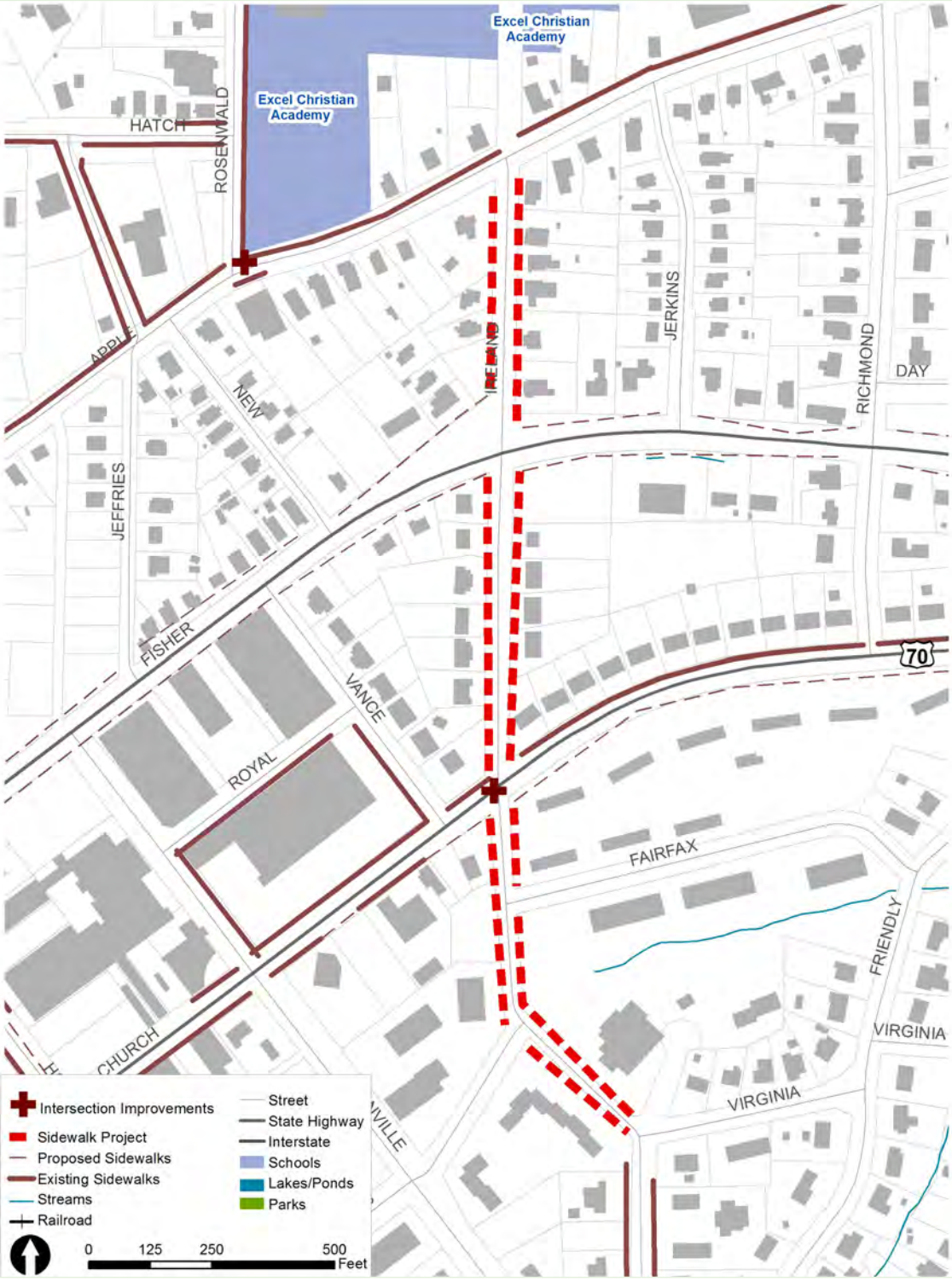
To: Virginia Avenue

Sides of Road: 2

Total Distance: 0.6 miles or 3,200 feet

Cost Estimate ($40/ft): $126,720*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*



Tarleton Avenue Sidewalk

This sidewalk segment follows Tarleton Avenue connecting City Park to Williams High School.

From: Country Club Drive

To: Church Street

Sides of Road: 2

Total Distance: 0.4 miles or 2,320 feet

Cost Estimate ($40/ft): $92,800*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*

Mebane Street Sidewalk

This sidewalk segment connects Wal-Mart to residential neighborhoods and the schools along Sellars Mill Road. There is a worn footpath along part of this segment.

From: Graham-Hopedale Road

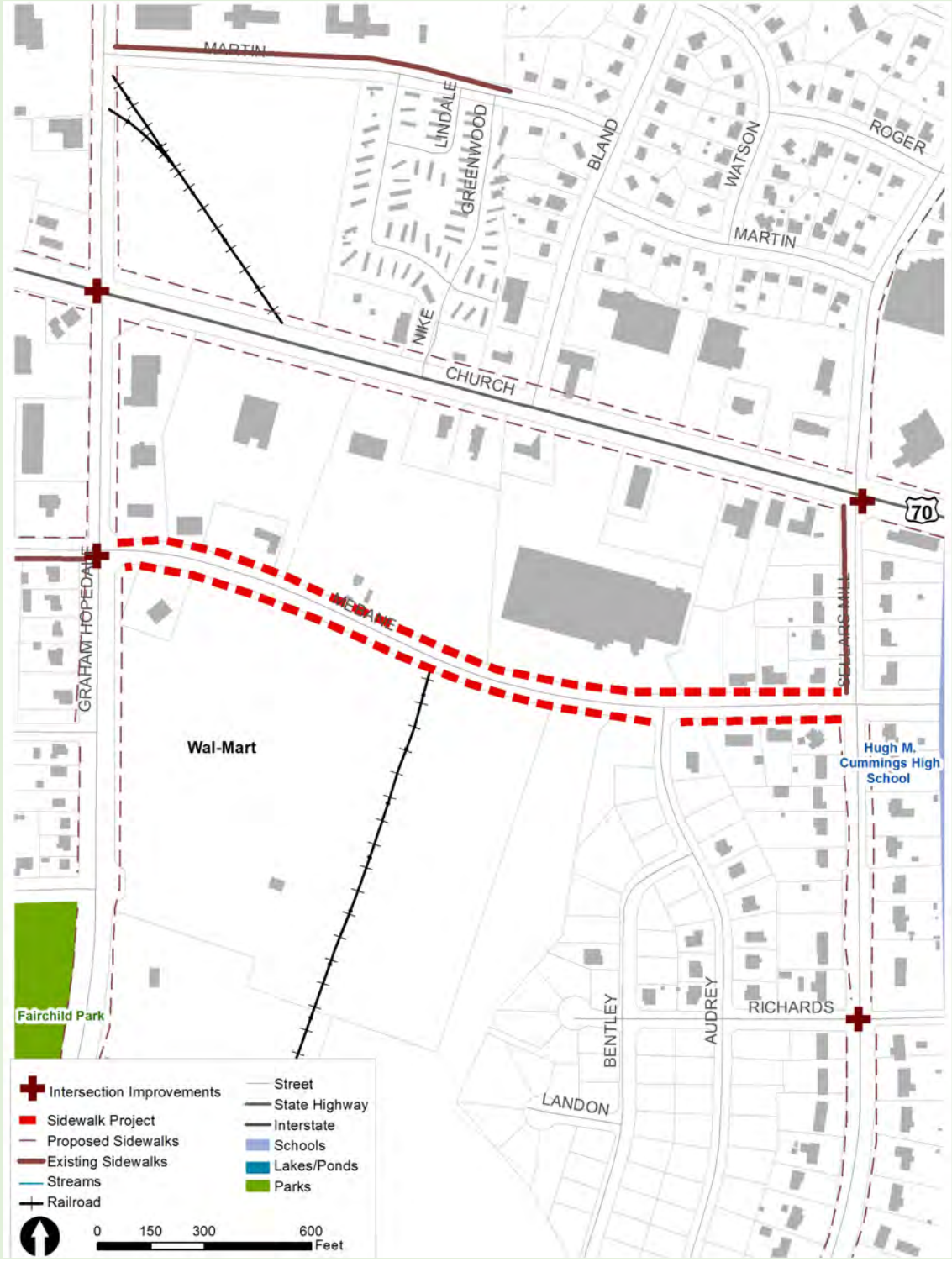
To: S. Sellars Mill Road

Sides of Road: 2

Total Distance: 0.8 miles or 4,200 feet

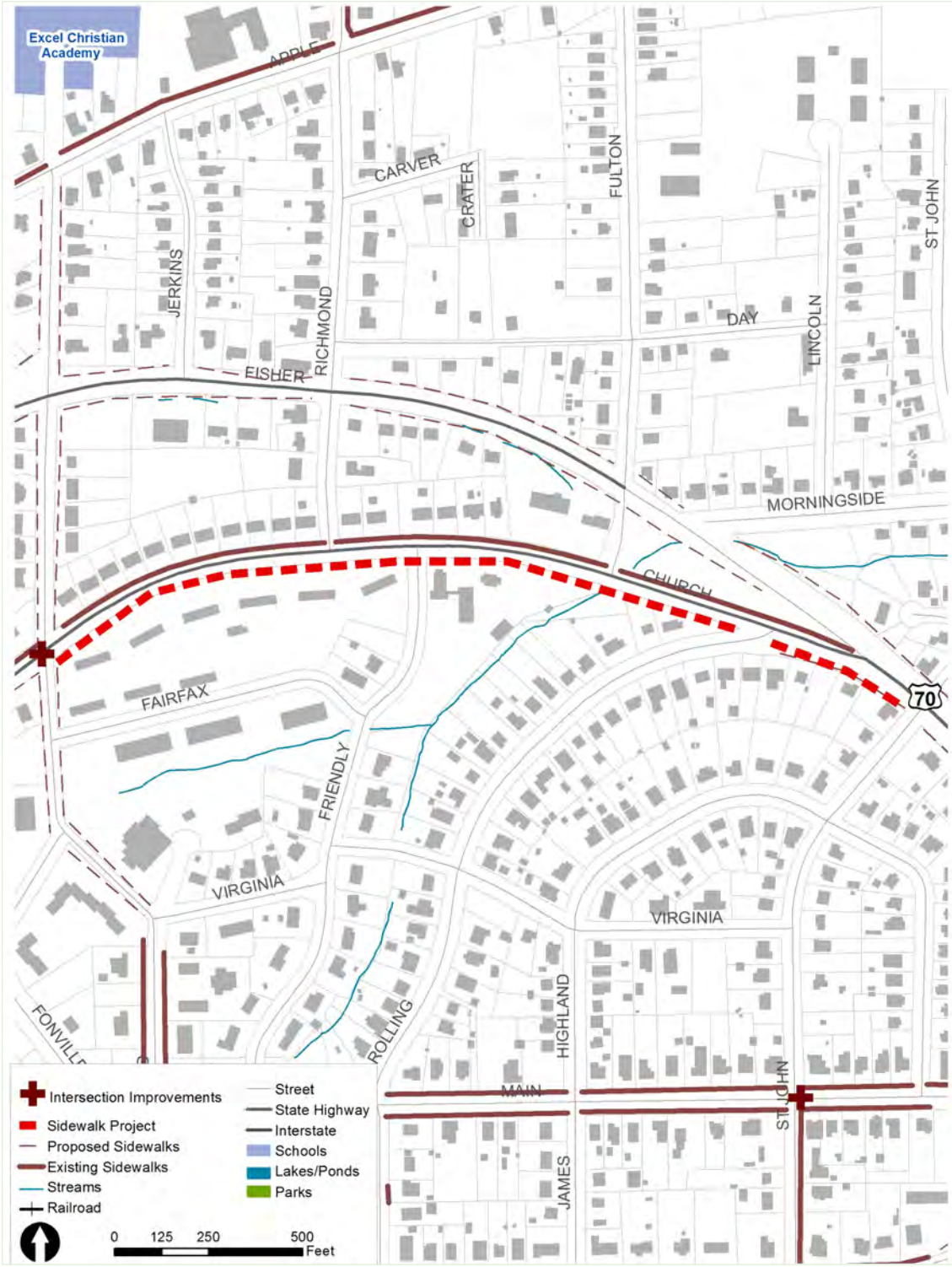
Cost Estimate ($40/ft): $168,000*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*



Church Street Sidewalk

This sidewalk segment follows US 70/Church Street connecting multiple land uses including multi-family housing and commercial destinations.



From: Ireland Street

To: Fisher Street

Sides of Road: 1

Total Distance: 0.45 miles or 2,400 feet

Cost Estimate ($40/ft): $96,000*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*

Mebane Street Sidewalk

This sidewalk segment serves a lower-income community and locations where there is a worn footpath for portions of this segment. It connects residential and commercial destinations.

From: Beaumont Avenue

To: Graham-Hopedale Road

Sides of Road: 1

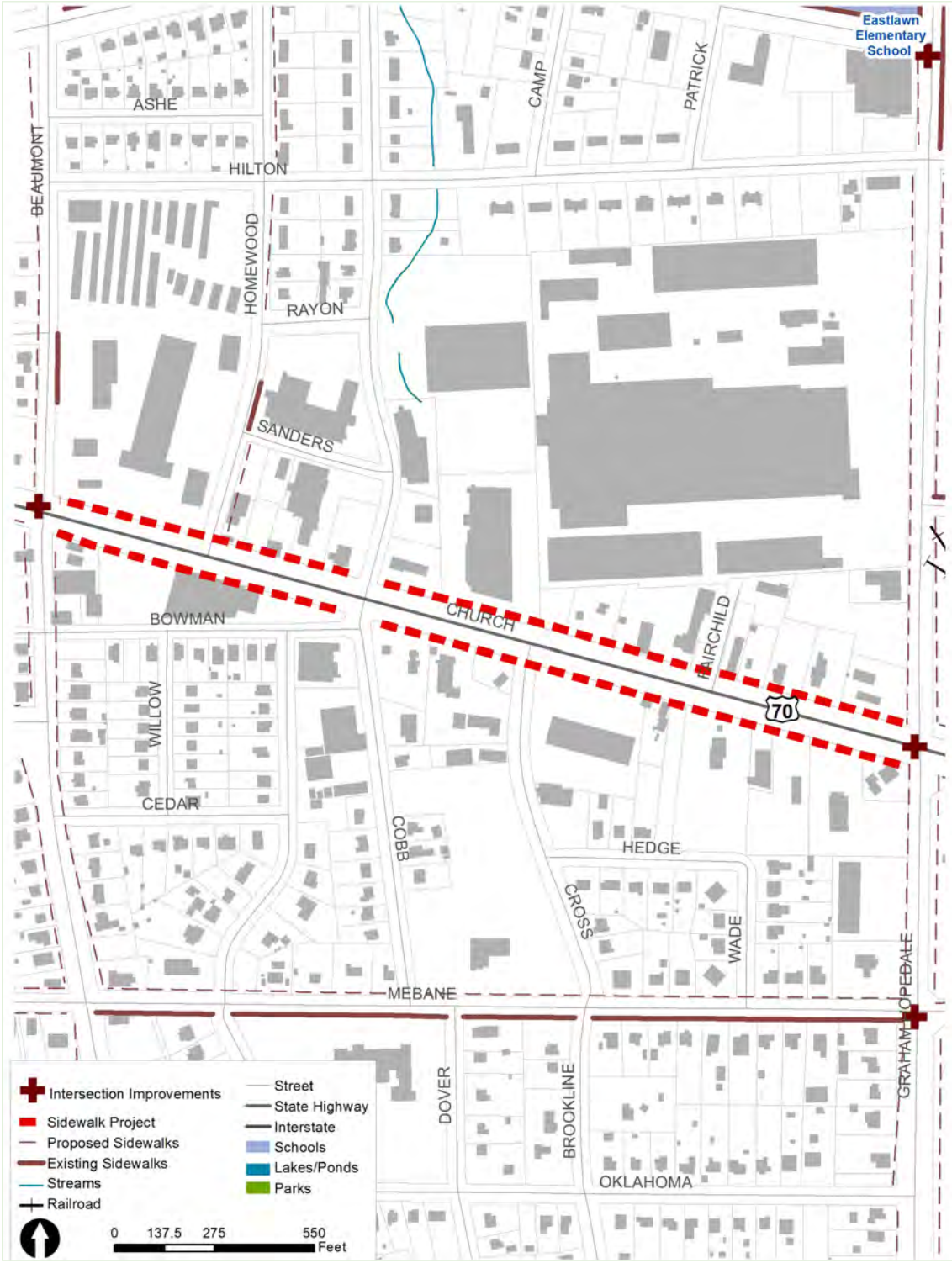
Total Distance: 0.4 miles or 2,200 feet

Cost Estimate ($40/ft): $88,000*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*

Church Street Sidewalk

This sidewalk segment follows US 70/Church Street connecting multiple land uses.



From: Beaumont Avenue

To: Graham-Hopedale Road

Sides of Road: 2

Total Distance: 0.9 miles or 4,900 feet

Cost Estimate ($40/ft): $196,000*

**These are planning-level cost estimates only. Any number of factors can greatly increase this number.*

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Chapter Four: Policy Recommendations

Chapter Outline:

Overview

While the physical recommendations described in this Plan represent an overall pedestrian network, strong pedestrian-oriented policies and regulations are also necessary to ensure pedestrian-friendly design with new development. Walkability and livability should be considered with all future development and growth decisions. The recommended policy strategies presented in this chapter would help the City of Burlington achieve its vision of becoming a pedestrian-friendly community. City planning staff should implement these policy updates and ensure the full suite of policy tools are used and enforced.

Several mechanisms exist to allow the City to incorporate these potential policy changes to strengthen the walkability of the community. A range of implementation options exist, from simple changes to the existing ordinance (shown in Table 4.1) all the way to a comprehensive replacement of the existing ordinance with a policy such as a Unified Development Ordinance. Stand-alone policies such as a Complete Streets Policy and Street Design Guidelines can also be developed to strengthen the non-motorized circulation elements for the City.

This chapter is divided into three main components: 1) Strategic policy direction based on peer community best practices, 2) Specific, strategic policy recommendations, and 3) Table of pedestrian-related policies in the City of Burlington Code of Ordinances and recommended updates.

Strategic Policy Direction

The peer community policy review in Chapter 2 provides best practices across the State of North Carolina. Key findings of the review are:

- The three peer communities and many others across the State require sidewalk construction concurrent with new development on both sides of the street for all street sections

and contexts with the exception of the most rural areas, alleys, and cul-de-sacs. Burlington only requires one side construction for most contexts;

- Each of the peer communities dictates a 5' minimum sidewalk width, similar to Burlington. However, the peer jurisdictions require a wider sidewalk in commercial, mixed use, or Town Center area (from 8' to 16');

- Two of the peer communities (Salisbury and Greensboro) offer a "fee in lieu" program to substitute a payment in lieu of sidewalk construction if topography or other geographic or community constraints make construction of a sidewalk infeasible in a development proposal. These communities include a calculation method for the fee that weighs the fee heavier for areas near pedestrian generators, such as schools, parks, or greenways;

- All three of the peer communities incorporate street connectivity requirements for new development, in which streets and sidewalks must provide connectivity to existing or future adjacent development;

- Each of the three peer communities also limit block length, which requires provision of walkable corridors in developed areas of 400'-600', including provisions for midblock crossings on longer blocks;

- All three peer communities include streetscape requirements to provide physical separation between the sidewalk and street edge. The separation ranges from a street yard in residential areas to hardscape treewells and on-street parking in most urban contexts. Streets trees to provide shade are required in most conditions and contexts; and

- Each of the peer jurisdictions includes guidance for a significant number of context-based street sections. While Burlington includes a limited number of street sections in its ordinance, the peer communities are much more comprehensive in the range and context of street sections. Davidson's and Salisbury's are included in their development ordinances, while Greensboro has a separate set of Urban Street Design Guidelines to give design guidance.

In evaluating the peer community comparisons, it is evident that Burlington could significantly strengthen many areas regarding sidewalk requirements within the context of its development ordinances. Some ideas for consideration and discussion are as follows:

1) Consideration of the development and adoption of a Complete Streets Policy: A Complete Street, in addition to general purpose vehicular travel lanes, include items such as sidewalks, bike lanes or shoulders, bus lanes, transit stops, crosswalks, median refuges, curb bulbouts, and other features that add to the usability and livability of the street as determined by context. Legislation on the subject has been passed in 21 states and over 100 other jurisdictions throughout the country, and the Safe and Complete Streets Act of 2011 is currently pending in Congress. It is anticipated that at a national level when the surface transportation bill is reauthorized, projects receiving federal funding will need to demonstrate some level of Complete Streets compliance. NCDOT adopted a Complete Streets Policy in 2009, and is currently developing design guidelines (including street sections) to provide guidance in designing state roads in North Carolina according to the principles of Complete Streets.

It is recommended that Burlington develop and adopt a Complete Streets policy. Sample language from the Greenville, South Carolina Complete Streets Policy is as follows:

> *"City staff shall enforce existing policies, provide guiding principles, and create operating practices as deemed appropriate and feasible so that transportation systems are planned, designed, constructed, and operated to make bicycling and pedestrian movements an integral part of the City's transportation planning and programming while promoting safe operations for all users. City staff shall plan for, design, construct and operate all new City transportation improvement projects to provide appropriate accommodation for pedestrians, bicyclists, transit riders, and persons of all abilities, while promoting safe operations for all users, as deemed appropriate and feasible. City staff shall incorporate Complete Streets principles into transportation strategic planning, transportation plans, manuals, rules, regulations and programs where deemed appropriate and as feasible.";*

2) As a follow-on to developing a Complete Streets Policy, Burlington should consider expanding its palette of street sections to incorporate a more context-based approach similar to the peer communities. Both Greensboro and Charlotte have developed comprehensive Urban Street Design Guidelines to encourage all modes of travel in new construction and redevelopment, while Davidson, Raleigh (Unified Development Ordinance under development), and Salisbury incorporate the palette of street sections directly in their development ordinances. Either approach could

be utilized in Burlington, and could dovetail with the NCDOT Complete Streets Design Guidelines under development;

3) Burlington should consider revising its development ordinances to require street and sidewalk connectivity in new and redevelopment as feasible by context type. This objective could be accomplished by revisions to the existing code as a minimum or through a comprehensive effort such as a Unified Development Ordinance to replace the existing code;

4) Development of a Connectivity Index requirement similar to Salisbury and Greensboro could help facilitate the implementation of this policy. By requiring street connectivity, non-motorized connectivity would also be required; and

5) Burlington should consider revising requirements for sidewalks to include sidewalks on both sides of the street except in the most rural cases and contexts. The City should also consider expanding the sidewalk width requirements for more urban, commercial, or mixed use contexts where pedestrian traffic is expected to be greater than that in residential or rural contexts. Other mechanisms such as the "fee in lieu" program could be incorporated into the requirements to enhance the sidewalk connectivity throughout the City.

Strategic Policy Recommendations

Suggested policy guidance by category is provided below. The categories include "Complete Streets," pedestrian network and connectivity, safety, aesthetics, land use and development, and greenways.

Complete Streets

Goal: *Adopt a "Complete Streets" approach and philosophy that all streets and development on streets be designed and operated to enable safe access for all users, ages, and abilities.*

- Ensure that transportation agencies, planners, engineers, and developers design and operate the entire right of way to enable safe access for all users including transit users, drivers, pedestrians, bicyclists, as well as for older people, children, and people with disabilities.

- Educate leaders, business owners, residents, and all stakeholders of the benefits of Complete Streets including: livability, safety, increased social interaction, increased economic activity, attractiveness, healthier living, less pollution, and increased access.

- Keep track of NCDOT's Complete Streets Policy, Implementation and Design Guideline development ongoing at the time of this study. The City should ensure that these practices are followed and that local NCDOT Division staff are aware of these new guidelines.

Pedestrian Network and Connectivity

Goal: *Create and maintain a road and pedestrian route network that provides direct connections between downtown, trip attractors, schools, and residential/commercial areas.*

- Require sidewalks on both sides of the road, with the exception of rural roads, alleys, and cul-de-sac neighborhoods.

- Develop street connectivity and pedestrian connectivity requirements with new development.

- 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.

- Provide sidewalks on all roads surrounding schools with marked crosswalks.

- Provide pedestrian access through cul-de-sacs and large parking lots, which are typical obstacles to pedestrian connectivity.

- Accommodate pedestrians and bicyclists 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.

Safety

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

- Provide raised medians or pedestrian refuge islands 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.

- Monitor and 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 residential 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.

- Follow design guidelines in Chapter 7 to the maximum extent possible. For example, the buffer space between the sidewalk and the curb and gutter should be maximized within the available right-of-way.

Aesthetics, Comfort, and Enjoyment

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

- 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.

- Require benches, shelters, sheltered transit stops, trees, and other features to facilitate the convenience and comfort of pedestrians.

Land Use and Development

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

- Encourage a mix of uses through building, zoning, and development codes to 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 schools, senior centers, and commercial areas or where sidewalks connect or overlap with recommended on-road greenway connections.

- Require applicable buildings to build to the sidewalk. Also, prohibit parking lots from being developed 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.

- Disallow parked vehicles from blocking pedestrian walkways.

- Consider a fee-in-lieu program as an alternative (to build sidewalks throughout the City rather than in locations where it is not feasible or as critical). This mechanism can be used to fill critical gaps in the overall network; Cary is a North Carolina community with such a provision that can be used as a model.

Greenways

Goal: *Establish greenways as part of the City of Burlington's public infrastructure.*

- Define 'Greenways' as part of the City of Burlington's public infrastructure. Greenways are public infrastructure that provide important functions to offer not only 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.

- Require subdividers 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.

- Encourage utility corridor development practices that allow for maximum compatibility with pedestrian and bikeway corridors. Allow access and use along sewer easements to create the possibility of trail development. 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.

Recommended Updates to Current Code of Ordinances

As described earlier in this chapter, there are several mechanisms that the City can utilize to incorporate pedestrian-related policy changes. These measures range from a wholesale rewrite of the various codes into a Unified Development Ordinance (Raleigh as example), provision of and reference to a set of design guidelines (Charlotte and Greensboro as examples), or a comprehensive review and modification of the current Code. If the City maintains its current Code of Ordinances, the following table (Table 4.1) represents opportunities to make simple changes. It will be important for these changes to be understood and implemented.

The Article column identifies the location within the Code of Ordinances. The "Contents & Revisions" column contains the ordinance text. Text in red provides recommended language changes or provides general guidance. The "Comments" column provides additional comments and guidance regarding that article.

Table 4.1 City of Burlington Code of Ordinances - Pedestrian-Related Policies and Recommended Revisions

Article	Contents & Revisions	Comments
Sec. 6.63 - Definitions	(a) A "street" is the entire width between property lines of every way or place, of whatever nature, when any part thereof is dedicated or open to the use of the public as a matter of right for the purpose of vehicular or pedestrian traffic.	Several definitions of 'street' in ordinance -- need to line up with each other
Sec. 6.63 - Definitions	(b) A "sidewalk" is the part of a street which is used, or to be used, for pedestrian traffic. -- *Suggest MUTCD definition*: Sidewalk. That portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements on a private property that is paved or improved and intended for use by pedestrians.	Several definitions of 'sidewalk' in ordinance -- need to line up with each other
Sec. 6.68 - When petition unnecessary	(g) Sidewalk improvements—When, in the judgment of the council, any street or part of a street is without sidewalks and sidewalks should be provided in the public interest, or that any existing sidewalk is unsafe or inadequate and should be repaired or improved.	
Sec. 6.89 - Grassplot, sidewalk, and driveway maintenance	It shall be the responsibility of the abutting property owner to maintain any grassplot or driveway between the property line and the curb of a paved street and to maintain in good passable condition any sidewalk immediately fronting his lot for sidewalk users of all abilities	
Sec. 1-2. - Definitions and rules of construction.	*Sidewalk.* The word "sidewalk" shall mean any portion of a street between the curbline and the adjacent property line, intended for the use of pedestrians. *Suggest MUTCD definition*: *Sidewalk*. That portion of a street between the curb line, or the lateral line of a road, and the adjacent property line or on easements on a private property that is paved or improved and intended for use by pedestrians.	Current definition is incomplete -- road might have no curb so need to define other types of edges. Plus sidewalk might not always be in ROW -- easements, etc.
Sec. 1-2. - Definitions and rules of construction.	*Street.* The word "street" shall mean and include any public way, road, highway, street, avenue, boulevard, parkway, alley, lane, path, viaduct, bridge or other public place and the approaches thereto within the town when any part thereof is open to the use of the public and established for purposes of vehicular traffic and pedestrian access and passage.	See other definitions also.
Sec. 1-2. - Definitions and rules of construction.	No definition of pedestrians included. *Suggest adding definition from MUTCD*: Pedestrian. A person on foot, in a wheelchair, on skates, or on a skateboard.	Also helps clarify situation for rolling pedestrians, etc.
Sec. 7-22. - Construction, repair or alteration of buildings.	(d) (5) Placement of such structures or buildings shall not impede flow of traffic, interrupt or block pedestrian access or passage, or utilize any required off-street parking.	
Chapter 23 - OFFENSES Sec. 23-8. - Skates and other human-powered motive devices.	(b) No person shall outside the central business district, ride or use any motive device propelled for propulsion by human power on the following thoroughfares: Webb....., Any person operating, riding or using any motive device propelled or designed for propulsion by human power on street shall keep to the right-hand portion of such street and yield the right-of-way to pedestrians and/or vehicular traffic and shall provide audible warning when passing pedestrians. All persons must exercise due care.....	
Chapter 23 - OFFENSES Sec. 23-8. - Skates and other human-powered motive devices.	(c) No person shall outside the central business district operate, ride or use any motive device propelled or designed for propulsion by human power on any public sidewalk, in a reckless manner or without exercising due care for their own safety or the safety of other persons using the sidewalk. Any person operating, riding or using any motive device propelled or designed for propulsion by human power on a sidewalk shall yield the right-of-way to any pedestrian and shall provide audible warning when passing.	
Chapter 27 - PICKETING Sec. 27-3. - Use of sidewalks.	Picketing may be conducted only on the sidewalks reserved for pedestrian movement and may not be conducted on the portion of a street used primarily for vehicular traffic and shall not block or impair passage for any users (including wheelchair users).	
ARTICLE II. - PLANNING AND ZONING COMMISSION Sec. 28-27 - Basic studies	In addition, the planning and zoning commission may make, cause to be made, or obtain special studies on the location, conditions and adequacy of specific facilities, which may include but are not limited to studies of housing; commercial and industrial facilities; parks, playgrounds, and recreational facilities; public and private utilities; and traffic, pedestrian demand, transportation and parking facilities	
ARTICLE II. - PLANNING AND ZONING COMMISSION sec. 28-29 - Comprehensive Plans	The comprehensive plans, with the accompanying maps, plats, charts, and descriptive matter, shall be and show the planning and zoning commission's recommendations to the city for the development of the area, including, among other things, the general location, character, and extent of streets, bridges, boulevards, parkways, sidewalks, trails, playgrounds, squares, parks, aviation fields, and other public ways, grounds and open spaces; the general location and extent of public utilities and terminals.....	

ARTICLE II. - PLANNING AND ZONING COMMISSION sec. 28-29 - Comprehensive Plans	The comprehensive plans and any ordinances or other measures to effectuate the plans shall be made with the general purpose of guiding and accomplishing a coordinated, adjusted, and harmonious development of the city and its environs which will, in accordance with present and future needs, best promote health, morals, and the general welfare, as well as efficiency and economy in the process of development, among other things, of adequate provision for traffic, the encouragement of pedestrian travel and connectivity of safe pedestrian access and passage, the promotion of safety from fire and other dangers, adequate provision for light and air, the promotion of the healthful and convenient distribution of population, the promotion of good civic design and arrangement, the wise and efficient expenditure of public funds, and the adequate provision of public utilities	
ARTICLE III. - DEPARTMENT OF RECREATION AND PARKS Sec. 31-46 - Enumeration of specific powers and duties.	(b) Set apart for use as parks, playgrounds, walking trails, recreation centers or facilities, any lands or buildings owned by or leased to the city, and may construct, improve and equip such lands or buildings as deemed necessary to the recreation program.	
ARTICLE III. - DEPARTMENT OF RECREATION AND PARKS Sec. 31-46 - Enumeration of specific powers and duties.	(e) Provide, construct, equip, operate and maintain parks, playgrounds, recreation centers, and all buildings and structures necessary or useful to departmental functions and other recreation facilities owned or controlled by the city or leased, or loaned, to the department by the owners thereof.	
Chapter 32 - STREETS AND SIDEWALKS ARTICLE I. - IN GENERAL	Add design direction & specifications for sidewalks.	Utilize design guidelines of this Pedestrian Plan to dictate pedestrian facility design. For example, sidewalks should be a minimum of 5' in width, with wider sidewalk (8' to 12' minimum) in commercial, mixed use, or Town Center areas.
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.2 - - Driving vehicles on street or sidewalk under construction or repair or routine maintenance	No person shall drive or cause to be driven any automobile or other vehicle upon any street or sidewalk when the same is barricaded and under process of construction, routine maintenance, or repair, or in any other manner cause any damage to any such street or sidewalk.	
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.4 - Sidewalk entrances to basements.	Every property owner owning property whereon basement floors are entered from the sidewalk shall erect a substantial iron fence around the opening to the stairway and provide such entrance with an iron gate which will automatically close. The iron fence must comply with ADA clearance requirements. Each and every person maintaining a sidewalk entrance otherwise than as herein provided shall be guilty of a violation of this section and each day such entrance shall be maintained shall constitute a separate offense.	
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.5 - Guards or fences on lots below street level	It shall be the duty of every person owning any lot or land in the city which is so much lower than the grade of the street or sidewalk on which it borders as to create a dangerous condition, or on which there is a dangerous condition by reason of a hole, excavation or other cause, to provide proper guards or a fence sufficiently high and strong to prevent persons from falling from the street into such lot. Any such person who fails to do so immediately after notice by the city manager, shall be guilty of violating this section, and every day such violation shall continue shall constitute a separate offense.	In a later section they are told that they must do clean-up 'immediately' --- suggest that same time frame for this much more hazardous situation
Chapter 32 - STREETS AND SIDEWALKS Sec.32.7 - Protecting public streets from dirt and debris	(e) As an additional remedy, violation of this section which endangers the comfort, repose, safety, health or peace of residents in the area is deemed, and is declared to be, a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.	
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.11 - Trees, etc.—Trimming or removal	(a) Trees in front of lots to have them properly trimmed when they impair or impede the passage of pedestrians along a sidewalk or block the view of pedestrians or drivers at driveways, crossings and intersection or any other occasions deemed necessary	
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.12 - Same—Projecting growths	Trees, vines, bushes, shrubbery or flowers standing in or upon any public street..... be kept trimmed by the owner or occupant of the property on or in front of which such vines, trees, bushes, shrubbery or flowers are growing so as not to interfere with the free and safe passage along the public right-of-way by pedestrians and vehicular trafficor impede the passage of pedestrians along a sidewalk or block the view of pedestrians or drivers at driveways, crossings or intersections	
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.50 - Permit required	No person shall obstruct or block any street or sidewalk in the city without a written permit therefor, from the city manager or his representative. The permittee shall provide details of the safe alternative pedestrian access or detour that will be in place for the duration of the sidewalk blockage. The permittee may be required to execute an	
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.51 - Removal by chief of police	All unauthorized encroachments or obstructions upon any street, sidewalk, public alley or highway in the city, where provision for removal is not otherwise prescribed, shall be removed by the chief of police or under his instructions....	
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.54 - Porch, fence, steps, etc., over sidewalk or street	.....Each day any such obstruction is allowed to remain after ten (10) days' notice by the city manager to remove the same or maintain a sidewalk entrance as herein provided shall constitute a separate offense.	

Chapter 32 - STREETS AND SIDEWALKS Sec. 32.82 - Provisions of permit	Every permit for excavations in, or work upon, the streets, alleys, sidewalks or public places of the city shall specify the location, character and extent of the proposed excavation or work, the temporary accommodations for pedestrian access and safety for the duration of the proposed excavation or work, the name of the person to whom the same is granted, and the name of the person by whom the excavation...	
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.85 - Protection of public	The person obtaining a permit under this article shall put out necessary approved flares, warning signals or barriers to warn persons using the streets in the vicinity of the working area. They shall provide and direct the public to a safe and accessible alternative path for the duration of the disruption.	
Chapter 32 - STREETS AND SIDEWALKS ARTICLE V. - DRIVEWAYS Sec. 32.100 - Specifications	Every person constructing a driveway under the provisions of this article shall construct the same in accordance and compliance with specifications, rules and regulations promulgated therefor by the city engineer and on file in the office of the city engineering division.	Driveway design has an impact on safety and access for pedestrians -- the driveway can be too wide, excessively sloped, be ill-defined, lead to conflict with motorists, etc. Plus driveways need to include a level landing area to comply with ADA (and to be usable by wheelchairs). Need more current design guidance on driveway design (ADA provides detailed guidance).
Chapter 32 - STREETS AND SIDEWALKS Sec. 32.125 - Definitions.	Sidewalk. That area of the public right-of-way between the curblines or the lateral lines of a roadway and the adjacent property lines reserved for pedestrian traffic, not including street crossings.	Use same definition as used above (Sec. 1.2)
Chapter 33 - SUBDIVISIONS Sec. 33.5 - Other definitions	Street: A general term for denoting a public way for purposes of vehicular traffic, including the entire area within the right-of-way, whether designated as an alley, avenue, boulevard, court, expressway, freeway, highway, lane, parkway, place, road, street, thoroughfare, throughway or however otherwise designated. For the purposes of this chapter, streets are divided into the following categories	Pedestrians, their role, safety & accommodation are completely left out of this and subsequent parts of this definition. MUTCD definition for street/highway also does not mention pedestrians but does clarify that it includes entire area within public ROW.
Chapter 33 - SUBDIVISIONS Sec. 33-8. - Design standards	Streets: (1) Layout of streets as to arrangement, width, grade, character, and location shall conform to the latest comprehensive plan and thoroughfare plan in effect, to adjoining street systems both planned and proposed, to topographic conditions, natural features and drainage systems to be provided and to the public convenience and safety	Note that the factors that go into the decisions regarding the layout of streets have a direct impact on pedestrian facilities in terms of connectivity, convenience, distances, crossing locations, and safety. For example, street width influences several critical pedestrian risk factors: (1) operating speed of vehicles: the speed of a vehicle which is the most important determinant in outcome for a pedestrian when a crash occurs; & (2) pedestrian exposure to traffic
Chapter 33 - SUBDIVISIONS Sec. 33-8. - Design standards (d) Sidewalks:	(1) Concrete sidewalks shall be required as follows: a. Where required by the city council in special circumstances or in accordance with a duly adopted sidewalk plan. b. On those streets designated as major thoroughfares, minor thoroughfares and frontage streets on the Burlington Thoroughfare Plan. c. Wherever needed to provide for a high volume of pedestrian traffic, especially along streets leading to schools which service the subdivision involved. d. Sidewalks shall meet established construction standards as administered by the city engineer. e. A public crosswalk or pedestrian way not less than ten (10) feet wide may be required near the center and entirely through excessively long blocks and at the end of culs-de-sac to provide pedestrian access to one (1) of the surrounding streets.	(a). Suggest creating technical-based guidelines for City Council to assist in deciding where sidewalks are required or could be located. Will need to update this line in future to reflect this new Pedestrian Plan. (b). This limits the requirement to major and minor thoroughfares & frontage streets -- there are many other locations that would benefit greatly from the addition of sidewalks -- needs expansion to cover all streets -- perhaps the rule should be written so that all roads are required to provide facility unless certain exception criteria are met (c). Sidewalks are needed in many situations other than when pedestrians traffic is high -- also existing ped. traffic may be low because of the lack of facility. (d). Need reference and further details -- this is a critical piece that should specifiy all of the design details (inc. width, buffers, material specifications, etc.). (e). Confusing definition -- suggest using term 'mid-block crossing' instead. Confused about cul de sac reference -- suggesting a pedestrian cross connection to adjacent street from end of cul-de-sac? Lots of considerations in mid-block crossing design that are not covered in this definition -- suggest reference to this Plan's design guidelines that goes into these details properly (including the use of medians for mid-block designs)
Chapter 33 - SUBDIVISIONSSec. 33.1- Miscellaneous. (c)Hardships and variances:	(1) Where extraordinary hardships may result from strict interpretation of this chapter, the planning commission and/or the city council may vary this chapter so that substantial justice is realized and the public interest is protected; provided that such variance does not have the effect of nullifying the intent and purpose of the comprehensive plan for Burlington and its jurisdiction or the objectives of this chapter.	Suggest creating specific policy spelling out when an exception can be made in providing a pedestrian facility so that execptions cannot easily be made under this general clause
Chapter 36 - TRAFFIC Sec. 36-1. - Definitions	Pedestrian. Any person on foot, in a wheelchair, on skates, etc.	
Chapter 36 - TRAFFIC Sec. 36-1. - Definitions	Right-of-way. That portion of a street which has been improved and designated for, or which is ordinarily used for, vehicular travel or pedestrian access.	
Chapter 36 - TRAFFIC Sec. 36-1. - Definitions	Safety zone. The area officially set apart within a roadway for the exclusive use of pedestrians, which area is either protected or plainly marked at all times while so set apart as a safety zone.	

Chapter 36 - TRAFFIC Sec. 36-1. - Definitions	Sidewalk. That portion of a street between the curblines or the lateral lines of a roadway, and the adjacent property lines exclusively intended for the use of pedestrians. -- Suggest MUTCD definition: Sidewalk. That portion of a street between the curb line, or the lateral line of a roadway, and the adjacent property line or on easements on a private property that is paved or improved and intended for use by pedestrians.	
Chapter 36 - TRAFFIC Sec. 36-1. - Definitions	Traffic. Pedestrians, ridden or herded animals, vehicles and other conveyances, either singly or together, while using any street for purposes of travel. Suggest using MUTCD definition: Traffic--pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars and other conveyances either singularly or together while using for purposes of travel and highway or private road open to public travel	
Chapter 36 - TRAFFIC Sec. 36.181 - Duty of drivers	Notwithstanding the provisions of this article, every driver of a vehicle shall exercise due care to avoid colliding with any pedestrian upon any roadway, shall pay attention and not be distracted by electronic devices and other activities while driving, shall reduce speed in the vicinity of pedestrians and pedestrian crossings, shall give warning by sounding the horn when necessary and shall exercise proper precautions upon observing any child or any confused or incapacitated person upon a roadway.	
Chapter 36 - TRAFFIC Sec. 36-182 - Right-of-way at crosswalks	(b) Whenever any vehicle is stopped at a marked crosswalk or at any unmarked crosswalk at an intersection to permit a pedestrian to cross the roadway, the driver of any other vehicle approaching from the rear or in an adjacent travel lane shall not overtake and pass such stopped vehicle	Need to address multiple threat for pedestrians
	No person, except one who is wholly or partially blind, shall carry or use on any street or highway, or in any other public place a cane or walking stick which is white in color or white tipped with red	
Chapter 36.5 - VEGETATION Sec. 36.5-12 - Definitions	(a) The purpose of this article is to regulate the planting, maintenance and removal of trees on city-owned public property and rights-of-way within the city and on city-owned property wherever located..... This article is also intended to provide for the trimming or removal of trees on public land when they obscure street lights, interfere with surface and subsurface utility lines or constitute a hazard to pedestrian access or visibility or vehicular traffic or otherwise endanger the public health, safety or welfare.	This definition only covers vegetation on public property -- need to be able to trim vegation on private property that extends into public property impeding access & also vegetation on private property that may be blocking sight distance

Chapter Five: Programs

Chapter Outline:

Overview

Meeting the goals of this Plan will not only require new facilities; it also requires implementation of pedestrian-related programs. A comprehensive approach is necessary to create a pedestrian-friendly community. Programs that encourage walking, educate about safety, and enforce safe behavior are also key components. This chapter outlines recommended programs to meet the needs of the community and the goals of this Plan that cannot be met through facility construction alone.

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 Burlington. The City should work with local volunteers and local community organizations such as Healthy Alamance, North Park in Motion, Piedmont Triad Sustainability, and the Alamance County Health Department to initiate at least one of the following programs or events (whichever are deemed the most appropriate and/or feasible) within the first few years of adopting this plan.

Education

Walkability Workgroup

The City of Burlington should support the creation of a local pedestrian advocacy group. Local advocacy groups are excellent resources for promoting safety, 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.

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.walkinginfo.org.

walkinginfo.org
Pedestrian and Bicycle Information Center

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. 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.

A pedestrian safety education campaign for the City of Burlington could also include messages on street signage related to speeding, yielding to pedestrians in crosswalks, stopping at stop signs, red light running, or jaywalking. In addition, bicycle patrol officers are in a particularly good position to educate pedestrians on safe and proper behavior as part of their routine activities. Particular emphasis should be given to the safety of children, seniors and people with disabilities.

Education for Seniors and Disabled Users

Programs and workshops would include instructors and guest speakers to provide information specific to the needs of the seniors and disabled groups who are interested in mobility. Themes of focus when talking to seniors and disabled groups could include: suggested places to walk, poor places to walk, personal safety, traffic devices, recognition of causes of pedestrian collisions, avoidance of pedestrian collisions, Promotion of proper attire (bright colors, proper shoes, glasses, walkers, canes etc), and the effects of certain medication on one's reaction response.

Education for Elementary School Children

Educating young children on pedestrian safety will create a good foundation of responsible, safe pedestrian behavior that

Above: Pedestrian and Bike Safety Rodeos are a fun and effective way to teach safe, responsible pedestrian behavior to children. Photos courtesy of http://www.childrenshospital.vanderbilt.org/

they will carry for the rest of their lives. There are both in and out of school opportunities for providing pedestrian education to elementary school children.

Within school, pedestrian safety topics can be introduced into the curriculum. Lessons could be designed to target particular age groups or grades and could include basic information, demonstrations, activities, and printed material. As children progress through elementary school, topics become more advanced, moving from an emphasis on basic awareness and safety at younger ages to education on pedestrian and motorist responsibilities and laws in the higher grades.

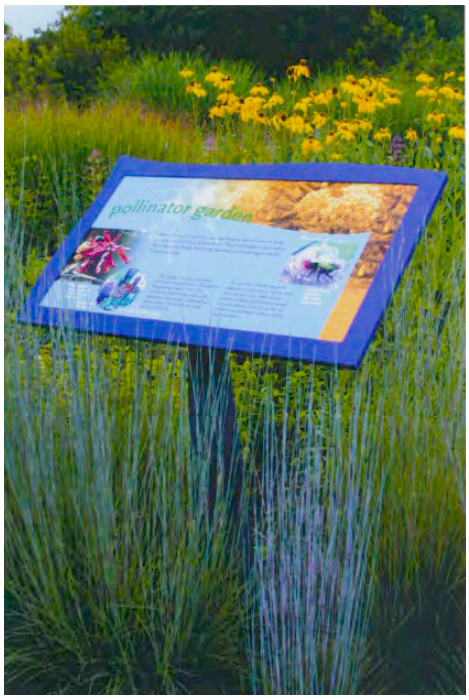
An effective, out of school tool for educating children on pedestrian safety are Community-Based Rodeos. Community-Based Rodeos include bicycle and pedestrian education. Volunteers—including parents, senior citizens, bike enthusiasts, and other screened/qualified volunteers—can staff the rodeo. Each rodeo can feature a traffic simulation course consisting of a miniature city with streets, sidewalks, intersections, traffic signs, traffic signals, a residential area, a business area, bike lanes, trucks, and buses. The course would allow children with their parents to practice bicycle handling and pedestrian skills. By utilizing this simulated environment, the ability of children to recognize traffic hazards is improved. These rodeos would also allow parents to participate in the educational process by involving them in the lesson plans.

Internal Education

'Internal' education refers to the training of all people who are involved in the actual implementation of the Pedestrian Master Plan. Internal training will be essential to institutionalizing pedestrian issues into the everyday operations of engineering, planning, and Recreation and Parks departments. Key City staff, members of the local planning board, MPO, NCDOT Division 7 staff, and Alamance County staff should all 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 attendance at special sessions or conferences. Even simple meetings to go over the 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. Guidance and materials for internal education methods is available from the NCDOT Bicycle and Pedestrian Division and the Institute for Transportation Research and Education (ITRE).

Environmental and Historic Education/Interpretation

Educational programs and interpretative signage could be developed along future trails and pedestrian routes. Greenway trails 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.



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 culture that make the City of Burlington unique, such as the buildings and sites within the Burlington Historic District. 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 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

Below and Opposite: These signage examples provided and designed by Cloud Gehshan Associates at www.cloudgehshan.com.

Communities approach to serve as a model throughout the nation: http://www.nhtsa.dot.gov/safecommunities.

Speed Campaign Tool Kit. The intent of this National Highway Traffic Safety Administration (NHTSA) tool kit is to provide marketing materials, earned media tools, and marketing ideas for communities to distribute to fit local needs and objectives while at the same time partnering with other

states, communities, and organizations all across the country on a speed management program. It includes messaging and templates you may choose from to support your speed management initiatives. Free TV and radio materials, posters, billboards, and other media materials can be downloaded here: http://www.nhtsa.gov/speed/toolkit/index.cfm. Example posters can be found on the previous page.

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.gov/gtss/kit/pedestrian.html.

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. Information about programs, involving media events, device distribution and hands-on educational activities for kids and their families is available at: http://www.safekids.org/ and locally at: http://safekidsalamance.wordpress.com/2009/09/11/about-safekids-alamance-county/.

Rules of the Road for Grandchildren: Safety Tips is an information website for teaching ygrandchildren the "rules of the road": 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

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/.

Education Actions

- Support the creation of a local Walkability Workgroup.

- Consider sponsoring a training session for pedestrian design/ review.

- Create a self-guided walking tour of historical/cultural sites.

- Establish outdoor classrooms utilizing interpretative signage in open space, parks, and on future trails.

- Download a variety of safety materials for distribution to various age groups and at multiple events and locations.

Encouragement

School Programs

Many programs focus on developing safer pedestrian facilities around schools. Programs can be adopted by parents and schools to provide initiatives for walking.

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 on page 74.

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 can be used to increase use of pedestrian facilities:

Ciclovias/Sunday Parkways

These programs have many names: Ciclovias, Open Streets, Sunday Parkways, Summer Streets, Sunday Streets, etc. Ciclovias, which originated in Bogotá, Colombia (hence the Spanish name), are periodic street closures (usually on Sundays) that create a temporary park that is open to the public for walking, bicycling, dancing, hula hooping, roller skating, etc. They have been very successful internationally and are rapidly becoming popular in the United States. They promote health by creating a safe and attractive space for physical activity and social interaction, and are cost-effective compared to the cost of building new parks for the same purpose. These events can be weekly events or one-time events, and are generally very popular and well-attended.

Greenways/Trails Report Card

An annual greenways or trails system report card can be a useful activity to measure and publicize accomplishments and performance against benchmarks. An annual report should include relevant walking metrics (walking count results, new pedestrian facility miles, major completed projects, pedestrian-involved crashes) and may also include information on user satisfaction, public perception of safety, or other qualitative data that has been collected related to walking.

City Walk Tours

Walks could be organized for the general public in order to (1) showcase the destinations reachable by walking, (2) educate participants on walking as a mode of transportation and (3) promote walking as a healthy activity.

Walk to Work Day/International Car Free Day

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. Some communities use September 22, for the festivities.

'Strive Not to Drive Day'

This event example, from the Town of Black Mountain, NC, 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 its local MPO Bicycle and Pedestrian Task Force and the Land-of-Sky Regional Council. A similar event could be held in Burlington, as the Pedestrian Plan is implemented.

International Walk to School Month

This month-long event is held each October. It gives children, parents, teachers, and community leaders the opportunity to be part of a global event. For more information, visit www.iwalktoschool.org.

National Trails Day

This event is held every year in June. Other events, competitions, races, and tours can be held simultaneously to promote trails in Burlington.

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.

Use Facilities to Promote Other Causes

Pedestrian 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 Burlington has numerous organizations that could help to promote pedestrian activities (e.g. the local Chamber of Commerce, local schools/PTAs, 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

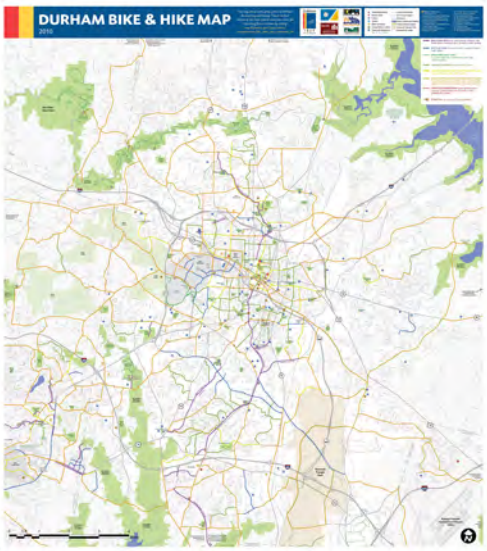
group walks, trail clean-ups, and other activities listed in this section.

The City of Burlington could require all community events to promote walking in event literature, advertisements, and other collateral materials as a mode of transportation to their event. The City could include this requirement as part of the permit process for events.

Partnerships with local retailers could also be established to promote walking. These partnerships could involve the campaign theme being promoted on bag stuffers and pre-printed bags. The costs of the bag stuffers and pre-printed bags would be born by retailers and could act as a donation by them. The City of Burlington would provide suggested artwork for the printed material. Retailers would, if possible, agree to provide counter space for guides and window space for promotional posters.

Art in the Landscape

The inclusion of art along pedestrian corridors and future 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. 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 community members.



Hike and Bike Map and Website

One of the most common requests of citizens interested in biking and walking is an informational hike/bike map and website. Currently, there is no official map for the Burlington area that clearly shows the best routes for bicycling, walking, and destinations within the current existing environment. Many residents are not aware of existing facilities and trails. User-friendly brochure maps can have a significant impact by providing legible, informational mapping, wayfinding, and education. A foldable hardcopy and online map should be developed and distributed through local area government agencies, schools, advocacy groups, and other community organizations. Maps should be made available at Recreation and Parks centers, libraries, municipal buildings, transit facilities,

bike shops, and tourism information centers. The map should be updated annually to reflect the bicycle and greenway improvements that will be implemented through this Plan. This map and website are also opportunities for the Burlington area to provide basic information on safety, commuting, trail etiquette, and local resources.

Walking/Running Clubs

Neighborhoods, local groups, or businesses could promote walking or running clubs for local residents or employees. Informal groups can be advertised on local bulletin or information boards. These clubs could be specialized to attract different interest groups, depending upon time of day or interest.. Examples include:

- Relay for Life (American Cancer Society support)
- Mothers' Morning Club (moms with strollers)
- Walking Wednesdays (senior groups)
- Lunch Bunch (lunch hour runs for people who work during the day)

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 Events

The City of Burlington should consider holding events that can help fund future facilities or programs. Program and event ideas that could be used to generate revenue in Burlington include:

- Races/triathlons (fees and/or donations)
- Educational walks/Nature walks/Historic walks (fees and/or donations)
- Fund-raisers including dinners/galas
- Concerts (fees and/or donations)
- Events coincident with other local events such as fairs, festivals, historic/folk events, etc.

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 funding for infrastructure improvements within 2 miles of schools. 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

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. Registration information is available at the International Walk to School website: www.walktoschool-usa.org.

Walk a Child to School in North Carolina. 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. 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. http://www.cdc.gov/nccdphp/dnpa/kidswalk/

Encouragement Actions

- Encourage children to walk to school, safely, through a combination of programs.

- Engage and partner with multiple Burlington area schools to become involved with national Safe Routes to School programs and funding opportunities.

- Establish awareness days and promote International Walk to School Month.

- Develop an online and hardcopy walking and biking map of the City of Burlington to distribute to residents.

- Encourage the establishment of walking clubs.

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

- Utilize future greenways for artwork and plantings.

Enforcement

Based on crash data analysis and observed patterns of behavior, local police can use targeted enforcement to focus on key issues such as motorists speeding, not yielding to pedestrians in crosswalks, parking on sidewalks, etc. 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.

Targeted enforcement of pedestrian laws should be focused in those areas with high pedestrian volumes or where pedestrians are especially vulnerable. It is recommended that such targeted enforcement occur at least four times per year and last one week. Focused enforcement should also take place at the start of the school year at selected schools near their primary access points for children walking. The Burlington Police should also be surveyed for input on appropriate educational material, advisory and warning signs, and other tools to help them accomplish their mission. It is also recommended that double fines be considered for failure to stop at red lights and stop signs. Finally, it is recommended that in the event

of a pedestrian fatality or injury, the Police Department and eventually the District Attorney vigorously pursue legal action against the responsible motorist.

Increased presence of law enforcement agencies near schools, senior centers, social service agency sites, or high-conflict areas can curb unlawful behavior. People tend to slow down and improve their driving behavior if they expect law enforcement to be present. These targeted enforcement activities can be effective but have budget implications in as much as they require dedication of police officer resources in a single location.

The NCDOT 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 GS20-114.1.

In a crosswalk enforcement operation, the local police department targets motorists who fail to yield to pedestrians in school crosswalks. A plain-clothes "decoy" police officer ventures into a crosswalk or crossing guard-monitored location, and motorists who do not yield are given a citation by a second officer stationed nearby on motorcycle. The police department or school district may alert the media to the crosswalk enforcement operation to increase public awareness of the issue of crosswalk safety, and news cameras may accompany the police officers to report on the operation.

Pedestrian Enforcement

Observations made by local trail and pedestrian facility users can help to identify conflicts or issues that require attention. To maintain proper use of trail facilities, volunteers could patrol trails, particularly on the most popular trails and on days of heavy use. The volunteer patrol can report suspicious or unlawful activity, as well as answer any questions a trail user may have. The volunteer patrol could be a responsibility of a pedestrian advocacy group or a neighborhood crime watch group.

In areas where potential speeding problems have been identified by residents, a Neighborhood Speed Watch can be used to warn motorists that they are exceeding the speed limit. A radar unit is loaned out to a designated neighborhood representative to record speed information about vehicles. The

person operating the radar unit must record information, such as make, model and license number of offending vehicles. This information is sent to the local law enforcement agency having jurisdiction at the location of the violations, and the department then sends a letter to the registered vehicle owner, informing them that the vehicle was seen on a specific street exceeding the legal speed limit.

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: www.nhtsa.dot.gov/people/injury/pedbimot/bike/resourceguide/index.html

Enforcement Actions

- Local police should use targeted enforcement to focus on key issues such as motorists speeding, not yielding to pedestrians in crosswalks, parking on sidewalks, etc.

- Establish a crossing guard program for peak school hours and for peak tourist pedestrian activity near beach access areas.

- Consider requiring all crossing guards to complete an NCDOT Crossing Guard Training Program.

- Develop a simple brochure that outlines local leash laws, to be distributed as warnings from police officers and as education tools at pet stores and veterinarian offices. This may help to decease incidents where pedestrians are intimidated or even harmed by unleashed dogs.

- Provide officers with an educational brochure to be distributed during pedestrian and bicycling-related enforcement activities.

- Offer training for planning, public works, engineering, and law enforcement staff that focuses on walking-related issues.

Chapter Six: Implementation

Chapter Outline:

Overview

This plan provides recommendations that will make Burlington a more walkable community. This chapter outlines the implementation steps that need to happen to make these recommendations a reality. It provides implementation priorities, key partners in implementation, facility development methods, and over 40 specific action steps. Finally, this plan's appendices provide a variety of in-depth resources for assistance in carrying out these tasks.

Key Action Steps

Phase I (2012-2013)

Consider Adoption of This Plan

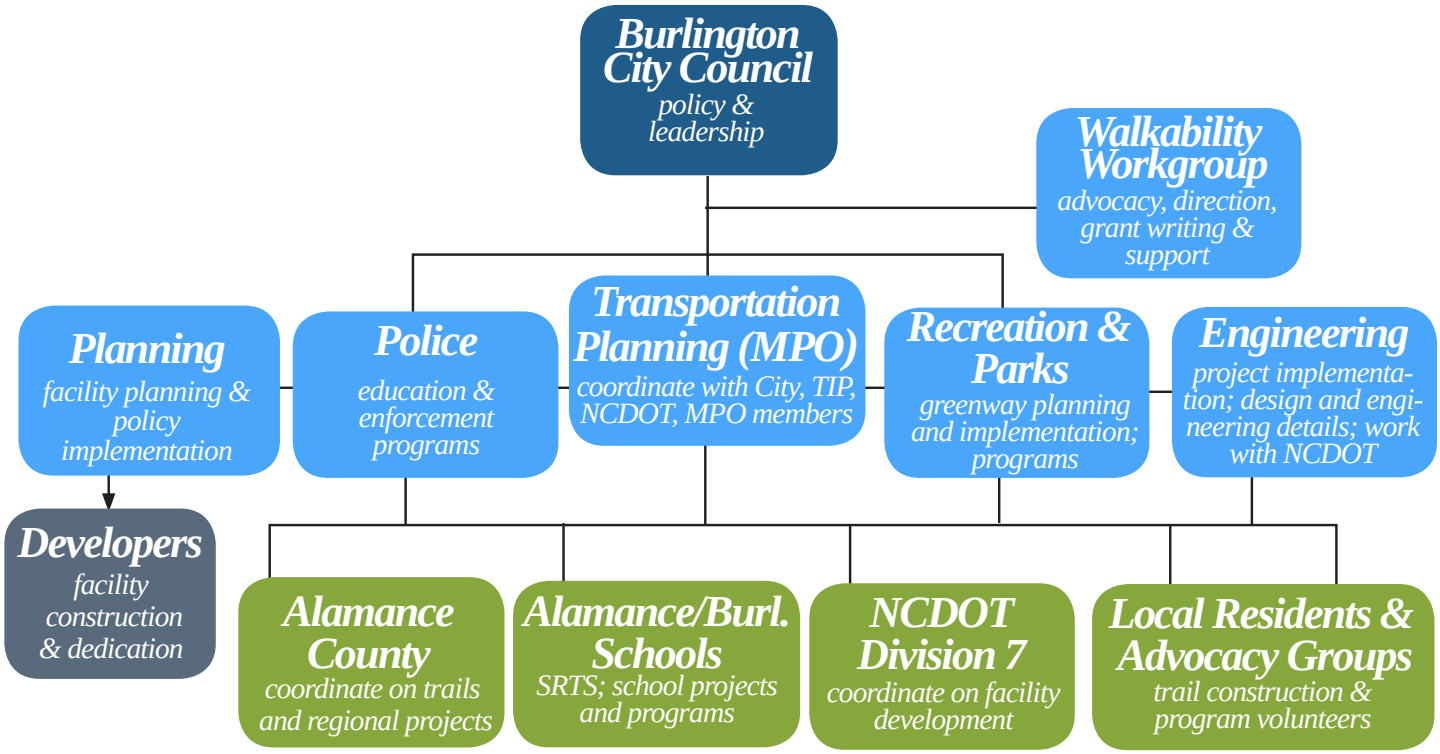
Before any other action takes place, the City of Burlington should adopt this plan. This should be considered the first step in implementation. Through adoption of this plan and its accompanying maps as the City's official pedestrian plan, Burlington will be better able to shape transportation and development decisions so that they fit with the goals of this plan. Most importantly, having an adopted plan is extremely helpful in securing funding from state, federal, and private agencies. Adopting this plan does not commit the City to dedicate or allocate funds, but rather indicates the intent of the City to implement this plan over time, starting with these action steps.

Consider Seeking Multiple Funding Sources and Facility Development Options

Multiple approaches should be taken to support pedestrian facility development and programming. It is important to secure the funding necessary to undertake initial projects but also to develop a long-term funding strategy to allow continued development of the overall system. The City should maintain its

current funding for pedestrian/sidewalk infrastructure in order to complete the top recommendations in this Plan.

ORGANIZATIONAL FRAMEWORK FOR IMPLEMENTATION



Another priority action is to immediately evaluate the recommendations against transportation projects that are currently programmed in the Transportation Improvement Program (TIP) to see where projects overlap, complement, or conflict with each other. The City should also evaluate which of the proposed projects could be added to future TIP updates.

Capital and local funds for pedestrian facilities and trail construction should be set aside every year, even if only for a small amount. Small amounts of local funding can be matched to outside funding sources or could be used to enhance NCDOT projects with bicycle or pedestrian features that may otherwise not be budgeted for by the state. A variety of local, state, and federal options and sources exist and should be pursued. In addition, the City should actively engage private and institutional partners such as healthcare providers and university partners in participating in partially finding enhancements; these contributions can be used as local match monies to leverage larger federal grant opportunities. These funding options are described in Appendix B: Funding.

As a precursor to pursuing federal funding opportunities, Burlington can gain an advantage over other applicants by completing certain required steps in advance of any grant application. Such advance items include preparation and processing of NEPA documentation, resolution of any right-of-way issues, and commitment of the required matching funds from local public and private sources.

Consider Regular Meeting With Key Project Partners

Coordination between key project partners will establish a system of checks and balances, provide a level of accountability, and ensure that recommendations are implemented. This meeting should be organized by the designated City staff, and should include representatives from the Organizational Chart shown above. The purpose of the meeting should be to ensure that this Plan's recommendations are integrated with other transportation planning efforts in the region, as well as long-range and current land use planning, economic development planning, and environmental planning. Attendees should work together to identify and secure funding necessary to immediately begin the first year's work, and start working on a funding strategy that will allow the City to incrementally complete each of the suggested physical improvements, policy changes and programs over a 5-10 year period. A brief progress benchmark report should be a product of these meetings, and goals for the year should be confirmed by participants. The meetings could also occasionally feature special training sessions on bicycle, pedestrian, and trail issues.

Consider Improving Pedestrian Policies

While the Burlington Code of Ordinances addresses non-motorized transportation in some ways, policy updates are recommended to ensure future development provides pedestrian facilities and improves pedestrian friendliness. Suggested policy strategies and changes are included in Chapter 4: Policy Recommendations.

Evaluate Progress

One year after Plan adoption, City Staff should convene to evaluate implementation progress. Evaluation should occur on an annual basis to determine if the Plan's visions, goals, and specific recommendations are being addressed and advanced. An annual evaluation will allow for updates of this Plan moving forward. See the section "Performance Measures" later in this chapter.

Phase II (2014-2015)

Consider Forming a Walkability Workgroup

The City of Burlington should consider forming a Walkability Workgroup to assist in the implementation of this Plan. The Walkability Workgroup could start largely with the members of the Pedestrian Plan Steering Committee. The Walkability Workshop should also have representation from active pedestrians, and should champion the recommendations of this Plan. The existence of this group represents a significant step in becoming designated as a Walk Friendly Community; a major role of the Walkability Workgroup is the stewardship of the Walk Friendly Community application process as well as evaluating deficiencies identified from committee reviews and advancing various work program initiatives to meet those deficiencies in an effort to advance the status of Burlington as a Walk Friendly Community.

The Walkability Workgroup should provide a communications link between the citizens of the community, the City government, and the MPO. They should also meet periodically, and be tasked with assisting the City staff in community outreach, marketing, and educational activities recommended by this Plan. Model examples of similar groups can be found in Raleigh, Durham, and Southern Pines.

Consider Developing Pedestrian Programming

Programs that encourage walking, educate about safety, and enforce safe behavior are also key components of a walkable community. A comprehensive toolbox of education, encouragement, and enforcement programs are provided in Chapter 5 with key action items and resources.

Phase III (2016-2015)

Consider Becoming Designated as a Walk Friendly Community

One of the goals for this Pedestrian Plan is to transform Burlington into a “Walk Friendly Community” (WFC). The Walk Friendly Community Campaign is an awards program that recognizes municipalities that actively support pedestrian activity and safety. A Walk Friendly Community provides safe accommodation for walking and encourages its residents

to walk for transportation and recreation. The program is maintained by the UNC Highway Safety Research Center's Pedestrian and Bicycle Information Center, with support from a variety of national partners.

The development and implementation of this Plan is an essential first step in eventually becoming a Walk Friendly Community. Being the first year of this award (2011), Burlington has an opportunity to become an early award winner. With ongoing efforts and the short term work program recommended here, the City should be in a position to apply for and receive WFC status within two years. An introduction to Walk Friendly Communities can be found at: www.walkfriendly.org/webinar.cfm.

Key Partners in Implementation

Role of Burlington City Council

The City Council will be responsible for adopting this plan. Through adoption, the City's leadership is further recognizing the value of pedestrian transportation and is putting forth a well-thought out set of recommendations for improving public safety and overall quality of life (see the 'Benefits of a Walkable Community' in Chapter 1). By adopting this Plan, the City Council is also signifying that they are prepared to support the efforts of other key partners in the plan's implementation, including the work of City departments and the local NCDOT, Division 7.

Role of the City of Burlington Planning and Community Development Department

The planning staff handles comprehensive planning, zoning and code enforcement, maintains GIS for the City, and serves as the lead transportation agency for the Burlington-Graham Metropolitan Planning Organization. The department will take primary responsibility for the contact with new development to implement the plan (with support from the Public Works Department). For example, the staff should be prepared to:

- Communicate and coordinate with local developers on adopted recommendations for pedestrian facilities, including paved multi-use trails.
- Assist the Public Works Department in communicating with NCDOT and regional partners
- Refer often to Chapter 4: Policy Recommendations for

information that may apply to pedestrian facility development in Burlington.

- Work to apply recommended policy revisions in Chapter 4 of this Plan.

- Maintain and update the pedestrian facility GIS database which includes sidewalks, greenways, and crossing facilities.

- Maintain and update pedestrian crash data developed during this study.

Role of the City of Burlington Transportation Planning (MPO)

The City of Burlington Urban Area MPO is the transportation planning agency serving the City of Burlington, City of Graham, City of Mebane, Town of Elon, Town of Gibsonville, Town of Green Level, Town of Haw River, Town of Whitsett, Village of Alamance, and Alamance County. The City of Burlington has served as the Lead Planning Agency for the MPO. Local governments are represented by an elected official on the Transportation Advisory Committee (TAC) and staff members, NCDOT, and FHWA staff comprise the Technical Coordinating Committee (TCC). The City of Burlington, as lead agency for the MPO should be prepared to:

- Become familiar with the recommendations of this Plan, and support its implementation.

- Serve as lead coordinator and planner for a newly formed Walkabililty Workgroup and for quarterly meetings with project partners.

- Oversee long range transportation planning and ensure the development of a multi-modal transportation network.

- Ensure recommendations from this Pedestrian Plan are integrated into regional planning and project implementation.

- Produce updates to the Long Range Transportation Plan (LRTP) that incorporate recommendations from this Pedestrian Plan.

- Ensure that TIP projects are updated with recommendations from this Plan.

- Follow upcoming roadway reconstruction and resurfacing projects and work early in the design process with City and NCDOT to ensure pedestrian facilities are incorporated early into the design.

- Keep up-to-date on current and changing funding sources and opportunities such as Safe Routes to School.

Role of the City of Burlington Engineering Department

The Engineering Department manages improvements to the City's infrastructure and manages construction inspections and engineering design. The department should be prepared to:

- Become familiar with the recommendations of this Plan, and support its implementation.
- Become familiar with the standards set forth in Appendix A of this Plan, as well as state and national standards for pedestrian facility design.
- Assist with local roadway projects and ensure pedestrian accommodations are being made.
- Work with NCDOT to ensure pedestrian accommodations are properly implemented and are compatible and connected with existing pedestrian facilities.

Role of the City of Burlington Public Works Department

The Public Works Department handles the responsibility for the construction and maintenance of pedestrian facilities on City-owned and maintained roadways, as well as on NCDOT roadways, where encroachment agreements are secured. The department also operates and maintains traffic signalization, traffic signs, and markings. The department should be prepared to:

- Communicate and coordinate with other City departments and the Walkabililty Workgroup on pedestrian projects.
- Become familiar with the standards set forth in Appendix A of this Plan, as well as state and national standards for pedestrian facility design.
- Secure encroachment agreements for work on NCDOT-owned and maintained roadways.
- Design, construct and maintain pedestrian facilities.
- Prepare sidewalk, trail, and pedestrian crossing striping and construction documents following design standards in Appendix A.
- Ensure adequate pedestrian crossing facilities at intersections and handle signal timing issues associated with the addition of pedestrian countdown signals.
- Communicate and coordinate with NCDOT Division 7 on this Plan's recommendations for NCDOT-owned and maintained roadways. Provide comment and reminders about this Plan's recommendations no later than the design phase.
- Work with Division 7 to ensure that when NCDOT-owned and maintained roadways in Burlington are resurfaced or

reconstructed, that this Plan's adopted recommendations for pedestrian facilities are included on those streets. If a compromise to the original recommendation is needed, then contact NCDOT Division of Bicycle and Pedestrian Transportation for guidance on appropriate alternatives.

Role of the Recreation and Parks Department

The Recreation and Parks Department operates the recreation, athletic, and special event programs for the citizens of Burlington. They also lead implementation and maintain a variety of community, neighborhood, greenway, and natural park areas. The Recreation and Parks Department should be prepared to:

- Pursue grants for funding projects and programs.
- Select and carry out walking-related programs; Work with locale advocacy groups and the Walkability Workgroup to assist in organizing walking/running events, educational activities, and enforcement programs.
- Communicate and coordinate with the City of Burlington Transportation Planning and neighboring municipalities and counties on regional trail facilities (especially the Haw River Trail/Mountains-to-Sea Trail; partner for joint-funding opportunities.
- Identify safety concerns and work with citizens to improve trail

Role of the Walkabililty Workgroup

The Committee should be prepared to:

- Meet with staff from the MPO, Engineering, Recreation and Parks, Planning and Community Development, and the Public Works Department; evaluate progress of the plan's implementation and offer input regarding pedestrian and trail-related issues; assist City staff in applying for grants and organizing pedestrian-related events and educational activities.

- Build upon current levels of local support for pedestrian issues and advocate for local project funding.

Role of the Local NCDOT, Division 7

Division 7 of the NCDOT is responsible for the construction and maintenance of pedestrian facilities on NCDOT-owned and maintained roadways in the City of Burlington, OR is expected to allow for the City to do so with encroachment agreements. Division 7 should be prepared to:

- Recognize this Plan as not only as an adopted plan of the

City of Burlington, but also as an approved plan of the NCDOT.

-Become familiar with the pedestrian facility recommendations for NCDOT roadways in this Plan (Chapter 3); take initiative in incorporating this plan's recommendations into the Division's schedule of improvements whenever possible.
-Review roadway designs for consitency with NCDOT's Complete Streets Policy and Design Guidelines, incorporating appropriate facilities and measures for walkability where context warrants.

- Become familiar with the standards set forth in Appendix A of this Plan, as well as state and national standards for pedestrian facility design; construct and maintain pedestrian facilities using the highest standards allowed by the State (including the use of innovative treatments on a trial-basis).

- Notify the City of Burlington MPO, Engineering, and Public Works Departments of all upcoming roadway reconstruction or resurfacing/restriping projects in Burlington, no later than the design phase; Provide sufficient time for comments from the planning staff.

- If needed, seek guidance and direction from the NCDOT Division of Bicycle and Pedestrian Transportation on issues related to this Plan and its implementation.

Role of the City of Burlington Police Department

The City of Burlington Police Department is responsible for providing the community the highest quality law enforcement service and protection to ensure the safety of the citizens and visitors to the City of Burlington. The Police Department should be prepared to:

- Become experts on pedestrian-related laws in North Carolina (see: www.ncdot.gov/ bikeped/lawspolicies/laws/).

- Continue to enforce not only pedestrian-related laws, but also motorist laws that affect the safety of pedestrians, such as speeding, running red lights, aggressive driving, etc. Traffic speed and volume were noted as deterrents to pedestrian travel in the Pedestrian Plan comment form (See Appendix D Public Involvement).

- Participate in pedestrian-related education programs.

- Review safety considerations with the Public Works Department as projects are implemented.

Role of Developers

Developers in Burlington can play an important role in facility

development whenever a project requires the enhancement of transportation facilities or the dedication and development of sidewalks, trails or crossing facilities. Developers should be prepared to:

- Become familiar with the benefits, both financial and otherwise, of providing amenities for walking and biking (including trails) in residential and commercial developments.
- Become familiar with the standards set forth in Appendix A of this Plan, as well as state and national standards for pedestrian facility design.
- Be prepared to account for bicycle and pedestrian circulation and connectivity in future developments.

Role of Local & Regional Stakeholders

Stakeholders for pedestrian facility development and related programs, such as Alamance County, Healthy Alamance, surrounding jurisdictions, the Alamance/Burlington School system, local colleges, and local economic development organizations play important roles in the implementation of this plan. Local and regional stakeholders should be prepared to:

- Become familiar with the recommendations of this Plan, and communicate & coordinate with the City for implementation, specifically in relation to funding opportunities, such as grant writing and developing local matches for facility construction.
- Alamance County should coordinate with the City on regional trail development and SRTS grants.
- The local school system and school leaders should assist in carrying out SRTS workshops, programs, and walkability audits, and also assist in SRTS grant applications.

Role of Corporate and Institutional Partners

Public-private partnerships are frequently being used as a mechanism to advance projects or leverage investments to qualify for additional funding capacity. With the emergence of the Center for Disease Control's "Healthy Communities by Design" initiative, it is beneficial to all parties for corporate and institutional partners concerned with health to participate actively in the implementation and funding of projects that contribute to healthy communities. The City of Greenville, SC has been extremely successful in its relationship with Greenville Hospital System in its sponsorship of the Swamp Rabbit Trail. With entities such as Labcorp and Elon University calling Burlington home, opportunities exist to bring these stakeholders into an active participation role ion realizing the overall Vision.

Role of Local Residents, Clubs and Advocacy Groups

Local residents, clubs and advocacy groups play a critical role in the success of this plan. They should be prepared to:

- Continue offering input regarding pedestrian issues in Burlington.
- Assist City staff and Walkabililty Workgroup by volunteering for pedestrian-related events and educational activities and/or participate in such activities.
- Assist City staff and Walkabililty Workgroup by speaking at City Council meetings and advocating for local pedestrian project and program funding.

Role of 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 many of the program ideas outlined in Chapter 5 of this plan. 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.

Performance Measures (Evaluating and Monitoring)

The City of Burlington should establish performance measures to benchmark progress towards fulfilling the recommendations of this Plan. These performance measures should be stated in an official report within two years after the Plan is adopted. The purpose for evaluation is to determine the City's successes and setbacks in implementing this Plan and making Burlington more walkable. Performance measures were derived from this Plan's goals listed in Chapter 1 and should address the following aspects of pedestrian transportation and recreation in Burlington:

Safety **–** Measures of pedestrian crashes and injuries or speeding in City.

Facilities **–** Measures of how many pedestrian facilities have been funded and constructed since the Plan's adoption. Measures of miles of sidewalk as percentage of total City roadways.

Maintenance **–** Measures of existing sidewalk/crosswalk deficiency or maintenance needs.

Counts **–** Measures of pedestrian traffic at specific locations throughout City including schools. Also, measures of pedestrian mode-share as percentage of all commuters.

Education, Encouragement and Enforcement Programs **–** Measures of the number of people who have participated in part of a pedestrian program since the Plan's adoption.

Facility Development Methods

This section describes different construction methods for the proposed pedestrian facilities outlined in Chapter 3. 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 access during roadway construction and re-construction projects than to initiate the improvements later as "retrofit" projects.

To take advantage of upcoming opportunities and to incorporate pedestrian elements into routine transportation and utility projects, the City should keep track of NCDOT's projects and any other local transportation improvements. Knowledge of procedures for project development at the state and federal level is essential for success in having influence early on.

NCDOT Transportation Improvement Program

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 Burlington, guided by the pedestrian projects within this plan, should present pedestrian projects along State roads to the MPO and State. Local requests for small pedestrian projects, such as crosswalks and smaller sidewalksegments of sidewalk, can be directed to the MPO or the local NCDOT Division 7 office. Further information, including the criteria evaluated can be found at: http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html.

Local Roadway Construction or 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 Burlington should take advantage of any upcoming construction projects, including roadway projects outlined in local comprehensive and transportation plans. For example, resurfacing projects offer an opportunity to add advanced stop lines and marked crosswalks at intersections. 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 yet exist.

Residential and Commercial Development

The construction of sidewalks and safe crosswalks should be considered during development (as described in Chapter 4). Construction 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

For pedestrian projects, it may be necessary to add new facilities before a roadway is scheduled to be reconstructed. In some places, it may be relatively easy to add sidewalk segments to fill gaps, but other segments may require working with homeowners, removing trees, relocating landscaping or

fences, re-grading 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. All new or replacement bridges should accommodate pedestrians with wide sidewalks on both sides of the bridge. Even though bridge construction and replacement does not occur regularly, it is important to consider these policies for long-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

As more pedestrian facilities are constructed, the City should consider developing and adopting a signage style policy and procedure, to be applied throughout the entire community, to make it easier for people to find destinations. Mile markers or signs for the City's trails are one example of these wayfinding signs, and they can be installed along routes as a part of a comprehensive wayfinding improvement project. For a step-by-step guide to help non-professionals participate in the process of developing and designing a signage system, as well as information on the range of signage types, visit the Project for Public Places website: www.pps.org/info/amenities_bb/signage_ guide.

Existing City and Other Utility Easements

The City may have several existing easements offering an opportunity for greenway facilities. Sewer easements are very commonly used for this purpose; offering cleared and graded corridors that easily accommodate trails. This approach avoids the difficulties associated with acquiring land, and it utilizes the City's existing resources. The City should work to allow public access and bicycle/pedestrian movement along City-owned and other public easements.

Maintenance

All facilities, including sidewalks and crosswalks require regular maintenance to reduce the damage caused over time by the effects of weather, use, and surrounding human and natural infrastructure (such as tree roots). A connected sidewalk system

is useless if maintenance is neglected and sidewalks degrade or marked crosswalks fade. Walkway maintenance includes: fixing potholes, sidewalk decay, damaged benches, and re-striping crosswalks.

In order to maintain passable sidewalk conditions, it is important to have a system in place to identify maintenance needs on existing sidewalks. Options include:

- Devoting a branch of the Public Works department to sidewalk inspection and repair.
- Developing a public reporting system where pedestrians can report maintenance issues.
- Establishing maintenance of existing sidewalks and crosswalks as part of the overall pedestrian facility component of the capital improvement program.

Typical pedestrian facility maintenance problems include:

- Step separation (vertical displacement at any point in the walkway that could cause pedestrians to trip or prevent wheelchair or stroller wheels from rolling smoothly)
- Badly cracked concrete/asphalt
- Settled areas that trap water (depressions in sidewalk or curb ramp that hold water)
- Tree root damage
- Vegetation overgrowth
- Obstacles in sidewalk
- Pedestrian countdown signal malfunction
- Faded, invisible marked crosswalk
- Damaged ancillary facilities such as benches, garbage cans, and pedestrian-scale lighting

It is recommended that the City of Burlington take a three-step approach to pedestrian facility maintenance. First, the City should provide a hotline and/or maintenance request form to accept citizen complaints for improvement and repair. Citizen complaints should be given first consideration for improvement or repair if the reporting involves a safety or access issue. Secondly, the City should devote some of its Public Works staff to conducting routine sidewalk and crosswalk inspection. Public Works staff will need to work closely with NCDOT staff to ensure sidewalk and crosswalk maintenance on all roads in Burlington as part of regular practice. Third, the City should make it the responsibility of individual property owners to maintain clear sidewalks, free of debris and vegetation.

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Key Action Steps Table

Task	Lead Agency	Support	Details	Phase
Presentations and Adoptions				
Present Plan to City Council	Project Consultants	MPO	Presentation to City Council in Fall 2011	I
Adopt this plan	City Council	MPO, Planning & Community Development	Through adoption, the Plan becomes an official planning document of the City. Adoption shows that the City of Burlington has undergone a successful, supported planning process.	I
Involve media to spread word to public and elected officials.	Public Information	MPO	The Public Information Department, with support from the MPO, should utilize the media to announce the adoption of the Pedestrian Plan. Media would include all local newspapers, websites, and local television. When significant trails and facilities are constructed, the media should be notified in order to spread the word to the public. This will help build upon successes.	I
Present this Plan to other local and regional bodies and agencies.	MPO, Walkabililty Workgroup	Planning & Community Development	This Plan should be presented to other local and regional bodies and agencies. Possible groups to receive a presentation might include: Alamance County, regional transportation planners, Healthy Alamance, health clubs and fitness facilities, schools and youth organizations, environmental clubs, major employers, and large neighborhood groups.	I
Staffing				
Form Walkability Workgroup	City Council, MPO	Walkabililty Workgroup	Confirm goals of the Walkabililty Workgroup to include assistance in the implementation of this Pedestrian Plan.	II
Designate department staff representatives and local stakeholders/ citizens to participate in the Walkabililty Workgroup.	MPO	Planning & Community Development, Public Works, Engineering, Recreation and Parks, Recreation and Parks, NCDOT, Public Information, etc.	Each City department should designate a staff member to participate in Walkabililty Workgroup. These staff will provide updates on pedestrian-related topics and keep informed on implementation.	II
Explore possibility of a regional multi-modal coordinator	MPO	Walkabililty Workgroup, Alamance County, Planning & Community Development	Currently, the Transportation Planner handles all MPO responsibilities, including bicycle and pedestrian issues. A fulltime position should be considered to handle all multi-modal concerns. The “keeping” of this Plan would be the Coordinator’s primary responsibility, including working closely with NCDOT, and surrounding jurisdictions to ensure its implementation, review, and regular update. The Coordinator would also serve as “staff” to the Walkabililty Workgroup and report Walkabililty Workgroup progress as appropriate to the Technical and Policy Committees of the MPO.	III

Phase I: 2012-2013; Phase II: 2014-2015; Phase III: 2016-2020

Local and Regional Coordination				
Begin Regular Meeting With Key Project Partners	MPO, Walkabililty Workgroup	Planning & Community Development, Engineering, Recreation and Parks, Public Works, NCDOT, and local & regional stakeholders	Key project partners (see org. chart on page 6-2) should meet on occasion, with one meeting per year reserved to evaluate the implementation of this Plan. Meetings should also occasionally include on-site tours of locations where facilities are recommended.	I
Ensure planning efforts are integrated regionally	MPO, Walkabililty Workgroup	Alamance County, surrounding municipalities, NCDOT	Combining resources and efforts with surrounding municipalities, regional entities, and stakeholders is mutually beneficial, especially with trail development. Communicate and coordinate with the regional partners on regional trails and pedestrian facilities; partner for joint-funding opportunities. After adoption by the City, this document should also be recognized in regional transportation plans.	I
Become familiar with the pedestrian facility recommendations for NCDOT roadways in this Plan (Chapter 3); take initiative in incorporating this plan's recommendations into the Division's schedule of improvements.	NCDOT Division 7	MPO, Engineering, Walkabililty Workgroup, Public Works, NCDOT Bike/Ped Division	Construct and maintain pedestrian facilities using the highest standards allowed by the State (including the possibility of using innovative treatments on a trial-basis). Seek guidance and direction from the NCDOT Division of Pedestrian and Pedestrian Transportation on issues related to this Plan and its implementation.	I
Notify the MPO and Engineering of all upcoming roadway reconstruction or resurfacing/restriping projects, no later than the design phase.	NCDOT Division 7, MPO	Engineering, NCDOT Bike/Ped Division, Public Works	Provide sufficient time for comments; Incorporate pedestrian recommendations from this Plan. If a compromise to the original recommendation is needed, then contact NCDOT Division of Pedestrian and Pedestrian Transportation for guidance on appropriate alternatives.	I
Infrastructure Improvements				
Seek Multiple Funding Sources and Facility Development Options. Identify funding for initial projects.	MPO	Engineering, Recreation and Parks, Planning and Community Development, Walkabililty Workgroup, local & regional stakeholders	Chapter 3 contains project cost estimates for initialprojects and Appendix B contains potential funding opportunities. Effort should be made to incorporate pedestrian projects into TIP and/or City capital improvement program.	I
Complete top recommended projects	MPO, Engineering, and NCDOT Division 7	NCDOT Bike/Ped Division	Chapter 3 provides a list of high-ranking projects. Immediate attention to the higher ranking projects will instantly have a large impact on pedestrian conditions in Burlington.	I

Phase I: 2012-2013; Phase II: 2014-2015; Phase III: 2016-2020

Design Orientation	Engineering, Public Works, MPO, and NC-DOT Division 7	NCDOT Bike/Ped Division	Become familiar with the standards set forth in Appendix A of this Plan, as well as state and national standards for pedestrian facility design.	I
Develop Pedestrian Facility Construc-tion Documents	Public Works, Engineering	MPO, Planning and Community Develop-ment, NCDOT	City engineers could prepare these in-house to save resources using the design guidelines of this plan and the project cut-sheets as starting points. Specifically, the resources listed in Appendix A will be very useful in drafting such documents.	I
Maintain current City funding for sidewalks; Develop a long term funding strategy	MPO, Walkabililty Workgroup	City Council, Plan-ning and Community Development, Engi-neering	To allow continued development of the overall system, capital and Powell Bill funds for pedestrian facility construction should be set aside every year, even if only for a small amount (small amounts of local funding can be matched to outside funding sources). Funding for an ongoing mainte-nance program should also be included in the City's operating budget.	I
Maintain pedestrian facilities	Public Works, NCDOT Division 7	Walkabililty Work-group + General Public (for reporting maintenance needs)	Public Works and NCDOT should make improvements to faded crosswalks and address crosswalks that are missing (see Appendix E)	I-III
Be open to creative solutions.	MPO, Public Works, Engineer-ing	Walkabililty Work-group, Planning and Community Develop-ment, Recreation and Parks	In many cases, the most ideal pedestrian scenario (such as a complete street of sidewalks) will not be achievable because of ROW issues, homeowners issues, etc. Consider alternative, creative means such as traffic calming techniques (speed humps, chicanes, bulb-outs, and speed limit reductions).	I-III
Consider speed limit reductions at locations through-out Burlington.	MPO, Engineer-ing	NCDOT	Speed was a common concern of the public during this planning process. Speed limit reduction should be considered, especially in areas of heavy pedestrian use. The authority to lower speeds is set out in NC General Statute 20-141(f) - Local municipalities may request speed limit reductions on NCDOT roads.	II
Re-evaluate to determine and complete "Phase 2" projects	MPO, Public Works, Engineer-ing	Walkabililty Work-group, Planning and Community Develop-ment, Recreation and Parks	In 2012 and 2013, reevaluate priorities based on what has been completed thus far by creating a new agenda of "Phase 2" projects. Consider including highly-scored projects that were not completed and consider updating certain aspects of the plan's design standards, programs, and policies based on innovations and new ideas since 2011.	II
Re-evaluate to determine and complete "Phase 3" projects	MPO, Public Works, Engineer-ing	Walkabililty Work-group, Planning and Community Develop-ment, Recreation and Parks	In 2015, reassess projects and reevaluate priorities and phases. Consider updating the entire plan.	III

Phase I: 2012-2013; Phase II: 2014-2015; Phase III: 2016-2020

Policies				
Improve Pedestrian Policies	City Council, Board of Adjustment	Planning and Community Development	Suggested policy revisions to the City of Burlington Code of Ordinances and general strategies are outlined in Chapter 4. The changes suggested clarify some basic policy positions regarding future development and the provision of pedestrian facilities. Some changes are also suggested for terminology that is more inclusive and 'Complete Streets' oriented.	I
Incorporate this Pedestrian Master Plan into regional planning documents such as the LRTP and local comprehensive plan.	MPO, Planning and Community Development	NCDOT	The Burlington Pedestrian Plan should become a component of the LRTP and local comprehensive plans. This step will make clear the importance of these documents working together in future development and transportation decisions.	I
Policy Orientation	All Stakeholders	NCDOT Bike/Ped Division	Become familiar with State and Federal bicycle and pedestrian policies, as outlined in Appendix D.	I
Consider Complete Streets policy	City Council, Planning and Community Development	MPO, Engineering, Public Works, Walkabililty Workgroup	The City of Burlington should consider Complete Streets policy guidance language to ensure commitment to developing roadways that accommodate all users.	II
Programs				
Launch Programs as New Projects are Built	Walkabililty Workgroup	MPO, Recreation and Parks	Assist in the coordination of programs, such as those described in Chapter 5. As described in Chapter 5, begin pilot education/encouragement/enforcement campaign immediately following the completion of a major pedestrian project.	II
Offer Training for Enforcement	Burlington Police Department	Walkabililty Workgroup, National Highway Traffic Safety Administration (NHTSA) or Association of Pedestrian and Bicycle Professionals (APBP)	Training for Burlington's officers could be done through free online resources, such as APBP webinars. If the City is able to find and secure grants for education, the City could also seek instructor-led courses offered by the NHTSA or groups such as the League of American Bicyclists (LAB).	II
Provide police officers with educational material to hand out with warnings	Police Department	NCDOT Bike/Ped Division	Provide officers with an informational handout to be used during bicycle and pedestrian-related citations and warnings.	II

Phase I: 2012-2013; Phase II: 2014-2015; Phase III: 2016-2020

Attend a pedestrian planning and design training session	Engineering, Public Works, MPO, Walkabililty Workgroup	Planning and Community Development	Sponsor at least one planner, one engineer, and one Walkabililty Workgroup member to attend a bicycle and pedestrian planning and design training session. NCDOT, in partnership with the Institute for Transportation Research and Education (ITRE), offers pedestrian planning and design workshops for practicing professionals. Free or inexpensive webinars are also available online through such groups as the Association of Pedestrian and Bicycle Professionals (APBP).	I-III
Pursue Safe Routes to School (SRTS) projects and programs. Apply for SRTS Grants and Infrastructure Funding	MPO, Walkabililty Workgroup	Engineering, Alamance-Burlington Schools, NCDOT Division 7	Establish 'bike-to-school' groups, 'walking school buses' or other similar activities for children through the Safe Routes to School Program. Re-apply for pedestrian infrastructure funding for projects within 1.5 miles of schools through NCDOT Division 7.	II
Become Designated as a Walk Friendly Community	Walkabililty Workgroup	MPO, Recreation and Parks, Public Works, Engineering	Burlington should make progress in accomplishing the goals of this Plan, and then apply for Walk Friendly Community status.	III
Create a user-friendly pedestrian walking map	Recreation and Parks, Walkabililty Workgroup	MPO	Produce and distribute a user-friendly online and hardcopy hike and bike map, and consider the advantages of adding bicycling routes. Provide basic safety information, commuting information, trail etiquette, transit information, and a list of local resources on the back side of the map.	III
Celebrate and promote awareness days and events such as Walk to Work and Walk to School Days.	Recreation and Parks, Walkabililty Workgroup	MPO	Awareness days provide an opportunity to encourage new walkers in a group setting with entertainment, prizes, and media attention.	III
Begin enforcement campaign.	Police Department	General Public (for reporting enforcement issues/ violation incidents)	Target and enforce all illegal motorist, pedestrian, and bicyclist behavior that may jeopardize public safety and the success of the Pedestrian Network.	II-III
Further Studies				
Conduct a study of all roadway railroad crossings and examine for pedestrian safety and ADA accessibility.	MPO, Public Works, Engineering, Railroad companies	NCDOT, Walkabililty Workgroup	As discussed in Chapter 2, many pedestrian crossings of railroad tracks throughout the study area are not safe or accessible. An examination of these crossings and priority improvements should be developed as part of this study.	II
Conduct a study on traffic calming needs and opportunities on local roads.	MPO, Public Works, Engineering	Walkabililty Workgroup, NCDOT	Traffic calming is critical to create safe walking environments. In many cases, where sidewalk isn't feasible, treatments such as speed humps can still improve safety by slowing traffic. Roadways should be identified and prioritized for improvements.	II-III

Phase I: 2012-2013; Phase II: 2014-2015; Phase III: 2016-2020

Conduct a study on existing driveway access issues such as high frequency and large sizes.	MPO, Public Works, Engineering	Walkabililty Workgroup, Local businesses and landowners	As discussed in Chapter 2, some roadways feature an excess of driveway entrances. An examination of driveways should be conducted with the end-goal of retrofitting improvements to create safer separated spaces for pedestrians.	II-III
Conduct a study on wide turning radii in City.	MPO, Public Works, Engineering	NCDOT	The City of Burlington commonly features roads with wide right-hand turn radii, including not only major roadway intersections, but also on residential and lesser-traveled roadways. Identifying these locations and addressing these intersections through curb extensions and curb radii reduction will make a big safety impact for pedestrians.	II-III
If public transportation (bus service) is provided in the City, ensure bus stops are pedestrian-friendly.	MPO, Planning and Community Development	Public Works, Engineering, Walkabililty Workgroup	Provide sidewalk connections and safe crossings in the vicinity of any future bus stops. Additionally, comfortable facilities (e.g., shelters, benches, etc.) for people waiting for the bus should also be recommended.	III
Evaluation and Databases				
Update bicycle and pedestrian database and establish central holding place for data.	MPO, City GIS staff (Planning & Community Development)	Engineering	Continuous updating of bicycle and pedestrian facility GIS database as new facilities come online and new crash data is published. The City GIS staff should lead this effort.	I-III
Publish Annual Performance Report	MPO, Walkabililty Workgroup	Recreation and Parks, Engineering, Public Works, Planning and Community Development	Publish an annual report to provide an update on progress made during that year to advance pedestrian modes. The MPO should lead this effort, but the all City departments must coordinate. This report will provide an objective measurement of progress.	I-III
Develop pedestrian count program to occur at least annually.	MPO	Walkabililty Workgroup, Engineering, Recreation and Parks	A key method to evaluate pedestrian use and needs is to conduct professional counts. This will serve as a baseline each year and would be a key part of an annual performance report.	II-III
Continually support and evaluate implementation of this plan.	MPO, Walkabililty Workgroup, Planning and Community Development	Recreation and Parks, Engineering, Public Works	The different city departments and boards and Walkabililty Workgroup representatives should meet quarterly to assess implementation and evaluate progress.	I-III
Develop a pedestrian facility maintenance strategy.	Public Works	MPO	Develop a pedestrian facility maintenance system that consists of 1) web-based/call-in citizen maintenance request option, 2) Public Works inspection and repair, and 3) maintenance as part of overall capital improvement program (See Maintenance section in this chapter).	II-III

Phase I: 2012-2013; Phase II: 2014-2015; Phase III: 2016-2020

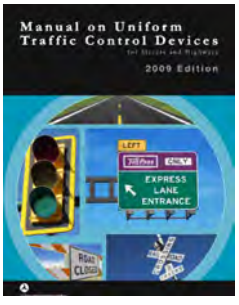
Appendix A: Design Guidelines

Chapter Outline:

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. Another major source of information in this chapter is the Pedestrian and Bicycle Information Center, found online at http://www.walkinginfo.org. 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. 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. 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.



The Pedestrian and Bicycle Information Center, AASHTO, the MUTCD, nationally recognized trail standards, and other sources have all informed the content of this chapter.

Sidewalks and Walkways

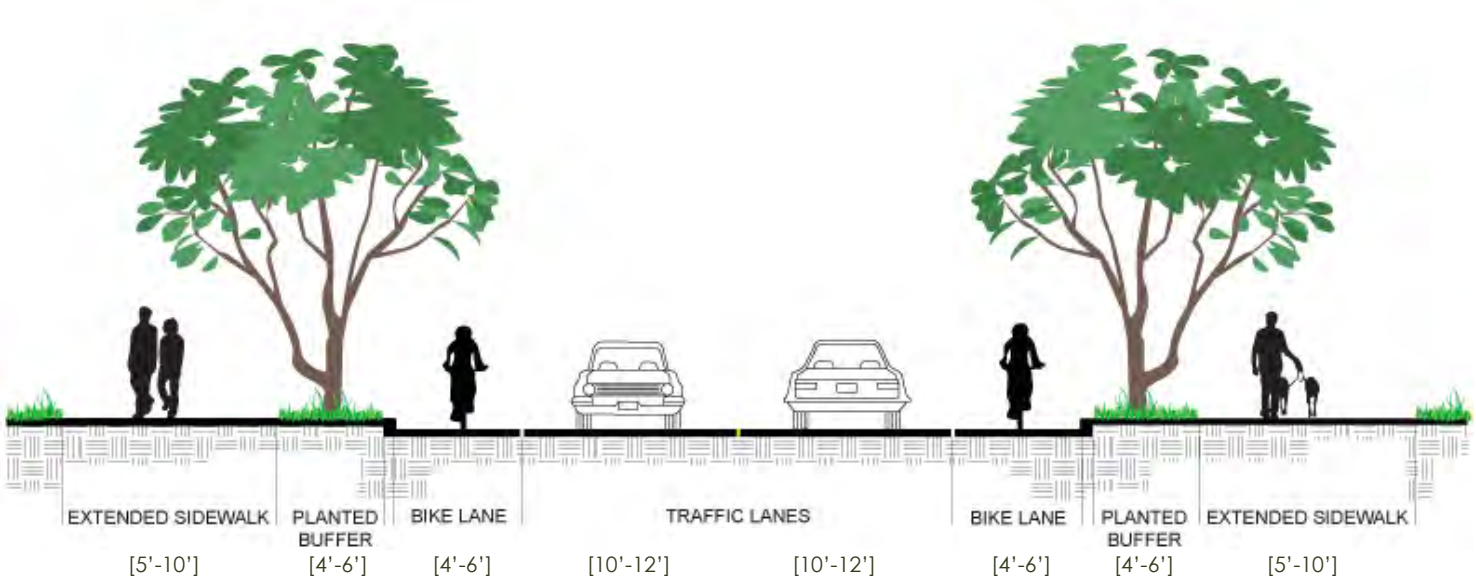
Sidewalks and walkways are extremely important public right-of-way components often times adjacent to, but separate from automobile traffic. In many ways, they act as the seam between private residences, stores, businesses, and the street.

There are a number of options for different settings, for both downtown and more rural and/or suburban areas. From a wide 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.

A well designed residential sidewalk will have a width of at least five feet. (Image from http://www.walkinginfo.org)

Sidewalk with a vegetated buffer zone. Notice the sense of enclosure created by the large canopy street trees. (Image from http://www.walkinginfo.org)

Below: Typical street with bike lanes



** If a greater slope is anticipated because of unusual topographic or existing conditions, the designer should maintain the preferred slope of 1:50 within the sidewalk area, if possible. This can be accomplished either by raising the curb so that the cross-slope of the entire sidewalk can be 1:50, or by placing the more steeply angled slope within the area between the sidewalk and the road.*

Sidewalk Guideline Sources:

American Association of State Highway and Transportation Officials. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Metro Regional Government. (2005). Portland, Oregon: Transportation Information Center. http://www.oregonmetro.gov

Sidewalks and Walkway Guidelines:

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

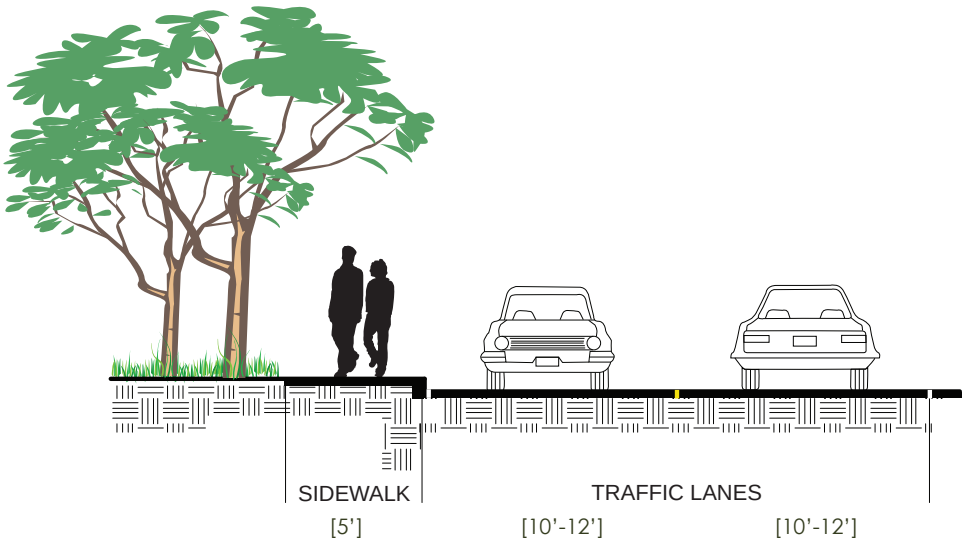
- Concrete sidewalks should be built to minimum depth of four inches; six inches at driveways.

- Sidewalks should be a minimum of five feet wide; sidewalks serving mixed use and commercial areas shall be a minimum of 8 ft in width (12–15 feet is required in front of retail storefronts). The maximum cross-slope should be no more than 2 percent (1:50).*

- 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.

- If a sidewalk with buffer on both sides is not feasible due to topography and right-of-way constraints, then a sidewalk on one side is better than no facility. Each site should be examined in detail to determine placement options.



Right: Where space and topography are limiting and a planted buffer is not possible, this cross section may be applied.

Multi-Use Trail Guidelines:

- The minimum width for two-directional multi-use trails is 10', however 12'-14' widths are preferred where heavy traffic is expected. Vertical clearance under bridges and other structures should be 8' to 10'.

- Centerline stripes should be considered for paths that generate substantial amounts of pedestrian traffic, or along curved portions of the trail, where sight-lines are limited. 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 10' 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.

- 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.

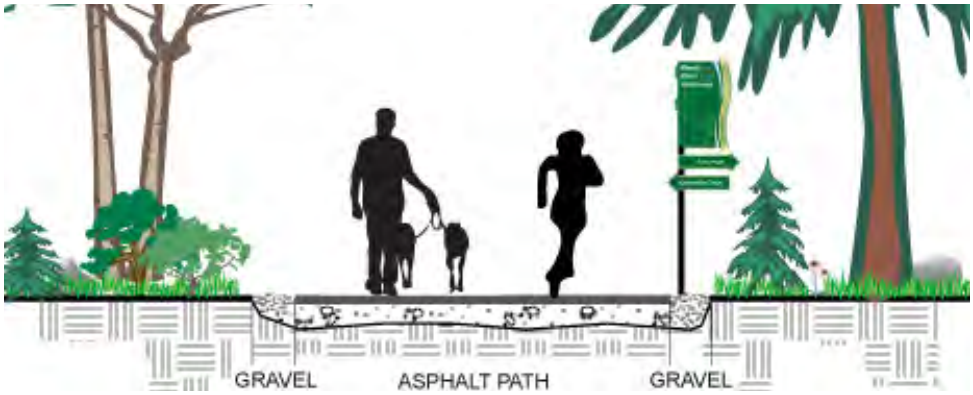
- Sidepaths should be constructed along corridors with relatively few intersections and driveways, reducing conflict points.

- Trail and Roadway Intersections: See following images for the layout of intersections between trail corridors and roadways. Signage rules for such intersections are available in the Manual for Urban Traffic Control Devices (MUTCD).

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

- Concrete Trail: 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 Trail: 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.

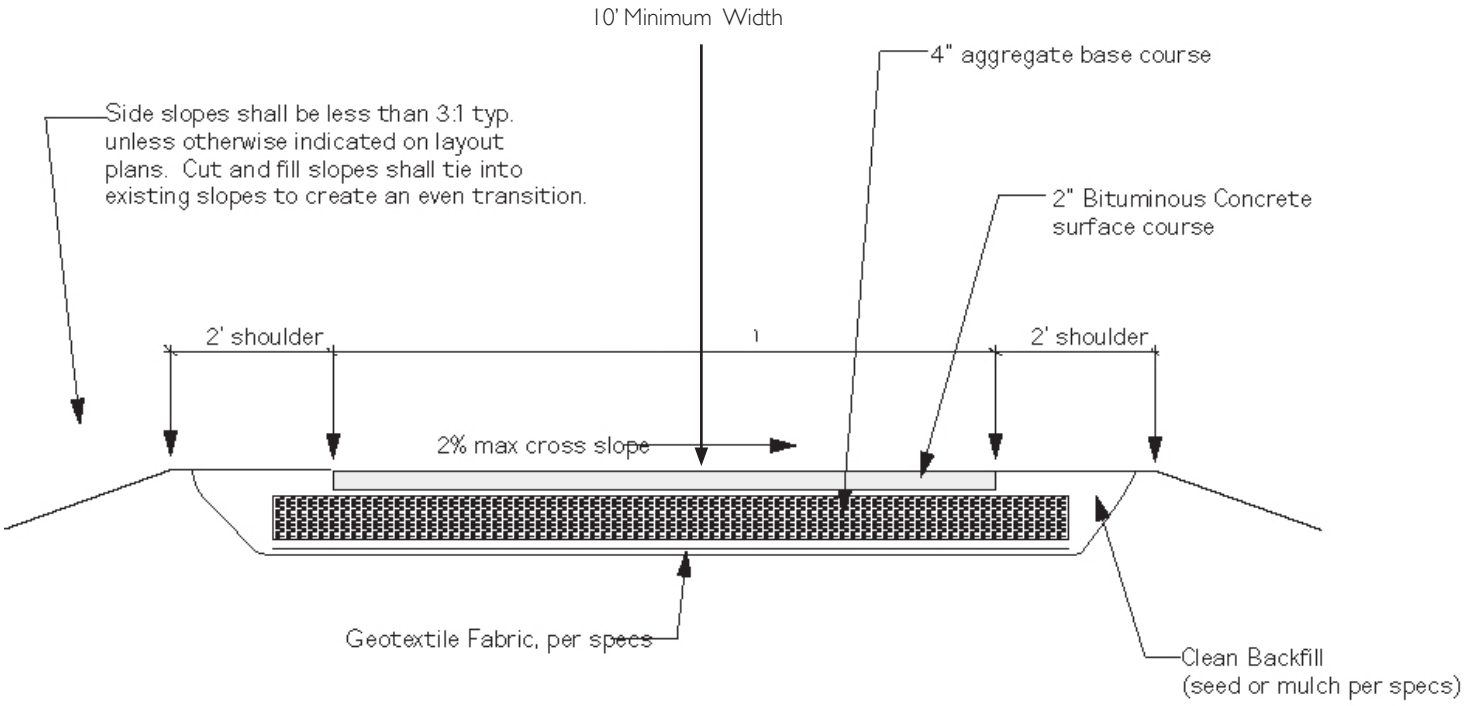


Top, Left: Vegetation clearing guidelines

Top, Right: Typical asphalt path section

Middle, Right: Typical natural surface trail section

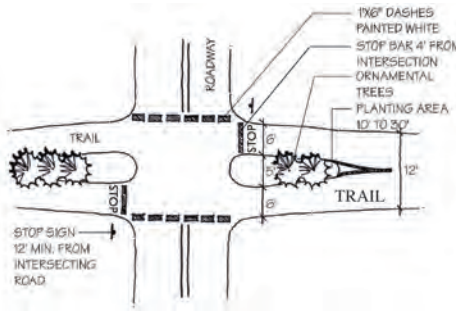
Below: Asphalt pavement construction detail



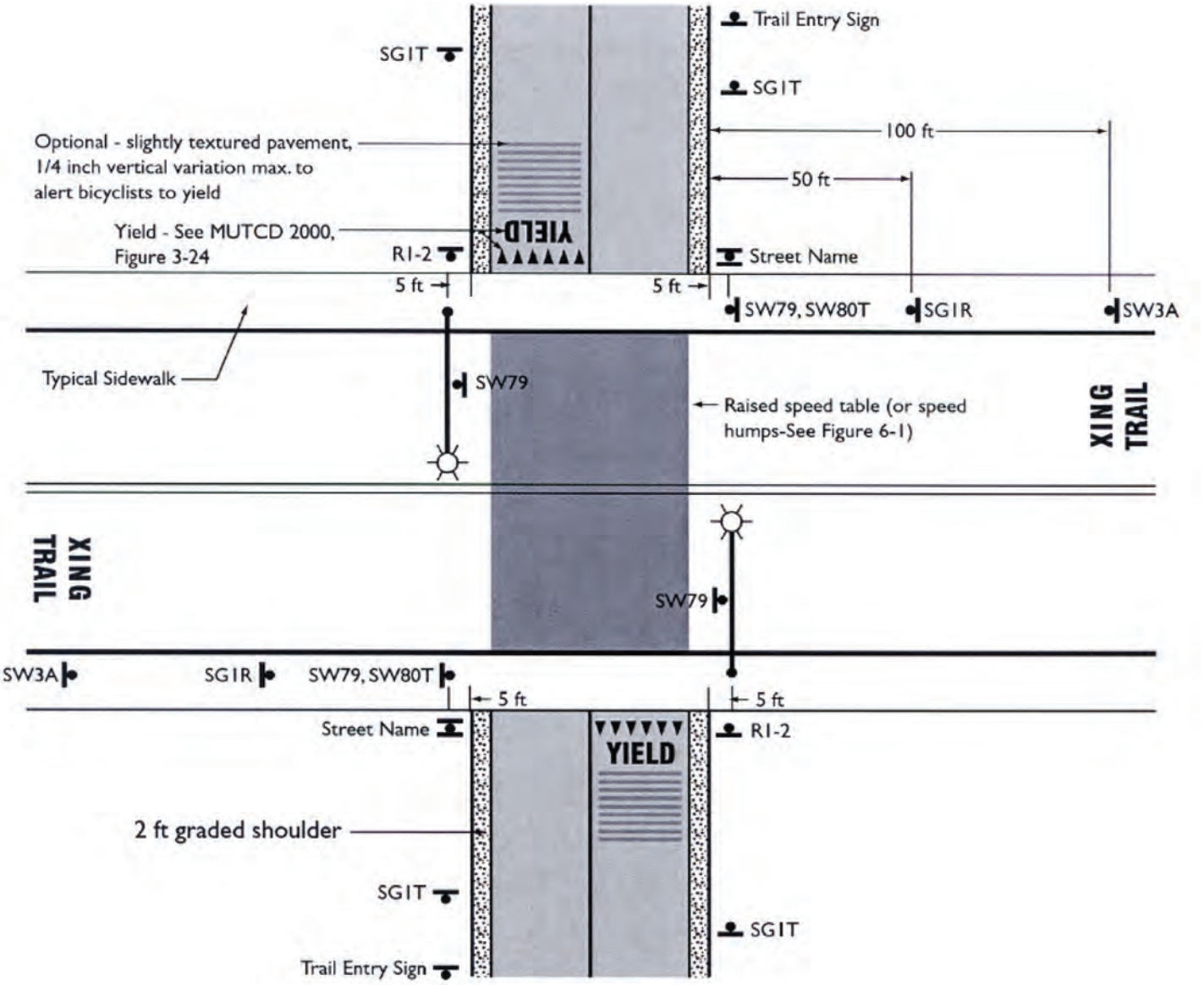
Greenway Trail

A greenway is defined as a linear corridor of land that can be either natural, such as rivers and streams, or man-made, such as abandoned railroad beds and utility corridors.* Many 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 in wheelchairs. 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.

**Note: A greenway trail located along a roadway corridor is sometimes referred to as a 'sidepath'.*



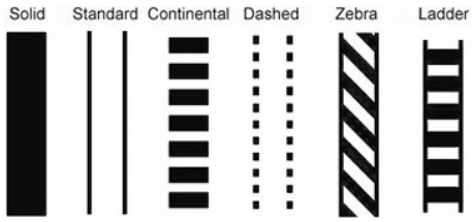
Above and below: Typical greenway trail approaches to a roadway



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). Every attempt should be made to install crossings at the specific point at which pedestrians are most likely to cross: a well-designed traffic calming location is not effective if pedestrians are instead using a more seemingly convenient and potentially dangerous location to cross the street. 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.

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 and pose increased maintenance challanges. Potential materials can be vetted by requesting case studies from suppliers regarding where the materials have been successfully applied. Also, as some materials degrade from use or if they are improperly installed, they may become a hazard for the mobility or vision impaired.



A variety of patterns are possible in designating a crosswalk; an example of a 'continental' design is shown above.

Crosswalk Guideline Sources: American Association of State Highway and Transportation Officials. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities. Metro Regional Government. (2005). Portland, Oregon: Transportation Information Center. www.oregonmetro.gov

Crosswalk Guidelines:

- Should not be installed in an uncontrolled environment [at intersections without traffic signals] where speeds exceed 40 mph unless accompanied by an enhancement such as a refuge island, beacons, curb extensions, etc. (AASHTO, 2004)

- Crosswalks alone may not be enough and should be used in conjunction with other measures to improve pedestrian crossing safety, particularly on roads with an average daily traffic above 10,000.

- Width of marked crosswalk should be at least six feet; 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 for aesthetic and visibility purposes. Lines should be one to two feet wide and spaced one to five feet apart.

- NCDOT typically requires pedestrian facilities (sidewalks) on both sides of a roadway when placing crosswalks.

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 (Pedestrian and Bicycle Information Center: http://www.walkinginfo.org/engineering/roadway-ramps.cfm). In addition, these federal regulations require that all new constructed or altered roadways include curb ramps.

Providing two separated curb ramps at each corner creates a safer crossing environment because the pedestrian does not have to travel out of direction into the motor vehicle lane to make a crossing. Single large curb ramps provide a less clear signal for both pedestrians and motorists about what crossing is about to be made.

Curb Ramp Guidelines Source: Metro Regional Government. (2005). Portland, Oregon: T ransportation Information Center. http://www.oregonmetro.gov

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.

Curb Ramp Guidelines:

- 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%); it is recommended that much less steep slopes be used whenever possible.

Left: The curb ramps shown have two separate ramps at the intersection (visible across the street) (Image from http://www.walkinginfo.org).

Raised or Lowered Medians

Medians are barriers in the center portion of a street or roadway. 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.

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 space occupied may be taking up room that could be used for bike lanes or other treatments. 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.

Median Guidelines:

- 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.

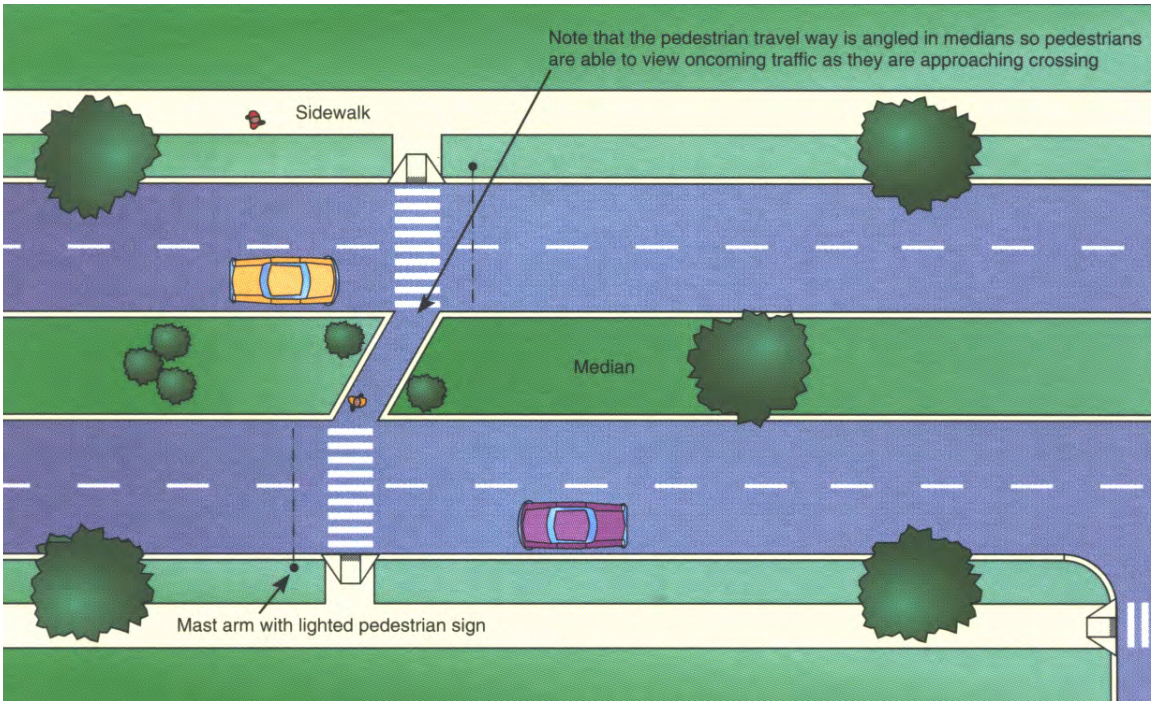
- Median crossings should provide ramps or cut-throughs for ease of accessibility for all pedestrians.

- 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 push-buttons should be located in the median of all signalized mid-block crossings, where the roadway width is in excess of 60 feet.

Median Guideline Sources:
American Association of State Highway and Transportation Officials. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.
Metro Regional Government. (2005). Portland, Oregon: Transportation Information Center. http://www.oregonmetro.gov



Left: A median used in conjunction with mid-block crossing, serving as a refuge for pedestrians. (Image from AASHTO).

Mid-Block Crossings

A Mid-Block crosswalk is any crosswalk that is not located within an intersection. Midblock crossings are often installed in areas with heavy pedestrian traffic to provide more frequent and convenient crossing opportunities. They may also be added near major pedestrian destinations, such as schools or busy commercial areas, where people might otherwise cross at unmarked locations.

Mid-Block Crossing Guidelines:

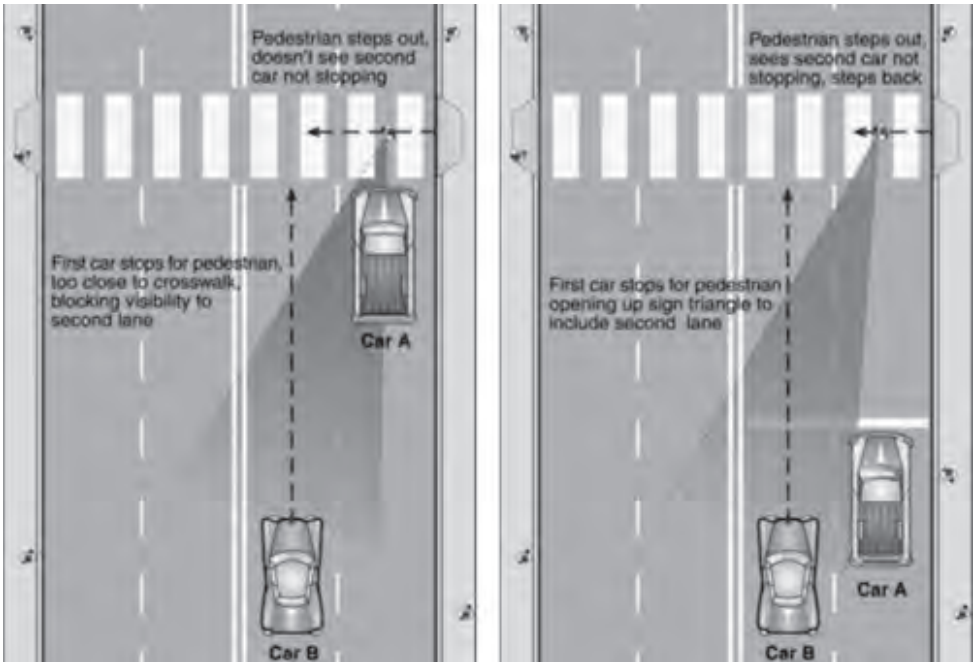
- Crosswalks at mid-block should not be installed within 300 ft. of a signalized crossing point.

- Utilize advance warning signs when mid-block crossings are present.

- Raised, mid-block crosswalks are typically used on two-lane streets with less than 35 MPH speed limit.

- It will be the standard practice of NCDOT to install Mid-Block Crosswalks based on an engineering study. All Mid-Block Crosswalks shall be signed and marked in compliance with the Manual on Uniform Traffic Control Devices (MUTCD), the North Carolina Supplement to the MUTCD, the current NCDOT Roadway Standard Drawings, and the standards the NCDOT Policy on Mid-Block Crossings.

- The NCDOT Policy on Mid-Block Crossings can be found at www.ncdot.gov/doh/preconstruct/traffic/teppl/topics/C-36/C-36_pr.pdf



Right: Advance stop bars enhance visibility for pedestrians. The first image shows a pedestrian crosswalk without advance stop bars. The image farthest right shows the advantages to having advance stop bars at pedestrian crossings. (Images from www.walkinginfo.org).

Advance Stop Bars

An advance stop bar is a painted line that signals for motorists to stop shy of a marked crosswalk. 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 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% (Pedestrian and Bicycle Information Center:http://www.walkinginfo.org/engineering/crossings-enhancements.cfm).

Bulb-Outs

A bulb-out, or curb extension, is a place where the sidewalk extends into the parking lane of a street. Because these curb extensions physically reduce the crossing distance of the roadway, a pedestrian's time spent in the street—is reduced. They can be placed either at mid-block crossings or at intersections.

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. Also, bulb-outs at intersections can greatly

reduce turning speed, especially if curb radii are set as tight as practical* (Pedestrian and Bicycle Information Center: www.walkinginfo.org/engineering/crossings-curb.cfm). Finally, bulb-outs also reduce travel speeds when used in mid-block crossings because of the reduced street width.

Bulb-outs should only be used where there is an existing on-street parking lane and should never encroach into travel lanes, bike lanes, or shoulders (Pedestrian and Bicycle Information Center).

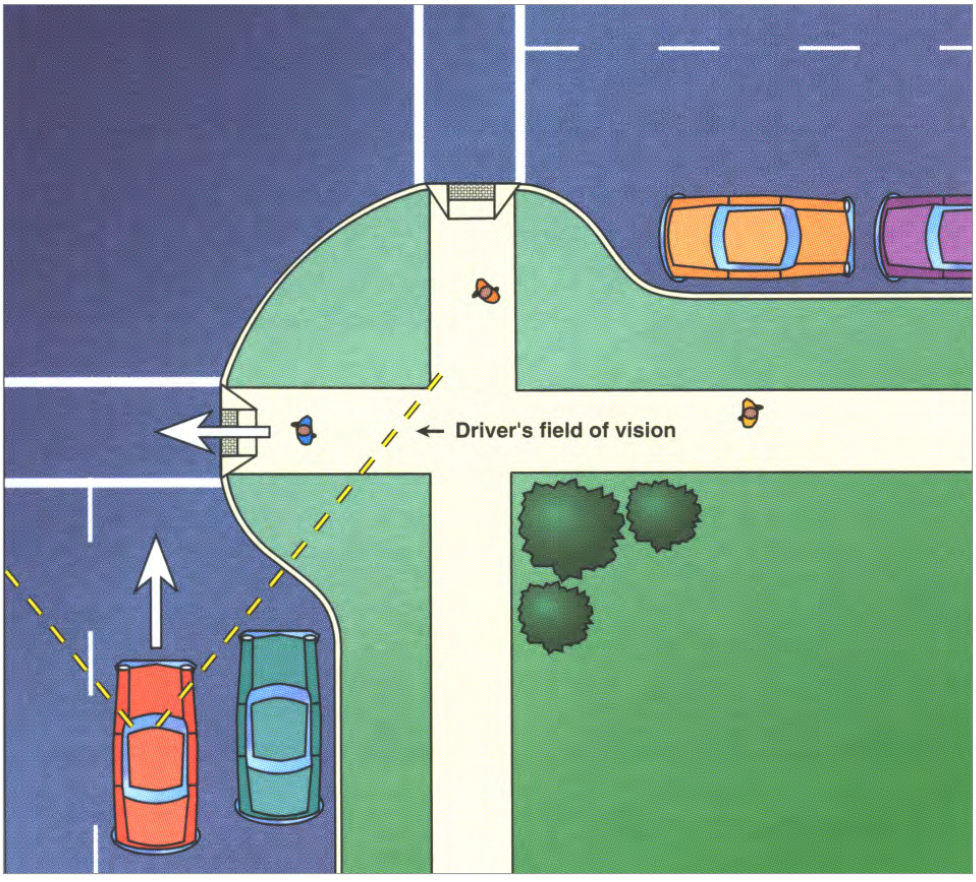
Bulb-out Crossing Guidelines:

- 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.



By reducing a pedestrian's crossing distance, less time is spent in the roadway, and pedestrian vehicle conflicts are reduced (Image from AASHTO).

Pedestrian Overpass/Underpass

Example trail overpass.

Pedestrian overpasses and underpasses efficiently allow for pedestrian movement across busy thoroughfares. 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 (Pedestrian and Bicycle Information Center: http://www.walkinginfo.org/engineering/crossings-overpasses.cfm).

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. Each should only be considered with rail lines, high volume traffic areas such as freeways, and other high volume arterials.

Example trail underpass.

Overpass/Underpass Guidelines:

- 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 multi-purpose paths.

- 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. 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.

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.

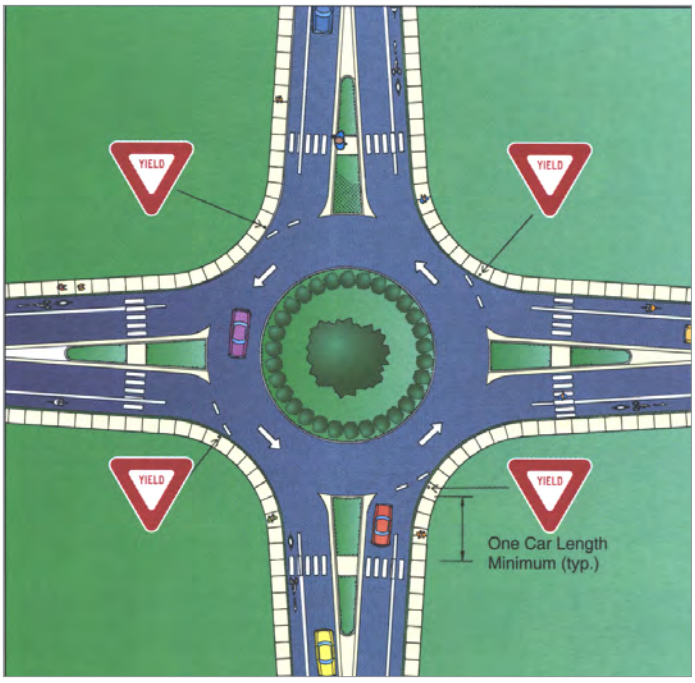
Problems may arise with the vision-impaired because there are not proper audible cues associated with when to cross. Studies are underway to develop and test solutions. Auditory accessible pedestrian signals placed on sidewalks and splitter islands are being studied.

Roundabout Guidelines:

– 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.fhrc.gov. The report provides information on general design principles, geometric elements, and provides detailed specifications for the various types of roundabouts.



Bottom, Left: Typical roundabout (Image from AASHTO)

Bottom, Right: A pedestrian walks through a pedestrian refuge island, as part of a roundabout.

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. 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.

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.

Right Turn on Red Restrictions

A low cost sign that restricts right-hand turns at a red light (Image from http://www.walkinginfo.org).

Introduced in the 1970s as a fuel saving technique, the Right Turn on Red (RTOR) law is thought to have had a detrimental effect on pedestrians. 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, crossing into the space where the pedestrian has the right of way for crossing.

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 next section, leading pedestrian intervals (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 on the left.

Pedestrian Signals

There are a host of traffic signal features and enhancements that can greatly improve the safety and flow of pedestrian traffic. Some include countdown signals, the size of traffic signals, positioning of traffic signals, audible cues, and timing intervals which are discussed below (Pedestrian and Bicycle Information Center: http://www.walkinginfo.org/engineering/crossings-signals.cfm).

As of 2008, new federal policy requires all new pedestrian signals to be of the countdown variety. In addition, all existing signals must be updated to countdown within 10 years (updated in MUTCD). Countdown signals have proven to be an effective measure of crash reduction (25% crash reduction in 2007 FHWA study).

Countdown signals are pedestrian signals that show how many seconds the pedestrian has remaining to cross the street. 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.

Signals 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.

Typical Pedestrian Signal Indicator (with countdown display).

The timing of these or other pedestrian signals needs to be adapted to a given situation. In general, shorter cycle lengths and longer walk intervals provide better service to pedestrians and encourage better signal compliance. For optimal pedestrian service, fixed-time signal operation usually works best. Pedestrian pushbuttons may be installed at locations where pedestrians are expected intermittently. Quick response to the pushbutton or feedback to the pedestrian (e.g.- indicator light comes on) should be programmed into the system. When used, pushbuttons should be well-signed and within reach and operable from a flat surface for pedestrians in wheelchairs and with visual disabilities. They should be conveniently placed in the area where pedestrians wait to cross. Section 4E.09 within the MUTCD provides detailed guidance for the placement of pushbuttons to ensure accessibility (Pedestrian and Bicycle Information Center: http://www.walkinginfo.org/engineering/crossings-signals.cfm).

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.

When high-volume turning situations 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 areas by using these intervals, the long wait times can encourage some to cross when there is a lull in traffic (Pedestrian and Bicycle Information Center: http://www.walkinginfo.org/engineering/crossings-signals.cfm).

Audible cues can also be used to pulse along with a countdown signal.

An LPI gives pedestrians an advance walk signal before the motorists get a green light, giving the pedestrian several seconds to start in the crosswalk where there is a concurrent signal. This makes pedestrians more visible to motorists and motorists more likely to yield to them. This advance crossing phase approach has been used successfully in several places, such as New York City, for two decades and studies have demonstrated reduced conflicts for pedestrians. The advance pedestrian phase is particularly effective where there is a two-lane turning movement. There are some situations where an exclusive pedestrian phase may be preferable to an LPI, such as where there are high-volume turning movements that conflict with the pedestrians crossing.

The use of infrared or microwave pedestrian detectors has increased in many cities worldwide. Theses devices replace the traditional push-button system. They appear to be improving pedestrian signal compliance as well as reducing the number of pedestrian and vehicle conflicts. The best use of these devices is when they are employed to extend crossing time for slower moving pedestrians.

Pedestrian Signal Guidelines:

- Pedestrian signals should be placed in locations that are clearly visible to all pedestrians.

- 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.

Landscaping

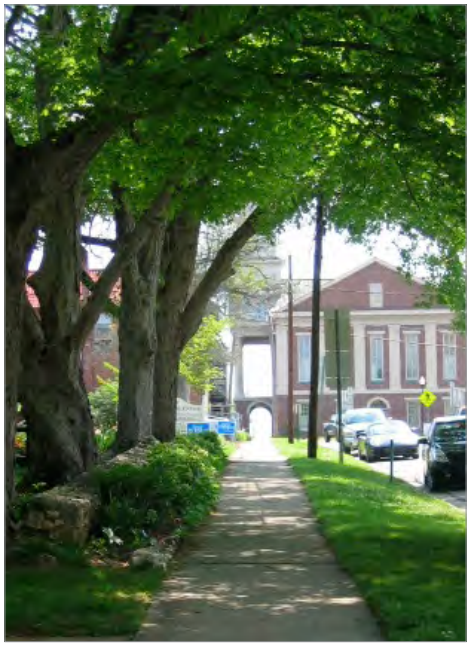
The introduction of vegetation in an urban environment can provide a welcomed intervention of nature into a place that is otherwise hardened from buildings, concrete, and asphalt. It can be used to provide a separation buffer between pedestrians and motorists, reduce the width of a roadway, calm traffic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

Landscaping used on the Sea Street in Seattle, Washington shows how stormwater treatment can be tied to aesthetically pleasing plantings. (Image from Seattle, WA, Public Utilities: Seattle.gov)



Street trees buffer and soften urban environments in a number of psychological, physical, and ecological ways; their shade is particularly helpful to pedestrians in North Carolina during summer months.

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 (AASHTO, 2004: Guide for the Planning, Design, and Operation of Pedestrian Facilities). Attention should be paid to crossings so that there is sufficient ambient light for motorists to see pedestrians. To be most effective, lighting should be consistent, adequately spaced, and distinguished.

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. 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'.

An example of pedestrian-scale lighting.

Roadway Lighting Guidelines:

- 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.

- Use full cut-off light fixtures to avoid excess light pollution.

Street Furniture and Walking Environment

The street furniture shown here is placed in such a manner so as to create a safe, pleasurable, and accessible 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.

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.

Street Furniture and Walking Environment Guidelines:

- 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

Where transit opportunities are available, 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 sidewalks. 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.

Local walking and biking maps should also be provided at bus stops, so that people are aware of the nearby destinations and how best to get there without an automobile.

This typical transit stop has all of the key features of shelter, ample seating, bicycle parking, landscaping, and trash bins (Image from http://www.walkinginfo.org).

Pedestrian Signs and Wayfinding

For a step-by-step guide to help non-professionals participate in the process of developing and designing a signage system, as well as information on the range of signage types, visit the Project for Public Places website: http://www.pps.org/info/amenities_bb/signage_guide

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.

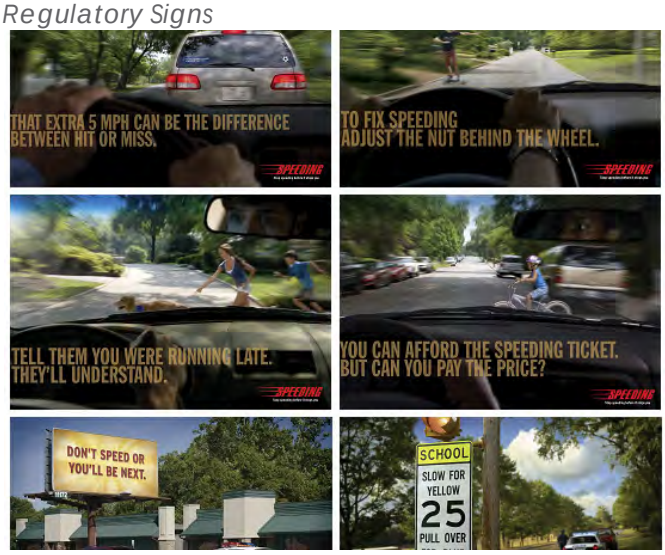
Regulatory signage is used to inform motorists or pedestrians of a legal requirement and should only be used when a legal requirement is not otherwise apparent (AASHTO, 2004: Guide for the Planning, Design, and Operation of Pedestrian Facilities).

Below: Typical traffic signs found around pedestrian friendly places.

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.

Regulatory Signs



School, Warning, and Informational Signs

Warning signage is 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.

Informational and wayfinding signage can provide 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.

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

Below: Wayfinding signs promote aesthetics as well as provide important information (image from Stefton, UK: http://www.sefton.gov.uk).

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 DOT bridge policy that within Urban Area boundaries (which are ambiguously defined as the "outer limits of potential urban growth"), 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 DOT 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 DOT 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 (typically 7.5' for one side) should be considered on new bridges in order to accommodate the placement of sidewalks. The full Bridge Policy for DOT can be download as a Microsoft Word document at this address:

www.ncdot.org/doh/preconstruct/altern/value/manuals/bpe2000.doc.

Bridge 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."

Rectangular Rapid Flash Beacon (RRFB)

Also known as "Light Emitting Diode (LED) Rapid-Flash System", "Stutter Flash" or "LED Beacons", RRFBs are user-actuated amber LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. They can be activated by pedestrians manually by a push button or passively by a pedestrian detection system. RRFBs use an irregular flash pattern that is similar to emergency flashers on police vehicles and may be installed on either two-lane or multi-lane roadways.

An official FHWA-sponsored experimental implementation and evaluation conducted in St. Petersburg, Florida found that RRFBs at pedestrian crosswalks are dramatically more effective at increasing driver yielding rates to pedestrians than traditional overhead beacons. The addition of RRFB may also increase the safety effectiveness of other treatments, such as the use of advance yield markings with YIELD (or STOP) HERE FOR PEDESTRIANS signs.

The MUTCD gave interim approval to RRFBs for optional use in limited circumstances in July 2008. The interim approval allows for usage as a warning beacon to supplement standard pedestrian crossing warning signs and markings at either a pedestrian or school crossing; where the crosswalk approach is not controlled by a yield sign, stop sign, or traffic-control signal; or at a crosswalk at a roundabout.

The MUTCD interim approval memo also contains other provisions for the implementation of the device and should be reviewed. For more details, see the see 2009 MUTCD, page 523, Section 4L.03

Activated, solar-powered, roadside RRRB at a mid-block crosswalk.

RRFB Guidelines:

- Currently, state and federal approval is required for use.

- Flashers should only flash during the times when crossings occur (e.g., such as during Burlington's school drop-off and pickup hours). This can be done with a time clock or pedestrian detection devices.

- RRFBs can also use automated passive (e.g., video or infrared) pedestrian detection, and should be unlit when not activated.

- RRFBs typically receive power by standalone solar panel units, but may also be wired to a traditional power source.

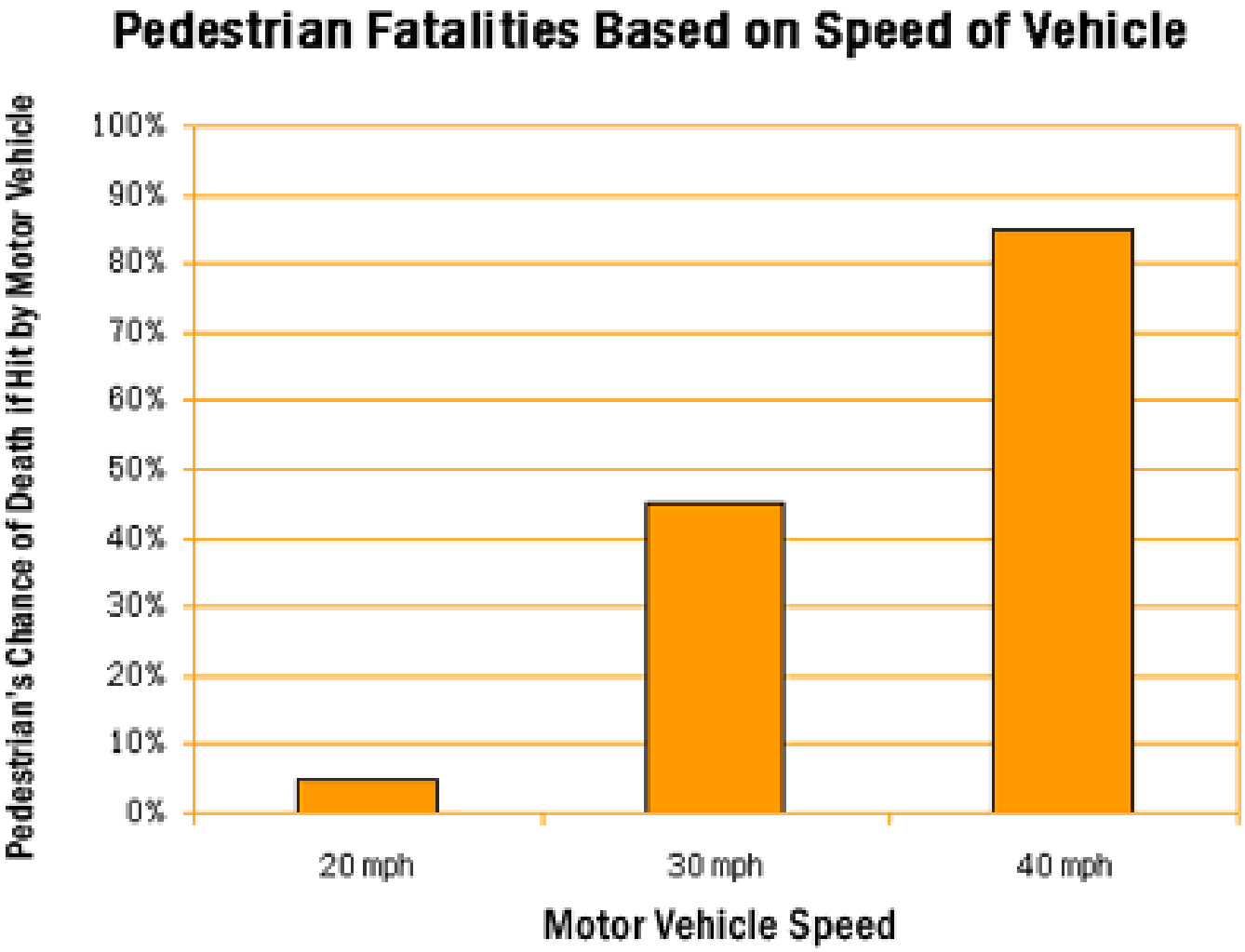
- Warning flashers can be mounted over the road or along the side of the road, and when used should be used in conjunction with advance warning signs.

Traffic Calming Treatments

Traffic calming is a procedure in which the arrangement of the street and its elements encourages slower traffic to ensure safe speeds. Typically, compliance with traffic control devices are optional but with the use of physical and visual cues that traffic calming introduces, drivers are forced to respond to the calming procedures.

Research on effective traffic calming in the U.S. suggests that traffic calming can effectively reduce the speed of vehicular traffic, decrease the number of automobile accidents, and contribute to noise reduction. Research also supports that the use of multiple traffic calming procedures will exponentially reduce the number of crashes.

Above: Example of multi-modal intersection with traffic calming elements.



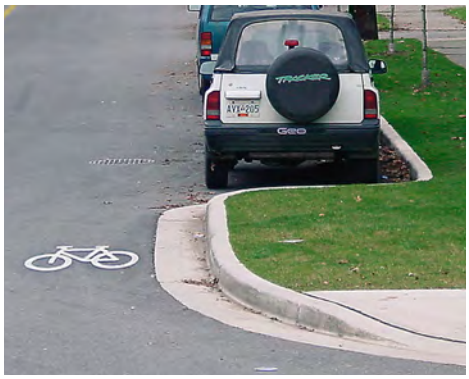
Above: Graph from Killing Speed and Saving Lives, U.K. Department of Transportation, London, 1987.

Curb Extensions (Bulb outs)

A curb extension (also known as a bulb out) is the additional sidewalk space allocated along the street as a traffic calming measure. By extending the curb, the street becomes more narrow to vehicular traffic thus slowing down traffic speeds. The curb extension also reduces the crossing distance for a pedestrian decreasing the time of a pedestrian in the street. The extension also improves the visibility of both motorist and pedestrians.

Curb extensions also prevent motorists from parking vehicles too close to crosswalks and curb ramps leaving the space open for pedestrian movement. Motor vehicles, parked too close to corners, present a threat to pedestrian safety, since they block sight lines, obscure visibility of pedestrians and other vehicles, and make turning particularly difficult for emergency vehicles and trucks.

Extensions to the curb are only recommended where parking exists. Curb extensions must not intervene with the adjacent drive lanes, bicycle lanes, or roadway shoulders. The turning needs of larger vehicles, such as school buses, need to be considered in curb extension design as well.



Above: The curb extension makes motorist reduce speeds for turning and provides street parking.

Below: The curb extension narrows the width of the street and can be used in combination with crosswalk markings.

Chokers

Chokers are a design tool used to widen sidewalks or planting beds along vehicular corridors to decrease the width of the travel lane. By narrowing the street, effectively reducing the travel lanes by half of a lane wide, the choker forces motorist to yield to each other and slow down. In order for this to function effectively, the width of the travel lane cannot be wide enough for two cars to pass. Sixteen feet is typically effective (and will permit emergency vehicles to pass unimpeded).

Chokers can be created by bringing both curbs in, or they can be done by more dramatically widening one side at a midblock location. They can also be used at intersections, creating a gateway effect when entering a street.

The choker produces a narrow passage for vehicular traffic.

This choker narrows the street from two lanes to one. Traffic is forced to slow down and, in some cases, wait for an approaching vehicle to pass before proceeding.

Crossing islands: (center islands, pedestrian islands, median slow points)

Crossing island allows pedestrians to stop before completely crossing a road.

Crossing islands are pedestrian refuge areas raised to curb height typically located in the center of street, intersections or midblock crossways. Center crossing islands protect pedestrians from vehicles and subsequently allow users to watch one direction of traffic at a time.

Where midblock or intersection crosswalks are installed at uncontrolled locations (i.e., where no traffic signals or stop signs exist), crossing islands should be considered as a supplement to the crosswalk. They are also appropriate at signalized crossings. If there is enough width, center crossing islands and curb extensions can be used together to create a highly improved pedestrian crossing.

Curb extensions may be built in conjunction with center crossing islands where there is street parking. Care should be taken to maintain bicycle access. Bicycle lanes must not be eliminated or squeezed in order to create the curb extensions or islands.

Crossing islands may be added to the middle of a street when the street is very wide.

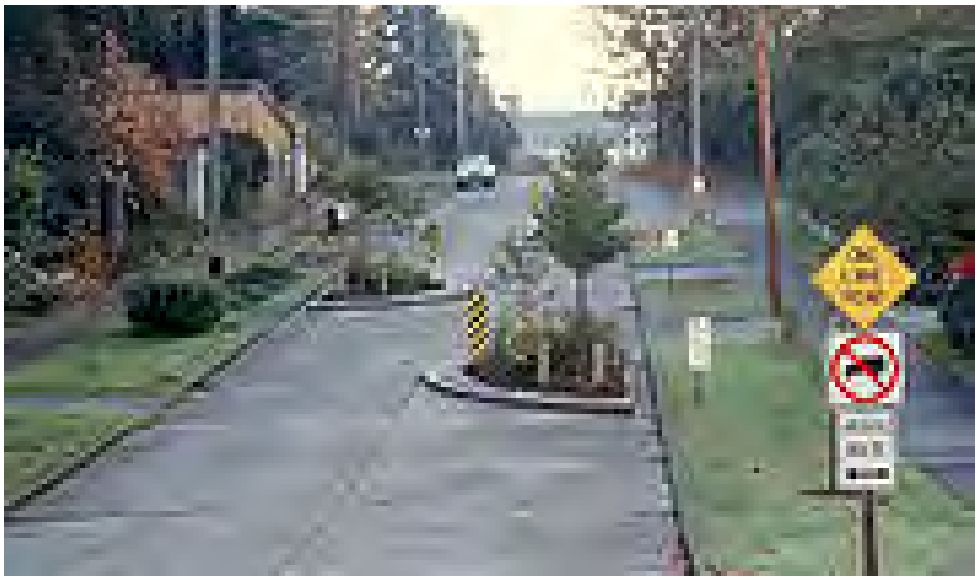
Crossing islands allow pedestrians to be concerned with one direction of traffic at a time. The roadway markings in the design shown here also help make motorists aware that a pedestrian may be crossing.

Chicane

A chicane is a traffic method used to narrow and/or turn the roadway with the use of divergent paths and shifting parking lanes. When motorists are prevented from driving in a direct linear fashion, their speeds are normally reduced. Using chicanes is a successful way to force motorist to shift travel lanes and restrict direct forward movement. Shifts can be created by moving street parking from one side to the other or by building landscaped islands that gradually cause the motorist to maneuver the obstacles in order to continue progression.

A chicane on a one-lane road.

This chicane narrows the street to fewer lanes and requires traffic to move slowly.



Mini Traffic Circles

Mini-circles are traffic islands raised to curb height, located at the center of an intersection. The design of a mini-circle is intended to force motorists to reduce speed in order to turn in a circular motion. Drivers making left turns are directed to go on the far side of the circle prior to making the turn. Drivers going straight must go around the circle before proceeding. And drivers going right must yield to traffic that is in the mini-circle.

The center portion of the mini-circle is usually landscaped with various plant materials that allow motorists and pedestrians clear sights to all sides of the intersection. In locations where landscaping is not feasible, traffic circles can be enhanced through specific pavement materials.

Mini-circles are designed to slow traffic but because they do not have the capability of controlling right turns at the intersection, pedestrians and cyclists do encounter potential risk. In order to compensate for this risk, right curb radii should complement this treatment to discourage high speed right turn maneuvers. Large vehicles (i.e. delivery and fire trucks) can be accommodated with a roll-curb on the mini-circle.

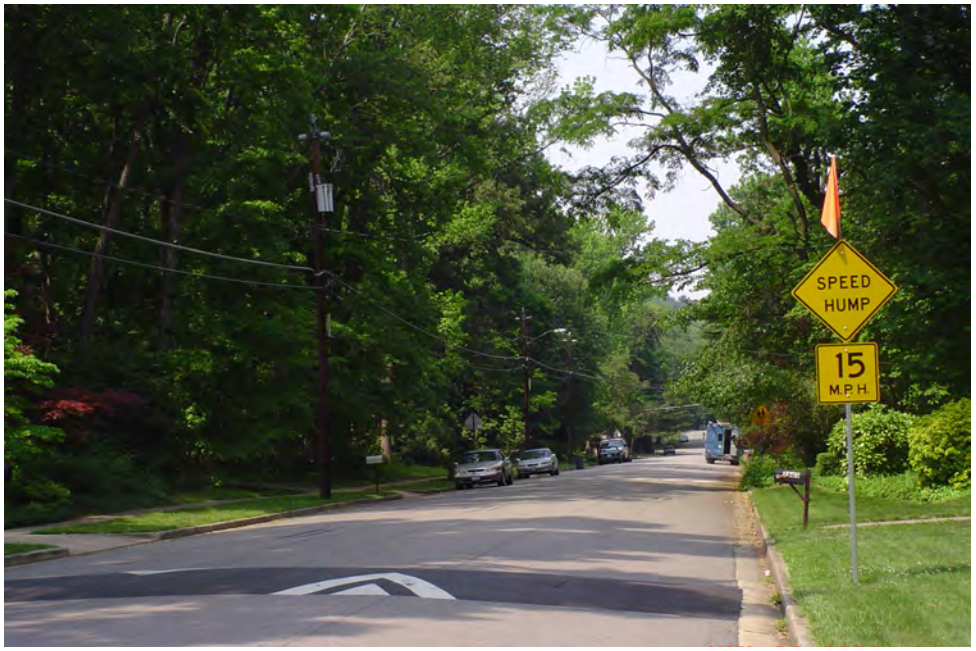
Cyclist and pedestrian needs can also be accommodated by moving crosswalks away from the mini-circle to a mid-block crossing or next intersection.

Mini traffic circle in Portland, Oregon.

Speed humps

Speed humps are 3"-4" raised mounds that extend the width of the street to deter motorists from excessive speeds. Speed humps should not be confused with the speed "bump" that is often found in mall parking lots. Generally, speed humps are 12' to 14' in length and span the width of the road. The length and height of the speed humps determine the speed at which traffic will travel over the devices. Shorter lengths and greater heights slow cars most drastically.

The traditional 12' hump has a design speed of 15 to 20 mph, a 14' hump a few miles per hour higher, and a 22' table has a design speed of 25 to 30 mph. The longer humps are much gentler for larger vehicles.



A warning sign notifies motorists before humps. Humps generally have pavement markings to enhance visibility and a taper edge near the curb to allow a gap for drainage.

Speed humps are used on streets to reduce speed, causing motorists to slow down.

Raised Intersection

A raised intersection is a speed table that spans the area of the entire intersection. Each side of the intersection has a ramp for the vehicle approach, which elevates the entire intersection to the level of the sidewalk. They can be built with a variety of materials, including asphalt, concrete, stamped concrete, or pavers. The crosswalks on each approach are also elevated as part of the treatment to enable pedestrians to cross the road at the same level as the sidewalk, eliminating the need for curb ramps. Use detectable warnings to mark the boundary between the sidewalk and the street.

The raised intersection above enhances the pedestrian environment at the urban crossings.

A raised intersection slows all vehicular movements through the intersection and improves pedestrian crossings in all directions.

Raised intersections, like the one shown here, reduce vehicle speeds at busy intersections.

Raised Pedestrian Crossing

A raised pedestrian crossing is a raised, flat portion of the roadway width of a crosswalk, usually 10' to 15'. Raised intersections and crosswalks encourage motorists to yield to the vehicular ramp and elevated pedestrians.

A raised pedestrian crossing provides a continuous route for the pedestrian at the same level as the sidewalk. Pavement markings may be used on the slope to make the crossing visible to motorists.

The raised crosswalk helps reduce vehicle speeds and the measures tend to have a predictable speed reduction solution.

Speed Table

A speed table is a broad portion of a speed hump, used as a pedestrian crossing. The speed table can either be parabolic, making it more like a speed hump, or trapezoidal, which creates the flat table like surface. Speed tables can be used in combination with curb extensions where street parking exists.

The speed table (above) causes less of a delay than humps and are typically preferred by fire departments over speed humps.

The speed table design (above) allows cars to pass without slowing as significantly as with speed humps.

Gateways

A gateway is a physical landmark that indicates a change in environment from a higher speed major roadway to a minor road (lower speed district). Gateways can include different traffic calming techniques such as of street narrowing, medians, signing, archways, roundabouts, or other identifiable features. Gateways reveal to motorists that an area of slower speeds has been reached. This can help achieve the goal of meeting expectations and preparing motorists for a different driving environment. Gateways are only an introduction and slower speeds are not likely to be maintained unless the entire area has been redesigned or other traffic-calming features are used.

Gateways produce an expectation for motorists to drive more slowly and watch for pedestrians when entering a commercial, business, or residential district from a higher speed roadway.

Creative gateways help establish a unique image for an area.

Landscaping

Landscaping along the corridor can work as a buffer to separate pedestrians from vehicles, reduce the visual width of the roadway (which encourages slower speeds), and provide an aesthetic appeal to the street. This can include a variety of trees, bushes, and/or flowerpots, which can be planted in the buffer area between the sidewalk or walkway and the street.

Choosing appropriate plants, providing adequate space for maturation, and preparing the ground can help ensure that the plants survive with minimal maintenance and don't buckle the sidewalks as they mature. The following guidelines should be considered: plants should be adapted to the local climate and fit the character of the surrounding area—they should survive without protection or intensive irrigation; and the plant's growth patterns should not obscure signs or pedestrians' and motorists' views of each other.

The landscaping on this street calms traffic by creating a visual narrowing of the roadway.

Landscaping with low shrubs, ground cover, and mature trees that are properly pruned can add shade, color, and visual interest to a street.

Paving Materials

Paving materials are important to the function and look of a street, both in the road and on the sidewalk. Paving materials can also increase crosswalk visibility and act as a physical traffic calming device when using paved brick or cobblestone. Textured crosswalks should be marked with reflective lines since these types of crosswalks are not as visible, especially at night or on rainy days.

Smooth travel surfaces are best for all pedestrians. The pedestrian path material should be firm, planar, and slip-resistant. Concrete is the preferred walking surface. A different look can be achieved by using stamped concrete or concrete pavers, which are available in a variety of colors and shapes. Colored paving can often enhance the function of portions of the roadway, such as a colored bicycle lane. This can create the perception of street narrowing, in addition to enhancing the travel facility for bicyclists.

Brick or cobblestone streets help slow traffic and create a feeling that the street is not a highway or fast-moving arterial.

This paving creates an aesthetic enhancement to the street.

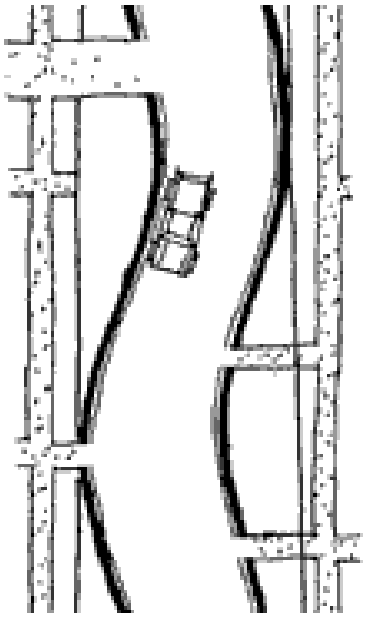
Serpentine Design

Serpentine roadway design is when a street is aligned in a wave fashion to shift traffic left and right with the use of built-in visual enhancements. This allows movement but forces vehicles to reduce speed. The opportunities for significant landscaping can be used to create a park-like atmosphere.

Such designs are usually implemented with construction of a new neighborhood street or during reconstruction of an existing street corridor. This type of design can be more expensive than other traffic-calming options and needs to be coordinated with driveway access.

The serpentine street is a curving roadway that helps slow traffic through the use of curbs and landscaping.

The opportunities for significant landscaping can be used to create a park-like atmosphere.



The serpentine design changes the entire look of a street to send a message to drivers that the road is not for fast driving.

Woonerf

A woonerf ("Street for living") is a Dutch term for a common space created to be shared by pedestrians, bicyclists, and low-speed motor vehicles.

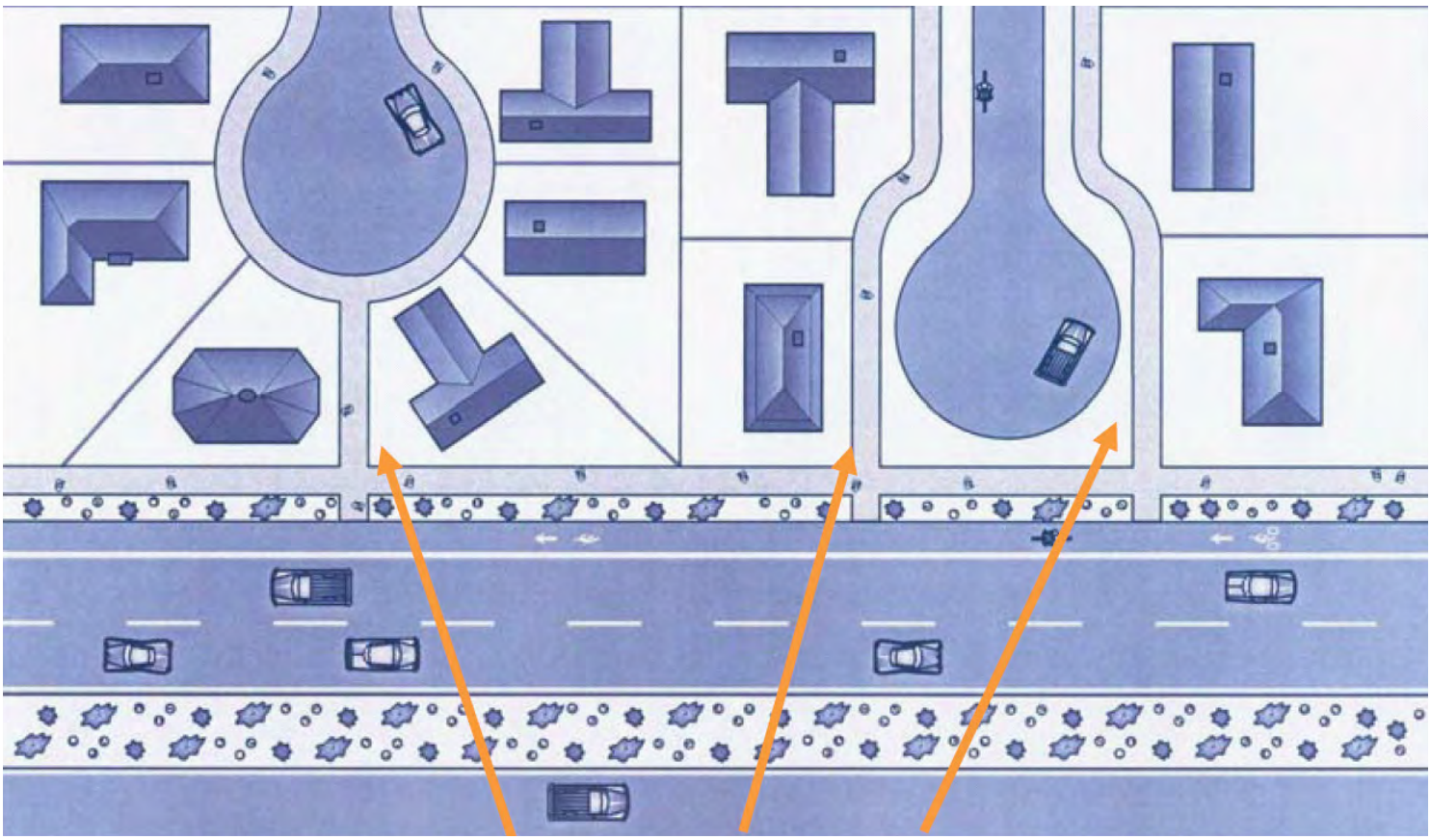
They are typically narrow streets without curbs and sidewalks. Vehicles are slowed by placing trees, planters, parking areas, and other obstacles in the street. Motorists become the intruders and must travel at very low speeds below 10 mph. This makes a street available for public use that is essentially only intended for local residents. A woonerf identification sign is placed at each street entrance.

Consideration must be given to provide access by fire trucks, sanitation vehicles and other service vehicles if needed.

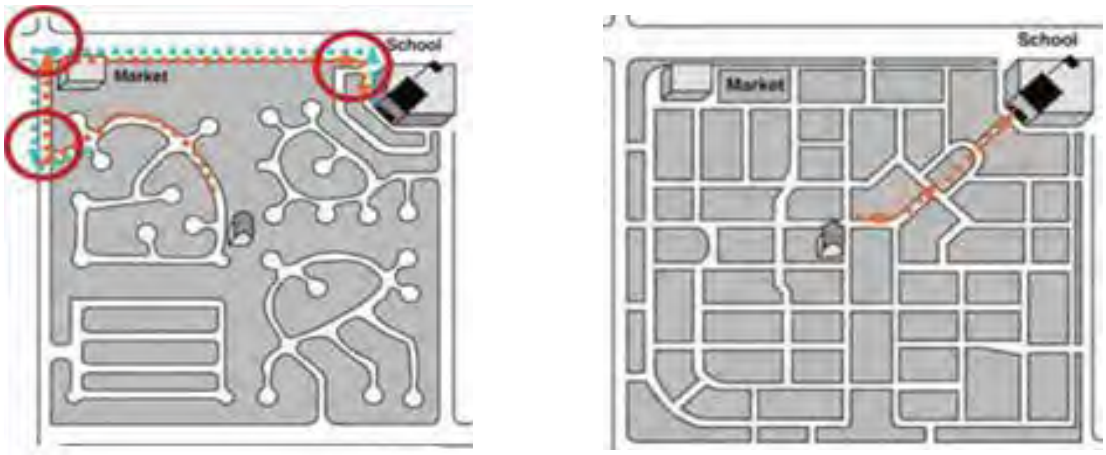
Motorists, cyclists, and pedestrians share the space on this woonerf or living street.

Land Use and Access

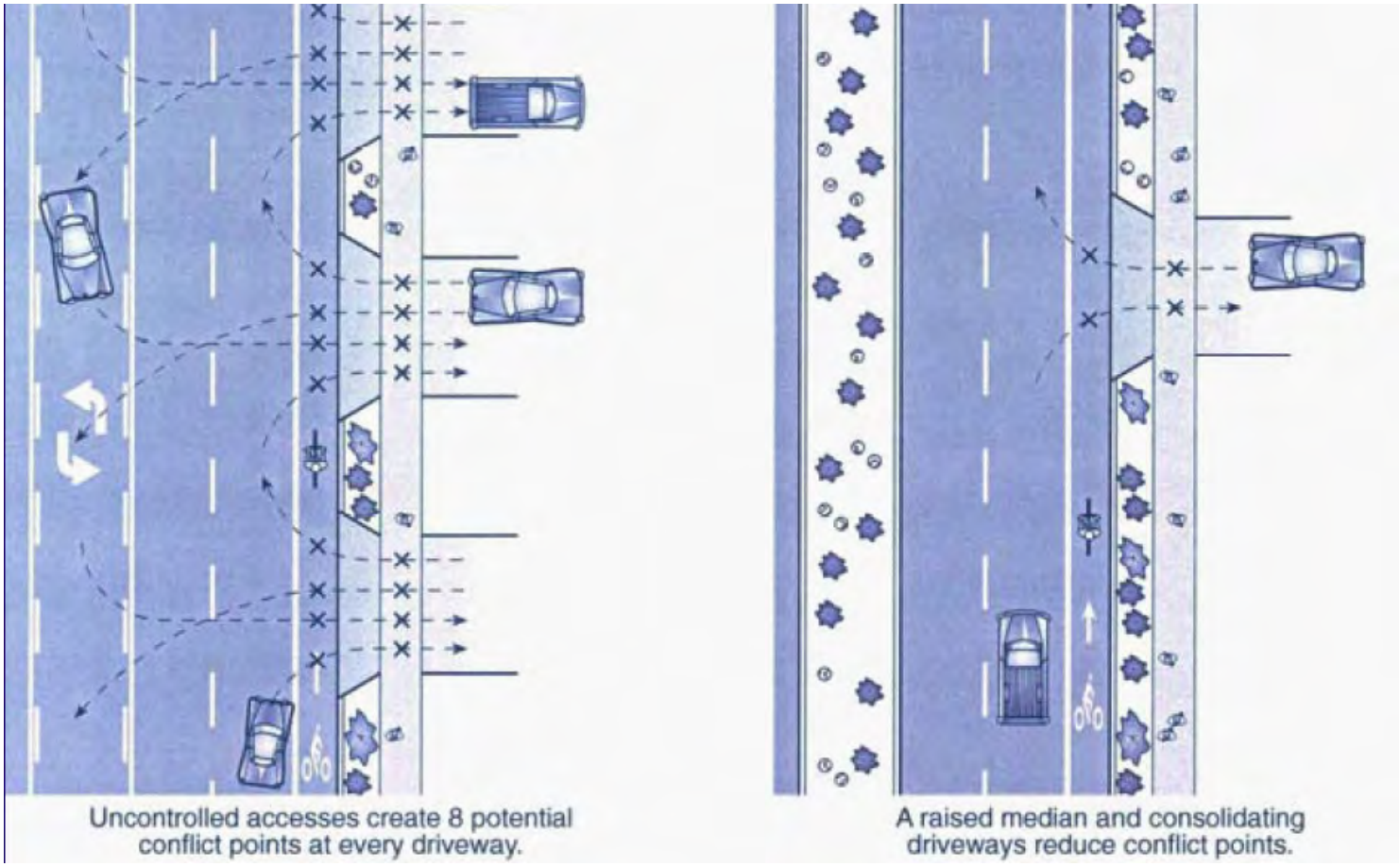
The land use and development environment plays a major role in the walkability of an area. The following are brief examples of the importance of connectivity, not only along corridors and across roadways, but also between neighborhoods and into commercial sites.



The above example shows the effectiveness of connecting a traditional cul-de-sac neighborhood to a collector or arterial road.



The above example communicates the difference between a connected street and pedestrian network (on right) versus separated cul-de-sac neighborhoods. A person living in the scenario to the right will have a longer trip to school and will likely be forced to travel by automobile. A person living in the scenario could walk to school safely and easily. This scenario, used consistently, would significantly reduce traffic.



Driveway access management is a key issue throughout the United States. A high number of driveway accesses and/or wide driveway accesses create more conflict points between motorists, bicyclists, and pedestrians. The City of Burlington should attempt to retrofit and build new development with the goal of achieving the scenario to the right.

Pedestrian connectivity is critical not only between destinations but within destinations. The example shown above shows an excellent commercial area with clear pedestrian pathways of travel.

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Appendix B: Funding Sources

Chapter Outline:

Overview

Due to the cost of most construction activities, it may be necessary to consider several sources of funding, that when combined, would support full project construction. This appendix outlines likely sources of funding for the identified projects at the federal, state, local government level and from the private sector.

Federal Funding Sources

Federal funding is typically directed through State agencies to local governments either in the form of grants or direct appropriations, independent from State budgets, where shortfalls may make it difficult to accurately forecast available funding for future project development. Federal funding typically requires a local match of approximately 20%, but there are sometimes exceptions, such as the recent American Recovery and Reinvestment Act stimulus funds, which did not require a match. Since these funding categories are difficult to forecast, it is recommended that the local jurisdiction work with its MPO on getting pedestrian projects listed in the State Transportation Improvement Program (STIP), as discussed below.

The following is a list of possible Federal funding sources that could be used to support construction of many pedestrian improvements. Most of these are competitive, and involve the completion of extensive applications with clear documentation of the project need, costs, and benefits. However, it should be noted that the FHWA encourages the construction of pedestrian facilities as an incidental element of larger ongoing projects. Examples include providing paved shoulders on new and reconstructed roads, or building sidewalks, trails and marked crosswalks as part of new highways.

Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users

Federal funding for transportation is primarily distributed through a number of different programs established by Congress. On August 10, 2005, President Bush signed into law the Safe Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU). The legislation updated Titles 23 and 49 of the United States Code (U.S.C.) and built on the significant changes made to Federal transportation policy and programs by the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) and the 1998 Transportation Equity Act for the 21st Century (TEA-21). The legislation had a number of provisions to improve conditions for bicycling and walking and increase the safety of the two modes.

SAFETEA-LU authorized the federal surface transportation programs for highways, highway safety, and transit for the 5-year period 2005-2009. SAFETEA-LU legislation expired on September 30, 2009, but at the time of writing had been extended to September 30, 2011. It is expected that Congress will extend the bill into 2011 or reauthorize the legislation. It should therefore be noted that it is not possible to guarantee the continued availability of any listed SAFETEA-LU programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been authorized in some form in repeated federal transportation reauthorization acts, and thus may continue to provide capital for improvements.

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

There are a number of programs identified within SAFETEA-LU that are applicable to pedestrian projects. These programs are discussed below, and summarized in Table B1. More information: http://www.fhwa.dot.gov/safetealu/index.htm

Surface Transportation Program

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

Table B1 – Bicycle/Pedestrian Funding Opportunities

	National Highway System	Surface Transportation Program	Highway Safety Improvement Program	Safe Routes to School Program	Transportation Enhancement Activities	Congestion Mitigation/Air Quality Program	Recreational Trails Program	Federal Transit Capital, Urban & Rural Funds	Transit Enhancements	Bridge	State and Community Traffic Safety Program	State/Metropolitan Planning Funds	Transportation and Community and System Preservation Pilot Program	Access to Jobs/Reverse Commute Program	Federal Lands Highway Program	Scenic Byways
Bicycle and pedestrian plan		*				*						*	*			
Shared use path/trail	*	*		*	*	*	*			*					*	*
Single track hike/bike trail							*									
Spot improvement program		*	*	*	*	*										
Maps		*		*		*					*					
Trail/highway intersection	*	*	*	*	*	*	*								*	*
Sidewalks, new or retrofit	*	*	*	*	*	*		*	*	*					*	*
Crosswalks, new or retrofit	*	*	*	*	*	*		*	*						*	*
Signal improvements	*	*	*	*	*	*										
Curb cuts and ramps	*	*	*	*	*	*										
Traffic calming		*	*	*									*			
Coordinator position		*		*		*							*			
Safety/education position		*		*		*					*					
Police Patrol		*		*							*					
Safety brochure/book		*		*	*	*	*				*					
Training		*		*	*	*	*				*					

source: http://www.fhwa.dot.gov/environment/bikeped/bp-guid.htm#bp4 on May 27, 2011

bridges on any public road, and transit facilities. Bicycle and pedestrian improvements are eligible activities under the STP. This covers a wide variety of projects such as on-street facilities, off-road trails, sidewalks, crosswalks, bicycle and pedestrian signals, parking, and other ancillary facilities. SAFETEA-LU also specifically clarifies that the modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is an eligible activity.

Funds under Title 23 generally may be used only for projects that are on the Federal-aid highway system -- which typically does not include local or minor collector roads. However, bicycle and pedestrian projects not located on the Federal-aid highway system may be funded under the STP (and therefore also under the Transportation Enhancement Activities, Congestion Mitigation and Air Quality Improvement Program) and under the Bridge Program. Highway Safety Improvement Program funds may be spent on any public highway or trail. In addition, non-construction projects, such as maps, coordinator positions, and encouragement programs, are eligible for STP funds. More information: http://www.fhwa.dot.gov/safetealu/factsheets/stp.htm

NCDOT Enhancement Funding (Enhancement Program Currently on Hold)

The federal Transportation Enhancement (TE) program is administered by the state Project Development Branch and is traditionally funded by a set-aside of Surface Transportation Program (STP) funds. Ten percent of STP funds are designated for Transportation Enhancement (TE) activities, which include the "provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists," and the "preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails)" 23 USC Section 190 (a)(35). TE grants can be used to build a variety of pedestrian, bicycle, streetscape, and other improvements that strengthen the cultural, aesthetic, and environmental aspects of the State's intermodal transportation system.

The State typically will make a Call for Projects, and each project must benefit the traveling public and help communities increase transportation choices and access, enhance the built of natural environment and create a sense of place. The TE program funds project design, engineering, and construction. To improve chances of selection, applicants should demonstrate strong community support. Chances are also improved if the

local match is higher than the required 20%. The program has been on hold since 2006, though funding is likely to become available again in the future with the reauthorization of the federal transportation bill.

A limited amount of statewide Enhancement funds are available each year for landscaping, stormwater runoff management, and pedestrian and bicyclist safety as a part of larger transportation projects. These funds are not allocated through the TE call for projects, and must be evaluated through the TIP prioritization process. More information: http://www.ncdot.gov/programs/Enhancement/

Safe Routes to School Program

The NCDOT Safe Routes to School (SRTS) program is a federally funded 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.

From 2005 to 2009, the state of North Carolina has been allocated $15 million in Safe Routes to School funding for infrastructure and non-infrastructure projects. In 2009, more than $3.6 million was distributed to 22 local agencies. All proposed projects must relate to increasing walking or biking to and from an elementary or middle school. An example of a noninfrastructure 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. No local match is required, and individual grant awards are limited to approximately $200,000.
More information: http://www.saferoutespartnership.org/state/statemap/northcarolina or contact DBPT/NCDOT at (919)807-0774.

Safe Routes to School Mini-grants

The National Center for Safe Routes to School offers 25 mini-grants of $1,000 each to parents, students, schools, community leaders, nonprofit organizations and local, state, and tribal

governments who partner with elementary and middle schools to support SRTS activities that enable and encourage children to safely walk and bicycle to school. Funds may be used for promotional and educational materials, safety items, equipment rentals and professional services. Applications are typically due in May for Fall implementation. The National Center seeks clear, well-thought-out application responses that:

- Propose activities that can address the school's particular situation or interests and that have the potential to have a broad reach and lasting impact;
- Demonstrate a reasonable connection between activities and desired outcomes, and include a plan for measuring those outcomes; and
- Include a clear description of how funding will be used for these activities.

More information: http://minigrants.saferoutesinfo.org

Highway Safety Improvement Program

The Highway Safety Improvement Program (HSIP) is a Federal funding source administered through NCDOT focusing on potentially hazardous locations on North Carolina's roads, with an emphasis on high risk rural roads. Some eligible uses of these funds would include traffic calming, bicycle and pedestrian safety improvements, and installation of crossing signs. The ultimate goal of the HSIP is to reduce the number of traffic crashes, injuries and fatalities by reducing the potential for and the severity of these incidents on public roadways. The application process considers the types of collisions in the area, and favors projects that select countermeasures that offer the most cost effective solution for the problem. A formula apportions HSIP funds to state departments of transportation (DOT) to administer, but any public road or pathway, including those owned by local governments, can benefit. More information: http://safety.fhwa.dot.gov/hsip/resources/fhwasa09030/ and http://www.ncdot.org/doh/preconstruct/traffic/safety/Programs/

High Risk Rural Roads Program

The purpose of the High Risk Rural Roads Program (HR3) program is to reduce the frequency and severity of collisions on rural roads by correcting or improving hazardous roadway locations or features. For a project to be eligible for HR3 funds, the project must be located on a roadway functionally classified as a rural major or minor collector, or a rural local road. There are 21 categories of projects eligible for funding under this program,

including a category for projects that improve pedestrian or bicyclist safety. NCDOT, Brian Mayhew (919) 715-7818 Bmayhew@dot.state.nc.us

Transportation, Community, and System Preservation Program

The Transportation, Community, and System Preservation (TCSP) Program provides federal funding for transit-oriented development, traffic calming, and other projects that improve the efficiency of the transportation system, reduce the impact on the environment, and provide efficient access to jobs, services, and trade centers. The program is intended to provide communities with the resources to explore the integration of their transportation system with community preservation and environmental activities. The TCSP Program funds require a 20 percent match. Pedestrian and bicycle projects meet several TCSP goals, are generally eligible for the TCSP program and are included in many TCSP projects. Past projects in North Carolina funded by TCSP include a greenway project in Knightdale and pedestrian connections through neighborhoods in Charlotte.
Because TCSP program is one of many programs authorized under SAFETEA-LU, current funding has only been extended through September 30, 2011, and program officials are not currently accepting applications for 2011. In most years, Congress has identified projects to be selected for funding through the TCSP program. Assuming that this method is used to allocate TCSP funds in the future, local jurisdictions will need to work closely with their RPO/MPO, NCDOT, and Members of Congress to gain access to this funding. More information: http://www.fhwa.dot.gov/tcsp/

Congestion Mitigation and Air Quality Improvement program

The Congestion Mitigation and Air Quality (CMAQ) Improvement program currently allocates approximately $20 million annually to North Carolina to fund programs in "air quality non-attainment and maintenance areas" (areas that do not meet federal air quality standards) and projects designed to improve air quality and reduce congestion, without adding single occupant vehicle capacity to the transportation system. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible.

CMAQ funding is processed by NCDOT through North Carolina

Metropolitan Planning Organizations (MPOs). Individual project proposals must meet a minimum cost threshold of $100,000, and must meet a required local share of 20%. More information: http://www.ncdot.org/doh/PRECONSTRUCT/tpb/services/air.html

Federal Transit Administration programs

Federal Transit Administration (FTA) funding is available for projects designed to improve access to transit. Individual grant programs vary on the specific goals, but eligible improvements include crossing improvements, pedestrian signals, sidewalks and trails. Programs of the FTA are described in the following section.

New Freedom Program

The New Freedom formula grant program provides capital and operating costs to provide transportation services and facility improvements that exceed those required by the Americans with Disabilities Act. Examples of pedestrian/accessibility projects funded in other communities through the New Freedom Initiative include installing Accessible Pedestrian Signals (APS), enhancing transit stops to improve accessibility, and establishing a mobility coordinator position. Likely eligible improvements include mid-block and high-visibility crossing improvements.

Applications for FTA funds are administered by the FTA, and pass through NCDOT for rural areas and MPO/RPOs for urbanized areas. More information: http://www.hhs.gov/newfreedom/ and http://www.fta.dot.gov/funding/grants/grants_financing_3549.html

FTA Job Access and Reverse Commute Program

The Job Access and Reverse Commute (JARC) program was established to address the unique transportation challenges faced by welfare recipients and low-income persons seeking to obtain and maintain employment. Capital, planning and operating expenses for projects that transport low income individuals to and from jobs and activities related to employment, and for reverse commute projects. In North Carolina, these funds have been granted for sidewalks and pedestrian signals. More information: http://www.fta.dot.gov/funding/grants/grants_financing_3550.html

Paul S. Sarbanes Transit in Parks Program

This program addresses the challenge of increasing vehicle

congestion in and around our national parks and other federal lands. Eligible recipients include state, tribal, or local governmental authorities with jurisdiction over land in the vicinity of an eligible area acting with the consent of the Federal Lands Management Area. The funds may support capital and planning expenses for new or existing alternative transportation systems in the vicinity of an eligible area. It includes non-motorized transportation systems such as pedestrian and bicycle trails. More information: http://www.fta.dot.gov/funding/grants/grants_financing_6106.html

FTA Urbanized Area Formula Program

FTA capital/Operating grant for urbanized areas over 50,000. This grant can be used for pedestrian or bicyclist access to transit. More information: http://www.fta.dot.gov/funding/grants/grants_financing_3561.html

Formula Grants for Other than Urbanized Areas

This program is formula-based and provides funding to states for supporting public transportation in rural areas with populations of less than 50,000. This grant funds routes to transit, bike racks, shelters, and equipment for public transportation vehicles. More information: http://www.fta.dot.gov/funding/grants/grants_financing_3555.html

Transportation for Elderly Persons and Persons with Disabilities

This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility. More information: http://www.fta.dot.gov/funding/grants/grants_financing_3556.html

Bus and Bus Related Facilities

This is capital assistance for new and replacement buses, related equipment and facilities. It has traditionally been designated to specific projects at a federal level. This grant can be used for pedestrian or bicycle access to transit and bus racks. More information: http://www.fta.dot.gov/funding/grants/grants_financing_3557.html

Metropolitan and Statewide Planning

This program provides funding for statewide and metropolitan coordinated transportation planning. Federal planning funds are first apportioned to State DOTs. State DOTs then allocate planning funding to MPOs. Eligible activities include pedestrian or bicycle planning to increase safety for non-motorized

users, and to enhance the interaction and connectivity of the transportation system across and between modes. http://www.fta.dot.gov/funding/grants/grants_financing_3563.html

Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide." The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure ("Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health").

The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants). North Carolina jurisdictions should track Partnership communications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals are more likely to score well than initiatives that are narrowly limited in scope to pedestrian improvement efforts. More information: http://www.epa.gov/smartgrowth/partnership/

Community Development Block Grant Funds

State level Community Development Block Grant Recovery (CDBG-R) funds are allocated through the NC Department of Commerce, Division of Community Assistance to local municipal or county governments for projects that enhance the viability of communities by providing decent housing and suitable living environments and by expanding economic opportunities, principally for persons of low- and moderate-income.

Federal CDBG grantees may "use Community Development Block Grants funds for activities that include (but are not limited to): acquiring real property; reconstructing or rehabilitating housing and other property; building public facilities and improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities; paying for planning

and administrative expenses, such as costs related to developing a consolidated plan and managing Community Development Block Grants funds; provide public services for youths, seniors, or the disabled; and initiatives such as neighborhood watch programs."

State CDBG funds are provided by the U.S. Department of Housing and Urban Development (HUD) to the state of North Carolina. Some urban counties and cities in North Carolina receive CDBG funding directly from HUD. Each Year, CDBG provides funding to local governments for hundreds of critically-needed community improvement projects throughout the state. Approximately $50 million is available statewide to fund a variety of projects. More information: http://www.nccommerce.com/en/CommunityServices/CommunityDevelopmentGrants/CommunityDevelopmentBlockGrants/

Land and Water Conservation Fund

The Land and Water Conservation Fund (LWCF) provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction. The program is administered by the Department of Environment and Natural Resources as a grant program for states and local governments. Maximum annual grant awards for county governments, incorporated municipalities, public authorities, and federally recognized Indian tribes are $250,000. The local match may be provided with in-kind services or cash. More information: http://www.ncparks.gov/About/grants/lwcf_main.php

Rivers, Trails, and Conservation Assistance Program

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation funds available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in North Carolina locales indirectly through technical assistance, particularly for community organizations, but is not a capital funding source. More information: http://www.nps.gov/ncrc/programs/rtca/ or contact the Southeast Region RTCA Program Manager Deirdre "Dee" Hewitt at (404) 507-5691.

National Scenic Byways Discretionary Grant Program

The National Scenic Byways Discretionary Grants program provides merit-based funding for byway-related projects each year, utilizing one or more of eight specific activities for roads designated as National Scenic Byways, All-American Roads, State scenic byways, or Indian tribe scenic byways. The activities are described in 23 USC 162(c). This is a discretionary program; all projects are selected by the US Secretary of Transportation.

Eligible projects include construction along a scenic byway of a facility for pedestrians and bicyclists and improvements to a scenic byway that will enhance access to an area for the purpose of recreation. Construction includes the development of the environmental documents, design, engineering, purchase of right-of-way, land, or property, as well as supervising, inspecting, and actual construction. More information: http://www.bywaysonline.org/grants/

Federal Lands Highway Program

The Federal Lands Highway Program (FLHP) is a coordinated program of public roads and transit facilities serving Federal and Indian lands. Funding for pedestrian improvements is available through the Public Lands Highway – Discretionary, and Forest Highways Programs.

Public Lands Highway - Discretionary

The Public Lands Highway - Discretionary (PLH-D) Program is intended for the planning, design, construction, reconstruction of improvement of roads and bridges that are within or adjacent to, or provide access to public lands and Indian reservations. PLH-D funding has been used for bike trails, walkways, and transportation planning activities. More information: http://flh.fhwa.dot.gov/programs/plh/discretionary/

Forest Highways

The Forest Highways (FH) Program provides funding to resurface, restore, rehabilitate, or reconstruct designated public roads that provide access to or are within a National Forest or Grassland. Eligible activities include provision for pedestrians and bicycles. More information: http://flh.fhwa.dot.gov/programs/plh/fh/

Department of Energy

The Department of Energy's Energy Efficiency and Conservation Block Grants (EECBG) grants may be used to reduce energy consumptions and fossil fuel emissions and for improvements in

energy efficiency. Section 7 of the funding announcement states that these grants provide opportunities for the development and implementation of transportation programs to conserve energy used in transportation including development of infrastructure such as bike lanes and pathways and pedestrian walkways. Although the current grant period has passed, more opportunities may arise in the future. More information: http://www.eecbg.energy.gov

State Funding Sources

North Carolina Department of Transportation (NCDOT)

State Transportation Improvement Program

NCDOT's Policy to Projects process uses data regarding pavement condition, traffic congestion and road safety, as well as input from local governments and NCDOT staff, to determine transportation priorities. This approach ranks projects for all modes of transportation in priority order, based on the department's goals and also determines which projects are included in the department's State Transportation Improvement Program (STIP), a federally mandated transportation planning document that details transportation improvements prioritized by stakeholders for inclusion in the Work Program over the next seven years. The STIP is updated every two years.

The STIP contains funding information for various transportation divisions of NCDOT including: highways, aviation, enhancements, public transportation, rail, bicycle and pedestrians, and the Governor's Highway Safety Program. Access to many federal funds require that projects be incorporated into the STIP. STIP is the largest single source of funding within SAFETEA-LU and NCDOT. To access the STIP: http://www.ncdot.org/planning/development/TIP/TIP/. For more about the STIP process: http://www.ncdot.org/performance/reform/

Spot Safety Program

The Spot Safety Program is a state funded public safety investment and improvement program that provides highly effective low cost safety improvements for intersections, and sections of North Carolina's 79,000 miles of state maintained roads in all 100 counties of North Carolina. The Spot Safety Program is used to develop smaller improvement projects to address safety, potential safety, and operational issues. The program is funded with state funds and currently receives approximately $9 million per state fiscal year. Other monetary sources (such as Small Construction or Contingency funds) can assist in funding Spot Safety projects, however, the maximum

allowable contribution of Spot Safety funds per project is $250,000.

The Spot Safety Program targets hazardous locations for expedited low cost safety improvements such as traffic signals, turn lanes, improved shoulders, intersection upgrades, positive guidance enhancements (rumble strips, improved channelization, raised pavement markers, long life highly visible pavement markings), improved warning and regulatory signing, roadside safety improvements, school safety improvements, and safety appurtenances (like guardrail and crash attenuators).

A Safety Oversight Committee (SOC) reviews and recommends Spot Safety projects to the Board of Transportation (BOT) for approval and funding. Criteria used by the SOC to select projects for recommendation to the BOT include, but are not limited to, the frequency of correctable crashes, severity of crashes, delay, congestion, number of signal warrants met, effect on pedestrians and schools, division and region priorities, and public interest. More information: http://www.ncdot.org/doh/preconstruct/traffic/safety/Programs/

High Hazard Elimination Program

The Hazard Elimination Program is used to develop larger improvement projects to address safety and potential safety issues. The program is funded with 90% federal funds and 10% state funds. The cost of Hazard Elimination Program projects typically ranges between $400,000 and $1 million. A Safety Oversight Committee (SOC) reviews and recommends Hazard Elimination projects to the Board of Transportation (BOT) for approval and funding. These projects are prioritized for funding according to a safety benefit to cost (B/C) ratio, with the safety benefit being based on crash reduction. Once approved and funded by the BOT, these projects become part of the department's State Transportation Improvement Program (STIP). More information: http://www.ncdot.org/doh/preconstruct/traffic/safety/Programs/

NCDOT Discretionary Funds

The Statewide Discretionary Fund is administered by the Secretary of the Department of Transportation. This $10 million fund can be used on any project at any location within the State. Primary, urban, secondary, industrial access, and spot safety projects are eligible for consideration, by the Secretary upon direct appeal from a North Carolina jurisdiction.

NCDOT Contingency Fund

The Statewide Contingency Fund is a $10 million fund administered by the Secretary of Transportation. The Division Engineer elicits written requests from municipalities, counties, businesses, schools, citizens, legislative members and NCDOT staff. The appeals are reviewed on their merits by the Contingency and Small Urban Funds Committee, which makes recommendations for funding to the Secretary. Written requests must provide technical information such as justification, location, improvements being requested, timing, etc. for thorough review. More information: http://www.ncdot.gov/doh/preconstruct/traffic/teppl/Topics/F-19/F-19_mm.pdf

Small Urban Funds

Each NCDOT Highway Division administers $2 million of funds for small-scale improvement projects in urban areas. Projects must be within 2 miles of city limits and have a maximum cost of $250,000. Requests for small urban funds may be made by municipalities, counties, businesses, school and industrial entities. A written request should be submitted to the Division Engineer providing technical information such as justification, location, improvements being requested, timing, etc. for thorough review.

Spot Improvement Program

The Division of Bicycle and Pedestrian Transportation (DPBT) budgets $500,000 per year for "spot" safety improvements throughout North Carolina. Eligible improvements include drain grate replacement, bicycle loop detectors, pedestrian signals and other small-scale improvements. These funds are used for small-scale projects not substantial enough to be included in the STIP. Proposals should be submitted directly to the Division of Bicycle and Pedestrian Transportation.

Small Construction Funds

The purpose of these funds is to finance improvements on the State System (US, NC, and SR routes) to be used for projects anywhere in the counties. These funds are used to fund a variety of transportation projects for municipalities, counties, businesses, schools, and industries throughout the state. There is a $250,000 maximum amount per request per fiscal year. Any project with a total cost greater than $150,000 requires a resolution or a letter of support for the project from the local jurisdiction. More information: http://www.nctransportationanswers.org/ourforms/SMALLCONSTRUCTIONFORM.pdf.

Governor's Highway Safety Program

The Governor's Highway Safety Program (GHSP) funds safety improvement projects on state highways throughout North Carolina. All funding is performance-based. Substantial progress in reducing crashes, injuries and fatalities is required as a condition of continued funding. This funding source is considered to be "seed money" to get programs started. The grantee is expected to provide a portion of the project costs and is expected to continue the program after GHSP funding ends. State Highway Applicants must use the web-based grant system to submit applications. More information: http://www.ncdot.org/programs/ghsp/

Bicycle and Pedestrian Planning Grant Initiative

The Bicycle and Pedestrian Planning Grant Initiative is a matching grant program administered through NCDOT that encourages municipalities to develop comprehensive bicycle plans and pedestrian plans. The Division of Bicycle and Pedestrian Transportation (DPBT) and the Transportation Planning Branch (TPB) sponsor this grant. All North Carolina municipalities are eligible and are encouraged to apply. Funding allocations are determined on a sliding scale based on population. Municipalities who currently have bicycle plans or pedestrian plans, either through this grant program or otherwise, may also apply to update their plan provided it is at least five years old. More information: http://www.ncdot.gov/bikeped/planning/

Incidental Projects

Bicycle and pedestrian accommodations such as bike lanes, sidewalks, intersection improvements, widened paved shoulders and bicycle and pedestrian-safe bridge design are frequently included as incidental features of highway projects. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds or with a local fund match.

Road Resurfacing

When space allows the inclusion of a bicycle lane onto a road without requiring significant drainage, Right-of-Way, or grading work, NCDOT can install the improvement during road resurfacing projects. If a project is feasible, the NCDOT can inform the affected community and offer them the opportunity to contribute to the marginal cost associated with these improvements.

Eat Smart, Move More North Carolina Community Grants

The Eat Smart, Move More (ESMM) NC Community Grants program provides funding to local communities to support their efforts to develop community-based interventions that encourage, promote and facilitate physical activity. The current focus of the funds is for projects addressing youth physical activity. Funds have been used to construct trails and conduct educational programs. More information: http://www.eatsmartmovemorenc.com/Funding/CommunityGrants.html

North Carolina Department of Environment and Natural Resources

The North Carolina Department of Environment and Natural Resources Division of Coastal Management offers the Public Beach and Coastal Waterfront Access Funds program, awarding $500,000 to $1 million a year in matching grants to local governments for projects to improve pedestrian access to the state's beaches and waterways. Eligible applicants include the 20 coastal counties and municipalities therein that have public trust waters within their jurisdictions.
More information: http://www.nccoastalmanagement.net/Access/about.html

The North Carolina Division of Recreation and Parks

The North Carolina Division of Recreation and Parks and the State Trails Program offer funds to help citizens, organizations and agencies plan, develop and manage all types of trails ranging from greenways and trails for hiking, biking and horseback riding to river trails and off-highway vehicle trails. More information: http://www.ncparks.gov/About/grants/main.php

The North Carolina Recreation and Parks Trust Fund (PARTF)

The Recreation and Parks Trust Fund (PARTF) provides dollar-for-dollar matching grants to counties, incorporated municipalities and public authorities, as defined by G.S. 159-7. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. A local government can request a maximum of $500,000 with each application. An applicant must match the grant dollar-for-dollar, 50% of the total cost of the project, and may contribute more than 50%. The appraised value of land to be donated to the applicant can be used as part of the match. The value of in-kind services,

such as volunteer work, cannot be used as part of the match. More information: http://www.ncparks.gov/About/grants/partf_main.php

Recreational Trails Program

The Recreational Trails Program (RTP) of the federal transportation bill provides funding to states to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, and equestrian use. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads. Recreational Trails Program funds may be used for:

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

In North Carolina, the Recreational Trails Program is administered by the North Carolina Division of Recreation and Parks. This grant is specifically designed to pay for recreational trail projects rather than utilitarian transportation-based projects. Grants up to $75,000 per project, and applicants must be able to contribute 20% of the project costs with cash or in-kind contributions. Projects must be consistent with the Statewide Comprehensive Outdoor Recreation Plan (SCORP). More information: http://www.ncparks.gov/About/trails_grants.php

Adopt-A-Trail Program

The Adopt-A-Trail (AAT) Program is a source of small funds for trail construction, maintenance, and land acquisition for trails. The program funds $108,000 annually in North Carolina, and awards grants up to $5,000 per project with no local match required. Applications are due in February. More information is available from Regional Trails Specialists and the Grants Manager.
More information: http://www.ncparks.gov/About/grants/docs/AAT_info.pdf

Powell Bill Funds

Annually, Powell Bill State street-aid allocations are made to incorporated municipalities that establish their eligibility and qualify as provided by G.S. 136-41.1 through 136-41.4. Powell Bill funds shall be expended only 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 allocations are based on population and mileage of town-maintained streets. More information: http://www.ncdot.org/programs/Powell_Bill/

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 year, 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. Funds may be used for planning and land acquisition to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits.
More information: http://www.cwmtf.net/#appmain.htm

State Administered 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 and pedestrian improvements 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. More information: www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/ or (919) 733-2853.

North Carolina Health and Wellness Trust Fund

The North Carolina Health and Wellness Trust Fund (HWTF) in partnership with Blue Cross and Blue Shield of North Carolina (BCBSNC) offers the Fit Community Grants, designed to

help communities become Fit Community designees. Up to eight communities that demonstrate a compelling need, proven capacity and promising opportunity for policy and environmental change in addressing physical activity and/or healthy eating behaviors will be awarded two-year grants up to $60,000 each. More information: http://www.fitcommunitync.org

Urban and Community Forestry Grant

The North Carolina Division of Forest Resources Urban and Community Forestry grant can provide funding for a variety of projects that will help toward planning and establishing street trees as well as trees for urban open space. The goal is to improve public understanding of the benefits of preserving existing tree cover in communities and assist local governments with projects which will lead to a more effective and efficient management of urban and community forests. Grant requests should range between $1,000 and $15,000 and must be matched equally with non-federal funds. Grant funds may be awarded to any unit of local or state government, public educational institutions, approved non-profit 501(c)(3) organizations and other tax-exempt organizations. First-time municipal applicant and municipalities seeking Tree City USA status are given priority for funding. For more about Tree City USA status, visit http://www.dfr.state.nc.us/Urban/tree_city_usa_overview.htm. For application instructions, visit: http://www.dfr.state.nc.us/Urban/urban_grant_overview.htm

Local Government Funding Sources

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 dedicated 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 category is described below. A variety of possible funding options available to North Carolina jurisdictions for implementing pedestrian projects are described below. However, many will require specific local

action as a means of establishing a program, if not already in place.

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, and can include projects such as street, sidewalk, or bikeway improvements within the downtown taxing district.

Tax Increment Financing

Project Development Financing bonds, also known as Tax Increment Financing (TIF) is a relatively new tool in North Carolina, allowing localities to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., sidewalk improvements) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to finance the debt created by the original public improvement project. Streets, streetscapes, and sidewalk improvements are specifically authorized for TIF funding in North Carolina. Tax Increment Financing typically occurs within designated development financing districts that meet certain economic criteria that are approved by a local governing body. TIF funds are generally spent inside the boundaries of the TIF district, but they can also be spent outside the district if necessary to encourage development within it.

Installment Purchase Financing

As an alternative to debt financing of capital improvements, communities can execute installment or 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.

Taxes

Many communities have raised money for general transportation programs or specific project needs 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 a municipality's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance greenway system acquisitions. Because of limits imposed on tax rates, use of property taxes to fund

greenways could limit the 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 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

A variety of fee options have been used by local jurisdictions to assist in funding pedestrian and bicycle improvements. Enabling actions may be required for a locality to take advantage of these tools.

Stormwater Utility Fees

Greenway trail property 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 create 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.

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 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.

Impact Fees

Developers can be required to pay impact fees through local enabling legislation. 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 so that "growth pays its own way."

In North Carolina, impact fees are designed to reflect the costs incurred to provide sufficient capacity in the system to meet the additional 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. A developer may reduce the impacts (and the resulting impact fee) by paying for on- or offsite pedestrian improvements that will encourage residents/tenants to walk or use transit rather than drive. Establishing a clear nexus or connection between the impact fee and the project's impacts is critical in avoiding a potential lawsuit.

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.

In-Lieu-Of Fees

As an alternative to requiring developers to dedicate on-site greenway or pedestrian facility that would serve their development, some communities provide a choice of paying a front-end charge for off-site protection of pieces of the larger system. Payment is generally a condition of development approval and recovers the cost of the off- site land acquisition or the development's proportionate share of the cost of a regional facility 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 short of qualitative interests.

Bonds and Loans

Bonds have been a very popular way for communities across the country to finance their pedestrian and greenway projects. A number of bond options are listed below. 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. Billings, Montana used the issuance of a bond in the amount of $599,000 to provide the matching funds for several of their TEA-21 enhancement dollars. Austin, Texas has also used bond issues to fund a portion of its bicycle and trail system.

Revenue Bonds

Revenue bonds are bonds that are secured by a pledge of the revenues from a specific 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

Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower

interest rate than a revenue bond. 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. 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. Bond measures are typically limited by time, based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering, design, and construction of pedestrian and bicycle facilities. Voter approval is required.

Special Assessment Bonds

Special assessment bonds are secured by a lien on the property that benefits from 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 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).

FundsfromPrivateFoundationsandOrganizations

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

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 reject legislation that threatens to reduce funding of conservation focused trust funds. 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 many generations. More information: http://www.landfortomorrow.org/

The Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation was established 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 information about what types of projects are funded and how to apply, visit http://www.rwjf.org/grants/

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 organization and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina, which makes 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. More information: http://www.nccommunityfoundation.org/Grants.

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 offer support in other areas of open space and greenways development. More information is available at http://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.
More information: http://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: Environmental and Energy Efficiency, Economic Development, and Community Vitality. The Foundation can support programs that support conservation, training and research around environmental and energy efficiency initiatives. More information: 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, 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. More information: http://www.conservationfund.org/kodak_awards.

National Trails Fund

American Hiking society created the National Trails Fund in 1998 as the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting, and maintaining foot trails in America. The society provides funds to help address the $200 million backlog of trail 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 that 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.

More information: http://www.americanhiking.org/.

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. Funded projects focus primarily on direct citizen action to protect and enhance natural resources for recreation. Project requests should be quantifiable, with specific goals, objectives and action plans and should include a measure for evaluating success. The Alliance prefers to fund projects with a good chance for closure or significant measurable results over a fairly short term of one to two years. More information: http://www.conservationalliance.com/grants.

BlueCross BlueShield of North Carolina Foundation

BlueCross BlueShied (BCBS) focuses on programs than use an outcome approach to improve the health and well being of residents. The Health of Vulnerable Populations grants program focuses on improving health outcomes for at-risk populations. The Healthy Active Communities grant funds projects that enhance the physical environment to create spaces and places for physical activity. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the nonprofit, provide and audit. More information: http://www.bcbsncfoundation.org/grants/.

Annual Azalea Celebration

NC Beautiful has promoted environmental education, beautification, and stewardship in North Carolina for 40 years and holds the Annual Azalea Celebration to help non-profit organizations enhance their community spaces. Winning applicants receive 100 azalea plants free of charge to beautify school- and church grounds, parks, greenways, public rights-of-way, and community and senior centers. In addition, recipients who sustain their projects and keep their azaleas healthy for a 3-year period are eligible to receive cash awards and additional plants through the A.J. Fletcher Award. More information: http://www.ncbeautiful.org/programs/celebration.html

Bike Belong Grants

The Bikes Belong Grant program funds important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include greenways and rail trails accessible by pedestrians and bicyclists. Applicants can request a maximum amount of $10,000 for their project, and priorities are given to areas that have not received Bikes Belong funding in the past three years.

A new Bikes Belong opportunity is Community Partnership Grants. These grants are designed to foster and support partnerships between city or county governments, non-profit organizations, and local businesses to improve the environment for bicycling in the community. Grants will primarily fund the construction or expansion of facilities such as bike lanes, trails, and paths. The lead organization must be a non-profit organization with IRS 501(c)3 designation or a city or county government office. More information: http://www.bikesbelong.org/grants/

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. Valuable in-kind gifts include donations of services, equipment, labor, or reduced costs for supplies.

Volunteer Work

Residents and other community members are excellent resources for garnering support and enthusiasm for a greenway corridor or pedestrian facility. Furthermore volunteers can substantially reduce implementation and maintenance costs. Individual volunteers from the community can be brought together with groups of volunteers from church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

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Appendix C: State and Federal Policies

Chapter Outline:

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.

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 Burlington:

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 4: Bicycle Facility Standards) (Retrieved from http://www.fhwa.dot.gov/environment/bikeped/design.htm on 5/6/2008)

United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations (March 2010)

Purpose

The United States Department of Transportation (DOT) is providing this Policy Statement to reflect the Department's support for the development of fully integrated active transportation networks. The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments. Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. Legislation and regulations exist that require inclusion of bicycle and pedestrian policies and projects into transportation plans and project development. Accordingly, transportation agencies should plan, fund, and implement improvements to their walking and bicycling networks, including linkages to transit. In addition, DOT encourages transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics when appropriate. Transportation programs and facilities should accommodate people of all ages and abilities, including people too young to drive, people who cannot drive, and people who choose not to drive.

Policy Statement

The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.

Authority

This policy is based on various sections in the United States Code (U.S.C.) and the Code of Federal Regulations (CFR) in Title 23—Highways, Title 49—Transportation, and Title 42—The Public Health and Welfare. These sections, provided in the Appendix, describe how bicyclists and pedestrians of all abilities should be involved throughout the planning process, should not be adversely affected by other transportation projects, and should be able to track annual obligations and expenditures on nonmotorized transportation facilities.

Recommended Actions

The DOT encourages States, local governments, professional associations, community organizations, public transportation agencies, and other government agencies, to adopt similar policy statements on bicycle and pedestrian accommodation as an indication of their commitment to accommodating bicyclists and pedestrians as an integral element of the transportation system. In support of this commitment, transportation agencies and local communities should go beyond minimum design standards and requirements to create safe, attractive, sustainable, accessible, and convenient bicycling and walking networks. Such actions should include:

- Considering walking and bicycling as equals with other transportation modes: The primary goal of a transportation system is to safely and efficiently move people and goods. Walking and bicycling are efficient transportation modes for most short trips and, where convenient intermodal systems exist, these nonmotorized trips can easily be linked with transit to significantly increase trip distance. Because of the benefits they provide, transportation agencies should give the same priority to walking and bicycling as is given to other

transportation modes. Walking and bicycling should not be an afterthought in roadway design.

- Ensuring that there are transportation choices for people of all ages and abilities, especially children: Pedestrian and bicycle facilities should meet accessibility requirements and provide safe, convenient, and interconnected transportation networks. For example, children should have safe and convenient options for walking or bicycling to school and parks. People who cannot or prefer not to drive should have safe and efficient transportation choices.

- Going beyond minimum design standards: Transportation agencies are encouraged, when possible, to avoid designing walking and bicycling facilities to the minimum standards. For example, shared-use paths that have been designed to minimum width requirements will need retrofits as more people use them. It is more effective to plan for increased usage than to retrofit an older facility. Planning projects for the long-term should anticipate likely future demand for bicycling and walking facilities and not preclude the provision of future improvements.

- Integrating bicycle and pedestrian accommodation on new, rehabilitated, and limited-access bridges: DOT encourages bicycle and pedestrian accommodation on bridge projects including facilities on limited-access bridges with connections to streets or paths.

- Collecting data on walking and biking trips: The best way to improve transportation networks for any mode is to collect and analyze trip data to optimize investments. Walking and bicycling trip data for many communities are lacking. This data gap can be overcome by establishing routine collection of nonmotorized trip information. Communities that routinely collect walking and bicycling data are able to track trends and prioritize investments to ensure the success of new facilities. These data are also valuable in linking walking and bicycling with transit.

- Setting mode share targets for walking and bicycling and tracking them over time: A byproduct of improved data collection is that communities can establish targets for increasing the percentage of trips made by walking and bicycling.

- Removing snow from sidewalks and shared-use paths: Current maintenance provisions require pedestrian facilities built with Federal funds to be maintained in the same manner as other roadway assets. State Agencies have generally established levels of service on various routes especially as related to snow and ice events.

- Improving nonmotorized facilities during maintenance projects: Many transportation agencies spend most of their transportation funding on maintenance rather than on constructing new facilities. Transportation agencies should find ways to make facility improvements for pedestrians and bicyclists during resurfacing and other maintenance projects.

Conclusion

"Increased commitment to and investment in bicycle facilities and walking networks can help meet goals for cleaner, healthier air; less congested roadways; and more livable, safe, cost-efficient communities. Walking and bicycling provide low-cost mobility options that place fewer demands on local roads and highways. DOT recognizes that safe and convenient walking and bicycling facilities may look different depending on the context — appropriate facilities in a rural community may be different from a dense, urban area. However, regardless of regional, climate, and population density differences, it is important that pedestrian and bicycle facilities be integrated into transportation systems. While DOT leads the effort to provide safe and convenient accommodations for pedestrians and bicyclists, success will ultimately depend on transportation agencies across the country embracing and implementing this policy." Ray LaHood, United States Secretary of Transportation

North Carolina Department of Transportation Complete Streets Policy

In 2009, NCDOT unveiled its efforts to routinely provide for all users of the roads - pedestrians, bicyclists, public transportation users, and motorists of all ages and abilities. The new document:

- Explains the scope and applicability of the policy ("all transportation facilities within a growth area of a town or city funded by or through NCDOT, and planned, designed, or constructed on state maintained facilities, must adhere to this policy");
- Asserts the Department's role as a partner to local communities in transportation projects;
- Addresses the need for context-sensitivity;
- Sets exceptions (where specific travelers are prohibited and where there is a lack of current or future need) and a clear process for granting them (approval by the Chief Deputy Secretary); and
- Establishes a stakeholders group, including transportation professionals and interest groups, tasked to create

comprehensive planning and design guidelines in support of the policy. Visit www.ncdot.gov for the full document.

FHWA Memorandum on Mainstreaming Bicycle and Pedestrian Projects

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**

NCDOT 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.

NCDOT Administrative Action to Include Local Adopted Greenway 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 greenway 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.

NCDOT Pedestrian Policy Guidelines

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.

NCDOT Online Pedestrian Planning and Design Resources List

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/bipedlnk.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 D: Public Input Summary

Chapter Outline:

Overview

In order to gain local knowledge and input, a public outreach component was included as an integral part of planning efforts for the Burlington Pedestrian Plan. Public input was gathered through several different means including the following: Steering Committee meetings, a workshop at the grand opening of Company Shops Market, public workshop tables at North Park and the Health Department, assistance from Healthy Alamance, and online efforts (Facebook social media, project website, City website, and online comment form). This offered the representatives and citizens of Burlington opportunity to contribute to the Plan's development.

Steering Committee meetings were held throughout the planning process with representatives from the City of Burlington. These took place to establish visions and goals for this effort. Committee members also identified key opportunities and strategies for the pedestrian system.

Steering Committee

This committee, composed of City staff met three times during the planning process. The group established visions and goals for the Plan, identified areas of need in Burlington, and reviewed the Plan. Members of the Committee marked up maps and identified pedestrian problem areas and possible solutions. The goals are listed in Chapter 1 and input from the Committee is reflected throughout the recommendations of this planning document.

The Steering Committee also provided comment on the Draft Plan. These comments led to revisions made by the Consultant in the development of the Final Plan.

Public Workshops

Two public input workshops were conducted during the planning process. The first opportunity was a public, open house workshop at the Company Shops Market grand opening Downtown on June 11, 2011. This initial public input session sought to gather preliminary input from citizens to assist in the development of draft recommendations for the plan.

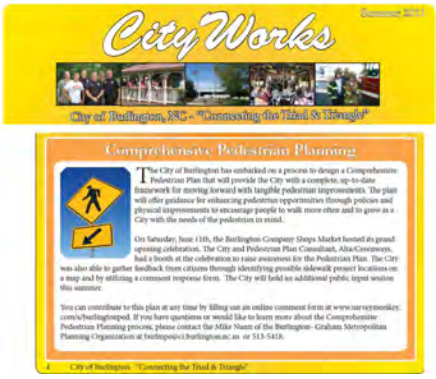
The second public workshop presented draft recommendations and solicited public comment at the Alamance Health Department and North Park on September 1, 2011. Preliminary recommendations were presented in map form at this meeting. Citizens responded to these draft recommendations by providing feedback and discussion of proposed pedestrian facilities.

At both workshop sessions, public input was taken in the form of map markups, written comments, question and answer sessions, and through discussions between citizens, consultant staff from Alta/Greenways and City staff. In addition, a hardcopy public comment form was developed and distributed for hand written responses during each meeting.

Page 1 (above) and Page 2 (right) of hardcopy comment form.

Newsletters

Two project newsletters were developed to keep the public updated during the planning process. Newsletters were distributed at the public workshops, other public venues, and digitally on the project website. The front and back of these newsletters can be seen on pages 202-205.



Project information and public workshops were promoted in the City of Burlington newsletter.

Project Website and Facebook Page

A project website was developed as a means to keep the public updated on the planning process. Meeting minutes, newsletters, link to the online comment form, and draft products were made available. Information was also distributed through the City's Facebook page. Facebook followers were made aware of the pedestrian planning process, public workshop events, and the online comment form.

Comment Form

A comment form was developed for Burlington during this process and made available in both hardcopy and online form (see hardcopy version on page 201). The comment form was available online for five months. To maximize the responses to the online form, the web address was distributed at the public meeting, to local interest groups, in newsletters, and on flyers

throughout the City. 440 persons completed the comment form.

The comment form results shown on the following pages have been tabulated to provide insight into local residents' opinions and values.

PUBLIC COMMENT FORM for the

Burlington Pedestrian Plan

1. How do you rate present pedestrian conditions in Burlington? (select one)

Excellent | Fair | Poor

2. How important to you is improving walking conditions in Burlington? (select one)

Very important | Important | Not important

3. Do you feel that the City should consider non-automobile transportation (i.e. pedestrian and bicycle) as a priority? (select one)

Yes | No | Doesn't Matter

4. How often do you walk now? (circle one)

never | few times per month
few times per week | 5+ times per week

5. Would you walk more often if more sidewalks, trails, and safe roadway crossings were provided for pedestrians?

Yes | No

6. Burlington should be a community where (Select one):

Sidewalks are only provided on major arterial roadways
Sidewalks are provided on arterial and collector roadways
Sidewalks are provided on all roadways

7. The City of Burlington should require commercial and residential developers to construct sidewalk during development.

Yes | No

8. Which pedestrian design requirements should be required with future construction, reconstruction, and/or development (Select all that apply)?

Sidewalks
Grass buffer between sidewalk and roadway
Street trees
Adequate lighting
Marked crosswalks
Pedestrian signals
Landscaped median refuges
Pedestrian signage
Safe walking spaces wtihin shopping centers
Pedestrian connectvity between neighborhoods, shopping centers, parks, and other destinations
Traffic calming such as speed humps and stop signs

9. Should public funds be used to improve pedestrian options and facilities?

10. Which types of funds should

Capital improvements b
Existi
New
State an
Other: _____

11. For what purposes do you w to walk for in the future? (circl

Fitness
Transportatio
So
Spendin
Other: _____

12. What walking destinations (circle all that apply)

Downtown
School
Shopping
Entertainment
Libraries/rec. centers

PLEASE TURN OVER TO COMPLETE ON BACK SIDE

13. What factors discourage walking? (circle all that apply)

Lack of sidewalks and trails
Lack of crosswalks at traffic signals
Lack of pedestrian signals at intersections
Automobile traffic and speed
Lack of interest
Lack of time
Aggressive motorist behavior
Sidewalks in need of repair
Lack of nearby destinations
Criminal activity
Level of street lighting
Lack of landscaping and/or buffer between sidewalk and road

14. What do you think are the top roadway corridors most needing new sidewalk?

Road Corridor #1:_____
Road Corridor #2: _____
Road Corridor #3: _____

15. What do you think are the top roadway intersections most needing crossing improvements?

#1:_____
#2: _____
#3: _____

16. Do you have any other general comments or ideas?

_____
_____
_____
_____

17. What is your zipcode?

_____

18. What is your gender?

Male | Female

19. What is your age?

0-18
19-25
26-35
36-45
46-55
56-65
65 and older

20. Where do you live?

Burlington
Graham
Alamance County
Guilford County
Other

21. Please provide your email address below if you would like to stay up to date with the Burlington Pedestrian Transportation Plan.

_____

FOR MORE INFORMATION, PLEASE VISIT THE PROJECT WEBSITE AT:

WWW.GREENWAYS.COM/BURLINGTON.HTML

Page 1 (above) and Page 2 (right) of hardcopy comment form.

SPRING 2011

Newsletter for the

Burlington, NC

Pedestrian Plan

Project Contact Information:

Mike Nunn,
Planner
City of Burlington/
Burlington MPO

By Mail:

425 South Lexington Avenue;
Burlington, NC 27215

By Phone:

336.513.5418

Email:

burlmpo@ci.burlington.nc.us

Website:

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

Project Background

This study will identify major opportunities and constraints for walking in Burlington. An action plan will be developed that includes recommendations to improve pedestrian connectivity and safety. These recommendations will include future sidewalks, greenways, crosswalks, policies, and programs (education, encouragement, and enforcement).

Project Vision

A project kickoff meeting was held in April 2011 with City of Burlington staff and consultants. The draft vision statements was established based on input from the Committee:

"The City of Burlington will be a place:

....where pedestrian connectivity and access is provided to people of all ages, abilities, and socio-economic backgrounds;

....where comprehensive pedestrian design is integrated into all future planning and development;

....where walking is encouraged and supported through a variety of programs;

and .....

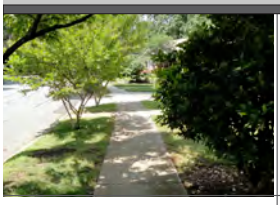
Above: A walking trail in City Park (above) and crosswalk in Downtown Burlington (below).

....where multi-modal transportation improvements create a sustainable and livable Burlington where citizens spend more time outdoors, engage in healthy activities, have a high quality of life, and have fresher air to breathe."

Above: Burlington photos by Alta/Greenways.

Page 1 of Newsletter #1.

Burlington | **Pedestrian Plan** SPRING 2011



Benefits of Walkable Communities

According to the recent 2009 Walk the Walk (CEOs for Cities) report, "houses with above-average levels of walkability command a premium of about $4,000 to $34,000 over houses with just average levels of walkability in the typical metropolitan areas studied."

Economic Benefits

"According to Rails-to-Trails Conservancy, ***existing walking and biking trails add $1.4 billion in economic activity nationwide each year in retail and tourism alone***, on top of increased real estate values, business profits from bicycle and pedestrian facility improvements, time savings, and healthcare cost savings." (*Growing Wealthier: Smart Growth, Climate Change and Prosperity*, Center for Clean Air Policy 2011)

A study cited by the Victoria Transport Policy Institute's 2011 "Transportation Affordability" found that ***households in automobile-dependent communities devote 50% more to transportation (more than $8,500 annually) than households in communities with more accessible land use and more multi-modal transportation systems (less than $5,500 annually).***

Health Benefits

"A study in Atlanta found walkability to be a significant factor in explaining the number of minutes per day of moderate physical activity. ***Residents of the most walkable environments in Atlanta were found to get approximately 37 minutes of moderate activity per day, whereas residents of the least walkable environments got only 18 minutes."*** (*Growing Wealthier: Smart Growth, Climate Change and Prosperity*, Center for Clean Air Policy 2011)

How to Stay Involved

Project Consultants:

ALTA/GREENWAYS

1. Check out **www.greenways.com/burlington.html** for links to additional project information and to **complete an online comment form**.

2. Stop by the **Public Open House Booth (during Downtown Co-op Grand Opening)**:

When: Saturday, June 11, 2011 11:00 AM - 3:00 PM
Where: Company Shops Market, 268 East Front Street, Burlington, NC

3. If you prefer to send a letter with your ideas, make a phone call, or to email, please refer to the contact information on page one.

Page 2 of Newsletter #1.

Newsletter #2 for the

SUMMER 2011

Burlington, NC

Pedestrian Plan

Project Contact Information:

Mike Nunn,
Planner
City of Burlington/
Burlington MPO

By Mail:

425 South Lexington Avenue;
Burlington, NC 27215

By Phone:

336.513.5418

Email:

burlmpo@ci.burlington.nc.us

Website:

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

Project Update

The City of Burlington has been making progress in the pedestrian process that started in the spring. A Steering Committee, formed of City staff, has met twice to guide the planning process. To date, an existing conditions analysis and the first public workshop have taken place. The City is currently developing a Draft Pedestrian Plan that includes recommendations for sidewalks, trails, and crossing improvements. The public has shown tremendous interest in this project with over 300 people participating in the online comment form already.

Draft Plan

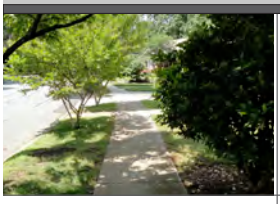
The City of Burlington will be completing a comprehensive Draft Pedestrian Plan that will be released for public review early this fall. The plan includes an introduction with visions and goals, an existing conditions analysis, recommendation maps for pedestrian facility improvements, program and policy recommendations, implementation and funding strategies, and design guidelines for pedestrian facility treatments.

The plan will serve as a guide for the City of Burlington in the coming years. Having a plan in place will allow the City to tap into outside funding sources.

Above: Photos from the first public input workshop held at the Grand Opening of the Company Shops Co-op in Downtown Burlington. Many residents stopped by to learn about the planning process and provide input.

Above: Burlington photos by Alta/Greenways.

Page 1 of Newsletter #2.



Work Completed & Next Steps

According to the recent 2009 Walk the Walk (CEOs for Cities) report, "houses with above-average levels of walkability command a premium of about $4,000 to $34,000 over houses with just average levels of walkability in the typical metropolitan areas studied."

Project Committee Meetings
Project consultants, City staff, and stakeholders met in April and July 2011 to learn about the pedestrian planning process, discuss visions and goals for Burlington, and to identify areas of pedestrian safety concern and needs within the City of Burlington.

Public Workshop #1
On June 11th, project consultants and City staff received input at the grand opening of the Company Shops Market in Downtown Burlington. Members of the public completed comment forms, spoke with the project team, and marked up maps. Citizens were able to voice their ideas and concerns for pedestrian safety and needs in Burlington. Many agreed that the addition of sidewalks, crosswalks, and trails would make Burlington more livable.

Public Workshop #2
The second workshop is **September 1, 2011. More information is below.**

Draft Plan and Final Plan During September and October, City staff and the general public will have an opportunity to review a full draft plan that includes policy recommendations, program strategies, and an implementation guide. The final plan is scheduled for completion in the Fall of 2011.

How to Stay Involved

Project Consultants:

ALTA/GREENWAYS

1. Check out **www.greenways.com/burlington.html** for links to additional project information and to **complete an online comment form**.

2. Stop by the **Public Open House #2 Booth (at the North Park Farmers Market)**:

When: Thursday, September 1, 2011 5:00 PM - 8:00 PM
Where: North Park, 849 Sharpe Road, Burlington, NC

3. If you prefer to send a letter with your ideas, make a phone call, or to email, please refer to the contact information on page one.

Page 2 of Newsletter #2.

1. How do you rate present pedestrian conditions in Burlington? (select one)

	Response Percent	Response Count
Excellent	5.7%	25
Fair	**56.6%**	**246**
Poor	37.7%	164
	answered question	**435**
	skipped question	**5**

2. How important to you is improving walking conditions in Burlington? (select one)

	Response Percent	Response Count
Very important	**60.7%**	**266**
Important	32.9%	144
Not important	6.4%	28
	answered question	**438**
	skipped question	**2**

3. Do you feel that the City should consider non-automobile transportation (i.e. pedestrian and bicycle) as a priority? (select one)

	Response Percent	Response Count
Yes	**79.6%**	**347**
No	11.9%	52
Doesn't matter	8.5%	37
	answered question	**436**
	skipped question	**4**

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

	Response Percent	Response Count
never	7.6%	33
few times per month	31.0%	135
few times per week	**38.4%**	**167**
5+ times per week	23.0%	100
	answered question	**435**
	skipped question	**5**

5. Would you walk more often if more sidewalks, trails, and safe roadway crossings were provided for pedestrians?

	Response Percent	Response Count
Yes	**86.0%**	**376**
No	14.0%	61
	answered question	**437**
	skipped question	**3**

6. Burlington should be a community where:

	Response Percent	Response Count
Sidewalks are only provided on major arterial roadways	7.2%	30
Sidewalks are provided on arterial and collector roadways	38.5%	161
Sidewalks are provided on all roadways	**54.3%**	**227**
answered question		**418**
skipped question		**22**

7. The City of Burlington should require commercial and residential developers to construct sidewalk during development.

	Response Percent	Response Count
Yes	**93.2%**	**399**
No	6.8%	29
answered question		**428**
skipped question		**12**

8. Which pedestrian design requirements should be required with future construction, reconstruction, and/or development (Select all that apply)?

	Response Percent	Response Count
Sidewalk	**89.8%**	**380**
Grass buffer between sidewalk and roadway	59.3%	251
Street trees	44.9%	190
Adequate lighting	82.0%	347
Marked crosswalks	68.3%	289
Pedestrian signals	48.9%	207
Landscaped median refuges	25.8%	109
Pedestrian signage	43.0%	182
Safe walking spaces within shopping centers	61.9%	262
Pedestrian connectivity between neighborhoods, shopping centers, schools, parks, and other popular destinations	74.2%	314
Traffic calming such as speed humps and stop signs	44.9%	190
Other (please specify)		46
answered question		**423**
skipped question		**17**

9. Should public funds be used to improve pedestrian options and facilities?

	Response Percent	Response Count
Yes	**86.5%**	**360**
No	13.5%	56
answered question		**416**
skipped question		**24**

10. What types of funds should be used? (Choose all that apply)

	Response Percent	Response Count
Capital improvements bond or other financing strategy	64.7%	268
Existing local taxes	56.0%	232
New local taxes	23.2%	96
State and federal grants	**77.8%**	**322**
Other (please specify)	9.7%	40
answered question		**414**
skipped question		**26**

11. 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	**90.4%**	**377**
Transportation to some destination	50.4%	210
Social visits	36.9%	154
Spending time outdoors	69.1%	288
Other (please specify)		22
answered question		**417**
skipped question		**23**

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

	Response Percent	Response Count
Downtown	60.3%	249
Place of work	25.9%	107
School	32.2%	133
Restaurants	49.6%	205
Shopping	53.0%	219
Parks	**77.2%**	**319**
Entertainment	35.6%	147
Trails and greenways	69.5%	287
Libraries or recreation centers	52.1%	215
Other (please specify)		19
answered question		**413**
skipped question		**27**

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

		Response Percent	Response Count
Lack of sidewalks and trails		**85.2%**	**351**
Lack of crosswalks at traffic signals		41.0%	169
Lack of pedestrian signals at intersections		30.6%	126
Automobile traffic and speed		71.1%	293
Lack of interest		6.8%	28
Lack of time		15.8%	65
Aggressive motorist behavior		52.2%	215
Sidewalks in need of repair		24.3%	100
Lack of nearby destinations		24.3%	100
Criminal activity		31.1%	128
Level of street lighting		43.0%	177
Lack of landscaping and/or buffer between sidewalks and road		26.7%	110
		answered question	**412**
		skipped question	**28**

14. What do you think are the top roadway corridors most needing new sidewalk?

Church - 134
Huffman Mill - 60
Front - 54
University - 25
Graham Hopedale - 23
Alamance - 20
Mebane - 18
Chapel Hill - 16
Shadowbrook - 12
Webb - 10

15. What do you think are the top roadway intersections needing pedestrian crossing improvements?

Church & Huffman Mill - 29
Church & Williamson - 13
Church & Graham-Hopedale - 13
Church & Edgewood - 11
Alamance & Mebane - 10
Church & Forestdale - 9
Edgewood & Shadowbrook - 8
Alamance & Church - 8
Garden & Huffman Mill - 7
Church & Sellars Mill - 7

16. Do you have any other general comments or ideas?

The following "word cloud" was generated using words from the above, open-ended question responses at www.wordle.net. Words used the most by citizens to answer this open-ended question are bigger below.

17. What is your zip code?

27215 - 255
27217 - 70
27253 - 25
27244 - 12
27249 - 9
27302 - 5
27216 - 3
27258 - 3
27349 - 3
27278 - 2
27377 - 2
27214 - 1
27201 - 1
27218 - 1
27231 - 1
27312 - 1

18. What is your gender?

	Response Percent	Response Count
M	33.2%	134
F	**66.8%**	**270**
	answered question	**404**
	skipped question	**36**

19. What is your age?

	Response Percent	Response Count
0-18	0.5%	2
19-25	1.2%	5
26-35	21.9%	89
36-45	**31.7%**	**129**
46-55	20.9%	85
56-65	17.0%	69
65 and older	6.9%	28
	answered question	**407**
	skipped question	**33**

20. Where do you live?

		Response Percent	Response Count
Burlington		**76.0%**	**310**
Graham		5.6%	23
Alamance County		12.5%	51
Guilford County		1.7%	7
Other		4.2%	17
		answered question	**408**
		skipped question	**32**

Appendix E: Intersection Inventory and Recommendations Tables

Table E1 - Intersection Inventory Table

Road 1	Road 2	Destinations Served	Sight Distance (Good, Fair, Poor)	Signage (Y/N)	Stop Light/ Stop Sign	Curb Ramp (Y/N)	Curb Ramp Complete/ Incomplete/ Inadequate	Curb Radius (Very Wide, Wide, Not Wide)	Marked Crosswalk (Y/N)	Number and Location of Crosswalks Adequate (Y/N)	Highly Visible (Y/N)	Crosswalk Condition (Good/Fair/ Poor)	Advanced Stop Line (Y/N)	Pedes-trian Xing Signal (Regular, Count-down, None)	Sides of Street with Sidewalk	Median island - Width and Type	Estimated Traffic Vol-ume (High/ Medium/ Low)	Speed Limit	Other Notes (curb exten-sions, midblock cross-ings, etc.)
Univer-sity	Boone Station	Shopping centers; commercial	Good	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	VW	N	-	-	-	-	N	2/8	3ft concrete on Univer-sity; Boone Station (one side)	MEDIUM	45/35	Very wide crossings; Destinations/restaurants on both sides; Sidewalk lacking; two right hand turn lanes off University onto Boone Station(total of six lanes to cross just to get to median)
Univer-sity	Rural Retreat	Davidson Park; Apts, shopping centers	Good	N	SL	Y	INADE-QUATE	VW	N	-	-	-	-	-	3/8	3ft concrete all ways	MEDIUM	45/35	Sidepath going north on University, Sidewalk on SW side of intersection; Need crossings Rural Retreat on east side and crossing of University on south side
Univer-sity	Shoppes at Wa-terford entrance	Shopping center (gro-cery); exist-ing sidepath on opposite side of Uni-versity	Good	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	W	N	-	-	-	-	N	3/5	Grassy median on University	MEDIUM	45	T intersection with side-path on opposite side of University as shopping center; Need crossing improvements on south side of intersection
Univer-sity	Church	Shopping center; exist-ing sidepath	Fair	N	SL	Y	INADE-QUATE	VW (one pork chop)	Y (on east side crossing Church)	N	N	F	Y	Y (COUNT-DOWN on east side crossing Church)	2/8	Concrete median on University	MEDIUM	45	Wide crossing; no pe-destrian crossing facili-ties to get across Univer-sity; lack of sidewalk

Road 1	Road 2	Destinations Served	Sight Distance (Good, Fair, Poor)	Signage (Y/N)	Stop Light/ Stop Sign	Curb Ramp (Y/N)	Curb Ramp Complete/ Incomplete/ Inadequate	Curb Radius (Very Wide, Wide, Not Wide)	Marked Crosswalk (Y/N)	Number and Location of Crosswalks Adequate (Y/N)	Highly Visible (Y/N)	Crosswalk Condition (Good/Fair/ Poor)	Advanced Stop Line (Y/N)	Pedes-trian Xing Signal (Regular, Count-down, None)	Sides of Street with Sidewalk	Median island - Width and Type	Estimated Traffic Vol-ume (High/ Medium/ Low)	Speed Limit	Other Notes (curb exten-sions, midblock cross-ings, etc.)
Church	St. Marks Church	Shopping centers; Food Lion; restaurants	Fair	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	W	N	-	-	-	-	N	2/8	N	MEDIUM/ HIGH	35	No crossing treatments (with exception of mixed bag of curb ramps). Need sidewalk and crossing improvements all ways
Church	Huffman Mill	Shopping centers; Har-ris Teeter	Fair	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	VW	Y (cross-ing Church on west side)	N	Y	GOOD	Y	COUNT-DOWN	2/8	Concrete median on Church - east side	HIGH	35	Great high-visibility marked crosswalk across Church connecting exist-ing sidewalk; Sidewalk needed first with cross-ing treatments
Church	Ala-mance	Commercial	Fair	N	SL	N	-	VW (several pork chops and conc. Medians)	N	-	-	-	-	N	0/8	Conrete medians and pork chops for turning traffic across Alamance; and across Church	HIGH	35	No pedestrian treatments here at all, including no sidewalk. Diagonally configured intersection
Church	Tarleton	City Park; high school; residential	Fair	N	SL	Y	COMPLETE	NW	Y	Y	N	GOOD	Y	N	2/5	Wide grassy, landscaped median across Church	HIGH	35/25	T intersection with con-nection to City Park; Existing crosswalk present with curb ramps but sidewalks lacking on Tarleton; No ped signal-ization
Main	Kitchin	YMCA, City Park, cemetery, residential	Fair	N	SL	N	-	W	N	-	-	-	-	N	2/8	Conc me-dian and pork chop on Kitchin (south side)	MEDIUM	35/35	With YMCA and park here, this is important crossing. Sidewalk ends on north side of Main just east of intersection;
Edge-wood	O'Neal	City Park, apartment community	Good	N	SL	Y	COMPLETE (for where sidewalk ex-ists)	W	Y	Y	Y	POOR	Y	Y (COUNT-DOWN)	4/8	Grassy median on O'Neal	MEDIUM	35	With bike lanes and sidewalks on O'Neal, this intersection features marked crosswalk, curb ramps, and countdown signals to connect exist-ing sidewalks. Cross-walks are badly faded though.

Road 1	Road 2	Destinations Served	Sight Distance (Good, Fair, Poor)	Signage (Y/N)	Stop Light/ Stop Sign	Curb Ramp (Y/N)	Curb Ramp Complete/ Incomplete/ Inadequate	Curb Radius (Very Wide, Wide, Not Wide)	Marked Crosswalk (Y/N)	Number and Location of Crosswalks Adequate (Y/N)	Highly Visible (Y/N)	Crosswalk Condition (Good/Fair/ Poor)	Advanced Stop Line (Y/N)	Pedes-trian Xing Signal (Regular, Count-down, None)	Sides of Street with Sidewalk	Median island - Width and Type	Estimated Traffic Vol-ume (High/ Medium/ Low)	Speed Limit	Other Notes (curb exten-sions, midblock cross-ings, etc.)
Edge-wood	Hermit-age	Turrentine Middle; Village at Brookwood; residential	Good	Y	SL	Y	COMPLETE (for where sidewalk ex-ists)	VW (Hermit-age widens into intersec-tion with con-crete dividers for sweeping right turns	Y	Y	N	FAIR	Y	N	3/8	Conc median islands and some painted space on Edgewood; and pork chops on Hermitage	LOW-ME-DIUM	35	T intersection with Her-mitage ending at Turren-tine Middle. Crosswalks and curb ramps in place leading to existing side-walk. Oppty for median refuge crossing Edge-wood and enhancements needed
Edge-wood	Tarleton	Residen-tial; school nearby	Fair	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	NW	Y	N	N	GOOD	Y	N	3/8	N	LOW-ME-DIUM	35	With existing sidewalk on Edgewood (which switches sides at inter-section), need ped cross-ing of Edgewood; curb ramps lacking here
May	Davis	Residential	Fair	N	SS	Y	INCOM-PLETE	VW (May split creating wide right turns)	N	-	-	-	-	N	6/8	Y, wide grassy me-dium	LOW-ME-DIUM	35	With plentiful existing sidewalk, crossing facili-ties needed here.
Davis	Fountain	Residential	Fair	N	SL	N	-	NW	N	-	-	-	-	N	7/8	Y, grassy median on Fountain, south side	LOW-ME-DIUM	35/25	Beautiful tree-lined streets with sidewalk; Virtually no pedestrian crossing treatment here though
Fisher	Rauhut	Residential; commercial nearby	Fair	N	SL	Y	INCOM-PLETE	VW	N	-	-	-	-	N	6/8	N, but pork chop island on NW cor-ner	MEDIUM	35	Sidewalk existing on most sides; no cross-ing treatments with the exception of some curb ramps
Rauhut	Hatch	Residential; conv. Store	Good	N	SL	Y	INADE-QUATE	NW	Y (cross-ing Rauhut on south side)	N	Y	GOOD	Y	Y (cross-ing Rauhut on south side)	6/8	N	MEDIUM	35	Many pedestrians and bicyclists here; incom-plete pedestrian crossing treatments at intersec-tion.
Apple	Rosen-wald	Sellers Gunn Elementary; residential	Fair	N	SS	Y	INCOM-PLETE	NW	Y (cross-ing Apple on north side and crossing Rosen-wald)	Y	N	POOR	Y	N	3/8	N	LOW-ME-DIUM	25/35	T intersection with marked crosswalks that are faded. With school present, enhancements are needed.

Road 1	Road 2	Destinations Served	Sight Distance (Good, Fair, Poor)	Signage (Y/N)	Stop Light/ Stop Sign	Curb Ramp (Y/N)	Curb Ramp Complete/ Incomplete/ Inadequate	Curb Radius (Very Wide, Wide, Not Wide)	Marked Crosswalk (Y/N)	Number and Location of Crosswalks Adequate (Y/N)	Highly Visible (Y/N)	Crosswalk Condition (Good/Fair/ Poor)	Advanced Stop Line (Y/N)	Pedes-trian Xing Signal (Regular, Count-down, None)	Sides of Street with Sidewalk	Median island - Width and Type	Estimated Traffic Vol-ume (High/ Medium/ Low)	Speed Limit	Other Notes (curb exten-sions, midblock cross-ings, etc.)
Maple	Harden	Commercial all corners	Fair	N	SL	Y	INCOM-PLETE	VW	N	-	-	-	-	N	1/8	Conc. Median on Maple (one side); one pork chop island	HIGH	35/45	No pedestrian crossing accommodations other than couple curb ramps.
Whit-sett	William-son	Residen-tial; Newlin Elem.; Forest Hills Park	fAIR	Good	SS	Y	INCOM-PLETE/IN-ADEQUATE	NW	Y	Y	N	GOOD	Y	N	3/8	N	LOW	25	Main issue is the corner where existing cross-walks come together (no curb ramps or landing pad)
Webb	William-son	Residential; school, park nearby	Good	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	NW	Y	Y	N	FAIR	Y	N	2/8	N	MEDIUM	25/35	Sidewalk ends here go-ing into Graham; Curb ramps lacking; slope issues at corners
Webb	Anthony	Commercial; residential; conv. Store	Fair	N	SL	Y	INADE-QUATE	NW	N	-	-	-	-	N	8/8	N	MEDIUM-HIGH	25/35	Sidewalks present at all corners but no crossing treatments other than curb ramps. Multiple, wide driveways an issue at all corners (auto repair store, gas station, etc.).
Webb	Gilmer	Commercial; residential; conv. store	Fair	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	NW	N	-	-	-	-	N	7/8	N	MEDIUM	25/35	Sidewalks present on all corners but one. No crossing treatments at all, other than some curb ramps that need en-hancement.
Webb	Mebane	Residential mostly; DT nearby	Fair	N	SL	Y	INCOM-PLETE	W	N	-	-	-	-	N	4/8	N	MEDIUM	35	Gap in sidewalk on Mebane and Webb (east side of intersectio). No crossing treatments present other than couple curb ramps.
Me-bane	Ireland	Residen-tial; aprts; laundromat, church	Fair	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	W	N	-	-	-	-	N	6/8	N	MEDIUM	35	Couple gaps in sidewalk network here. No cross-ing treatments present other than couple inad-equate curb ramps.
Main	St. John	Residential	Poor (hill)	N	SS	Y	INADE-QUATE	NW	N	-	-	-	-	N	5/8	N	LOW-ME-DIUM	25/35	No crossing treatments present.

Road 1	Road 2	Destinations Served	Sight Distance (Good, Fair, Poor)	Signage (Y/N)	Stop Light/ Stop Sign	Curb Ramp (Y/N)	Curb Ramp Complete/ Incomplete/ Inadequate	Curb Radius (Very Wide, Wide, Not Wide)	Marked Crosswalk (Y/N)	Number and Location of Crosswalks Adequate (Y/N)	Highly Visible (Y/N)	Crosswalk Condition (Good/Fair/ Poor)	Advanced Stop Line (Y/N)	Pedes-trian Xing Signal (Regular, Count-down, None)	Sides of Street with Sidewalk	Median island - Width and Type	Estimated Traffic Vol-ume (High/ Medium/ Low)	Speed Limit	Other Notes (curb exten-sions, midblock cross-ings, etc.)
Main	Ireland	Residential	Good	N	SS	Y	INCOM-PLETE/IN-ADEQUATE	NW	N	-	-	-	-	N	8/8	N	LOW-ME-DIUM	25/35	No crossing treatments, other than curb ramps, present with all 8 sides having sidewalk.
Main	Ruffin/ Hawkins	Downtown; residential; Barker Park	Poor	N	SS	Y	INADE-QUATE	NW	N	-	-	-	-	N	10/10	N	LOW-ME-DIUM	20	5 point intersection essentially; Sidewalks present all directions but no crossing treatments… some issue with drive-ways on two corners
Church	Trade	Downtown; residential; church, some com-mercial	Fair	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	NW	N	-	-	-	-	N	5/8	N	MEDIUM-HIGH	25/35	Some sidewalk gaps present. Driveways an issues on two corners. No crossing treatments at all.
Church	Ireland	Grocery Store, Dollar Store, North-gate Plaza, Housing De-velopment, residential area	Fair	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	NW	Y	N	N	GOOD	Y	N	2/8	N	MEDIUM-HIGH	25/35	Footpaths noted near grocery store
Church	Beau-mont	Gas station mini-marts with some nearby resi-dential	Good	N	SL	N	INCOM-PLETE/IN-ADEQUATE	NW	N	-	-	-	Y	N	0/8	N	MEDIUM-HIGH	25/45	Landscaping on corners and utility poles serve as obstructions
Vaughn	Graham Hopedale	East Lawn Elementary, Alamance County Government Building	Good	Y	SL	Y	INCOM-PLETE/IN-ADEQUATE	W	Y	N	N	FAIR	Y	N	3/5	12’ con-crete, and 6’ painted	MEDIUM-HIGH	35	Concrete median island is not wheelchair acces-sible and protrudes into the crosswalk.
Gra-ham-Hoped-ale	McKin-ney	East Lawn Elementary, Alamance County Government Building	Good	Y	SS, in one direc-tion only	Y	INADE-QUATE	NW	Y	Y	N	GOOD	Y	N	5/5	N	MEDIUM-HIGH	35	

Road 1	Road 2	Destinations Served	Sight Distance (Good, Fair, Poor)	Signage (Y/N)	Stop Light/ Stop Sign	Curb Ramp (Y/N)	Curb Ramp Complete/ Incomplete/ Inadequate	Curb Radius (Very Wide, Wide, Not Wide)	Marked Crosswalk (Y/N)	Number and Location of Crosswalks Adequate (Y/N)	Highly Visible (Y/N)	Crosswalk Condition (Good/Fair/ Poor)	Advanced Stop Line (Y/N)	Pedes-trian Xing Signal (Regular, Count-down, None)	Sides of Street with Sidewalk	Median island - Width and Type	Estimated Traffic Vol-ume (High/ Medium/ Low)	Speed Limit	Other Notes (curb exten-sions, midblock cross-ings, etc.)
Church	McKin-ney	Homer Andrews Elementary, High School nearby and Town & Country Nature Park nearby;	Good	Y	SL	N	INCOM-PLETE/IN-ADEQUATE	NW	Y	N	Y	GOOD	Y	CD	1/5	N	MEDIUM-HIGH	25/45	Serves as a ‘gateway’ for the City ofr Burlington
Church	Sellers Mill	Cum Park Plaza, Food Lion, Roses, other com-mercial destina-tions, nearby schools, nearby resi-dential, and post office	Good	N	SL	N	INCOM-PLETE/IN-ADEQUATE	NW	N	N	-	-	Y	N	1/8	N	MEDIUM-HIGH	25/45	Utilities (poles, guide wires, fire hydrants) on corners may serve as obstructions.
Sellers Mill	Richards/ Peidmont	Cummings High School, Broadview Middle School	Poor	Y	SS, one direc-trion	Y	INCOM-PLETE/IN-ADEQUATE	NW	Y	Y	N	GOOD	N	N	1/8	N	Medium	35	Two other crossings to the north and south are similar in condition.
Gra-ham-Hoped-ale	Hanover	Fairchild Park, Wal Mart, Food Mart	Good	N	SL	N	-	NW	N	-	-	-	Y	N	0/8	N	Medium-High	35	Servaes as a ‘Gateway’ to Burlington
Gra-ham-Hoped-ale	Mebane	Fairchild Park, Wal Mart, East Port Shop-ping Center	Good	N	SL	Y	INCOM-PLETE/IN-ADEQUATE	NW	N	-	-	-	Y	N	2/8	N	Medium-High	35	Some sides of approch-ing streets have curb and gutter, others have open shoulders.
Gra-ham-Hoped-ale	Church	Wal Mart, fast food, general commer-cial, nearby school	Good	N	SL	N	-	W	N	-	-	-	Y	N	0/8	N	High	35/45	No existing curb ramps.

Road 1	Road 2	Destinations Served	Sight Distance (Good, Fair, Poor)	Signage (Y/N)	Stop Light/ Stop Sign	Curb Ramp (Y/N)	Curb Ramp Complete/ Incomplete/ Inadequate	Curb Radius (Very Wide, Wide, Not Wide)	Marked Crosswalk (Y/N)	Number and Location of Crosswalks Adequate (Y/N)	Highly Visible (Y/N)	Crosswalk Condition (Good/Fair/ Poor)	Advanced Stop Line (Y/N)	Pedestrian Xing Signal (Regular, Countdown, None)	Sides of Street with Sidewalk	Median island - Width and Type	Estimated Traffic Volume (High/ Medium/ Low)	Speed Limit	Other Notes (curb extensions, midblock crossings, etc.)
Mebane	Beamont	I.H Food Mart, Maranatha Grocery Store, neighborhood residential areas	Good	N	SL	N	-	NW	N	-	-	-	Y	N	1/8	N	Medium	35	Some sides of approching streets have curb and gutter, others have open shoulders.
Mebane	Kitchen	City Park, YMCA	Good	N	SL	Y	INCOMPLETE/INADEQUATE	NW	N	-	-	-	Y	N	2/5	N	Medium-High	35	No formal pedestrinan access exists between sidewalk and nearby City Park Walking Track
Mebane	Sixth	Links residential areas and school to the south, downtown areas to the north and east and City Park to the west	Good	N	SL	Y	INCOMPLETE/INADEQUATE	W	Y	N	N	Poor	Y	CD	5/8	N	Medium-High	35	
Mebane	Maple	Downtown; Post office; First Baptist Church; residential	Good	N	SL	Y	INADEQUATE	NW	N	-	-	-	N	N	7/8	N	Medium	35	No crossing treatments other than curb cuts;
Webb	Broad	Downtown; residential	Fair	N	SL	Y	COMPLETE	W	N	-	-	-	-	Y	6/8	Y (concrete median, north side on Webb)	Medium-High	35	No crossing treatments other than curb ramps
Elmira	Webb/ Park/RR	Residential connection to Downtown	Fair	N	SL	Y	INCOMPLETE/INADEQUATE	NW	N	-	-	-	-	N	2/5	N	Medium-	35	No pedestrian accommodations across Park, Railroad, or Webb. Crossing the railroad forces the pedestrian into the roadway.
Sharpe	Rauhut	Conv. Store; residential	Poor	N	SL	Y	INCOMPLETE/INADEQUATE	W	N	-	-	-	-	N	1/8	N	Medium	35	No pedestrian treatments for intersection other than one curb ramp

Road 1	Road 2	Destinations Served	Sight Distance (Good, Fair, Poor)	Signage (Y/N)	Stop Light/ Stop Sign	Curb Ramp (Y/N)	Curb Ramp Complete/ Incomplete/ Inadequate	Curb Radius (Very Wide, Wide, Not Wide)	Marked Crosswalk (Y/N)	Number and Location of Crosswalks Adequate (Y/N)	Highly Visible (Y/N)	Crosswalk Condition (Good/Fair/ Poor)	Advanced Stop Line (Y/N)	Pedestrian Xing Signal (Regular, Countdown, None)	Sides of Street with Sidewalk	Median island - Width and Type	Estimated Traffic Volume (High/ Medium/ Low)	Speed Limit	Other Notes (curb extensions, midblock crossings, etc.)
Church	Fifth	Downtown; residential	Fair	N	SL	Y		NW	N	-	-	-	-	N	7/8	N	Medium-High	25/35	No pedestrian treatments for intersection other than curb ramps; With sidewalk on most legs and residential connection to Downtown, ped treatments are needed
Church	Country Club	Williams High School; residential; commercial	Fair	N	SL	Y	INCOMPLETE	W	Y	Y	N	Good	Y	Y (missing for one of leg)	4/8	Y (concrete median on Church - west side of intersection)	High	35	Pedestrian treatments are comprehensive; however, curb ramp is missing on one corner; countdown signal is missing for one of the crosswalks
Mebane	Alamance	Commercial; residential nearby	Good	N	SL	Y	-	VW	N	-	-	-	-	N	4/8	N	High	35	Mebane Street under construction at time of study. Crossing lacks pedestrian treatments
Chapel Hill	Tucker	Fairway One Stop (grocery/gas), residential areas	Poor	N	SL	N	-	VW	N	-	-	-	Y	N	0/8	N	High	35	Pork chop island on west corner.
Garden	Boone Station	Alamance Crossing, Senior Center, Apartments	Good	N	SL	Y	INCOMPLETE	W	N	-	-	-	-	N	2/8	Y (concrete median on Boone Station - west side)	Medium	35	Shopping center on one side; Summerlyn Place Apartments and senior center on other side

Table E2 - Intersection Recommendation Table

Road 1	Road 2	Needs Sidewalk (Y/N)	Stripe New H/V Crosswalk Markings (Y/N)	Restripe Existing Crosswalk Markings - H/V (Y/N)	Advanced Stop Lines (Y/N)	Reconstruct Existing Curb Ramps (Y/N)	Construct New Curb Ramps (Y/N)	Median Refuge Islands (Y/N)	Curb Extensions; Curb Radius Reduction (Y/N)	Pedestrian Countdown Signal Heads (Y/N)	Restrict Right turn on Red	High - Visibility Pedestrian Warning Signs	In-Roadway Pedestrian Crossing Signs	Remove Sight-Distance Obstruction	Pedestrian Underpass/ Overpass	Details and Extra Notes
University	Boone Station	Y	Y	-	Y	Y	Y	Y	N	Y	N	N	N	N	N	Sidewalk needed first with marked crosswalks and countdown signals needed.
University	Rural Retreat	Y	Y	-	Y	Y	-	N	Y	Y	N	N	N	N	N	Sidewalk needed to connect to Boone Station. Marked crosswalks and countdown signals needed.
University	Shoppes at Waterford	Y	Y	-	Y	Y	Y	Y	N	Y	N	Y	N	N	N	Marked crosswalk and countdown signal needed to get pedestrians from sidewalk on east side into shopping center. Sidewalk would also be appropriate on west side of University.
University	Church	Y	Y	-	Y	Y	Y	Y (including pork chop island refuge oppty)	N	Y	N	N	N	N	N	Sidewalk needed first with crossing treatments (marked crosswalks and countdown signals). Opportunity for utilization of median island space and pork chop island space.
Church	St. Marks Church	Y	Y	-	Y	Y	Y	N	N	Y	N	N	N	N	N	Sidewalk needed first with crossing treatments (marked crosswalks and countdown signals).
Church	Huffman Mill	Y	Y	-	Y	N	Y	N	N	Y	N	N	N	N	N	Sidewalk needed first with crossing treatments (marked crosswalks and countdown signals).

Road 1	Road 2	Needs Sidewalk (Y/N)	Stripe New H/V Crosswalk Markings (Y/N)	Restripe Existing Crosswalk Markings - H/V (Y/N)	Advanced Stop Lines (Y/N)	Reconstruct Existing Curb Ramps (Y/N)	Construct New Curb Ramps (Y/N)	Median Refuge Islands (Y/N)	Curb Extensions; Curb Radius Reduction (Y/N)	Pedestrian Countdown Signal Heads (Y/N)	Restrict Right turn on Red	High - Visibility Pedestrian Warning Signs	In-Roadway Pedestrian Crossing Signs	Remove Sight-Distance Obstruction	Pedestrian Underpass/ Overpass	Details and Extra Notes
Church	Alamance	Y	Y	-	Y	N	Y	Y	N	Y	N	N	N	N	N	Sidewalk needed first along both roads. With number of concrete median dividers, opportunity for creation of pedestrian refuge spaces along way. This intersection will require extensive study before applying ped treatments.
Church	Tarleton	Y	N	Y	-	N	N	Y	N	Y	Y	Y	N	N	N	Existing marked crosswalks should be highly-visible. Also, there is opportunity for median refuge space. Countdown signals should also be provided. Sidewalk would be ideal along Tarleton from park to high school
Main	Kitchin	Y	Y	-	Y	N	Y	N	N	Y	N	Y	N	N	N	Sidwalk needed first. Marked crosswalks with curb ramps and countdown signals should also be provided with proximity to YMCA and park.
Edgewood	O'Neal	N	N	Y	-	N	N	N	N	-	N	N	N	N	N	Existing marked crosswalks need new paint (faded).
Edgewood	Hermitage	Y	Y	Y	Y	N	N	Y	N	Y	N	Y	N	N	N	Marked crosswalk needed across school entrance. All crosswalks should be high-visibility. Opportunity for median refuge in current crossing of Edgewood. Crossing guard should be utilized here.
Edgewood	Tarleton	Y	Y	Y	-	Y	Y	N	N	Y	N	N	N	N	N	Marked crosswalk especially needed across Edgewood with curb ramps.
May	Davis	N	Y (across May)	-	Y	N	Y	Y (utilize existing large median separating right/left turns on May)	N	N	N	Y	N	N	N	With sidewalk existing on Davis, marked crosswalk, refuge island (utilizing existing grassy, tree-lined median), curb ramps needed to cross May. For crossing Davis, add marked crosswalk and utilize grassy median at east side.
Davis	Fountain	N	Y	-	-	N	Y	N	N	N	N	Y	N	N	N	With existing sidewalk on most sides of intersection, pedestrian crossing treatments are needed (high-visibility marked crosswalks and curb ramps)
Fisher	Rauhut	N	Y	-	Y	N	Y	Y (PORK CHOP ISLAND REFUGE)	N	Y	N	Y	N	N	N	High visibility marked crosswalks and countdown signals a priority. Utilize painted pork chop island space for raised refuge.

Road 1	Road 2	Needs Sidewalk (Y/N)	Stripe New H/V Crosswalk Markings (Y/N)	Restripe Existing Crosswalk Markings - H/V (Y/N)	Advanced Stop Lines (Y/N)	Reconstruct Existing Curb Ramps (Y/N)	Construct New Curb Ramps (Y/N)	Median Refuge Islands (Y/N)	Curb Extensions; Curb Radius Reduction (Y/N)	Pedestrian Countdown Signal Heads (Y/N)	Restrict Right turn on Red	High - Visibility Pedestrian Warning Signs	In-Roadway Pedestrian Crossing Signs	Remove Sight-Distance Obstruction	Pedestrian Underpass/ Overpass	Details and Extra Notes
Rauhut	Hatch	Y	Y	N	Y	Y	Y	N	N	Y	N	Y	N	N	N	With existing sidewalk present most sides, marked crosswalk and countdown signals needed all ways (with curb ramp improvements)
Apple	Rosenwald	Y	N	Y	-	N	Y	N	N	N	N	Y	Y	N	N	Restripe crosswalks to make high-visibility; Add curb ramp on east side of Apple; Add in-roadway signage and advanced crossing signage for crossing Apple
Maple	Harden	Y	Y	-	Y	-	Y	N	N	Y	N	N	N	N	N	Need sidewalk first; Marked crosswalks, countdown signals, and curb ramps necessary; Utilize pork chop island for refuge. Ensure crosswalks are at 90 degree angles.
Whitsett	Williamson	N	N	Y	-	Y	Y	N	N	N	N	Y	N	N	N	On E corner, need to add curb ramps and concrete “landing” pad where crosswalks come together. Make crosswalks highly-visible and improve existing curb ramps
Webb	Williamson	Y	N	Y	-	Y	Y	N	N	N	N	Y	N	N	N	Marked crosswalks should be highly-visible. Curb ramps needed on east side of Williamson.
Webb	Anthony	N	Y	-	Y	Y	N	N	N	Y	Y	Y	N	N	N	Marked crosswalks and countdown signals a must at this intersection. Curb ramps need repair. Driveways should be addressed by more clearly delineating sidewalk space.
Webb	Gilmer	Y (on one side of Webb heading to DT)	Y	N	Y	Y	Y	N	N	Y	N	Y	N	N	N	Marked crosswalks, curb ramps, and countdown signals the priority here. Webb is quite wide so there is opportunity for refuge or bulbout (but would require further study and corridor analysis).
Webb	Mebane	Y	Y	N	Y	N	Y	N	N	Y	N	Y	N	N	N	Sidewalk needed along Mebane (east of intersection) and along Webb (east side). Marked crosswalks and countdown signals needed all legs with addition of curb ramps.

Road 1	Road 2	Needs Sidewalk (Y/N)	Stripe New H/V Crosswalk Markings (Y/N)	Restripe Existing Crosswalk Markings - H/V (Y/N)	Advanced Stop Lines (Y/N)	Reconstruct Existing Curb Ramps (Y/N)	Construct New Curb Ramps (Y/N)	Median Refuge Islands (Y/N)	Curb Extensions; Curb Radius Reduction (Y/N)	Pedestrian Countdown Signal Heads (Y/N)	Restrict Right turn on Red	High - Visibility Pedestrian Warning Signs	In-Roadway Pedestrian Crossing Signs	Remove Sight-Distance Obstruction	Pedestrian Underpass/ Overpass	Details and Extra Notes
Mebane	Ireland	Y	Y	N	Y	Y	Y	N	Y (SW corner)	Y	Y	Y	N	N	N	Sidewalk needed along Mebane (west of intersection) and along Ireland (north of intersection). Needs marked crosswalks and countdown signals. Curb bulbout is possible to reduce turning radius on SW corner.
Main	St. John	Y	Y	-	Y	Y	Y	N	N	N	N	Y	N	N	N	Need high visibility marked crosswalk and advanced pedestrian crossing signs (preferably with flashing lights). Main, in general, is a good candidate for road diet (currently 4 lanes with low traffic volumes). Would make corridor more walkable.
Main	Ireland	N	Y	-	Y	Y	Y	N	Y (small bulbouts an option on all corners)	N	N	Y	N	N	N	Need high visibility marked crosswalk and advanced pedestrian crossing signs (preferably with flashing lights). Main, in general, is a good candidate for road diet (currently 4 lanes with low traffic volumes). Would make corridor more walkable. Bulbouts should be considered.
Main	Ruffin/ Hawkins	N	Y	-	Y	Y	N	N	Y (with wide Main Street, bulbouts are an option)	N	N	Y	Y	N	N	Marked crosswalks are the first priority. Curb ramp improvements and driveway/sidewalk improvements also needed. Signage should be considered.
Church	Trade	Y	Y	-	Y	Y	Y	N	N	Y	N	Y	N	N	N	Gaps in sidewalk should be filled. Marked crosswalks and countdown signals are prime importance. Driveways need improvement (sidewalk delineation).
Ireland	Church	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	Y	N	Unsed grocery signage at pedestrian height is a sight obstruction that could be removed.
Church	Beaumont	Y	Y	N	Y	N	Y	N	N	Y	N	Y	N	N	N	Utilities on corners will need to be relocated or worked around.
Vaugn	Graham-Hopedale	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	N	Two median refuge opportunities: across Vaugn through the concrete median and across Grahm-Hopedale on north side.
Graham-Hopedale	McKinney	N	Y	N	N	N	N	N	N	N	N	N	Y	N	N	Crossing guard needed.

Road 1	Road 2	Needs Sidewalk (Y/N)	Stripe New H/V Crosswalk Markings (Y/N)	Restripe Existing Crosswalk Markings - H/V (Y/N)	Advanced Stop Lines (Y/N)	Reconstruct Existing Curb Ramps (Y/N)	Construct New Curb Ramps (Y/N)	Median Refuge Islands (Y/N)	Curb Extensions; Curb Radius Reduction (Y/N)	Pedestrian Countdown Signal Heads (Y/N)	Restrict Right turn on Red	High - Visibility Pedestrian Warning Signs	In-Roadway Pedestrian Crossing Signs	Remove Sight-Distance Obstruction	Pedestrian Underpass/ Overpass	Details and Extra Notes
Church	McKinney	Y	N	N	N	N	Y	N	N	N	N	N	N	N	N	Long term recommendation would include sidewalk and crosswalk along Church and across McKinney
Church	Selers Mill	Y	Y	N	Y	N	Y	N	N	Y	N	Y	N	N	N	No existing curb ramps. Utilities on corners will need to be relocated or worked around.
Selers Mill	Richards/ Piedmont	Y	Y	N	N	N	Y	N	N	N	N	N	N	N	N	Crossing guards should be considered at this intersection, and at intersections to the north and south serving the schools. Sellars Mill could be considered for a complete street project, possibly with a road diet anf bicycle lanes.
Graham-Hopedale	Hanover	Y	Y	N	Y	N	Y	N	N	Y	N	Y	N	N	N	No existing sidewalk or curb/gutter. Utility boxes and donation box on SW corner may need to be relocated.
Graham-Hopedale	Mebane	Y	Y	N	Y	Y	Y	N	N	Y	N	Y	N	N	N	Some utilities (poles, guide wires, and fire hydrant will need to be worked around.)
Graham-Hopedale	Church	Y	Y	N	Y	N	Y	N	N	Y	N	Y	N	N	N	Pedestrian warning signs for cars turning off of Church should be considered. A pork chop ped refuge island opportunity exists on the SE corner.
Mebane	Beamont	Y	Y	N	Y	N	Y	N	N	Y	N	Y	N	N	N	Pedestrian space is undefined at some corners, where there is open driveway access. Crosswalks should be stripped across driveways and access management should be taken into account in general.
Mebane	Kitchen	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N	Crosswalk recommended across Kitchen on park side only. Sidewalk should connect to City Park Walking Trail.
Mebane	Sixth	N	Y	Y	Y	Y	Y	N	N	N	N	Y	N	N	N	
Maple	Mebane	Y (one side of Mebane)	Y	-	Y	Y	N	N	N	Y	N	Y	N	N	N	Curb ramps need improvement; Marked crosswalks and countdown signals are most important here.
Webb	Broad	Y	Y	-	Y	N	N	Y (where existing island is located)	N	Y	N	Y	N	N	N	Need crosswalks and countdown signals most. Could utilize median island for small refuge.
Elmira	Webb/Park/ RR	N	Y	-	Y	Y	Y	N	N	Y	N	N	N	N	N	Need separated pedestrian crossing over railroad tracks. Need marked crosswalks across Park and Webb.

Road 1	Road 2	Needs Sidewalk (Y/N)	Stripe New H/V Crosswalk Markings (Y/N)	Restripe Existing Crosswalk Markings - H/V (Y/N)	Advanced Stop Lines (Y/N)	Reconstruct Existing Curb Ramps (Y/N)	Construct New Curb Ramps (Y/N)	Median Refuge Islands (Y/N)	Curb Extensions; Curb Radius Reduction (Y/N)	Pedestrian Countdown Signal Heads (Y/N)	Restrict Right turn on Red	High - Visibility Pedestrian Warning Signs	In-Roadway Pedestrian Crossing Signs	Remove Sight-Distance Obstruction	Pedestrian Underpass/ Overpass	Details and Extra Notes
Sharpe	Rauhut	Y	Y	-	Y	Y	Y	N	N	Y	N	N	N	N	N	Need sidewalk along Sharpe and both sides of Rauhut.Marked crosswalk needed mainly from existing sidewalk on west side of Rauhut to conv. Store on north side of intersection.
Church	Fifth	N	Y	-	Y	N	N	N	N	Y	N	Y	N	N	N	Marked crosswalks and countdown signals needed here.
Church	Country Club	Y	N	Y	-	N	Y	N	Y (for SW corner)	Y (one more needed)	Y	Y	N	N	N	Add curb ramp on NE corner; Add missing countdown signal; Consider bulbout for righthand turn off Country Club onto Church.
Mebane	Alamance	Y	Y	-	Y	N	Y	Y	N	Y	N	N	N	N	N	Sidewalk needed along Alamance. Marked crosswalks and countdown signals needed for crossing.
Chapel Hill	Tucker	Y	Y	-	Y	-	Y	N	N	Y	N	Y	N	N	N	Opportunity for pork shop refuge island.
Garden	Boone Station	Y	Y	-	Y	N	Y	N	N	Y	N	Y	N	N	N	Sidewalk needed first and foremost. Curb ramp, marked crosswalk, and countdown signals are needed crossing treatments

Appendix F: Sidewalk Network Toolbox

						Top 1-10 "Most in Need of Improvement"	Contains a Top 10 Intersection "Most in Need of Improvement"	Direct Access to/from a School	Elem., Middle, and High School Proximity (1/2 mile radius)	College/University Proximity (1 mile radius)	Direct Access to/from a Proposed Trail	Direct Access to/from a Park or Recreation Center	Park or Recreation Center Proximity (1/2 mile radius)	Direct Access to/from an Existing Sidewalk	Serves Low Income Areas with Lower Car-Ownership Rates	Segment Contains a High Level of Reported Ped Accidents (>1)	Segment Contains Reported Ped Accidents	Direct Access to/from Downtown	Direct Access to Major Shopping Centers/Groceries	Direct Access to/from Higher Density Residential Areas	Known worn footpath	Priority Score Total	Segments completely beyond the town limits
						4	4	5	4	3	3	4	4	5	5	4	4	4	4	3	5	65	
Segment ID	Road Name	From	To	No. of Sides	Total Length (miles)	Public Input		School Proximity			Parks & Recreation			Transportation				Destinations			Footpaths	Total	Location
75	Graham Hopedale Rd	Mebane St	Vaughn Rd	2	0.8	4	4		4				4	5	5	4	4		4	3		41	
76	Graham Hopedale Rd	Hanover Rd	Mebane St	2	1.1	4			4			4	4	5	5	4	4		4	3		41	
124	Mebane St	Chapel Hill Rd	Kitchin St	1/2	0.5	4			4			4	4	5	5	4	4	4		3		41	
175	Church St	Graham Hopedale Rd	Sellars Mill Rd	2	0.8	4	4		4				4	5	5	4	4		4	3		41	
11	Ireland St	Apple St	Virginia Ave	2	0.6			5	4				4	5	5		4	4		3	5	39	
58	Tarleton Ave	Church St	Country Club Dr	2	0.4			5	4			4	4	5	5		4	4		3		38	
77	Mebane St	Graham Hopedale Rd	N Sellars Mill Rd	2	0.8	4			4				4	5	5		4		4	3	5	38	
68	Church St	Ireland St	N Fisher St	1	0.4	4			4				4	5	5	4	4	4		3		37	
72	Mebane St	Beaumont Ave	S Graham Hopedale Rd	1	0.4	4			4				4	5	5	4	4		4	3		37	
74	Church St	Beaumont Ave	Graham Hopedale Rd	2	0.9	4	4		4				4	5	5	4	4			3		37	
55	Church St	Country Club Dr	Glendale Ave	1/2	0.2	4		5	4				4	5	5		4	4				35	
71	Mebane St	Queen Ann St	Beaumont Ave	2	0.5	4							4	5	5		4	4		3	5	34	
105	Graham Hopedale Rd	McKinney St	Tom Barnwell Dr	1	0.4	4		5	4					5	5	4	4			3		34	
54	Main St	Kitchin St	E Kime St	1	0.4				4			4	4	5	5		4	4		3		33	
65	Hatch St	Lakeside Ave	Rauhut St	1	0.2				4				4	5	5	4	4	4		3		33	
69	Church St	Fisher St	Beaumont Ave	2	1.0	4			4					5	5	4	4	4		3		33	
84	Church St	Sellars Mill Rd	Mckinney St	2	1.4	4	4	5	4				4	5					4	3		33	
93	Rauhut St	Key St	Shepherd St	1	0.1				4			4	4	5	5		4	4		3		33	
123	Mebane St	Kitchin St	Sixth St	1	0.4	4			4			4	4	5	5			4		3		33	
23	Huffman Mill Rd	Forestdale Dr	Mebane St	1/2	1.1	4			4				4	5		4	4		4	3		32	
247	Apple St	Rauhut St	Ireland St	1	0.3			5	4					5	5				4	3	5	31	
189	Maple Ave	Hanford Rd	Chapel Hill Rd	2	0.8				4				4	5		4	4		4		5	30	
248	Ireland St	Mebane St	Broad St.	1	0.1								4	5	5		4	4		3	5	30	

Segment ID	Road Name	From	To	No. of Sides	Total Length (miles)	Public Input		School Proximity			Parks & Recreation			Transportation				Destinations			Footpaths	Total	Location
22	Church St	Huffman Mill Rd	Delaney Dr	2	0.6	4	4		4				4	5			4		4			29	
32	Church St	International Dr	Huffman Mill Rd	2	0.6	4	4		4				4	5			4		4			29	
57	Sunset Dr	Tarleton Ave	Parkview Dr	1	0.1			5	4				4	5			4	4		3		29	
60	Chapel Hill Rd	Church St	S Mebane St	1	0.6	4	4	5	4				4	5						3		29	
62	Rauhut St	Massey St	Sharpe Rd	1	0.3				4			4	4	5	5		4			3		29	
63	Sharpe Rd	Rauhut St	Ross St	1	0.4				4				4	5	5	4	4			3		29	
73	Beaumont Ave	Church St	N Mebane St	2	0.4				4				4	5	5	4	4			3		29	
81	Graham St	Maryland Ave	Beaumont Ave	1	0.4							4	4	5	5		4	4		3		29	
89	Trail Six	Delaney Dr	Alamance Rd	1	0.6			5	4			4	4	5			4			3		29	
97	Queen Ann St	Railroad St	Webb Ave	1	0.5				4				4	5	5		4	4		3		29	
116	Webb Ave	Williamson St	Tinnin St	1	0.3	4			4				4	5	5			4		3		29	
126	Kitchin St	Church St	Main St	1	0.1				4				4	5	5		4	4		3		29	
146	Hall Ave	Hatch St	Apple St	1	0.1				4				4	5	5		4	4		3		29	
150	Church St	Hillcrest Ave	Sixth St	1	0.0	4			4				4	5	5			4		3		29	
183	Wicker St	Tillman St	Lakeside Ave	1	0.2				4			4	4	5	5			4		3		29	
204	Tarleton Ave	Country Club Dr	Sunset Dr	1	0.2			5	4				4	5			4	4		3		29	
244	Church St	ONeal St	Tarleton Ave	1	0.1	4			4			4	4	5	5					3		29	
33	Shadowbrook Dr	Edgewood Ave	Neese Dr	1	0.5	4	4		4				4	5					4	3		28	
47	Webb Ave	Glen Raven Rd	Hawthorne Ln	2	1.1	4			4				4	5			4		4	3		28	
50	Church St	Engleman Ave	N ONeal St	2	0.9	4	4		4				4	5					4	3		28	
52	Front St	Rosalyn Dr	Atwater St	1	0.6	4			4			4	4	5				4		3		28	
85	Sellars Mill Rd	Church St	Morningside Dr	1	0.7		4		4				4	5			4		4	3		28	
157	Quintas Ave	Belmont St	Wood Ave	1	0.2				4			4	4	5			4	4		3		28	
125	Kitchin St	Overbrook Rd	Mebane St	1	0.2				4			4	4	5	5			4				26	
156	Williamson St	Forest Hills Park	Webb Ave	1	0.2				4			4	4	5	5			4				26	
8	Church St	St Marks Church Rd	Collinwood Dr	1	0.7	4	4						4	5			4		4			25	
59	Trail One	Alamance Rd	Trail Eight	2	0.3		4	5	4				4	5						3		25	
67	Beaumont Ave	Morningside Dr	N Church St	1	0.4				4					5	5	4	4			3		25	
70	Mebane St	James St	Queen Ann St	2	0.7	4							4	5	5			4		3		25	
82	Graham St	Gilmer St	Maryland Ave	1	0.4							4	4	5	5			4		3		25	
83	Beaumont Ave	Mebane St	Graham St	1	0.4							4	4	5	5		4			3		25	
90	Trail Eight	Trail Two	Mebane St	1	0.4			5	4				4	5			4			3		25	
94	Fisher St	Rauhut St	Ireland St	2	0.4				4				4	5	5			4		3		25	
95	Fisher St	Ireland St	Church St	2	0.7				4				4	5	5			4		3		25	
101	St John St	Grace Ave	Mebane St	1	0.1								4	5	5		4	4		3		25	
127	St Marks Church Rd	Peeler St	Church St	1	0.4		4					4	4	5			4		4			25	
140	Durham St	Walnut St	Logan St	1	0.5								4	5	5		4	4		3		25	
147	Apple St	Hall Ave	Storey St	1	0.0				4				4	5	5			4		3		25	
148	Rauhut St	Apple St	Union Ave	1	0.0				4				4	5	5			4		3		25	
151	Main St	Kime St	Sixth St	2	0.1				4				4	5	5			4		3		25	

Segment ID	Road Name	From	To	No. of Sides	Total Length (miles)	Public Input		School Proximity			Parks & Recreation			Transportation				Destinations			Footpaths	Total	Location
161	Sidney Ave	Welch St	Queen Ann St	1	0.2				4				4	5	5			4		3		25	
164	Cleveland Ave	Long St	Queen Ann St	1	0.1				4				4	5	5			4		3		25	
167	Tucker St	Kenwood Dr	Avon Ave	1	0.4								4	5	5		4	4		3		25	
179	Holt St	Fisher St	Main St	1	0.2				4				4	5	5			4		3		25	
181	Lakeside Ave	Hancock St	Hatch St	1	0.4				4				4	5	5			4		3		25	
182	Logan St	Durham St	Lakeside Ave	1	0.2				4				4	5	5			4		3		25	
184	Elmira St	Burch Bridge Rd	Staley St	1	0.4								4	5	5		4	4		3		25	
222	Turrentine St	Southern Neighbor-hood Park	Avon Ave	1	0.4							4	4	5	5			4		3		25	
245	Alamance Rd	Trail Five	Mebane St	2	0.6	4	4		4					5		4	4					25	
36	Front St	E Trollinger Ave	Saddle Club Rd	3	0.4	4			4	3				5	5					3		24	
44	Front St	Rockwood Ave	Hermitage Rd	1	0.4	4			4				4	5			4			3		24	
48	Webb Ave	Hawthorne Ln	Willowbrook Dr	2	0.9	4			4				4	5				4		3		24	
51	Alamance Rd	Church St	Trail Five	2	1.0	4	4		4				4	5						3		24	
158	Whitsett St	Thompson St	Cates Ave	1	0.1				4			4	4	5				4		3		24	
215	Graham Hopedale Rd	Hanover Rd	River St	1	0.2	4						4	4		5		4			3		24	
223	Maple Ave	Flushing St	Albany St	1	0.6				4			4	4	5				4		3		24	
43	Front St	Briarcliff Rd	Rockwood Ave	1	0.7	4			4	3			4	5						3		23	
141	Durham St	Cadiz St	Walnut St	1	0.4							4	4			4	4	4		3		23	
176	Richards Ave	West end of street	Sellars Mill Rd	1	0.1			5	4				4	5	5							23	
229	Berkley Rd	Woodhaven Dr	Regent Park Ln	1	0.5				4		3	4	4	5						3		23	
230	Regent Park Ln	WoodHaven Dr	End of Street	1	0.2				4		3	4	4	5						3		23	
24	Delaney Dr	Church St	Trail Six	1	0.4			5	4			4	4	5								22	
31	Church St	Forestdale Dr	International Dr	1	0.3	4	4		4				4	5								21	
61	Sharpe Rd	Lakeside Ave	Rauhut St	1	0.6								4	5	5		4			3		21	
64	Apple St	Ross St	Sharpe Rd	1	0.6				4				4	5	5					3		21	
66	Beaumont Ave	Apple St	Morningside Dr	1	0.5				4				4	5	5					3		21	
79	Sellars Mill Rd	Hanover Rd	Mebane St	2	1.0			5	4				4	5						3		21	
96	Maple Ave	Anthony St	Flushing St	2	0.3								4	5	5			4		3		21	
98	Grace Ave	St. John St	Piedmont Way	1	0.2								4	5	5			4		3		21	
99	Piedmont Way	Rainey St	Mebane St	1	0.2								4	5	5			4		3		21	
102	James St	Grace Ave	Mebane St	1	0.1								4	5	5			4		3		21	
106	Morningside Dr	Beaumont Ave	Graham Hopedale Rd	1	0.5				4					5	5		4			3		21	
107	NC 62	Sharpe Rd	Hazel Dr	1/2	0.7								4	5	5		4			3		21	
117	Albany St	Belmont St	Carden St	1	0.2			5	4				4	5						3		21	
118	Albany St	Whitsett St	Elm St	1	0.4			5	4				4	5						3		21	
119	Chapel Hill Rd	Mebane St	Tucker St	1	0.4	4							4	5	5					3		21	
120	Chapel Hill Rd	Tucker St	Corporation Pkwy	1	0.6	4							4	5	5					3		21	
121	Chapel Hill Rd	Kilby St	Maple Ave	1	0.4	4			4				4	5					4			21	
138	Vaughn Rd	Church St	Beaumont Ave	1	0.3				4					5	5			4		3		21	

Segment ID	Road Name	From	To	No. of Sides	Total Length (miles)	Public Input		School Proximity			Parks & Recreation			Transportation				Destinations			Footpaths	Total	Location
139	Baldwin Rd	Church St	Apple St	1	0.5								4	5	5			4		3		21	
159	Wood Ave	Quintas Ave	Williamson St	1	0.1				4			4	4	5				4				21	
160	Anthony St	Loy St	Queen Ann St	1	0.1								4	5	5			4		3		21	
162	Welch St	Sidney Ave	Anthony St	1	0.1								4	5	5			4		3		21	
163	Long St	Sidney Ave	Fair St	1	0.1								4	5	5			4		3		21	
165	Anthony St	Morehead St	Maple Ave	1	0.1								4	5	5			4		3		21	
166	Morehead St	Flanner St	Anthony St	2	0.1								4	5	5			4		3		21	
216	Vanderford St	Tucker St	Kilby St	1	0.3								4	5	5			4		3		21	
220	Donovan St	Fix St	Avon Ave	1	0.1								4	5	5			4		3		21	
221	Avon Ave	Turrentine St	Donovan St	1	0.1								4	5	5			4		3		21	
21	Huffman Mill Rd	I 40	Forestdale Dr	2	0.8	4	4							5			4			3		20	
45	Webb Ave	Flora Ave	Glen Rave Rd	1	1.1	4			4	3			4	5								20	
88	Woodhaven Dr	Mckinney St	Regent Park Ln	1	0.2				4			4	4	5						3		20	
100	Rainey St	St John St	Beaumont Ave	1	0.4								4	5			4	4		3		20	
122	Harden St	Maple Ave	Town Limit	1	0.6				4				4	5					4	3		20	
174	Floyd St	Kilby St	Maple Ave	1	0.4				4			4	4	5						3		20	
241	Tarleton Ave	Front St	Webb Ave	1	0.6				4				4	5				4		3		20	
109	Ross St	Lower Hopedale Rd	Sharpe Rd	1	0.3								4	5	5		4					18	
135	Hermitage Rd	Edgewood Ave	Brookwood Ave	1	0.1			5	4					5			4					18	
5	Church St	Cappoquin Way	University Dr	1	0.4	4							4	5					4			17	
12	University Dr	Church St	Dunleigh Dr	1	0.3	4							4	5					4			17	
14	*University Dr*	*Boone Station Dr*	*Bonnar Bridge Pkwy*	*1*	*0.4*	*4*			*4*				*4*	*5*								*17*	*Y*
53	Tarleton Ave	Front St	Edgewood Ave	1	0.2				4				4	5				4				17	
91	ONeal St	Church St	Existing Sidewalk (North)	1	0.1				4				4	5					4			17	
103	Washington St	St John St	Main St	1	0.1									5	5			4		3		17	
104	Main St	St John St	Church St	1	0.1									5	5			4		3		17	
128	St Marks Church Rd	Boone Station Dr	Peeler St	1	0.4							4	4	5					4			17	
134	May Ct	Tarleton Ave	Davis St	1	0.1				4				4	5				4				17	
178	Homewood Ave	Vaughn Rd	Church St	1	0.2				4					5	5					3		17	
194	Alamance Rd	Eric Ln	Mebane St	2	0.8	4	4							5					4			17	
208	*Apple St*	*Sharpe Rd*	*Springwood Dr*	*1*	*0.4*								*4*	*5*	*5*					*3*		*17*	*Y*
224	Maple Ave	Albany St	Chapel Hill Rd	1	0.3				4				4	5					4			17	
9	Church St	Collinwood Dr	Forestdale Dr	1	0.4	4	4							5						3		16	
20	Church St	Delaney Dr	May Dr	2	0.9	4			4				4				4					16	
37	Front St	Sadlle Club Rd	Briarcliff Rd	0	0.6	4			4	3				5								16	
78	Hanover Rd	Graham Hopedale Rd	Sellars Mill Rd	1	0.4				4				4		5					3		16	
80	Graham St/Hanover Rd	Beaumont Ave	Graham Hopedale Rd	1	0.3							4	4		5					3		16	
86	Morningside Dr	Bland Blvd	Sellars Mill Rd	1	0.4				4				4	5						3		16	
132	Shadowbrook Dr	Saddle Club Rd	Edgewood Ave	1	0.2	4	4							5						3		16	
145	Garfield Rd	Harriet Dr	Davis St	1	0.1				4				4	5						3		16	

Segment ID	Road Name	From	To	No. of Sides	Total Length (miles)	Public Input		School Proximity			Parks & Recreation			Transportation				Destinations			Footpaths	Total	Location
149	Tarpley St	Webb Ave	Existing Sidewalk	1	0.0								4	5				4		3		16	
152	Rockwood Ave	Arbor Dr	Hawthorne Ln	1	0.3				4				4	5						3		16	
154	Glen Raven Rd	Durham St	Park Ave	1	0.6				4				4	5						3		16	
168	Tucker St	Chapel Hill Rd	Kenwood Dr	1	0.3								4		5			4		3		16	
180	Lakeside Ave	Sharpe Rd	Hancock St	1	0.4								4		5			4		3		16	
214	*Graham Hopedale Rd*	*Lower Hopedale Rd*	*Apple St*	*1*	*0.3*	*4*					*3*		*4*		*5*							*16*	*Y*
217	Everett St	Vanderford St	Fix St	1	0.1								4	5				4		3		16	
218	Kilby St	Vanderford St	Stokes St	1	0.0								4	5				4		3		16	
219	Stokes St	Kilby St	Maple Ave	1	0.3								4	5				4		3		16	
237	Hawthorne Ln	Davis St	Webb Ave	1	0.4				4				4	5						3		16	
238	Hawthorne Ln	Rockwood Ave	Sherwood Dr	1	0.4				4				4	5						3		16	
239	Hawthorne Ln	Sherwood Dr	Davis St	1	0.3				4				4	5						3		16	
240	Sherwood Dr	Harriet Dr	Front St	1	0.4				4				4	5						3		16	
87	Morningside Dr	Sellars Mill Rd	Riverside Dr	1	0.4						3		4	5						3		15	
177	Riverside Dr	Morningside Dr	Town & Country Nature Park	1	0.1				4		3	4	4									15	
110	*Lower Hopedale Rd*	*NC 62*	*Old Glencoe Rd*	*1*	*0.9*								*4*	*5*	*5*							*14*	*Y*
4	Church St	Springwood Church Rd	Cappoquin Way	1	0.5	4							4	5								13	
6	Church St	University Dr	Random Ln	1	0.3	4							4	5								13	
7	Church St	Random Ln	Westbrook Ave	1	0.2	4							4	5								13	
13	University Dr	Dunleigh Dr	Rural Retreat Rd	1	0.4	4							4	5								13	
16	*University Dr*	*Bonnar Bridge Pkwy*	*Huffman Mill Rd*	*1*	*0.5*	*4*			*4*					*5*								*13*	*Y*
129	Rural Retreat Rd	University Dr	St Marks Church Rd	1	0.4							4	4	5								13	
136	Central Ave	Front St	Davis St	1	0.0								4	5				4				13	
137	Askew St	Atwater St	Trollinger St	1	0.0								4	5				4				13	
153	Rockwood Ave Ext	Hawthorne Ln	Webb Ave	1	0.7				4				4	5								13	
173	Kilby St	Chapel Hill Rd	Floyd St	1	0.1							4	4	5								13	
10	Forestdale Dr	Church St	Boone Station Dr	1	0.3		4							5						3		12	
35	Saddle Club Rd	Front St	Briarcliff Rd	1	0.7				4	3				5								12	
39	Briarcliff Rd	Saddle Club Rd	W Front St	1	0.3					3				5			4					12	
41	*Huffman Milll Rd*	*Marina Dr*	*Harris Rd*	*1*	*0.8*	*4*						*4*	*4*									*12*	*Y*
111	*Lower Hopedale Rd*	*Old Glencoe Rd*	*Graham Hopedale Rd*	*1*	*0.4*						*3*		*4*		*5*							*12*	*Y*
169	Tucker St	Koury Dr	Chapel Hill Rd	1	0.4								4		5					3		12	
196	Alamance Rd	Troxler Rd	Grand Oaks Blvd	2	1.2	4								5						3		12	
207	*Apple St*	*Springwood Dr*	*Graham Hopedale Rd*	*1*	*0.3*								*4*		*5*					*3*		*12*	*Y*
206	*Graham Hopedale Rd*	*Woodleigh Ave*	*Tom Barnwell Tr*	*1*	*0.4*	*4*			*4*											*3*		*11*	*Y*
42	*Rural Retreat Rd*	*Stonecrest Dr*	*Williams Mill Rd*	*1*	*0.3*								*4*	*5*								*9*	*Y*
92	Engleman Ave	Edgewood Ave	Church St	1	0.5				4					5								9	
113	*Old Glencoe Rd*	*Lakeside Ave Ext*	*NC 62*	*1*	*1.1*								*4*		*5*							*9*	*Y*
114	*Old Glencoe Rd*	*Willow Lake Rd*	*Lakeside Ave Ext*	*1*	*0.5*								*4*		*5*							*9*	*Y*

Segment ID	Road Name	From	To	No. of Sides	Total Length (miles)	Public Input		School Proximity			Parks & Recreation			Transportation				Destinations			Footpaths	Total	Location
130	Garden Rd	St Marks Church Rd	Boone Station Dr	1	0.7								4	5								9	
131	Garden Rd	Boone Station Dr	Huffman Mill Rd	1	0.5		4							5								9	
193	Hanford Rd	Maple Ave	Hanford Hills Rd	1	0.5									5			4					9	
195	Alamance Rd	Grand Oaks Blvd	Eric Ln	2	1.1	4								5								9	
205	*Graham Hopedale Rd*	*Apple St*	*Woodleigh Ave*	*1*	*0.5*	*4*									*5*							*9*	*Y*
213	*Lakeside Ave*	*Old Glencoe Rd*	*Brassfield Dr*	*1*	*0.4*								*4*		*5*							*9*	*Y*
243	Grand Oaks Blvd	Huffman Mill Rd	Holt Pardue Rd	1	0.3									5					4			9	
1	Brittney Ln	I 85/I 40	Springwood Church Rd	1	0.3							4	4									8	
2	Springwood Church Rd	Brittney Ln	Tyndall Dr	1	0.4							4	4									8	
17	Huffman Mill Rd	University Dr	Longpine Rd	2	0.9	4													4			8	
34	Saddle Club Rd	Shadowbrook Dr	Edgewood Ave	1	0.2									5						3		8	
133	Westover	Shadowbrook Dr	Edgewood Ave	1	0.3									5						3		8	
203	Sharpe Rd	Burch Bridge Rd	Lakeside Ave	1	0.3										5					3		8	
212	Lakeside Ave	Brassfield Dr	Sharpe Rd	1	0.6										5					3		8	
236	*NC 62*	*Old Glencoe Rd*	*Glencoe St*	*1*	*0.5*						*3*				*5*							*8*	*Y*
242	Meadowood Dr	Stonewyck Dr	Church St	1	0.4									5						3		8	
142	Durham St	Flora Ave	Cadiz St	1	0.8								4							3		7	
185	Burch Bridge Rd	Sharpe Rd	Elmira St	1	0.4								4							3		7	
246	Alamance Rd	Kirkpatrick Rd	Troxler Rd	1	0.6	4					3											7	
26	Kirkpatrick Rd	Longpine Rd	Grand Oaks Blvd	1	0.4									5								5	
27	Kirkpatrick Rd	Grand Oaks Blvd	Kentwood Dr	1	0.4									5								5	
108	NC 62	Hazel Dr	Old Glencoe Rd	1	0.5										5							5	
112	*Old Glencoe Rd*	*NC 62*	*Lower Hopedale Rd*	*1*	*0.7*										*5*							*5*	*Y*
192	Hanford Rd	Hanford Hills Rd	Town Limit	1	0.4									5								5	
3	Springwood Church Rd	Tyndall Dr	Burlington Rd	1	0.5								4									4	
18	Huffman Mill Rd	Longpine Rd	I 40	2	0.5	4																4	
40	Huffman Mill Rd	Harris Rd	Grand Oaks Blvd	1	1.2	4																4	
170	Tucker St	I 40	Koury Dr	1	0.3												4					4	
188	Maple Ave	Mapleview Dr	Hanford Rd	2	0.6												4					4	
29	Kirkpatrick Rd	Troxler Rd	Alamance Rd	1	0.6						3											3	
197	Anthony Rd	Alamance Rd	Airport Rd	1	0.6						3											3	
209	*Burch Bridge Rd*	*St Regis Dr*	*Haw River*	*1*	*0.4*						*3*											*3*	*Y*
210	*Burch Bridge Rd*	*St Regis Dr*	*Old Glencoe Rd*	*1*	*0.4*						*3*											*3*	*Y*
227	*Maple Ave*	*Race Track Rd*	*Whites Kennel Rd*	*1*	*0.5*						*3*											*3*	*Y*
228	*Maple Ave*	*ETJ*	*Race Track Rd*	*1*	*0.3*						*3*											*3*	*Y*
25	Longpine Rd	Huffman Mill Rd	I 40	1	0.3																	0	
28	*Kirkpatrick Rd*	*Kentwood Dr*	*Troxler Rd*	*1*	*0.4*																	*0*	*Y*
30	Troxler Rd	Kirkpatrick Rd	Alamance Rd	1	0.5																	0	
115	*Old Glencoe Rd*	*Burch Bridge Rd*	*Willow Lake Rd*	*1*	*0.4*																	*0*	*Y*

Segment ID	Road Name	From	To	No. of Sides	Total Length (miles)	Public Input		School Proximity			Parks & Recreation			Transportation				Destinations			Footpaths	Total	Location
143	*Durham St*	*Macarthur Ln*	*Flora Ave*	*1*	*0.6*																	*0*	*Y*
144	*Durham St*	*ETJ*	*Macarthur Ln*	*1*	*0.4*																	*0*	*Y*
155	*Flora Ave*	*Webb Ave*	*Durham St*	*1*	*0.6*																	*0*	*Y*
171	Tucker St	Hatchery Rd	I 40	1	0.5																	0	
172	Tucker St	Anthony Rd	Hatchery Rd	1	0.7																	0	
186	Maple Ave	White Skennel Rd	Bayview Dr	2	1.3																	0	
187	Maple Ave	Bayview Dr	Mapleview Dr	2	1.0																	0	
190	Industry Dr	Tucker St	Anthony Rd	1	0.7																	0	
191	Industry Dr	Anthony Rd	Maple Ave	1	0.4																	0	
198	Anthony Rd	Airport Rd	Lear Dr	1	0.6																	0	
199	Anthony Rd	Lear Dr	Tucker St	1	0.3																	0	
200	Anthony Rd	Tucker St	Whites Kennel Rd	1	0.5																	0	
201	Anthony Rd	Whites Kennel Rd	Faucette Rd	1	0.3																	0	
202	Anthony Rd	Faucette Rd	Industry Dr	1	0.4																	0	
211	*Burch Bridge Rd*	*Old Glencoe Rd*	*Sharpe Rd*	*1*	*0.8*																	*0*	*Y*
225	*Monroe Holt Rd*	*Maple Ave*	*Lacy Holt Rd*	*1*	*0.6*																	*0*	*Y*
226	*Monroe Holt Rd*	*Lacy Holt Rd*	*Proposed Greenway (past Ralph Graham Dr)*	*0*	*0.7*																	*0*	*Y*
231	Hatchery Rd	Surburban	Tucker St	1	0.5																	0	
232	Hatchery Rd	Alamance Rd	Surburban	1	0.5																	0	
233	Eric Ln	Winston Dr	Alamance Rd	1	0.5																	0	
234	*Whites Kennel Rd*	*Anthony Rd*	*Country Club*	*1*	*0.5*																	*0*	*Y*
235	*Whites Kennel Rd*	*Country Club*	*Maple Ave*	*1*	*0.5*																	*0*	*Y*

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