# City of Oxford

# Comprehensive Pedestrian Plan



## Adopted

August 14th, 2012

Division of Bicycle & Pedestrian Transportation

Prepared By

alta GREENWAYS

# Acknowledgements


## Citizen Involvement

A special thanks to the 200+ local residents who participated in this planning process through comment forms, public workshops, and meetings.

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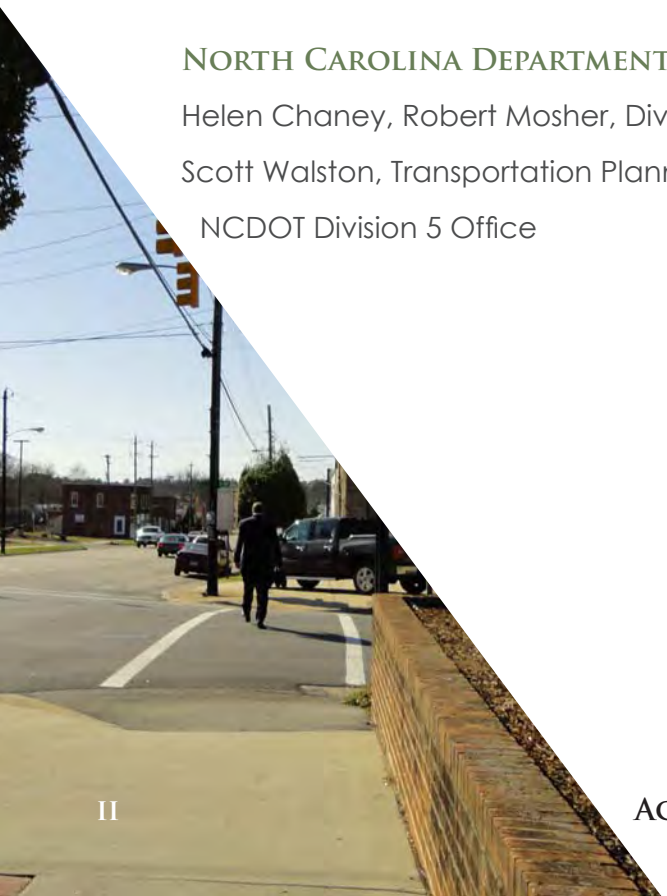

# CONTENTS



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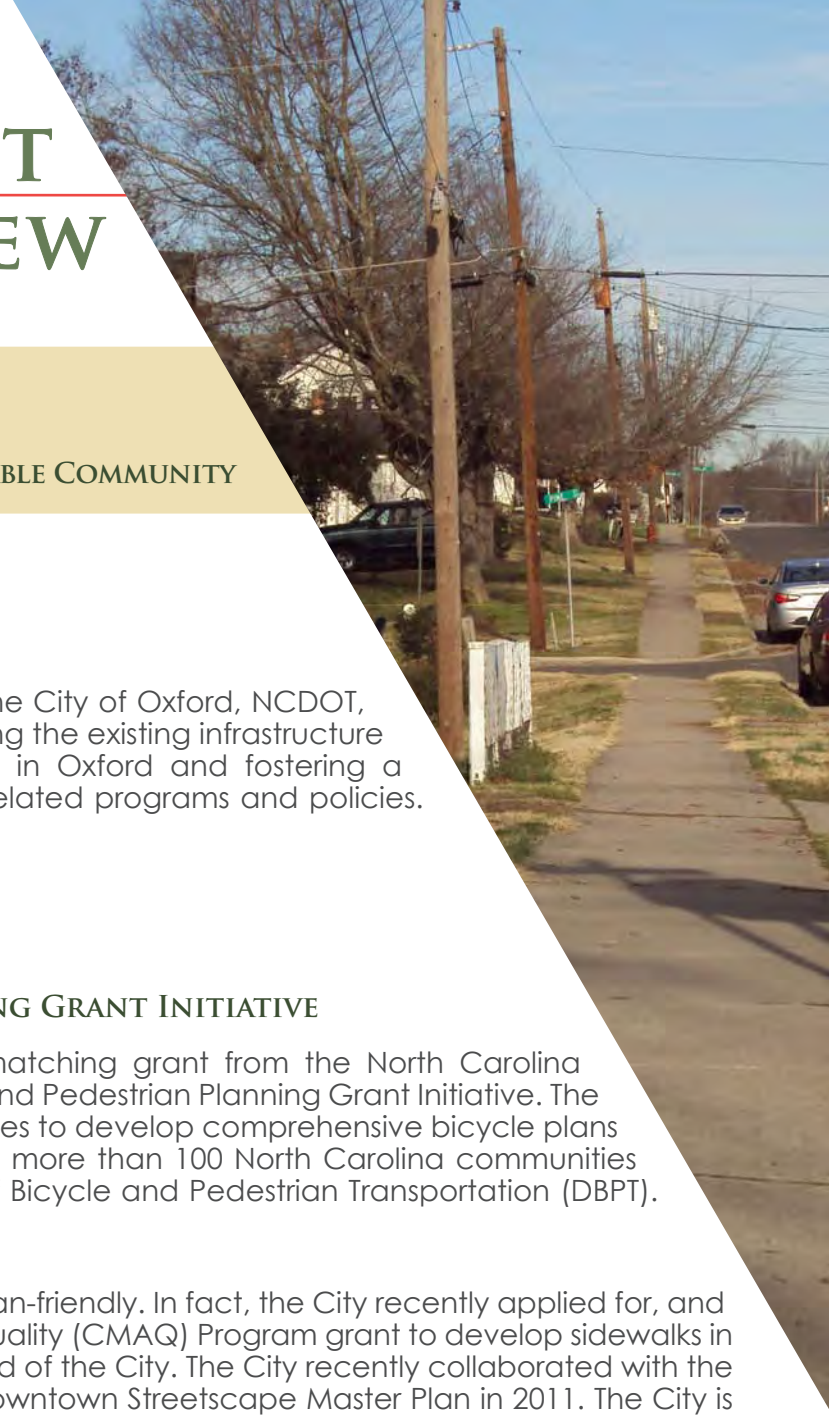
# 1 Project Overview



## Chapter Outline

Purpose | Background | Vision & Goals

The Planning Process | Benefits of A Walkable Community

## Purpose

This Comprehensive Pedestrian Plan will guide the City of Oxford, NCDOT, and other local and regional partners in improving the existing infrastructure and constructing new facilities for pedestrians in Oxford and fostering a 'walking culture' through the development of related programs and policies.

## Background

### NCDOT's Bicycle and Pedestrian Planning Grant Initiative

In 2011, the City of Oxford was awarded a matching grant from the North Carolina Department of Transportation (NCDOT) Bicycle and Pedestrian Planning Grant Initiative. The purpose of the grant is to encourage municipalities to develop comprehensive bicycle plans and pedestrian plans. This program has assisted more than 100 North Carolina communities and is administered through NCDOT's Division of Bicycle and Pedestrian Transportation (DBPT).

### Community Initiative

The City is very committed to becoming pedestrian-friendly. In fact, the City recently applied for, and was awarded a Congestion Mitigation and Air Quality (CMAQ) Program grant to develop sidewalks in the vicinity of Webb High School, on the north end of the City. The City recently collaborated with the North Carolina State University to develop the Downtown Streetscape Master Plan in 2011. The City is determined to improve walkability and connectivity of pedestrian facilities throughout the community.

This Plan combines past planning efforts with new research and analysis, and includes public input. The result is a complete, up-to-date framework for moving forward with tangible pedestrian improvements.

Current pedestrian conditions within Oxford are not adequate to serve the needs of its residents. This Plan will provide guidance for enhancing conditions for pedestrians throughout town, particularly in areas identified by the project Steering Committee and City Staff. Beyond physical improvements, this Plan also outlines policies and programs to help encourage people to walk more often, drive more safely, and to grow as a city with the needs of pedestrians taken into full consideration.

# Vision and Goals

The following vision statement and goals were developed during the first Steering Committee meeting and reinforce the goals and vision of the City's adopted 2009 Comprehensive Plan. The vision statement applies to both the Plan itself and the desired outcome of its implementation.

## Pedestrian Plan Vision Statement

In the future Oxford will:

1. **Retain** its rural atmosphere where friendly citizens foster a positive community spirit.

2. **Be** a regional destination for tourists and visitors attracted by the city's heritage and historic character.

3. **Provide** recreation opportunities for all citizens.

4. **Be** a walkable and safe community with tree-lined streets, citywide sidewalk connectivity, traffic calming and wayfinding signage.

5. **Educate** our citizens on the benefits of being a walkable community with greenways, trails and pedestrian facilities.

6. **Plan** for future growth by requiring new development to construct sidewalks, while protecting its environmental resources and maintaining quality public services at an affordable cost.

7. **Create** gateways into the community that welcome visitors and give residents a "sense of place" by protecting and enhancing priority corridors.

## Measurable Goals of the Pedestrian Plan

- Adopt a City ordinance that sidewalk, curb and gutter be constructed on both sides of streets. Cul-de-Sac bulbs could be exempt from sidewalks but the City should require curb & gutter.
- Fill gaps in the existing sidewalk network.
- Reconstruct curb ramps in Downtown to be ADA compliant.
- Increase the miles of sidewalks as a percent of total City roadways.
- All of the City's ordinances should be reviewed and revised to acknowledge the importance of pedestrian safety and the role of pedestrian design in the health of the community. Topic areas should include driveway access management and designs for pedestrian traffic flow.

Photos from Public Open House 3.29.2012

# The Planning Process

## The Project Steering Committee

The project Steering Committee for the Comprehensive Pedestrian Plan consisted of local staff and key stakeholders. The project Steering Committee met with the project Consultants four times throughout the process, focusing on project vision and goals (December 2011), existing conditions (February 2012), the draft plan (May 2012) and the final plan (July 2012).

## Data Collection and Analysis

After collecting baseline information about the study area in December 2011, the Consultants began assessing existing conditions, which are the focus of Chapter 2 of this Plan. Consultants used aerial photography and geographic information systems (GIS) data, to identify opportunities and constraints for pedestrian facility development. These preliminary findings were then tested for applicability and appropriateness through on-the-ground field research. Field research also included an intersection inventory and a photographic inventory. The existing conditions and the preliminary findings were then presented to the Steering Committee in February 2012 and to the public in March 2012.

## Public Involvement

In February 2012, a project website was developed with input and guidance from the Steering Committee. The website was publicly launched in February 2012. An online public comment form was developed for the project and released on the project website in February 2012. The public comment form yielded more than 160 responses.

In March 2012, project Consultants and the Steering Committee hosted a public open house at the City of Oxford Public Works facility. People were invited to learn about the Comprehensive Pedestrian Plan and provide comments about where they would like to see improvements for walking. A public input map, newsletters, and posters were provided for review and project Consultants answered questions and took comments. Interested members of the community stopped by to learn about the plan and provided critical input. The general feedback was highly positive, with many people impressed that the City of Oxford was being proactive in addressing walkability.

In May 2012, project Consultants were present at the Strawberry Day Festival in Downtown Oxford. People were invited to learn about the Comprehensive Pedestrian Plan and provide comments about where they would like to see improvements for walking. A public input map, Draft Plan and an informational poster were provided for review. Project Consultants answered questions, took feedback and had visitors fill out the public comment form. Approximately 40 people stopped by the booth to learn about the project and the majority of them filled out comment forms.

Photo from Strawberry Day 5.12.2012

## Plan Development

In April and May 2012, the Draft Plan was developed through input gathered during the steps described above. The Draft Plan was available for review and comment at the City's Strawberry Day celebration, and was posted online for public review shortly thereafter. Comments from the Steering Committee, the public, NCDOT, and other stakeholders were collected, and the plan was then revised into the final version that was presented to City Council in August 2012.

# Benefits of a Walkable Community

When considering the level of dedication in time and valuable resources that it takes to create a walkable community, it is also important to assess the immense value of pedestrian transportation. There are **economic benefits, quality of life benefits, health benefits, environmental benefits** and **transportation benefits** of a walkable community.

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 helps to improve people's health and fitness, enhance environmental conditions, decrease traffic congestion, and will contribute to a greater sense of community.

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 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".*

**2011 National Association of Realtors:**

**46%** of respondents answered: my community has too few shops and restaurants within easy walking distance

**40%** of respondents answered: my community has too few sidewalks

## Economic Benefits

Walking is an affordable form of transportation. A walkable community directly affects a citizen's transportation costs. According to the Pedestrian and Bicycle Information Center (PBIC), of Chapel Hill, NC, the cost of operating a car for a year is approximately $5,170, while walking is virtually free. The PBIC explains, "When safe facilities are provided for pedestrians and bicyclists, more people are able to be productive, active members of society. Car ownership is expensive, and consumes a major portion of many Americans' income." 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).


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.

There are also 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 homebuyers 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.[1]

**"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".[2]

Trails can play a part in making communities more walkable, and they too have a positive economic impact. In a survey of homebuyers 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.[3] 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[4], the Rails-to-Trails Conservancy[5], and the Trust for Public Land[6] , further substantiate the positive connection between walkability and property values across the country.

According to the Federal Highway Administration, the basic cost of a single mile of urban, four-lane highway is between $20 million and $80 million. In urban bottlenecks where congestion is the worst, common restrictions such as the high costs of right of ways and the needs to control high traffic volumes can boost that figure to $290 million or more.[7] By contrast, the costs of bicycle and pedestrian facilities range anywhere from a few thousand dollars per mile to rarely more than $1 million, with great variability between types of infrastructure local circumstances.[8]

**"Me thinks that the moment my legs begin to move, my thoughts begin to flow."**

**(Henry David Thoreau)**

## Quality of Life Benefits

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 within their community. Communities with such amenities can attract new businesses, industries, and in turn, new residents.

**"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."**

**(Mark Twain)**

Walking is a fundamental social community activity. Members of a community who walk to a destination are more likely 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 have shown. Every day, more commuters switch to public transportation, bicycling and walking in places where prior infrastructure investments have made these options safe and convenient".[9]

Other impacts include a reduction in overall neighborhood noise levels. According to the National Center for Safe Routes to School, "Walking or biking to school gives children time for physical activity and a sense of responsibility and independence; allows them to enjoy being outside; and provides them with time to socialize with their parents and friends and to get to know their neighborhoods".[10]

It is particularly important for people who are transportation disadvantaged (people with disabilities, elders, children, and people with low incomes). Poor walking conditions can contribute to what is considered "social exclusion", that is, the physical, economic and social isolation of vulnerable populations.

In a 2004 Centers for Disease Control and Prevention survey, 1,588 adults answered questions about barriers to walking to school for their youngest child aged 5 to 18 years.[11] The main reasons cited by parents included distance to school, at 62%, and traffic-related danger, at 30%. Strategic additions to municipal trail systems could shorten the distance from homes to schools, and overall pedestrian and bicycle improvements can improve the safety of our roadways.

## Health Benefits

As mentioned in the introduction, 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.

### Center for Disease Control

**30 minutes of moderately intense exercise" is equivalent to:**

1.5 miles of walking; or

5 miles of bicycling; or

1 less slice of pizza.

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.[12]

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".[13]

## Environmental Benefits

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 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-

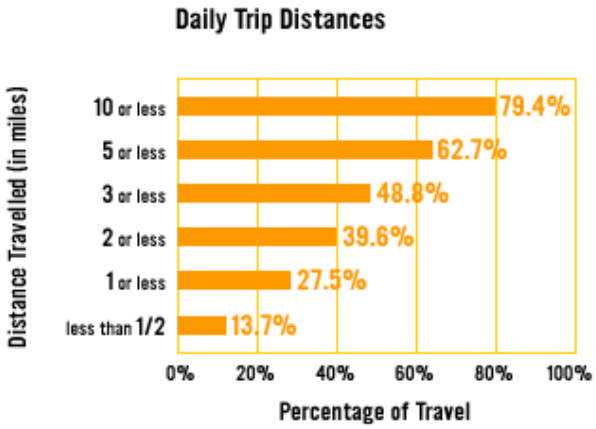
polluting automobiles, trails and greenways also reduce air pollution by protecting large areas of plants that create oxygen and filter air pollutants such as ozone, sulfur dioxide, carbon monoxide and airborne particles of heavy metal. Finally, greenways improve water quality by creating a natural buffer zone that protects streams, rivers and lakes, preventing soil erosion and filtering pollution caused by agricultural and road runoff.

## Transportation Benefits

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.[14]

> "The civilized man has built a coach, but has lost the use of his feet."
>
> (Ralph Waldo Emerson)

A National Household Travel Survey found that roughly 40% of all trips taken by car are less than two miles (see chart below).[15]




Nearly two-thirds of all households say they have satisfactory shopping available within walking distance of their home and 57% of parents with children 13 years or younger live within one mile of a public elementary school.[16] By replacing short car trips with bicycle trips, residents have a significant positive impact on local traffic and congestion. Traffic congestion reduces mobility, increases auto-operating costs, adds to air pollution, and causes stress in drivers. Furthermore, every car trip replaced with a pedestrian trip reduces U.S. dependency on fossil fuels, which is a national goal. Currently, out of every dollar drivers spend on gasoline, at least $0.35 flow into foreign economies.[17]

According to the Brookings Institution, the number of older Americans is expected to double [between 2000 and 2025].[18] 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.

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."[19]

Creating a walkable community provides greater and safer mobility 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, and there are other licensed drivers who just choose not to drive.[20]

There are 90+ million non-drivers in the United States and providing sidewalks to increase mobility for these 90+ million historically underserved citizens will enhance environmental conditions, decrease traffic congestion, improve overall health and contribute to a greater sense of community.

**Footnotes from, "The Benefits of a Walkable Community":**

1. CEOs for Cities. (2010) Walking the Walk: How Walkability Raises Home Values in U.S. Cities

2. http://www.charmeck.org/mecklenburg/county/ParkandRec/Greenways/Documents/1benefits.pdf

3. National Association of Realtors and National Association of Home Builders (2002).Consumer's Survey on Smart Choices for Home Buyers.

4. How Cities Use Parks for Economic Development, 2002.

5. Economic Benefits of Trails and Greenways, 2005.

6. Economic Benefits of Parks and Open Space, 1999.

7. Active Transportation for America: The Case for Federal Investment in Bicycling and Walking. Rails to Trails Conservancy and Bikes Belong Coalition 2008 / Sissel, S., Cost per Highway Mile, 2008.

8. Krizek, K.e Guidelines for Analysis of Investments in Bicycle Facilities, 2006.

9. Active Transportation for America: The Case for Federal Investment in Bicycling and Walking. Rails to Trails Conservancy and Bikes Belong Coalition 2008.

10. National Center for Safe Routes to School. (2006). National Center for Safe Routes to School Talking Points.

11. Centers for Disease Control and Prevention. The Importance of Regular Physical Activity for Children. Accessed in 2005 from www.cdc.gov/nccdphp/dnpao/index.html.

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

13. Rails-to-Trails Conservancy. (2006) Health and Wellness Benefits.

14. U.S. EPA (2003). Travel and Environmental Implications of School Siting.

15. 'Daily Trip Distances' chart from the Bicycle and Pedestrian Information Center website, www.pedbikeinfo.org.

16. U.S. Census Bureau, American Housing Survey for the United States: 2005. 2006.

17. Active Transportation for America: The Case for Federal Investment in Bicycling and Walking. Rails to Trails Conservancy and Bikes Belong Coalition 2008.

18. Brookings Institution. 2003. The Mobility Needs of Older Americans: Implications for Transportation Reauthorization.

19. American Public Health Association. (2010) The Hidden Health Costs of Transportation.

20. U.S. DOT "Distribution of Licensed Drivers 2001.

# 2 Existing Conditions

## Chapter Outline

Overview | Land Use & Development | Demographics
Existing Conditions | Existing Plan & Program Review

## Overview

In order to propose a comprehensive pedestrian system for Oxford, it is critical to examine the existing environment for pedestrians. A pedestrian system consists of several types of facilities including sidewalks, crosswalks, curb ramps, pedestrian countdown timers, speed tables, trails, greenways, and pedestrian bridges, thus an analysis of all of these facilities is required. Oxford's geographic characteristics, existing roadway configurations, land ownership, and existing sidewalk facilities significantly affect the viability of pedestrian transportation and recreation, and the everyday decisions of pedestrians, and motorists.

Oxford was once home to several Indian Tribes and in the 1700s, Virginians began to settle in Oxford and Granville County. In the mid to late 1800s, Oxford's economy was primarily based on agriculture, and most specifically, Bright Tobacco. "By the late 19th century, this thriving local economy resulted in a beautiful brick commercial district which included as many as three banks, general and hardware stores, an opera house, various professional offices, and new types of businesses." [1] Oxford has been able to maintain it's historic, tree-line Downtown with a charming sense of place that both residents and visitors alike can enjoy. While the majority of Downtown streets offer sidewalks along both sides, the City has continued to grow and expand out from it's Downtown Core, and now includes many areas that are challenging for pedestrians and pedestrian planning. This chapter assesses Oxford's development history, demographic profile, and existing pedestrian conditions.

## Land Use & Development

Oxford has seen significant residential growth in the past 20 years partly in response to the City growing as a bedroom community for the Research Triangle Park and the City of Raleigh. Oxford is located along Interstate 85, in Granville County. NC 96, US 15, and US 158 all travel through Oxford and connect the community to neighboring communities. The land use patterns that have developed as a result of that growth are characteristic of many small North Carolina communities, with a dense historic Downtown surrounded by outlying residential neighborhoods. Also affecting land use are three schools within the City, the Masonic Children's Home, the Central Children's Home of North Carolina, the Revlon plant, and the existence of a vibrant Downtown Core.

The Downtown Core has many small shops and restaurants. There is an Ace Hardware Store and a Radio Shack on Hillsboro Street. New restaurants such as "Harvest" are beginning to in-fill some of the vacant downtown store fronts and buildings. Within walking distance of the City's Downtown Core is Oxford Recreation Complex (Hix Field), offering ball fields and a playground.

Outside of the Downtown Core, small neighborhoods have developed in the past 50 years. Many of these neighborhoods don't have sidewalks, but traffic speeds are slower and many pedestrians were seen walking in the street.

# Demographic Analysis

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. Since 2000, the population of Oxford has increased by 1.5%, bringing the population of Oxford to 8,461 in 2010.

Map 2.1 on page 2-3 shows population density (persons per square mile) throughout the City. The most densely populated areas in Oxford are in the neighborhoods that surround the Downtown Core and the cluster of neighborhoods just south of the Oxford Loop (US 158).

Household income in Oxford ranges from below $19,500 to over $100,000 per year. Map 2.2 on page 2-4 illustrates household income ranges for Oxford. The highest median household incomes are in the northeast portion of the City. Some of the lowest median household incomes are in the southwest portion of the City, including parts of the Downtown. Map 2.3 on page 2-5 presents walk to work data, and as shown on Map 2.2 on page 2-4, the lower median income area correlates with the highest percentage of residents that walk to work in Oxford. The greater need for improved pedestrian access and mobility is in lower-income areas, higher-density areas, and areas of higher walk to work percentages. Projects identified in this Plan will be prioritized with input from residents, the Steering Committee and key community stakeholders.

Special attention and consideration will be given to projects located in lower-income areas that overlap with higher-density areas and areas of higher walk to work percentages.


As of the date of development of this Comprehensive Pedestrian Plan, the most detailed geographic level of US Census data was used during the analysis of existing demographic conditions.

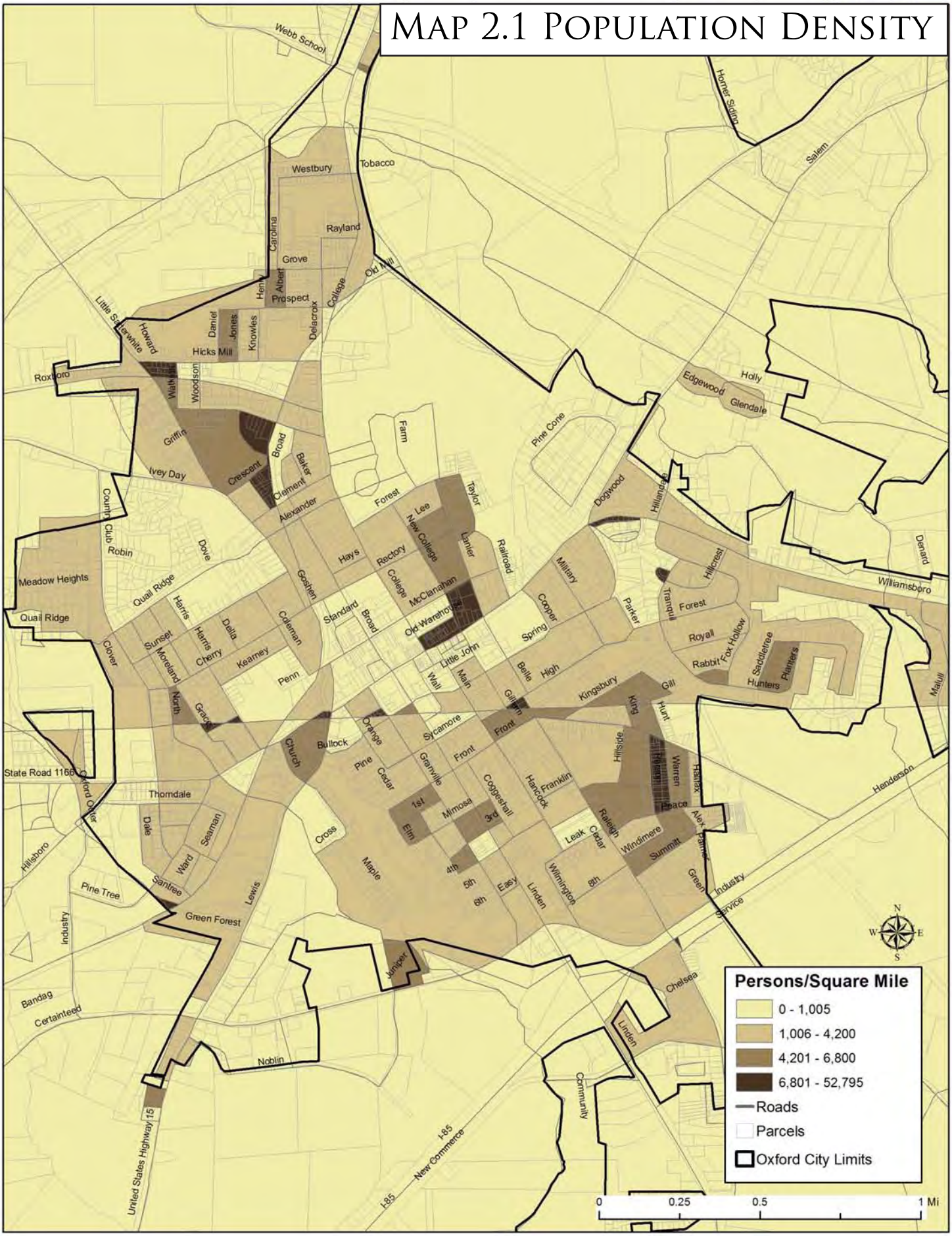
Median household income was offered at the block group/census tract level in the 2000 Census[2], and was offered at the block group/census tract level in the 2005-2009 American Community Survey (ACS), administered through the US Census. Median household income was available in HCT12, as part of Summary File #3 in the 2000 Census.[3]

The 2005-2009 ACS data is the most detailed level of data at the time of the development of this plan and was used to map Median Household Income and Population Walking to Work.

Pedestrians walking with groceries on 8th Street

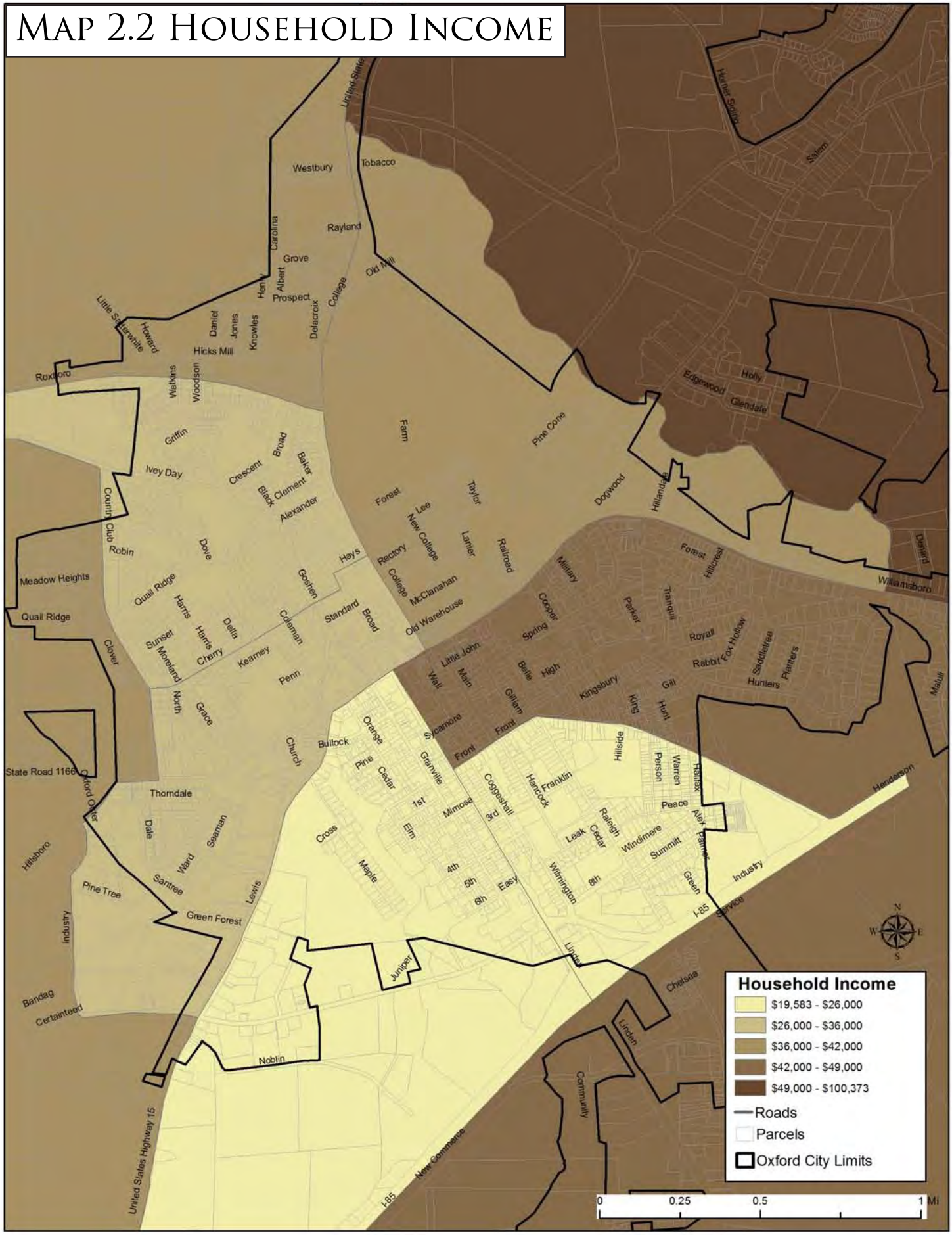
Pedestrian walking along US 15 (College Street)

# Map 2.1 Population Density




*Map based on data from 2010 US Census*

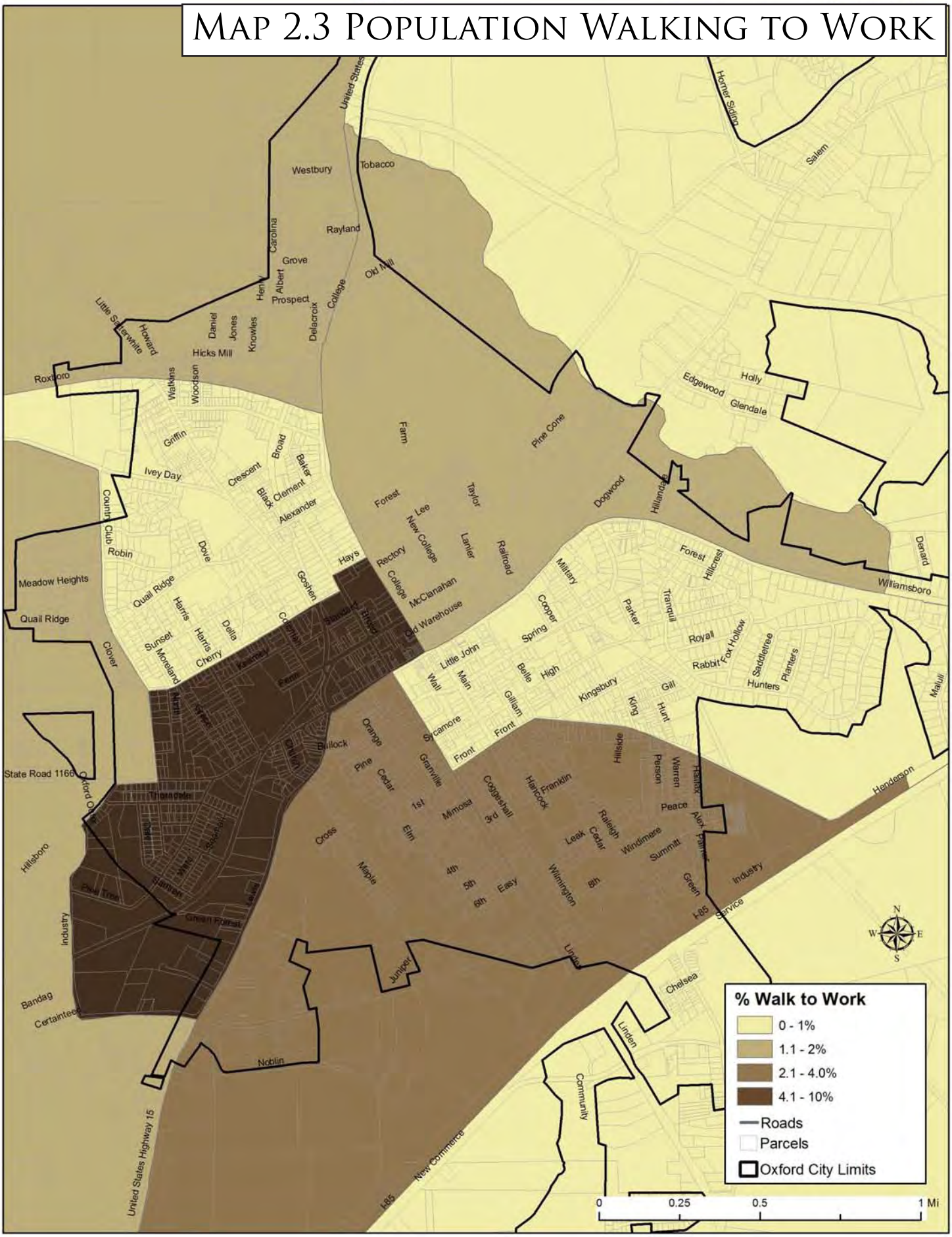
# Map 2.2 Household Income






*Map based on 2005-2009 American Community Survey (ACS) 5-year estimates*

# Map 2.3 Population Walking to Work




*Map based on 2005-2009 American Community Survey (ACS) 5-year estimates*

# Existing Conditions

## Fieldwork Observations

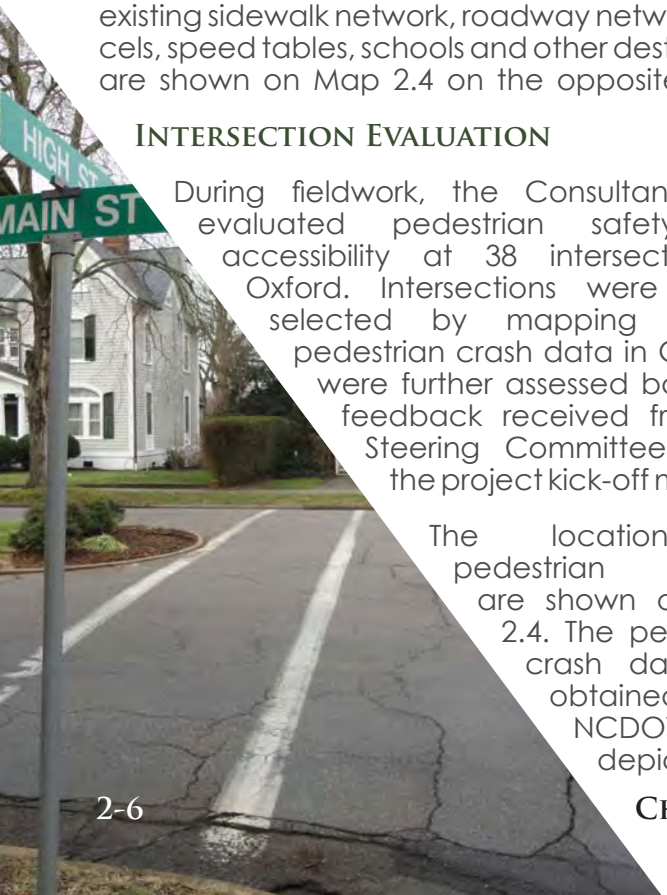
The City of Oxford features a well-established pedestrian-friendly Downtown core and the majority of streets have existing sidewalks on both sides. However, many intersections and crossing facilities are not safe for pedestrians. There are some gaps in the sidewalk network and a lack of crossing treatments make safe pedestrian travel difficult.

Several roads feature wide shoulders, such as sections of US 15 and NC 96, but also contain truck traffic and high traffic speeds.

Numerous pedestrians were observed in the Downtown core, where sidewalks exist on both sides of the street, traffic is generally slower, and roadway crossing widths are more narrow. Hazards still exist in this area, however, such as cars backing out of front-in angled parking along Williamsboro Street.

While sidewalks exist throughout the Downtown core and in some outlying areas, there are segments that have become overgrown with vegetation and are deteriorating, creating a disconnected and unsafe network of pedestrian facilities.

There are roads without sidewalks in some neighborhoods in the City that pose danger to pedestrians. Examples include Raleigh Road, Sunset, Cherry, Eighth, Harris, Peach, and Linden Streets, as they have no traffic calming treatments. The existing sidewalk network, roadway network, parcels, speed tables, schools and other destinations are shown on Map 2.4 on the opposite page.




## Intersection Evaluation

During fieldwork, the Consultant team evaluated pedestrian safety and accessibility at 38 intersections in Oxford. Intersections were initially selected by mapping NCDOT pedestrian crash data in GIS, and were further assessed based on feedback received from the Steering Committee during the project kick-off meeting.

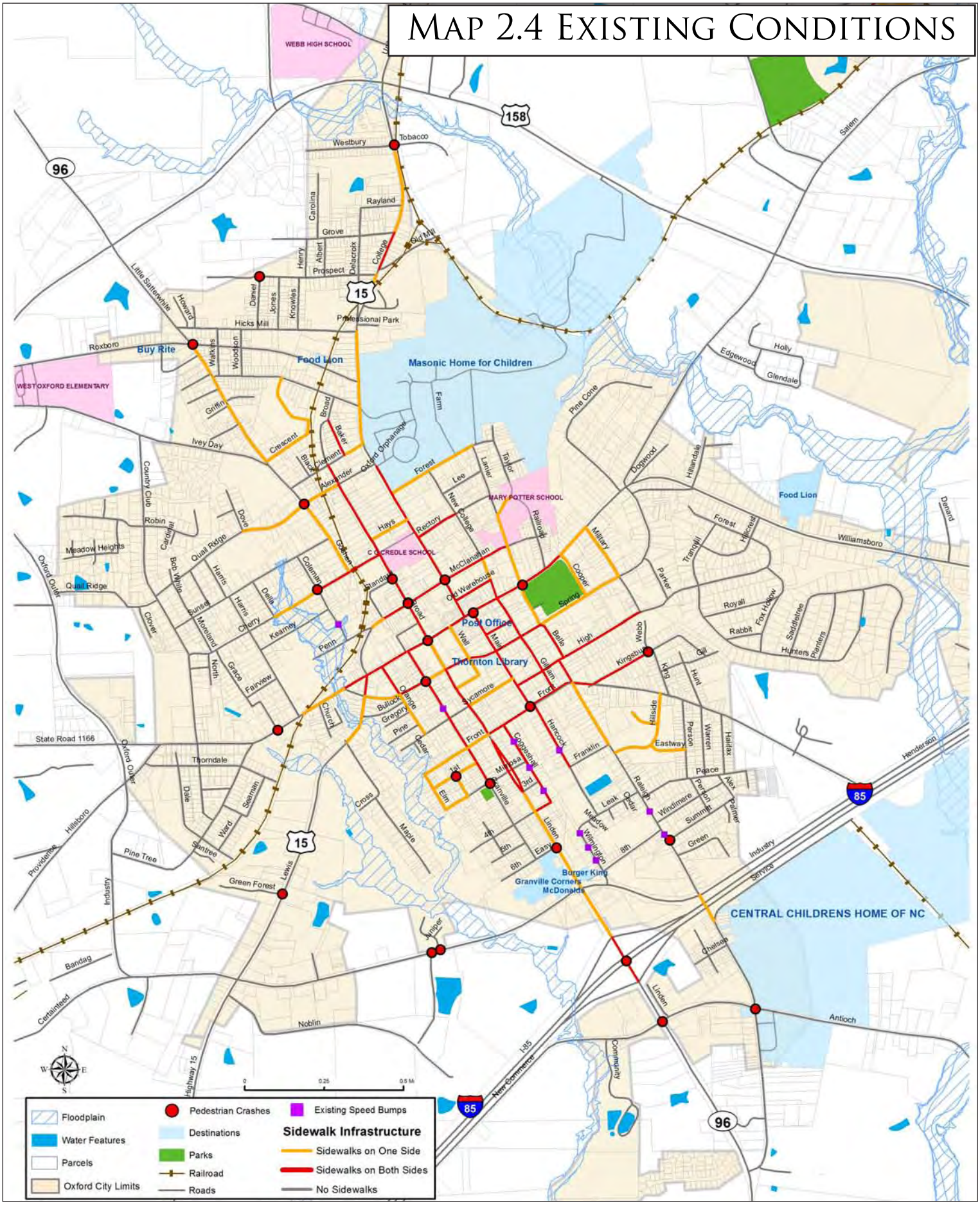
The locations of pedestrian crashes are shown on Map 2.4. The pedestrian crash data was obtained from NCDOT, and depicts the location of pedestrian-related crashes for the years 2000-2010. Three crashes occurred at or near the intersection of Broad Street & McClanahan Street, and three occurred along Linden Avenue north of I-85, two crashes occurred at or near the intersection of Front Street & Main Street. As more recent data becomes available, the City of Oxford may want to consider continuing to track and record the locations of the crashes.

The intersections that were evaluated are in the table below. The majority of intersections that were evaluated are in need of new and/or retrofitted pedestrian crossing facilities. Recommendations for each intersection are presented in Chapter 3.

### Table 2-1. Intersections

| | |
|---|---|
| 1. Industry & Linden | 20. Williamsboro & New College |
| 2. Industry & Raleigh | 21. Williamsboro & Main |
| 3. Linden & I-85 | 22. Hillsboro & Wall |
| 4. Raleigh & Front | 23. Hillsboro & College |
| 5. Front & Gilliam | 24. Hillsboro & Broad/ Linden |
| 6. Gilliam & High | 25. Hillsboro & Granville |
| 7. Main & High | 26. Hillsboro & Lewis |
| 8. Main & Front | 27. Hillsboro & Orange |
| 9. Front & Coggeshall | 28. Spring & Orange |
| 10. Front & Linden | 29. McClanahan & Broad |
| 11. Front & Granville | 30. McClanahan & College |
| 12. Granville & Sycamore | 31. McClanahan & New College |
| 13. Granville & Spring | 32. McClanahan & Lanier |
| 14. Spring & Linden | 33. College & Rectory |
| 15. Spring & Wall | 34. College & Roxboro |
| 16. Spring & Main | 35. Linden & Mimosa |
| 17. Spring & Gilliam | 36. NC 96 & Roxboro |
| 18. Spring & Belle | 37. Cherry & Coleman |
| 19. Williamsboro & Lanier / Belle | 38. Raleigh & Antioch |

# Map 2.4 Existing Conditions



# Existing Plans & Programs

## EXISTING PLANS

### GRANVILLE COUNTY GREENWAY MASTER PLAN

***The entire plan is available in Appendix C of this Plan.***

#### Project Mission

That Granville County and its municipalities –

- Recognize that greenways enhance a community's economic and environmental well-being, and
- Integrate the Greenway Master Plan into their Mixed Use Land Development Plans.

#### Vision

Local Governments that adopt the Greenway Master Plan will:

- Minimize planning, construction, and land preparation costs of greenway segments,
- Maximize public use facilities that provide functional and attractive routes for nonmotorized, transportation, recreation, and sport,
- Become leaders in creating communities that promote the health and well-being of their residents and workers by maintaining an optimal balance between land development and open space needs.


#### Recommendations

G1. Oxford-Clarksville Trail - Jefferson Davis Way: North-South route connecting Oxford with NC Bike Route 4 (North Line Trace) and Clarksville, VA/Tobacco Heritage Trail.

G4. Aviation Pass: East-West route from Oxford (GMC) to NC Bike Route 1 (Carolina Connection) and Henderson, passing Oxford-Henderson Airport.

G5. Jordan Creek Trail: Connect East Oxford industrial/residential complex (Revlon, Dill Manufacturing, Autumn Park)with Mary Potter School and Oxford City Hall.

G6: Oxford Loop: Loop around Oxford City Limits.

G7. :Larger loop around Oxford connecting inner loop/ I-85 pedestrian pass with Oxford Park, with Highway 15, with Kinton Forks/Highway 96 with Lake Devin, with trail G12b.

G9,: East-West route connecting Lake Devin to Oxford Loop/trail G6.

G10. Foundry Branch Trail: Connect Industry Dr. in Oxford with West Oxford School along Foundry Branch Sewer Line

G13.: a. Virginia's Tobacco Heritage Trail near Virgilina that dips into Granville County.

b. North-South route connecting Oxford Loop with NC Bike Route 4 (North Line Trace) and Virgilina/Tobacco Heritage Trail.

G14.: East-West route connecting Oxford Loop with the Tar River and continuing to Granville/ Person County line.

G15.: OxMoor Run, Creedmoor Connection, Seaboard Trail

### OXFORD COMPREHENSIVE PLAN (2009)

***The entire plan is available in Appendix C of this Plan.***

#### Community Vision Statement

In the future Oxford will:

1. Retain its rural atmosphere where friendly citizens foster a positive community spirit.

2. Be a regional destination for tourists and visitors attracted by the city's heritage and historic character.

3. Provide recreation opportunities for all citizens.

4. Have a historic and vibrant downtown with unique shops, restaurants, housing, and community activities.

5. Be a walkable and safe community with tree-lined streets and attractive buildings.

6. Have well-designed neighborhoods and

commercial areas offering a variety of shopping, dining, entertainment, and housing options for all residents.

7. Plan for future growth while protecting its environmental resources and maintaining quality public services at an affordable cost.

**Key Action Steps:**

Downtown

Goal: Maintain a downtown that is vibrant, clean and safe which supports residential development and contains a mixture of specialty shops, restaurants and cultural activities.

1. Support downtown as the center for Oxford's civic and cultural activities.

Help to increase the visibility of the city cemetery as an asset by exploring its use as a park and developing a walking trail.

Expand walking trails throughout the downtown.

4. Encourage retail development and residential uses in the downtown to attract visitors, reuse buildings, create jobs, and support the local tax base.

Revisit existing streetscape plan – focus on traffic calming and pedestrian friendly.

5. Preserve downtown's historic character by fostering attractive architectural design, improving physical facilities and promoting pedestrian activity.

Create and maintain a landscaping plan.

Parks & Open Space

Goal: To offer diverse and continually improving leisure and recreation opportunities for citizens of all ages and interests, improve the quality of life of citizens, and promote healthy living and a healthy population.

3. Increase public awareness of benefits of healthy living activities in programs.

Increase public awareness of benefits of healthy living activities in programs.

Establish a campaign to increase public awareness about available recreation opportunities.

Goal: To provide walkable and "bikeable" communities with access to regional destinations.

1. Create a citywide and regional non-motorized transportation and recreation network (greenways, bikeways, walkways).

Incorporate the County Transportation and Greenway Master Plans into development decisions.

Coordinate new development and public improvement proposals with existing or proposed bikeways and walkways.

Collaborate with developers to determine how they might construct or provide a link to existing or proposed greenway corridors, facilities, or non-motorized transportation networks.

Collaborate with developers to determine how they might construct or provide a link to existing or proposed greenway corridors, facilities, or non-motorized transportation networks.

Collaborate with developers to determine how they might construct or provide a link to existing or proposed greenway corridors, facilities, or non-motorized transportation networks.

Permit greenways as a use under open space, outdoor recreation, and passive recreation activities.

Promote walking and biking as a safe and convenient form of recreation and transportation.

2. Acquire necessary rights-of-way and easements to implement non-motorized transportation improvement plans.

Continuously monitor railroad abandonment and investigate railroad banking possibilities.

Pursue joint-use easements and dedications (utilities, schools, institutions, large property owners, etc) that accommodate greenways and other forms of non-motorized transportation.

3. Enhance walkable and bikeable infrastructure.

Establish minimum walkable and bikeable standards for all improvements.

Insure that all development and public improvements are designed and constructed to meet these standards.

### Neighborhoods and Housing

Goal: To provide a wide variety of quality housing options for all residents and age groups characterized by walkability and good design.

1. Safe and Walkable Neighborhoods.

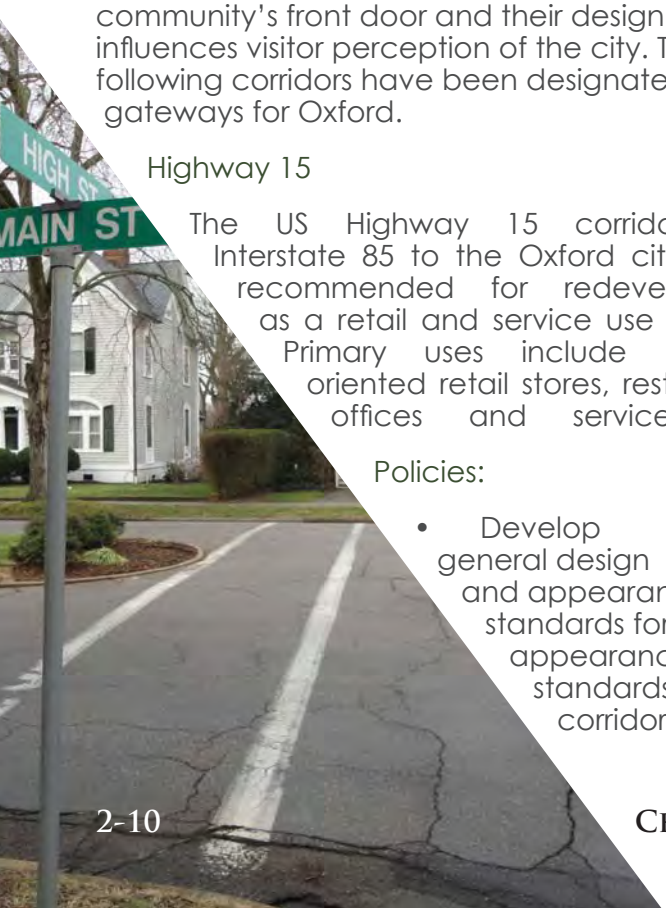
Maintain sidewalks around town.

Require sidewalks in new developments.

Develop walkable new neighborhoods and make existing neighborhoods walkable.

### Gateway Corridors and Special Focus Areas

Gateway corridors serve as major entrance ways into the city. They serve as the community's front door and their design influences visitor perception of the city. The following corridors have been designated as gateways for Oxford.




#### Highway 15

The US Highway 15 corridor from Interstate 85 to the Oxford city limit is recommended for redevelopment as a retail and service use corridor. Primary uses include highway oriented retail stores, restaurants, offices and service uses.

Policies:

- Develop general design and appearance standards for the appearance standards for the corridor.
- Work with NCDOT to minimize the number of driveways cuts to preserve the transportation function of the corridor.
- Develop a landscape plan for the corridor.

#### Highway 96

The highway 96 corridor from Interstate 85 north to Industry drive is recommended for both community scale and neighborhood scale commercial use from Industry Drive to 4th street. North of 4th street is recommended that the corridor retain its residential character.

#### Highway 158

The Highway 158 Bypass is recommended for a mixture of land uses from Williamsboro Street on the east to its junction with Roxboro Road on the west. Primary uses include light industrial on the eastern segment , mixed use residential in the central segment and community scaled commercial development on the western end of the corridor. This corridor serves an important through route transportation function around downtown Oxford. As one of Oxford's newly developed areas, special emphasis should be placed on landscaping and high quality design along the length of the corridor.

Policies:

- Maintain limited drive way access to the corridor.
- Develop landscaping plan for the corridor.

#### College Street

College Street serves as an important entry corridor into the heart of Oxford from the US 158 Bypass to downtown. Along it's route, College street changes character and contains a variety of land uses from residential and institutional to commercial. For the purposes of the plan, the corridor is divided into two sections to reflect the change in uses along the route.

#### US 158 Bypass to Roxboro Rd. (Segment 1)

The segment from the intersection of 158 Bypass to Roxboro Road is recommended for a variety of land uses from Mixed Use and Community Scaled Commercial to high density residential and institutional. Signage, landscaping and driveway access are important considerations. It is recommended design guidelines be developed for this segment.

Roxboro Road to Downtown (Segment 2)

This segment of College Street is a primarily residential corridor lined with historic homes and institutions. Important development considerations include maintaining the residential and historic character of the corridor. Some limited commercial uses such as bed and breakfast lodging may be appropriate for the corridor to preserve viability of large historic homes.

Policies:

- Implement Design guidelines from US 158 Bypass to McClanahan Street.
- Limit widening of College Street to maintain downtown as a low volume traffic area. Direct truck and through traffic to outer roadways.
- Amend the zoning ordinance to add a transitional zoning district along the corridor. Such a district would allow for limited non-residential uses such as bed and breakfasts while maintaining design controls to protect the historic residential character of the area.

Roxboro Road

Roxboro Road from US 158 Bypass to College Street serves as a gateway into Oxford from the west. As the former route for US 158 and now designated as Business 158 it consists of a variety of older commercial, residential and open land uses typical of a gateway corridor. West Oxford Elementary anchors the corridor on the west and the Oxford Childrens Home on the east. The land use plan recommends special designation for this corridor as a redevelopment area. The plan designates the Roxboro road frontage as primarily commercial. As this corridor redevelops, special considerations include signage, landscaping and design of commercial uses.

## OXFORD DOWNTOWN STREETSCAPE MASTER PLAN (2011)

***The presentation of the Downtown Streetscape Plan is available in Appendix C of this Plan.***

### Approach

"Our approach was a collaborative effort involving the City of Oxford and the community to propose attractive and functional solutions to improving the overall streetscape of Downtown Oxford. Our team's approach had three key steps. First, we worked in teams to examine the physical and environmental conditions of the entire site and specific portions including the factors that shaped the physical environment and the result strengths and weaknesses of each specific area.

Then, through detailed site analysis and the design workshop with city and county officials, each team member built on the information acquired in the first step to identify the future potential conditions and opportunities for a specific area of study in Downtown Oxford."

## KERR-TAR REGIONAL COUNCIL OF GOVERNMENTS (KERR-TAR COG)

## LAKES DISTRICT REGIONAL BICYCLE PLAN (2014)

Kerr-Tar Regional Council of Governments (KTCOG) is developing a regional bicycle plan. The Kerr-Tar Lakes District Regional Bike Plan project will be developed by KTCOG staff in collaboration with NCDOT, local governments, other key stakeholders, and the general public. The project timeline is June 1, 2012 through June 30, 2014. The plan will recommend bicycle transportation connections between the region's lakes, towns, public lands, and landmarks within the Kerr-Tar region. Special attention will be paid to how the regional bike route system is connected to the proposed East Coast Greenway and Southeast High Speed Rail Station in Henderson and proposed regional commuter bus transit stations in Butner and Roxboro. Improvements to existing roadways and construction of new facilities will be recommended.

The Kerr-Tar Lakes District Regional Bike Plan will be developed in a five-phase process. A Steering Committee will be established to work with KTCOG staff in development of the plan.

**During the development of the Kerr-Tar Lake District Regional Bicycle Plan, the COG should review the recommendations of this Pedestrian Plan to ensure consistency and regional connectivity. See Chapter 5 for further guidance on regional collaboration efforts.**

## Program Review

### "EAT SMART, MOVE MORE" MOVEMENT - LIVEWELL GRANVILLE COUNTY

Information from:

http://www.eatsmartmovemorenc.com/AboutUs/TheMovement.html

The Eat Smart, Move More North Carolina movement is a statewide movement that promotes increased opportunities for healthy eating and physical activity wherever people live, learn, earn, play and pray.

This program helps communities, schools and businesses make it easy for people to eat healthy food and be physically active. It also encourages individuals to think differently about what they eat and how much they move, and to make choices that will help them feel good and live better.

Eat Smart, Move More NC is guided by the work of the Eat Smart, Move More NC Leadership Team, a multi-disciplinary team composed of statewide partners working together to increase opportunities for healthy eating and physical activity. Locally, the Granville-Vance District Health Department works with community partners and stakeholders to advance East Smart Move More NC precepts and other strategies that address identified health priorities.


#### Vision

A North Carolina where healthy eating and active living are the norm, rather than the exception.

#### Mission

To reverse the rising tide of obesity and chronic disease among North Carolinians by helping them to eat smart, move more and achieve a healthy weight.

### GRANVILLE COUNTY SAFE ROUTES TO SCHOOL

Information from:

http://www.granvillesaferoutes.org

"Safe Routes to School" is part of Granville County's commitment to encouraging a healthy lifestyle early in life by creating opportunities for kids and to walk or bike together to or from school.

This program is funded by NCDOT in partnership with "Safe Routes" National Center for Safe Routes to School and provides parents, students and educators with information to encourage bicycling and walking to school.

### GRANVILLE COUNTY "KIDS LIVING HEALTHY"

Information from:

http://ghshospital.org/community_support/kids_living_healthy.aspx

Kids Living Healthy is a wellness initiative designed by Granville Health System to encourage students and their families to live healthy lifestyles. Students are challenged to select themes such as nutrition, exercise or other ways to stay healthy and illustrate their ideas through individual pieces of art.

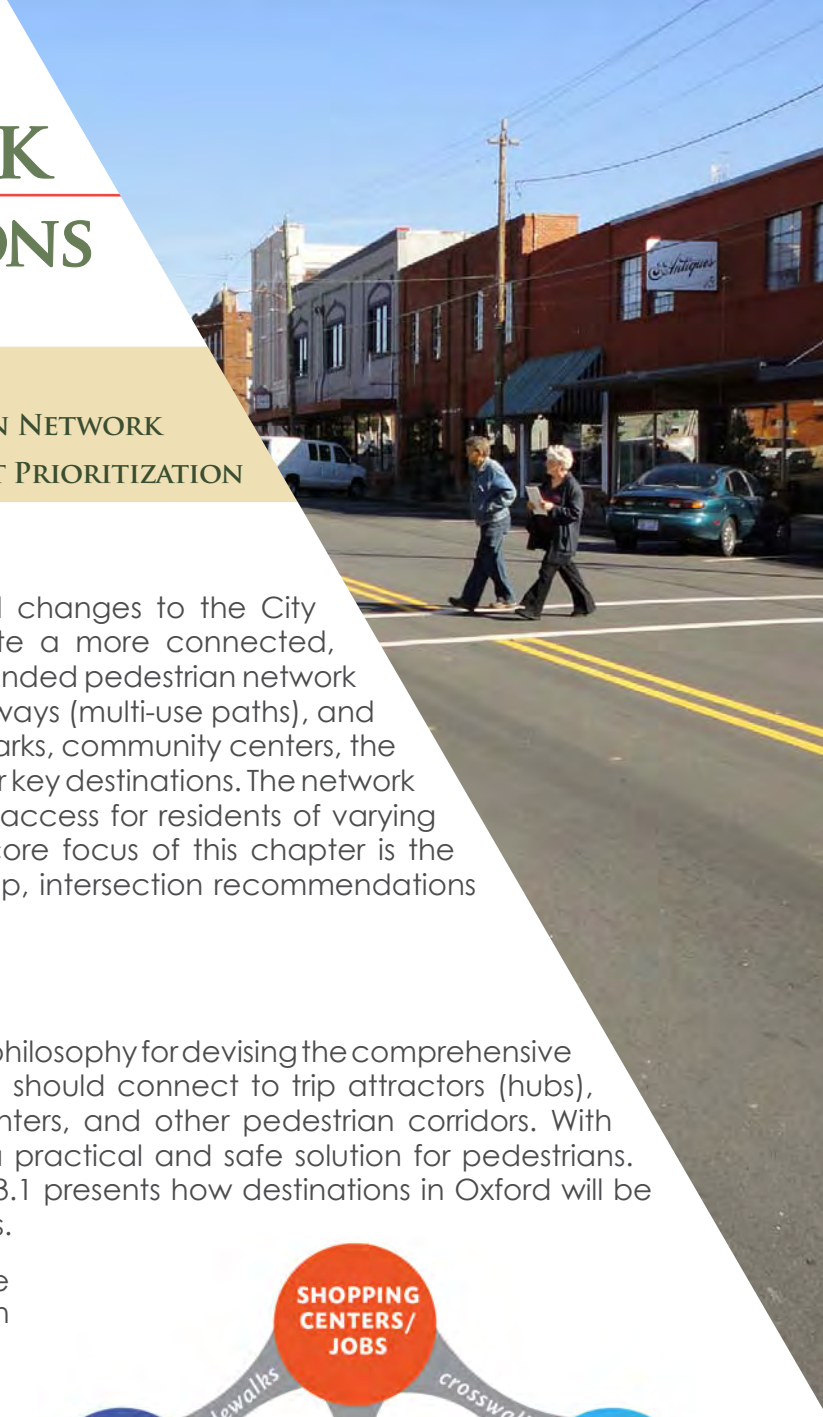
**Footnotes from, "Chapter 2, Existing Conditions"**

1. City of Oxford Website, "http://www.oxfordnc.org/history.htm".

2. 2000 US Census Website, "http://www.census.gov/population/www/censusdata/c2kproducts.html".

3. 2000 US Census Website, Frequently Asked Questions, "https://ask.census.gov/faq.php?dept=769&id=5000".

# 3 Network Recommendations



## Chapter Outline



## Overview

This chapter contains a series of recommended changes to the City of Oxford's physical environment that will create a more connected, comprehensive pedestrian network. The recommended pedestrian network provides a connected system of sidewalks, greenways (multi-use paths), and crossing improvements that connect to schools, parks, community centers, the business district, library, shopping centers, and other key destinations. The network serves multiple users and interests, and improves access for residents of varying physical capabilities, ages, and skill levels. The core focus of this chapter is the methodology, the overall pedestrian network map, intersection recommendations and the prioritization of projects.

## Methodology

The "hubs and spokes" model serves as the guiding philosophy for devising the comprehensive pedestrian network. Pedestrian corridors (spokes) should connect to trip attractors (hubs), such as parks, schools, downtown, shopping centers, and other pedestrian corridors. With these connections, the network then becomes a practical and safe solution for pedestrians. The 'hubs and spokes' model shown in Diagram 3.1 presents how destinations in Oxford will be linked through various types of pedestrian facilities.

A variety of resources were consulted during the development of the recommended pedestrian network. The following resources were consulted:

- Previous plans and studies
- Maps developed from GIS data (pedestrian crashes, demographic data, sidewalk gap analysis)
- Input from the Steering Committee and NCDOT
- Input obtained during public involvement events
- Fieldwork inventory and evaluation
- Pedestrian trip attractors/destinations

Diagram 3.2 on page 3-2 "Pedestrian Network Methodology" illustrates the comprehensive approach that was taken during the planning process to obtain input from a variety of sources. As described in Chapter 2, fieldwork included an examination of conditions at all major intersections along primary corridors, and a consideration of


**Diagram 3.1**: Hubs and Spokes Model

sidewalk gap connectivity. map discussion and analysis was conducted at Steering Committee meetings and public meetings to pinpoint specific areas in need of pedestrian improvements.

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.

**Diagram 3.1**: Pedestrian Network Methodology


# THE PEDESTRIAN NETWORK

The Proposed Pedestrian Network Maps beginning on page 3-8 present proposed pedestrian and greenway (multi-use path) facilities for Oxford. Proposed improvements to the network include sidewalks, roadway crossing improvements, traffic calming techniques, and multi-use paths or greenways to create a comprehensive and safe system of on and off-road facilities. Although the maps do not show recommendations for 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).

### Sidewalk Recommendations (Map 3.4)

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.

### Multi-use Paths/ Regional Greenways (Map 3.5)

Potential local and regional greenway opportunities were identified during the planning process. Greenways are proposed for Oxford to provide transportation and recreational alternatives for pedestrian travel in and around Oxford, and to connect to the regional greenway network. The recommended greenways in this Plan aim to expand upon the comprehensive off-road system identified in the Granville County Greenway Master Plan that utilizes stream corridors, railroad corridors and easements to make connections throughout Granville County.

### Intersection Improvements (Maps 3.6 & 3.7)

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 Oxford were targeted for enhancements during this study (to improve existing crossing facilities or create new crossing facilities at intersections and mid-blocks). Two mid-block crossings were identified in Oxford, one in Downtown across Williamsboro Street, and one across College Street near C.G. Credle Elementary School. Improvements to both of these mid-block crossings are noted in the intersection graphics presented later in this chapter. City Staff input, resident input, NCDOT pedestrian crash data, and fieldwork were utilized to identify high priority intersections. Intersection recommendations in the form of graphic illustrations for the 38 high priority intersections are presented starting on page 3-16 of this chapter. The intersection graphic "key" is presented and explained on page 3-15.

### Gateway Corridors

A gateway corridor can serve as a welcoming entrance way into the City. In many cases,

the a gateway corridor is the first impression residents and visitors have of the community and as such, should be inviting and attractive. The community's history, culture, livability and "sense of place" should be reflected in the designated gateway corridors. Several gateway corridors have been identified during the development of this Plan and the City should consider adopting gateway overlay districts as part of their zoning ordinance to protect and enhance these gateway areas. Potential gateway corridor recommendations could include sidewalks on both sides of the street, a "welcome" sign, street trees, landscaped center medians, landscaped sidewalk buffers, drive access management policies, wayfinding signage, and pedestrian level lighting. The gateway corridor areas are shown on Maps 3.1-3.3 as light grey polygons.

**An advanced visualization of Linden Avenue/ NC 96 was developed to graphically illustrate the planning-level recommendation for this gateway corridor into Oxford. The existing conditions image for Linden Avenue/NC 96 is shown on page 3-4, and the advanced visualization on page 3-5. Further review and evaluation of this corridor by NCDOT will be needed during the future design phase of the project.**

### Traffic Calming Opportunities

Traffic calming is the name for road design strategies that can be implemented to reduce vehicular traffic speed and volume, create a more pedestrian-friendly environment, and allow residential and commercial streets to better balance their multiple uses. The type of projects can range from a few minor changes to major rebuilding of a street network.

Types of traffic calming techniques vary from community to community and state to state. Techniques that are typically utilized include (but are not limited to) speed limit reduction, speed alert and enforcement, warning signage, gateway signage, speed tables and raised crosswalks, planted center median islands, speed humps, rumble strips, traffic circles, pavement treatments such as cobblestones or bricks, bicycle lanes, curb extensions, road diets, and reducing lane widths as appropriate.

There are several areas in Oxford where traffic calming techniques could be implemented. These areas are identified on Maps 3.1-3.3. Before implementing any traffic calming techniques, the Town's Engineering Department should analyze each corridor and evaluate the potential impacts of implementing a traffic calming technique. More information and further detailed recommendations on traffic calming techniques can be found in the 2011 Downtown Streetscape Master Plan developed by North Carolina State University.

### Downtown Oxford Improvements

In addition to the other facilities described in this Chapter, curb bulb-outs should be constructed at mid-block crossings and near on-street parking areas to increase pedestrian crossing safety by reducing the crossing distance. Several locations in Downtown Oxford along Williamsboro / Hillsboro Street, Main Street, College Street, Broad Street and Linden Avenue have on-street parking and curb bulb-outs should be considered in these areas. Other Downtown improvements could include wayfinding signage or informational kiosks, additional street trees that create shade for pedestrians, in-road pedestrian crossing signage, pedestrian level lighting and public art spaces.

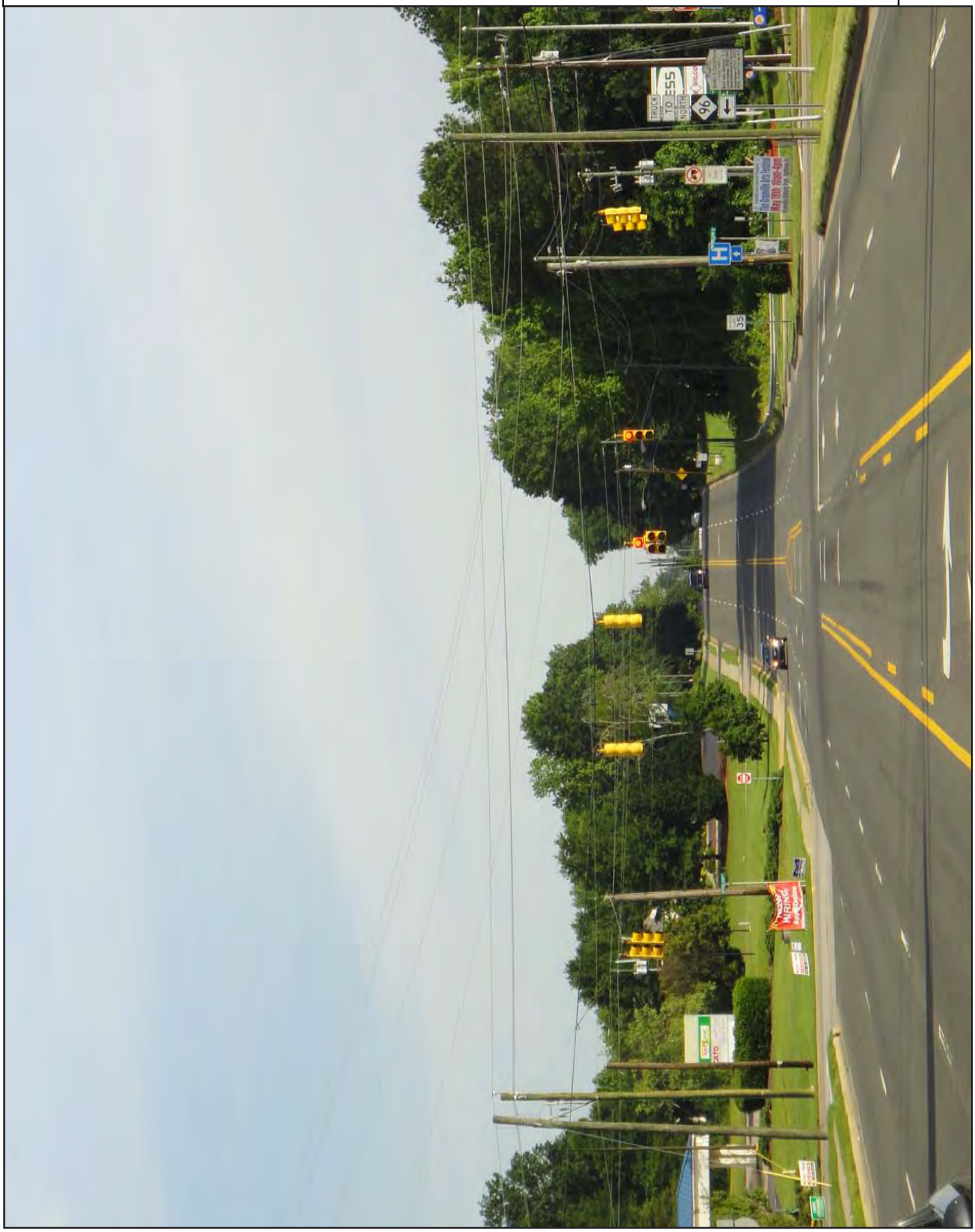
The advanced visualization on page 3-7 illustrates what Hillsboro Street in Downtown could look like with some of these potential improvements. Downtown improvements such as these will create a more pedestrian-friendly Downtown Oxford, increase the "sense of place" for residents and could potentially serve as an economic or tourism stimulus for the Downtown.

All together these proposed facilities should be developed or improved to create a safe and connected pedestrian network throughout the City of Oxford. All pedestrian facility projects undertaken should aim to meet the highest standards possible when topography and right-of-way allows. The 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.

The network should be completed in phases (as prioritized later in this chapter). However, individual projects within the network could be developed as opportunities arise, regardless of the order. Also, as mentioned earlier in this chapter, new ordinances should make pedestrian accommodations a mandatory part of any commercial or residential development.

# Linden Avenue Gateway Corridor - Existing

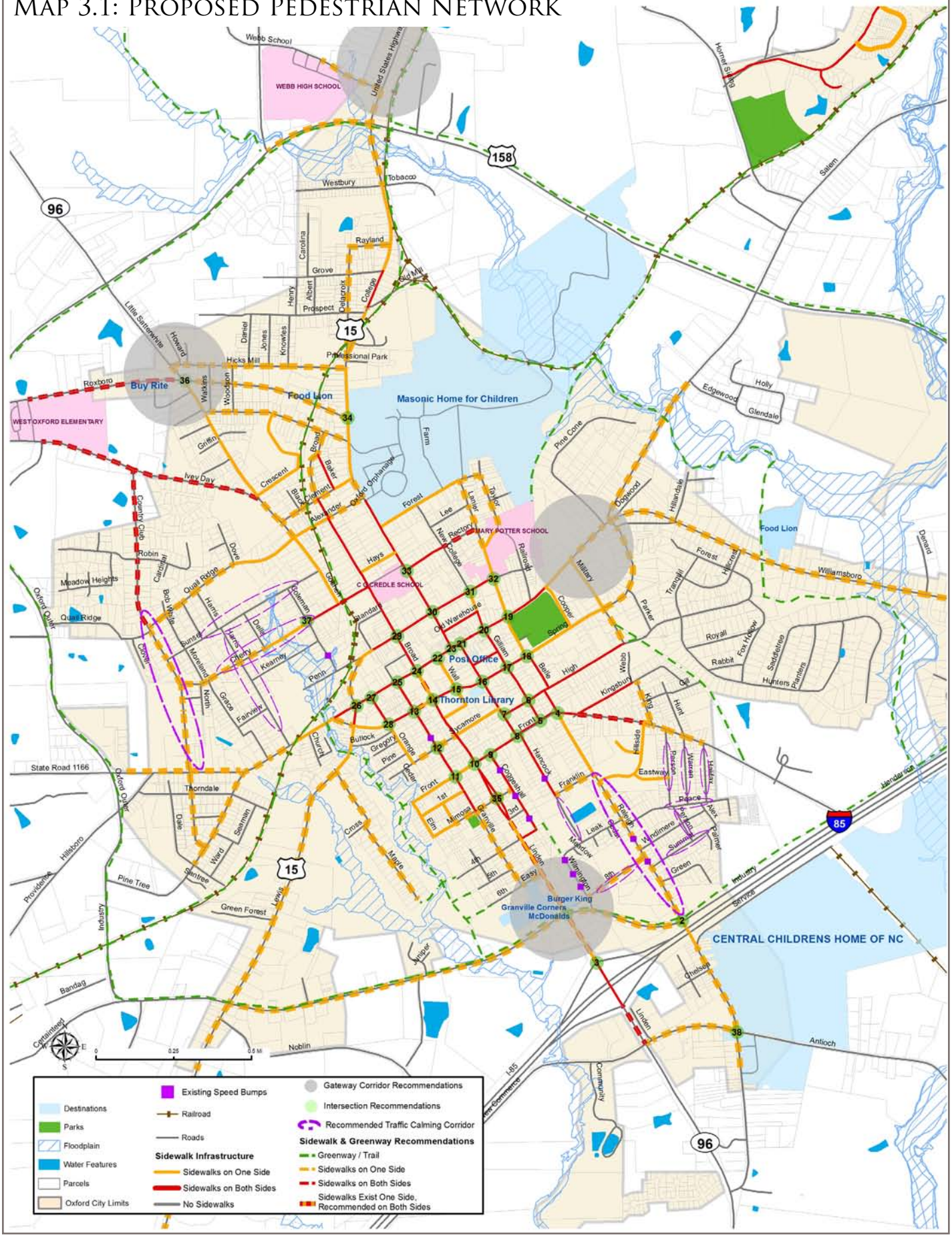


# Linden Avenue Gateway Corridor - Visualization

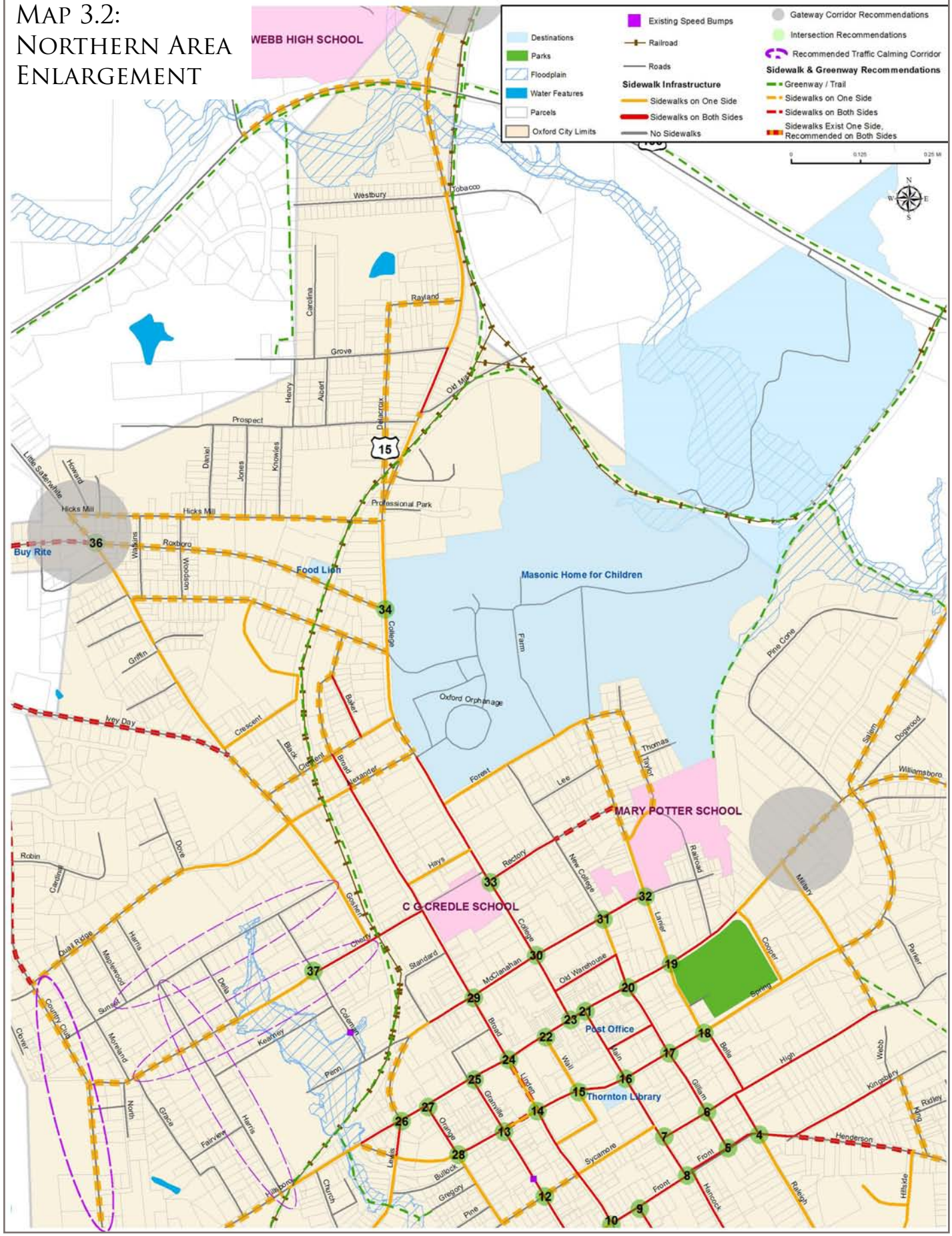
# Downtown Oxford - Existing

# Downtown Oxford - Visualization

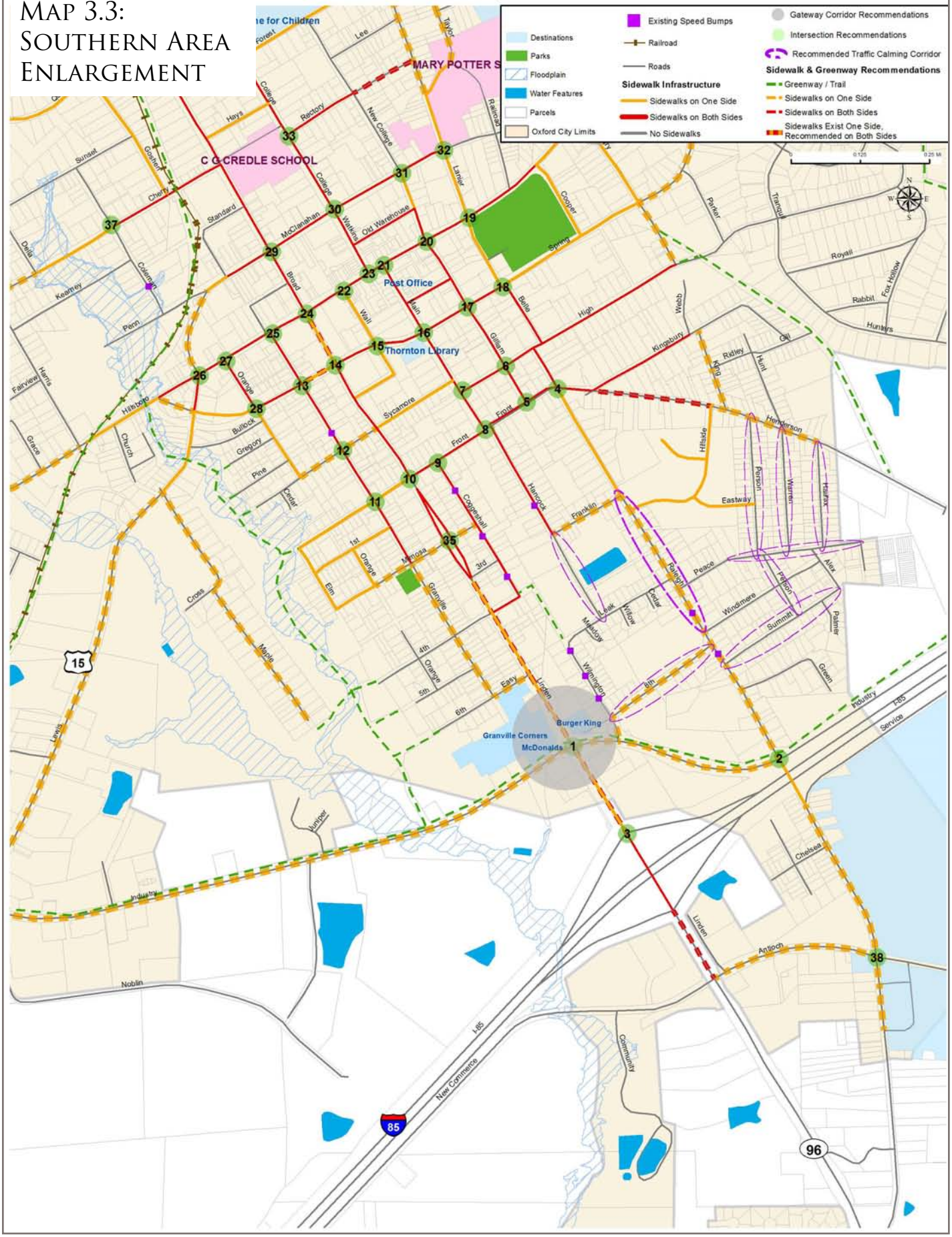
# Map 3.1: Proposed Pedestrian Network



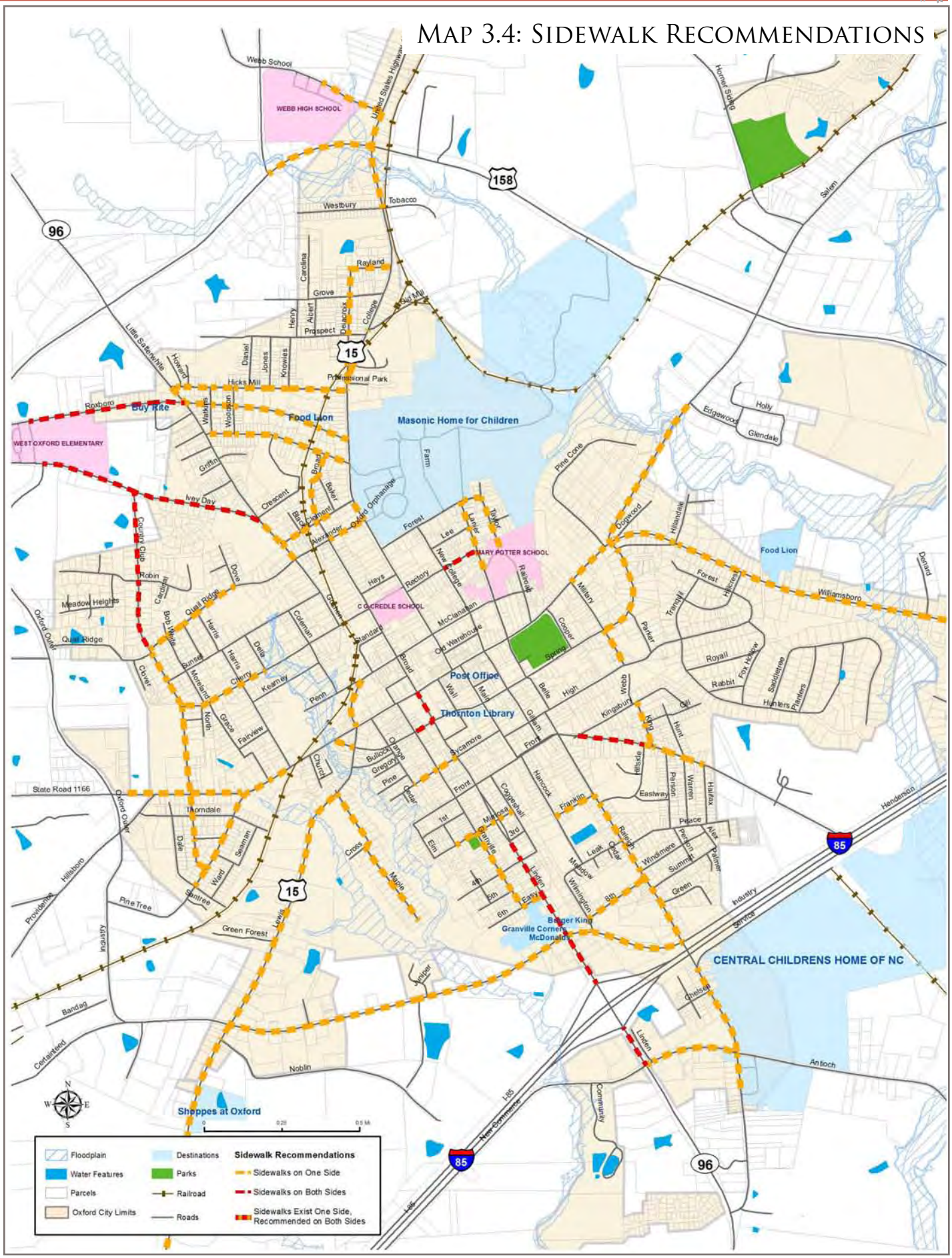
# Map 3.2: Northern Area Enlargement



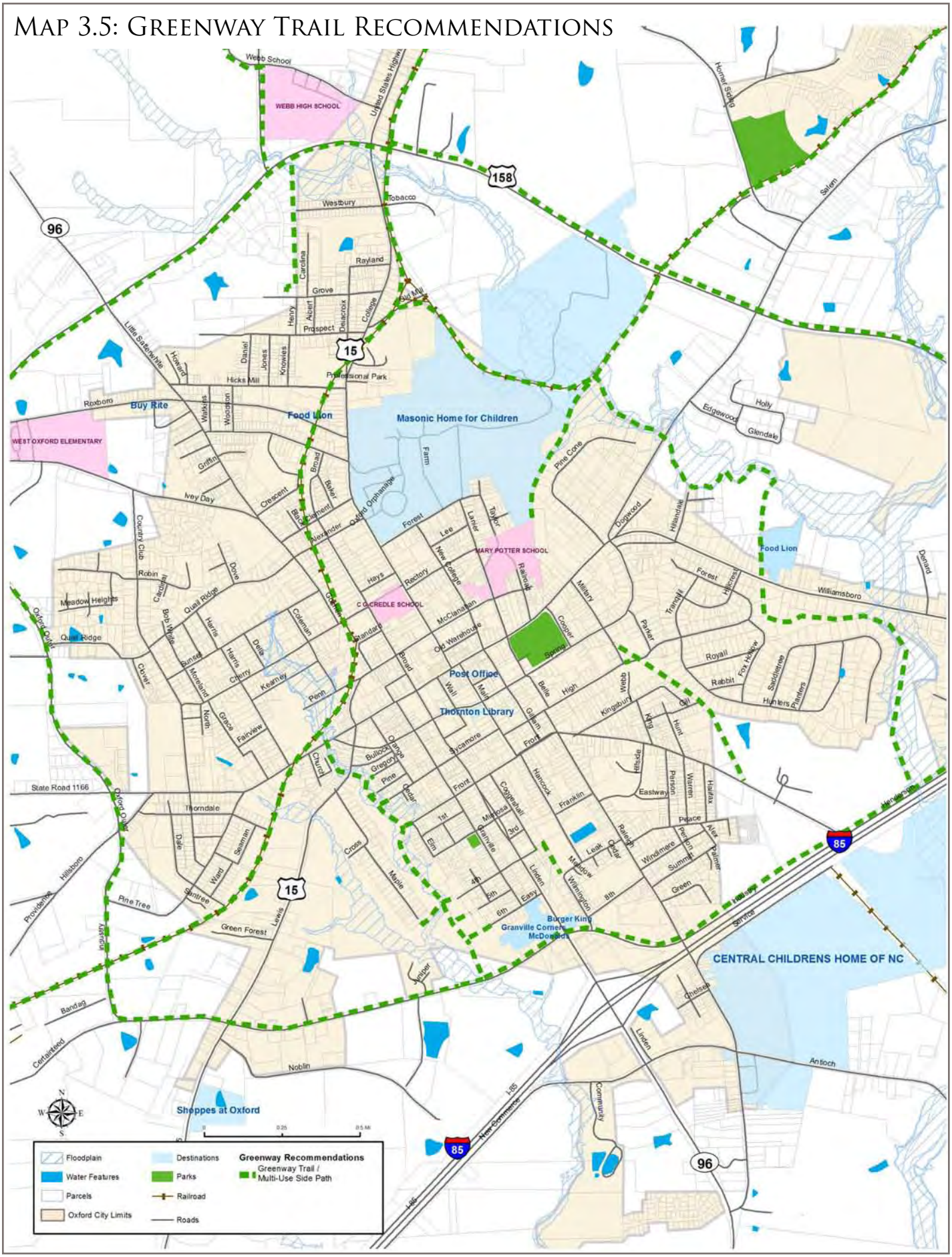
# Map 3.3: Southern Area Enlargement



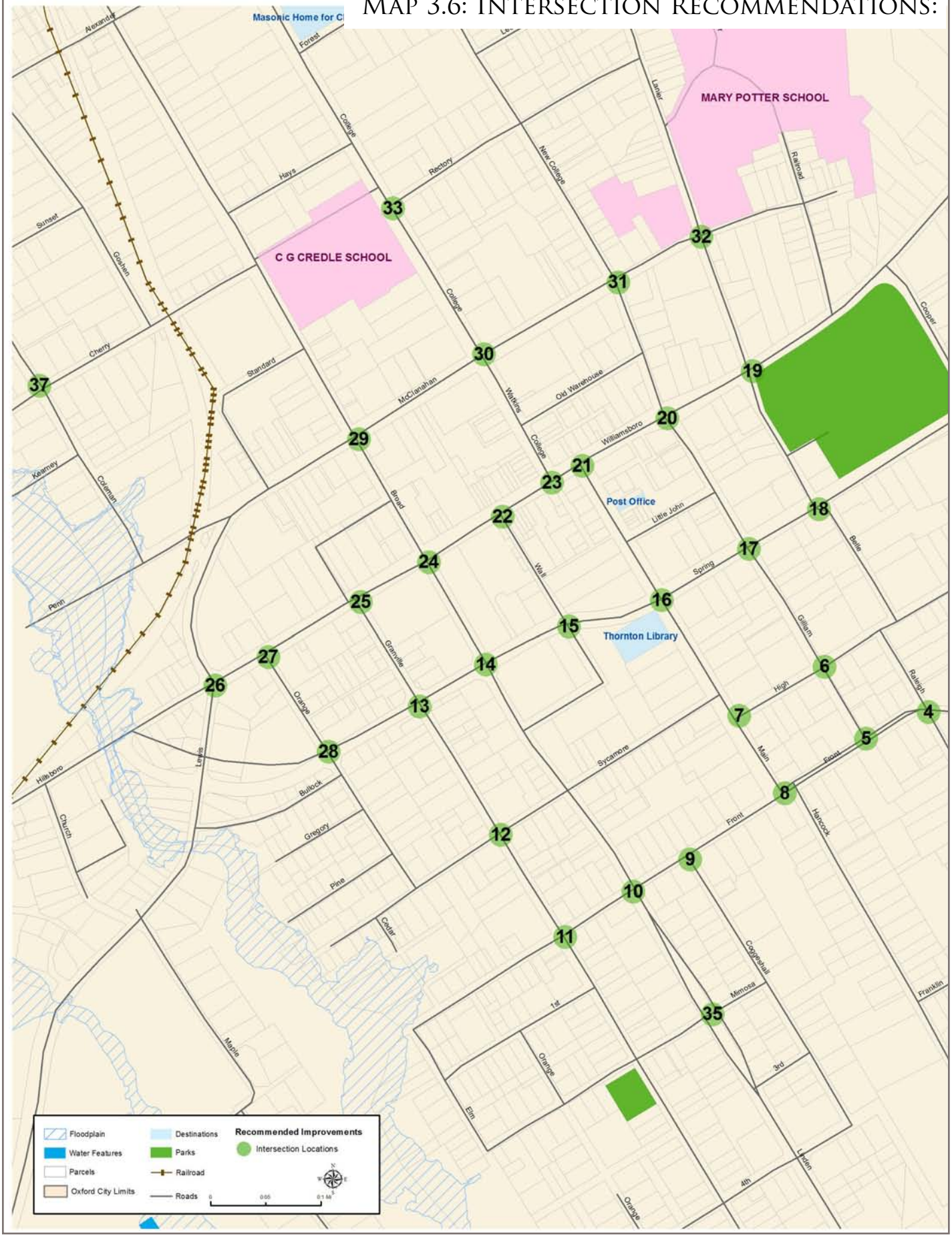
# Map 3.4: Sidewalk Recommendations



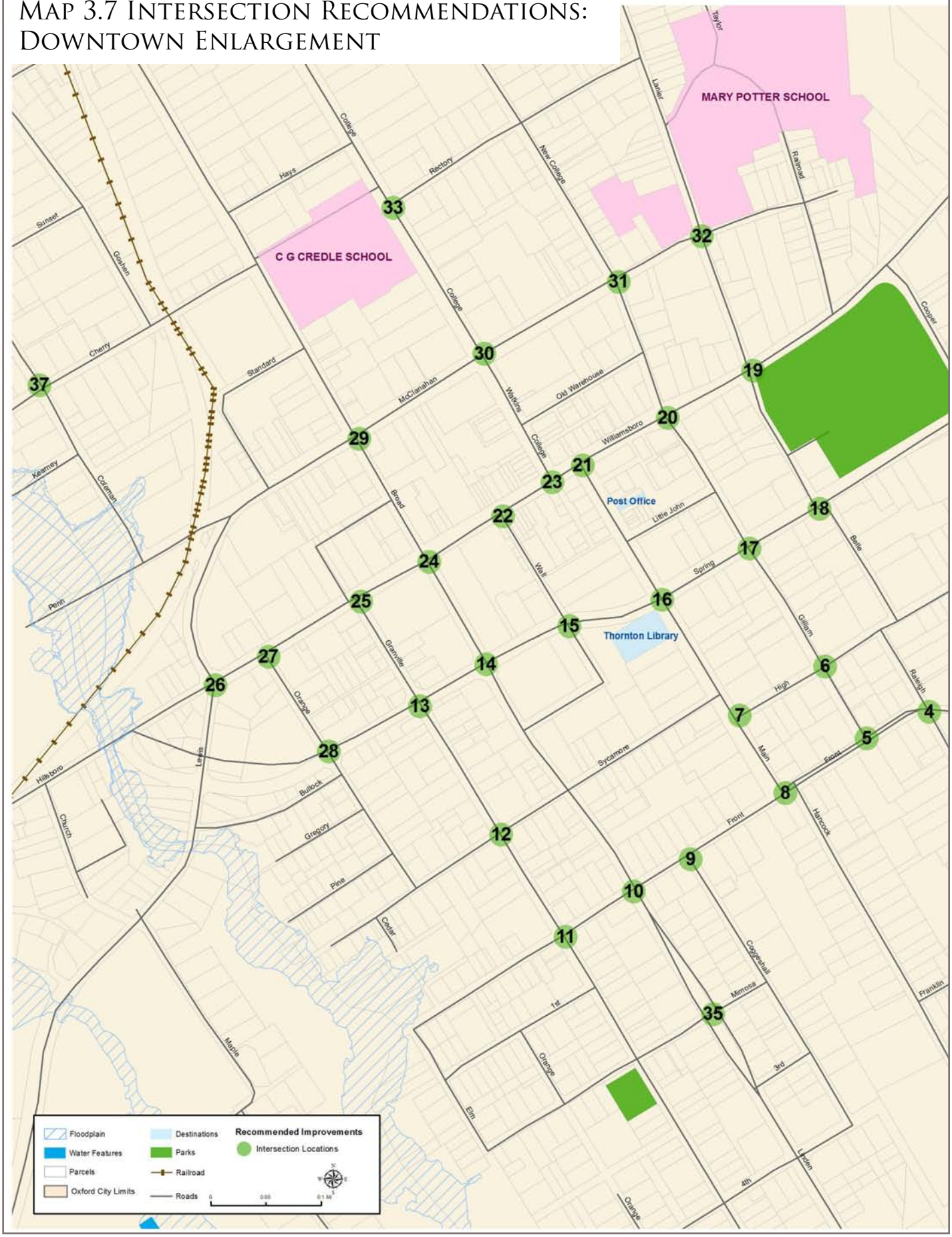
# Map 3.5: Greenway Trail Recommendations



# Map 3.6: Intersection Recommendations:



# MAP 3.7 INTERSECTION RECOMMENDATIONS: DOWNTOWN ENLARGEMENT



# "Pedestrian-Friendly" Intersections

As previously mentioned, the 38 intersections listed in Table 3-1 were evaluated for pedestrian safety and for visibility for automobile drivers. Recommendations were developed for each intersection and are illustrated in each intersection graphic. Fieldwork photos and captions are also presented for each intersection to give local context and to summarize what is shown in the graphic.

The Recommendation Key on page 3-16 presents a description of each color and symbol included in the intersection recommendation graphics that are found starting on page 3-17 of this chapter.

A Consultant evaluates the intersection of Main and High Streets during fieldwork.

Table 3-1. Intersections

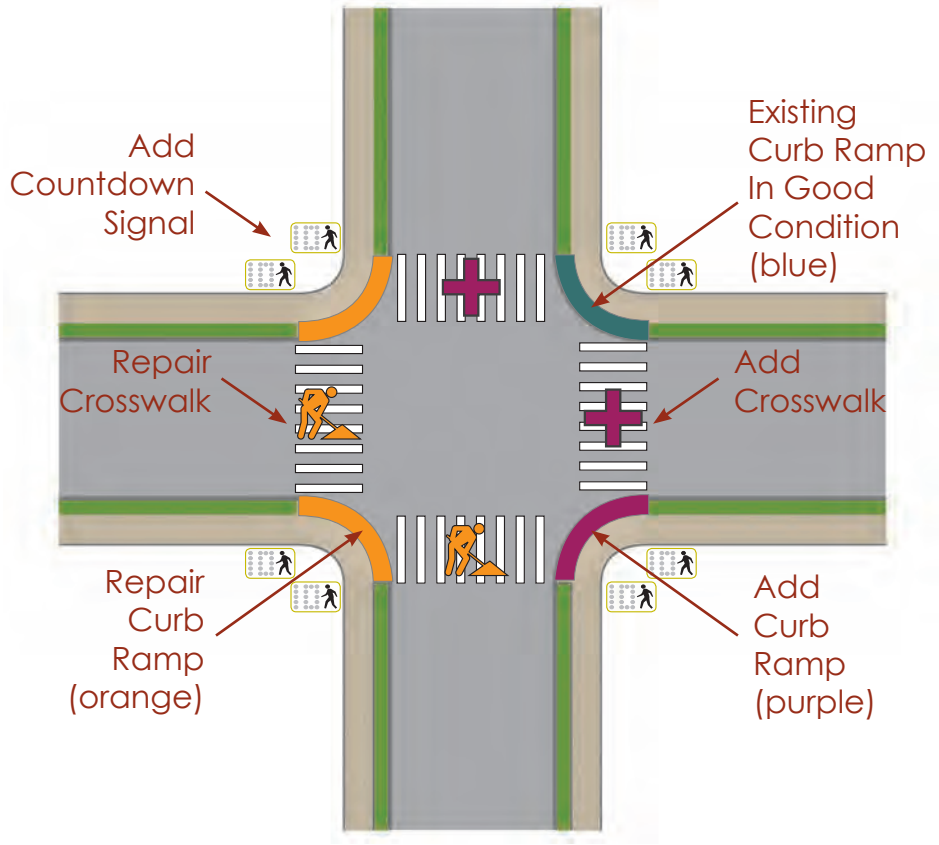
| | |
|---|---|
| 1. Industry & Linden | 20. Williamsboro & New College |
| 2. Industry & Raleigh | 21. Williamsboro & Main* |
| 3. Linden & I-85 | 22. Hillsboro & Wall |
| 4. Raleigh & Front | 23. Hillsboro & College |
| 5. Front & Gilliam | 24. Hillsboro & Broad/ Linden |
| 6. Gilliam & High | 25. Hillsboro & Granville |
| 7. Main & High | 26. Hillsboro & Lewis |
| 8. Main & Front | 27. Hillsboro & Orange |
| 9. Front & Coggeshall | 28. Spring & Orange |
| 10. Front & Linden | 29. McClanahan & Broad |
| 11. Front & Granville | 30. McClanahan & College |
| 12. Granville & Sycamore | 31. McClanahan & New College |
| 13. Granville & Spring | 32. McClanahan & Lanier |
| 14. Spring & Linden | 33. College & Rectory* |
| 15. Spring & Wall | 34. College & Roxboro |
| 16. Spring & Main | 35. Linden & Mimosa |
| 17. Spring & Gilliam | 36. NC 96 & Roxboro |
| 18. Spring & Belle | 37. Cherry & Coleman |
| 19. Williamsboro & Lanier / Belle | 38. Raleigh & Antioch |

*Nearby mid-block crossing recommendations are included in intersection graphics.

## RECOMMENDATION KEY

Street Names

### INTERSECTION OF STREET #1 AND STREET #2

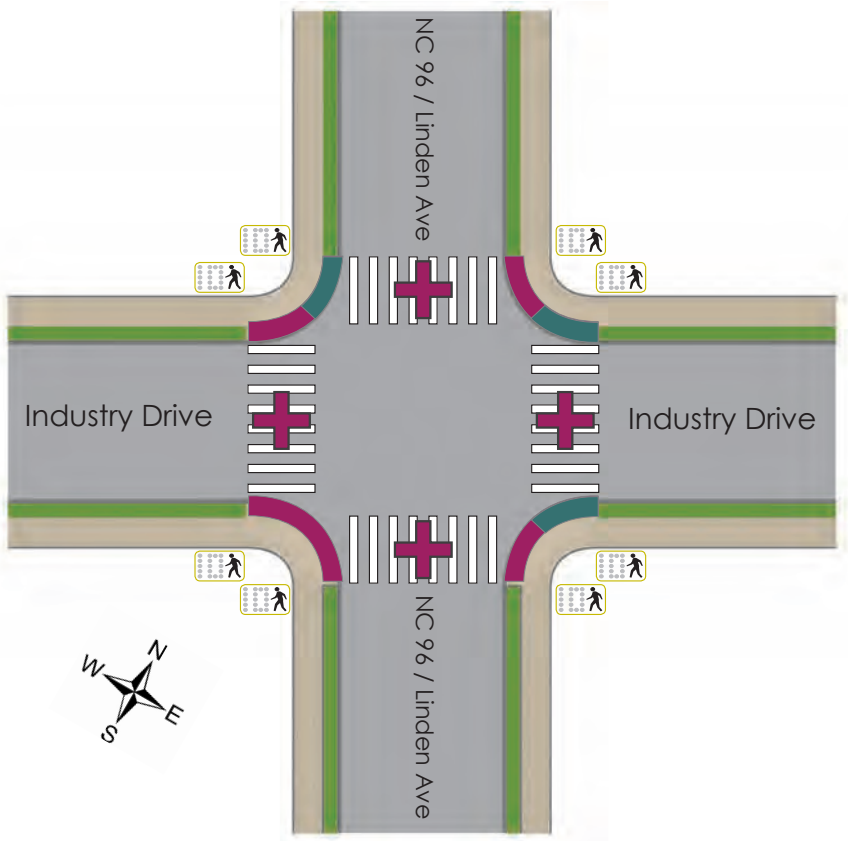



Intersection Photo

- Add crosswalks to west and south streets
- Upgrade / retrofit curb ramp on southwest and northeast corners
- Add advanced pedestrian signage.

Recommendation Commentary

## #1: INTERSECTION OF INDUSTRY AND NC 96 / LINDEN





Orientation of Photo Differs from Orientation of Recommendation Graphic

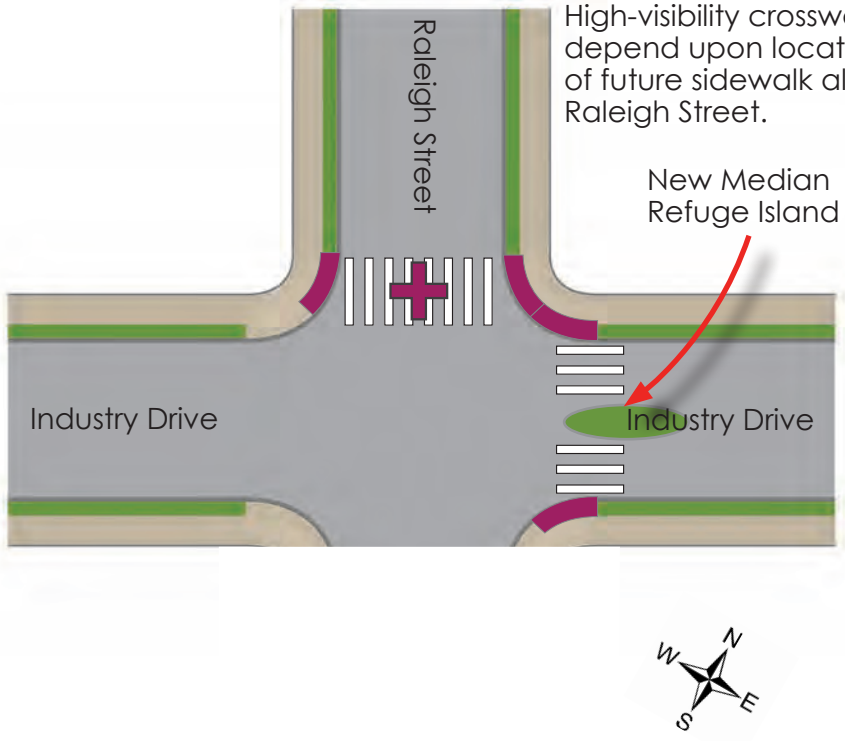
- Add 4 new crosswalks across NC 96 / Linden Ave. and Industry Dr.
- Add 5 new curb ramps.
- Add 8 pedestrian countdown timers in all directions.

## #2: INTERSECTION OF INDUSTRY AND RALEIGH


Orientation of Photo Differs from Orientation of Recommendation Graphic

- Extend existing sidewalk from pedestrian bridge to crosswalk across Industry Dr.
- Add 1 new curb ramp when new sidewalk is constructed.
- Add 1 new crosswalk across Raleigh St.
- Add advanced pedestrian signage and median refuge island on Industry Dr.
- Consider speed limit reduction on Industry Dr., approaching this pedestrian crossing area.

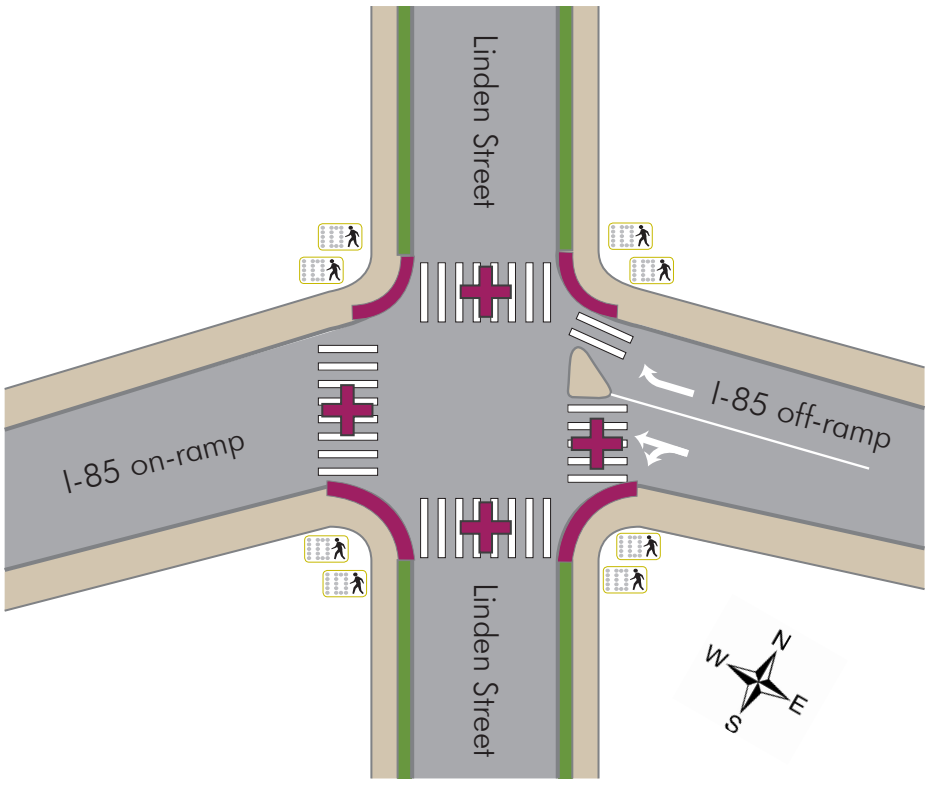
Final construction of curb ramps and placement of High-visibility crosswalk will depend upon location of future sidewalk along Raleigh Street.



## #3: INTERSECTION OF I-85 AND NC 96 / LINDEN


Orientation of Photo Differs from Orientation of Recommendation Graphic

- Add 4 new crosswalks across NC 96 / Linden Ave. and the on-ramps for I-85.
- Add 8 new curb ramps.
- Add 8 pedestrian countdown timers in all directions.
- Add raised pedestrian refuge island on I-85 off-ramp.



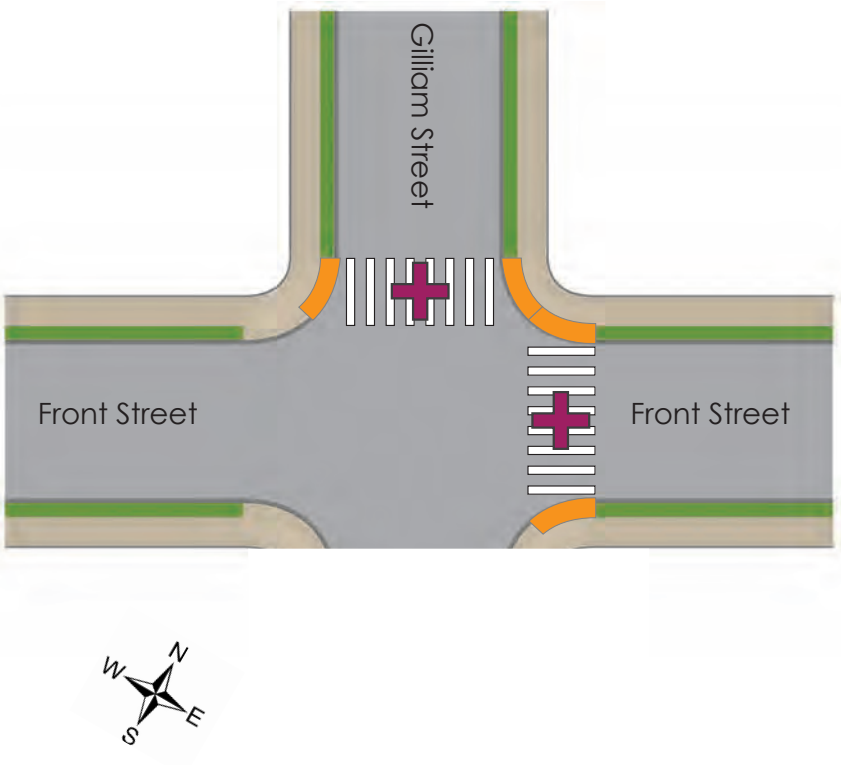

## #4: INTERSECTION OF RALEIGH AND FRONT / HENDERSON



Orientation of Photo Differs from Orientation of Recommendation Graphic

- Add 2 new crosswalks across Front St. and Henderson St.
- Add 1 new crosswalk across Raleigh St., connecting the northern corners of Front and Henderson St.
- Upgrade/retrofit 6 curb ramps.

## #5: INTERSECTION OF FRONT AND GILLIAM

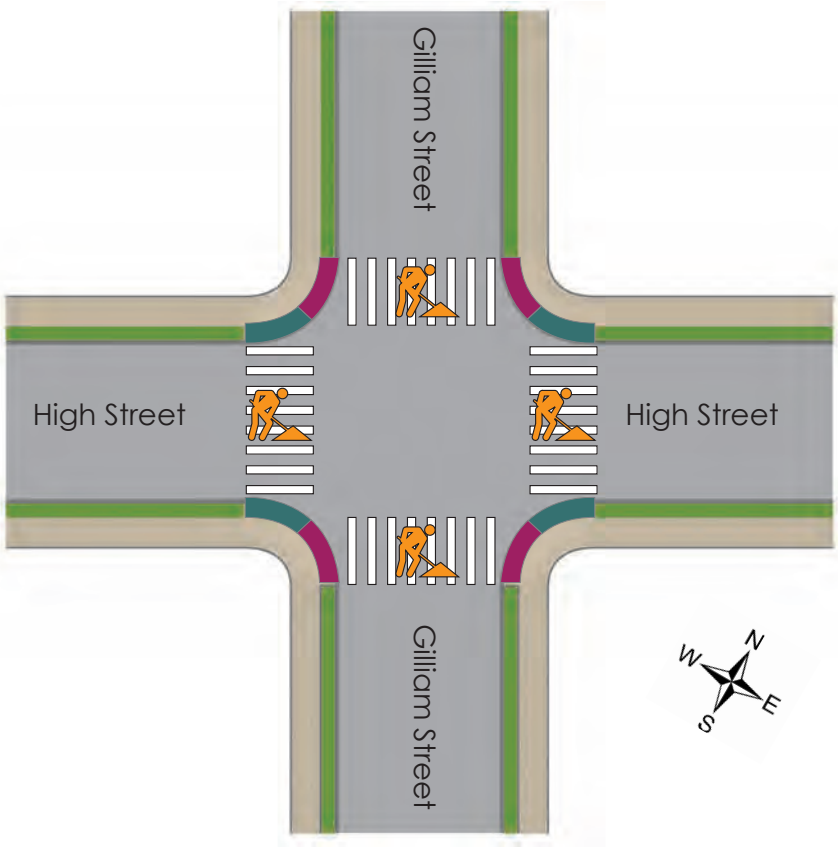




- Add 1 new crosswalk across Gilliam St.
- Add 1 new crosswalk across Front St.
- Upgrade/retrofit 4 curb ramps.

## #6: INTERSECTION OF GILLIAM AND HIGH

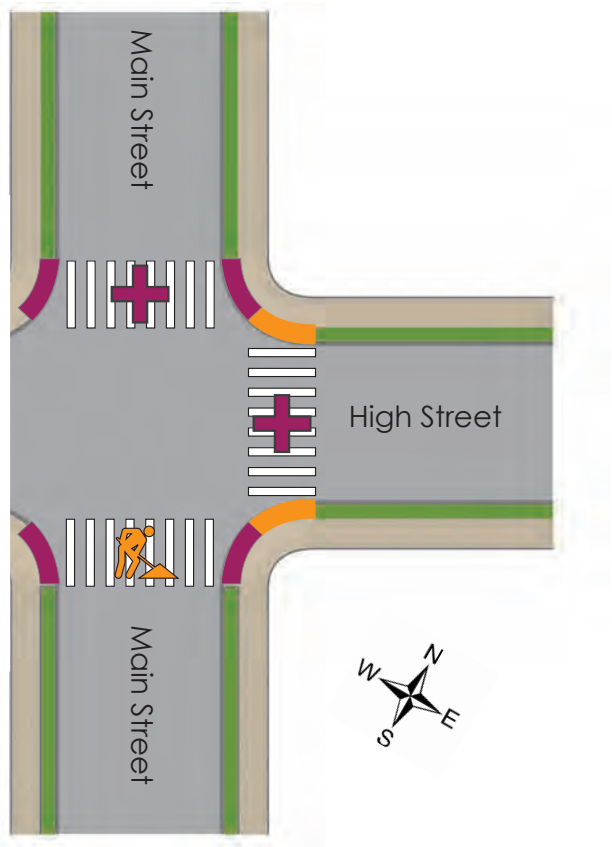

- Upgrade all 4 crosswalks to high-visibility.
- Add 4 new curb ramps across Gilliam St.
- 4 existing curb ramps across High St. are in good condition.



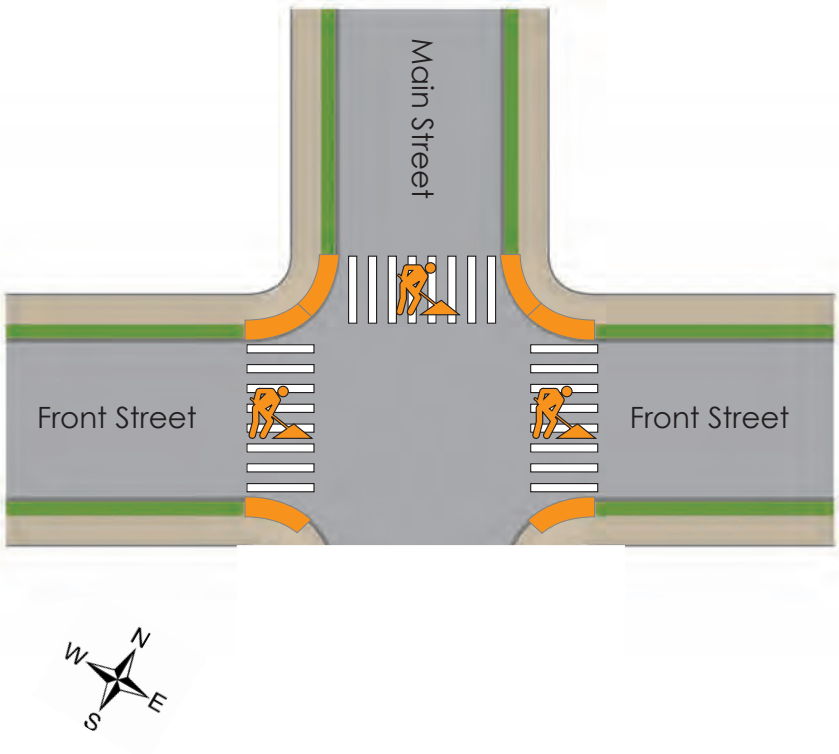
## #7: INTERSECTION OF MAIN AND HIGH

Orientation of Photo Differs from Orientation of Recommendation Graphic

- Add 1 new crosswalk across High St.
- Add 1 new crosswalk across Main St.
- Upgrade/retrofit curb ramps across High St.
- Upgrade 1 existing crosswalk across Main St. to high-visibility.
- Add 4 new curb ramps across Main St.




## #8: INTERSECTION OF MAIN AND FRONT

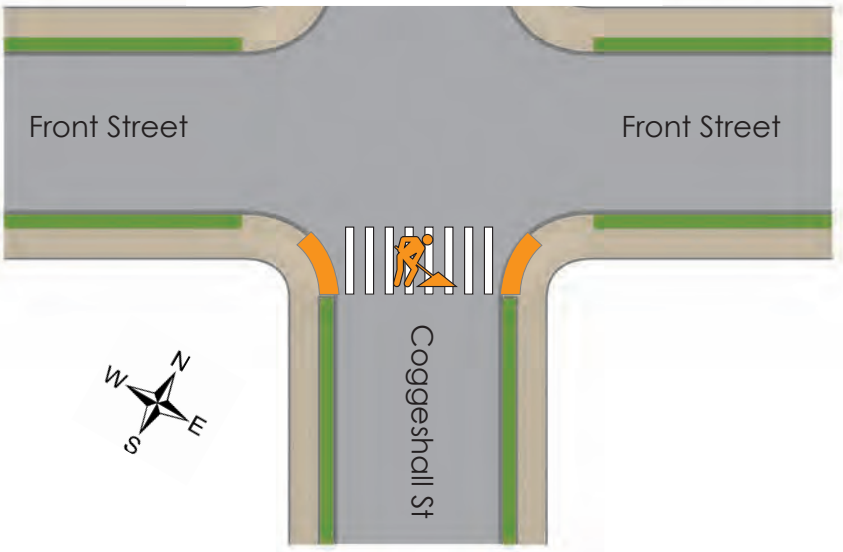




Orientation of Photo Differs from Orientation of Recommendation Graphic

- Upgrade/retrofit 6 existing curb ramps.
- Upgrade 3 existing crosswalks to high-visibility.

## #9: INTERSECTION OF FRONT AND COGGESHALL

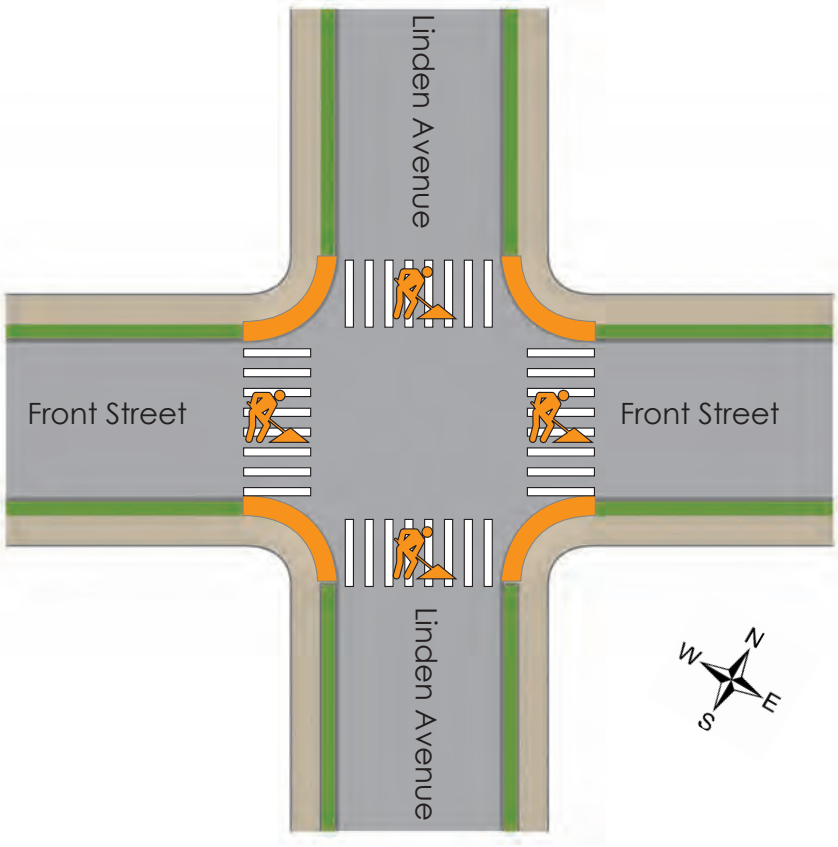




- Upgrade 1 existing crosswalk across Coggeshall St. to high-visibility.
- Upgrade/retrofit 2 existing curb ramps across Coggeshall St.

## #10: INTERSECTION OF FRONT AND LINDEN

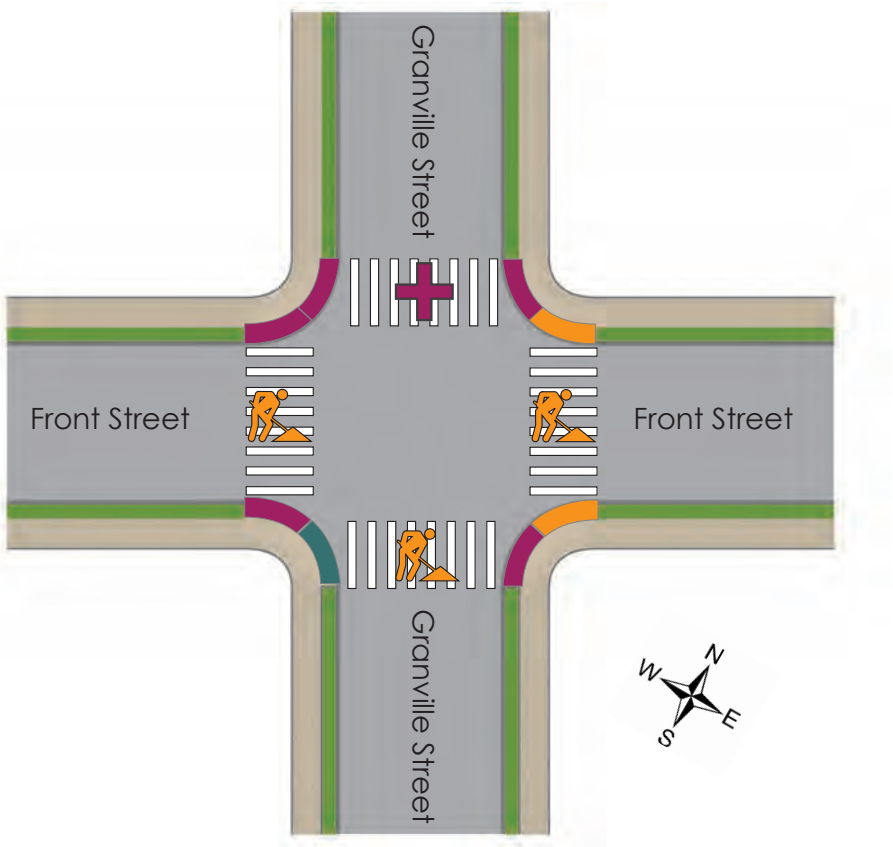

- Upgrade/retrofit 8 existing curb ramps.
- Upgrade 4 existing crosswalks to high-visibility.



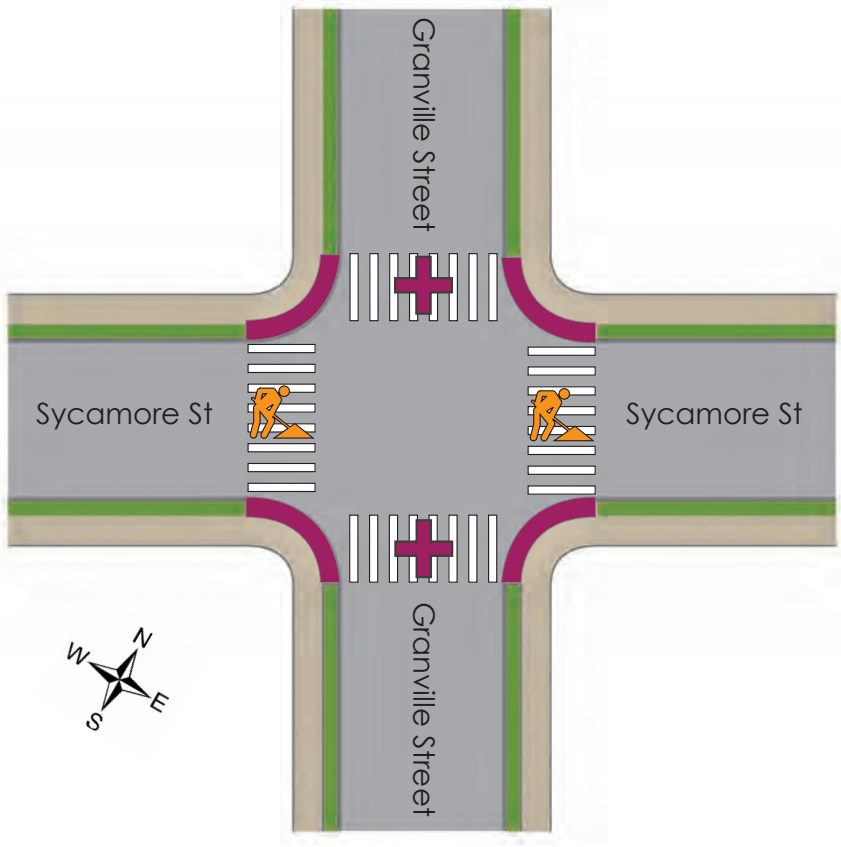
## #11: INTERSECTION OF FRONT AND GRANVILLE

Orientation of Photo Differs from Orientation of Recommendation Graphic

- Add 5 new curb ramps across Granville St. and Front St.
- Upgrade/retrofit 2 existing curb ramps across Front St.
- Upgrade 3 existing crosswalks to high-visibility.
- Add 1 new crosswalk across Granville St.
- 1 existing curb ramp across Granville St. is in good condition.




## #12: INTERSECTION OF GRANVILLE AND SYCAMORE

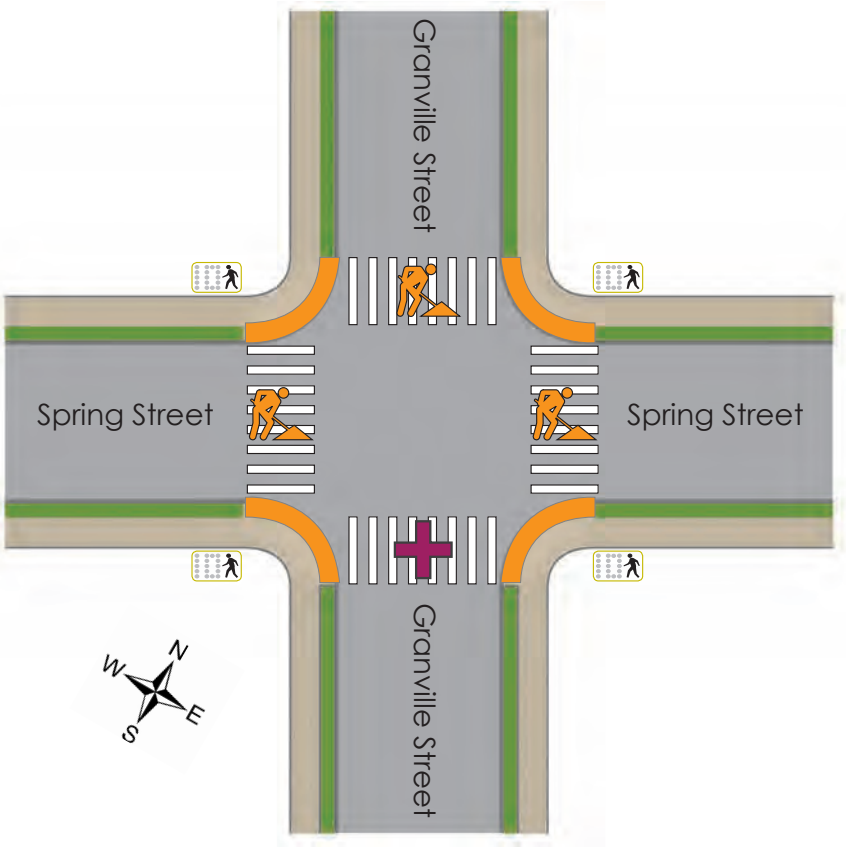




Orientation of Photo Differs from Orientation of Recommendation Graphic

- Add 2 new crosswalks across Granville St.
- Upgrade 2 existing crosswalks across Sycamore St. to high-visibility.
- Add 8 new curb ramps.

## #13: INTERSECTION OF GRANVILLE AND SPRING





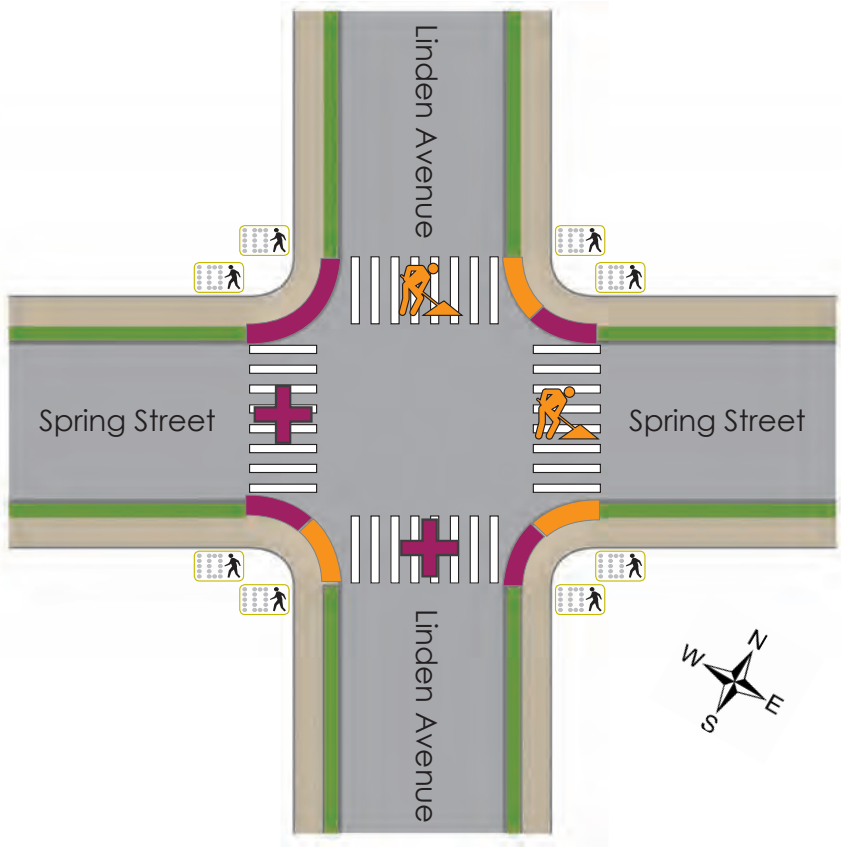
Orientation of Photo Differs from Orientation of Recommendation Graphic

- Upgrade/retrofit all 8 existing curb ramps.
- Upgrade 3 existing crosswalks to high-visibility.
- Add 1 new crosswalk crossing Granville St.
- Add 4 pedestrian countdown timers crossing Spring St.

## #14: INTERSECTION OF SPRING AND LINDEN

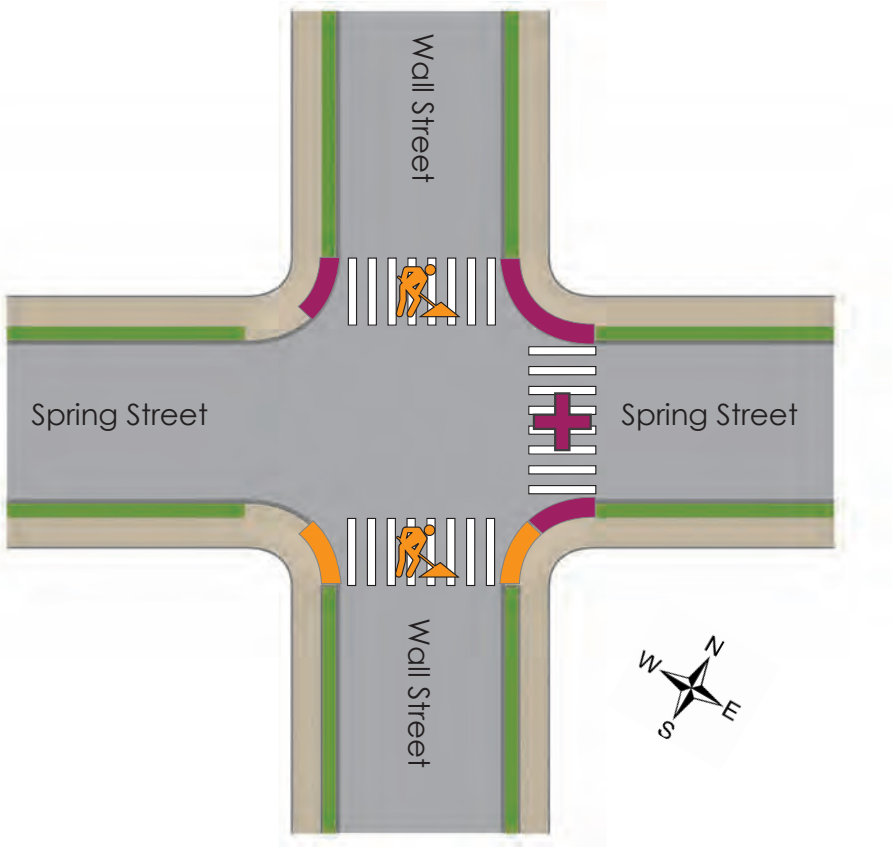

Orientation of Photo Differs from Orientation of Recommendation Graphic

- Add 5 new curb ramps.
- Upgrade/retrofit 3 existing curb ramps.
- Upgrade 2 existing crosswalks to high-visibility.
- Add 2 new crosswalks.
- Add 8 pedestrian countdown timers in all directions.

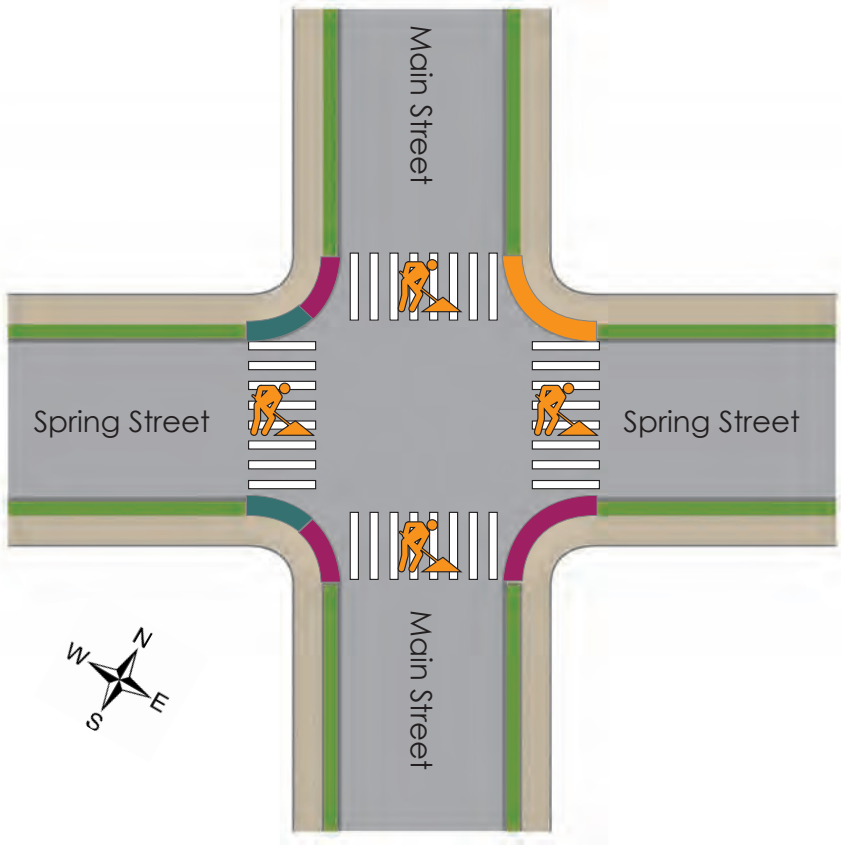


## #15: INTERSECTION OF SPRING AND WALL


- Add 4 new curb ramps.
- Upgrade/retrofit 2 existing curb ramps.
- Upgrade 2 existing crosswalks across Wall St. to high-visibility.
- Add 1 new crosswalk across Spring St.



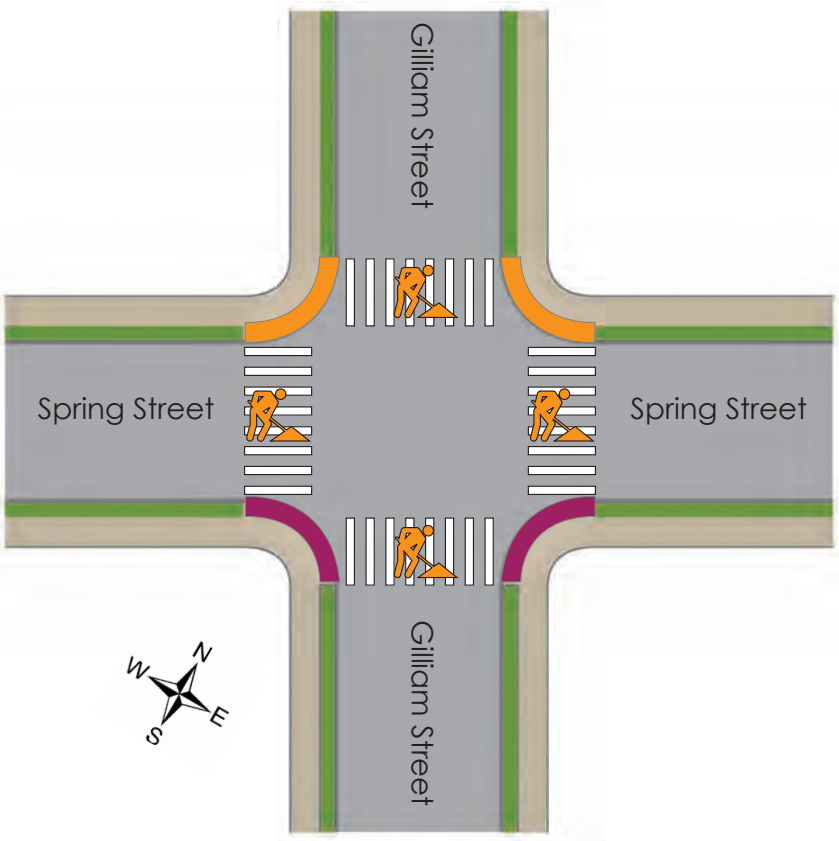

## #16: INTERSECTION OF SPRING AND MAIN





- Upgrade all 4 existing crosswalks to high-visibility.
- Add 4 new curb ramps.
- Upgrade/retrofit 2 existing curb ramps.

## #17: INTERSECTION OF SPRING AND GILLIAM

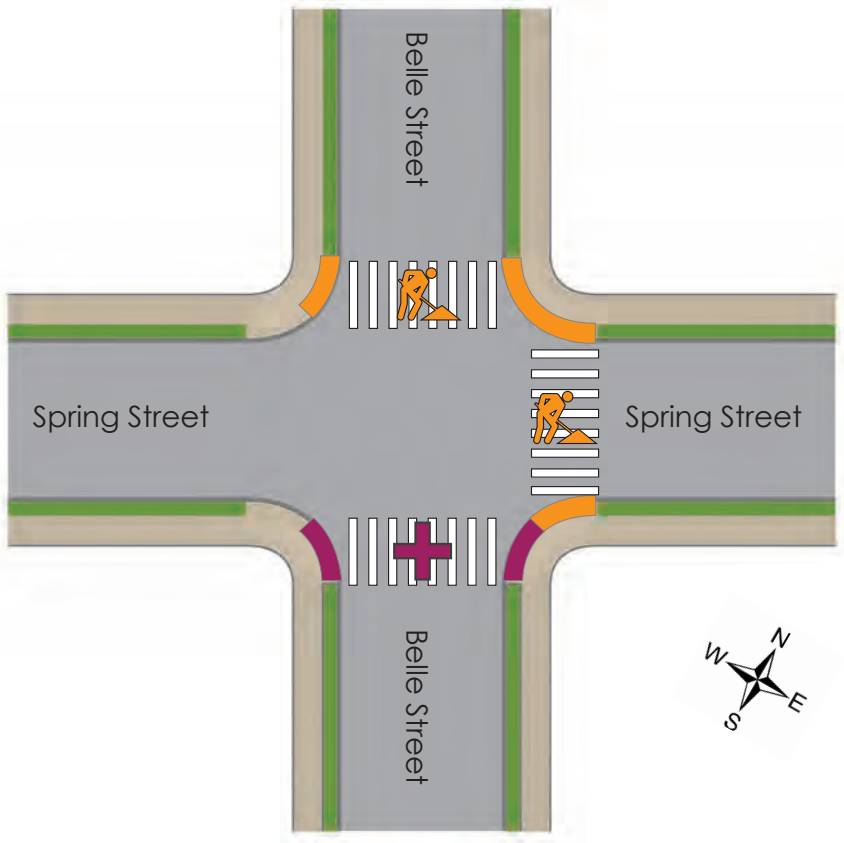




- Upgrade 4 existing crosswalks to high-visibility.
- Add 4 new curb ramps.
- Upgrade/retrofit 4 existing curb ramps.

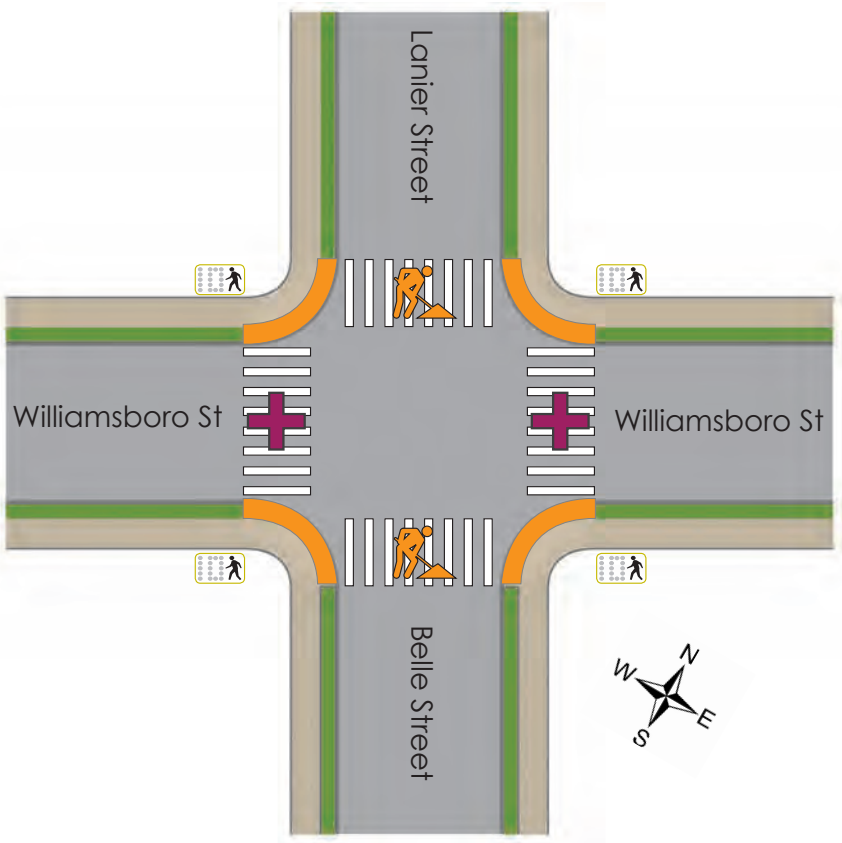
## #18: INTERSECTION OF SPRING AND BELLE


- Add 1 new crosswalk across Belle St.
- Upgrade 1 existing crosswalk across Belle St. to high-visibility.
- Upgrade 1 existing crosswalk across Spring St. to high-visibility.
- Upgrade/retrofit 4 curb ramps.
- Add 2 new curb ramps across Belle St.



## #19: INTERSECTION OF WILLIAMSBORO AND LANIER / BELLE


- Upgrade/retrofit all 8 existing curb ramps.
- Upgrade 2 existing crosswalks crossing Lanier St. and Belle St. to high-visibility.
- Add 2 new crosswalks across Williamsboro St.
- Add 4 pedestrian countdown timers across Williamsboro St.
- Extend existing median island on Belle toward intersection to create adequate pedestrian refuge island.

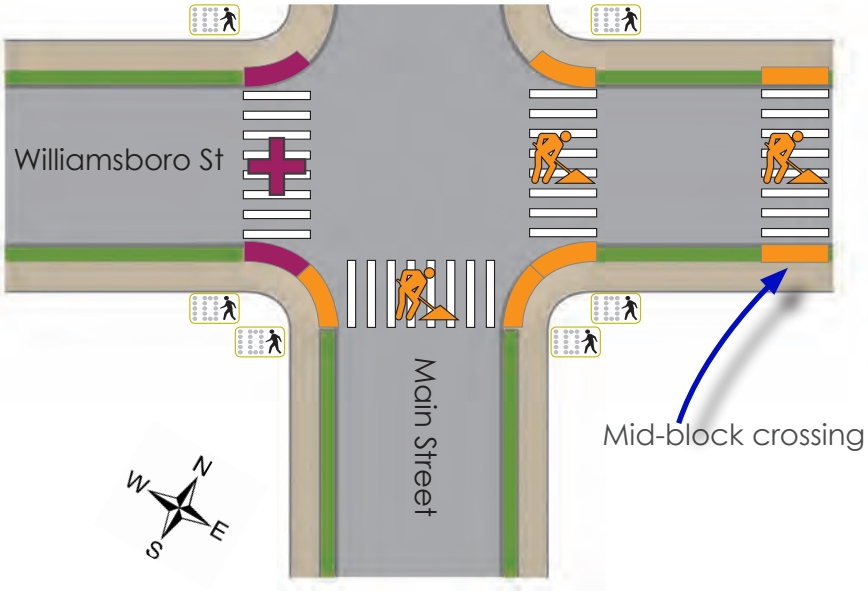



## #20: INTERSECTION OF WILLIAMSBORO AND GILLIAM/NEW COLLEGE



- Upgrade/retrofit all 8 existing curb ramps.
- Upgrade 2 existing crosswalks across New College St. and Williamsboro St. to high-visibility.
- Add 1 new crosswalk across Williamsboro St.
- Add 8 pedestrian countdown timers in all directions.

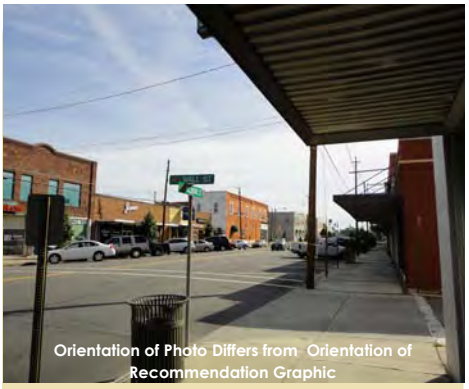
## #21: INTERSECTION OF WILLIAMSBORO AND MAIN *AND* WILLIAMBSORO MID-BLOCK CROSSING



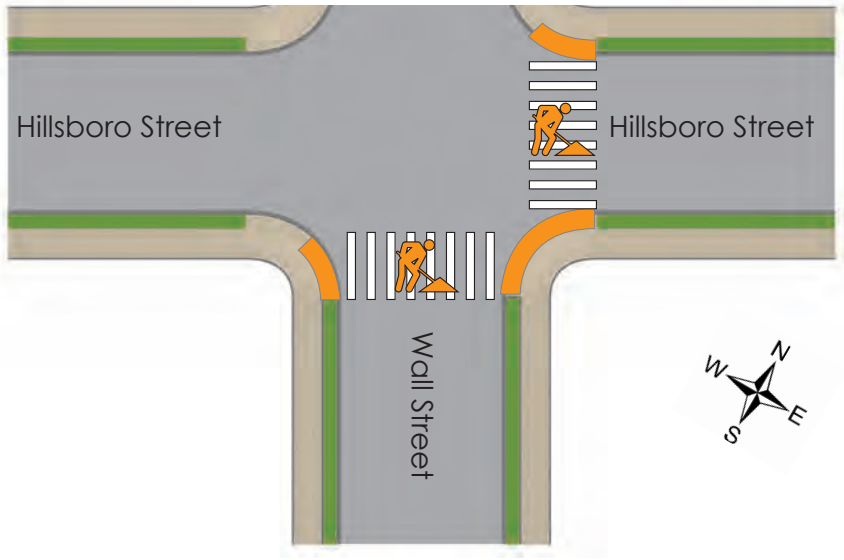


- Upgrade/retrofit 4 existing curb ramps.
- Upgrade 2 existing crosswalks across Main St. and Willliamsboro St. to high-visibility.
- Add 2 new curb ramps across Williamsboro St.
- Add 1 new crosswalk across Williamsboro St.
- Add 6 pedestrian countdown timers.
- Upgrade 1 existing mid-block crosswalk across Williamsboro St. to high-visibility.
- Add in-road pedestrian signage.
- Use curb bulb-outs in on-street parking areas to increase pedestrian visibility and reduce crossing distance.

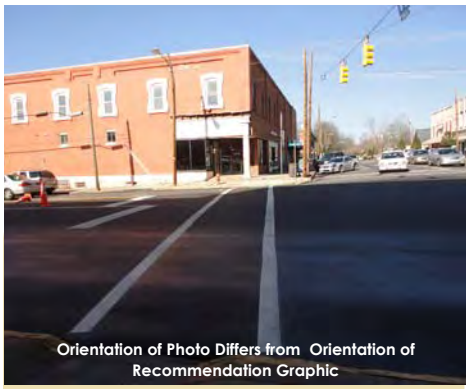
## #22: INTERSECTION OF HILLSBORO AND WALL



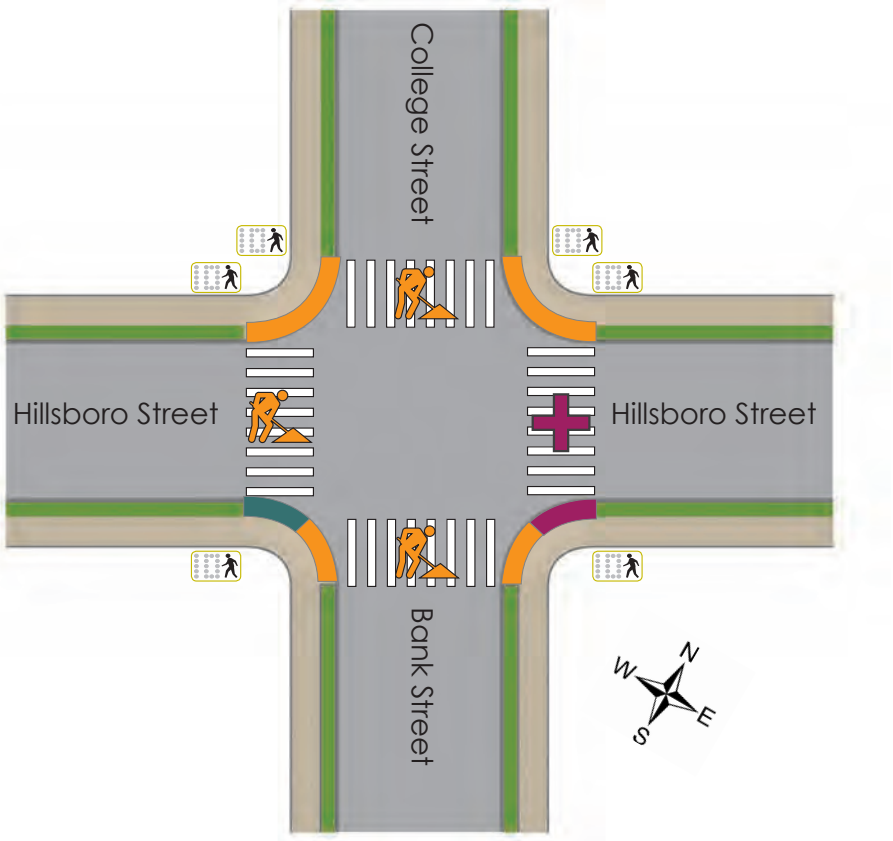

- Upgrade 2 existing crosswalks across Hillsboro St. and Wall St. to high-visibility.
- Upgrade/retrofit 4 existing curb ramps.



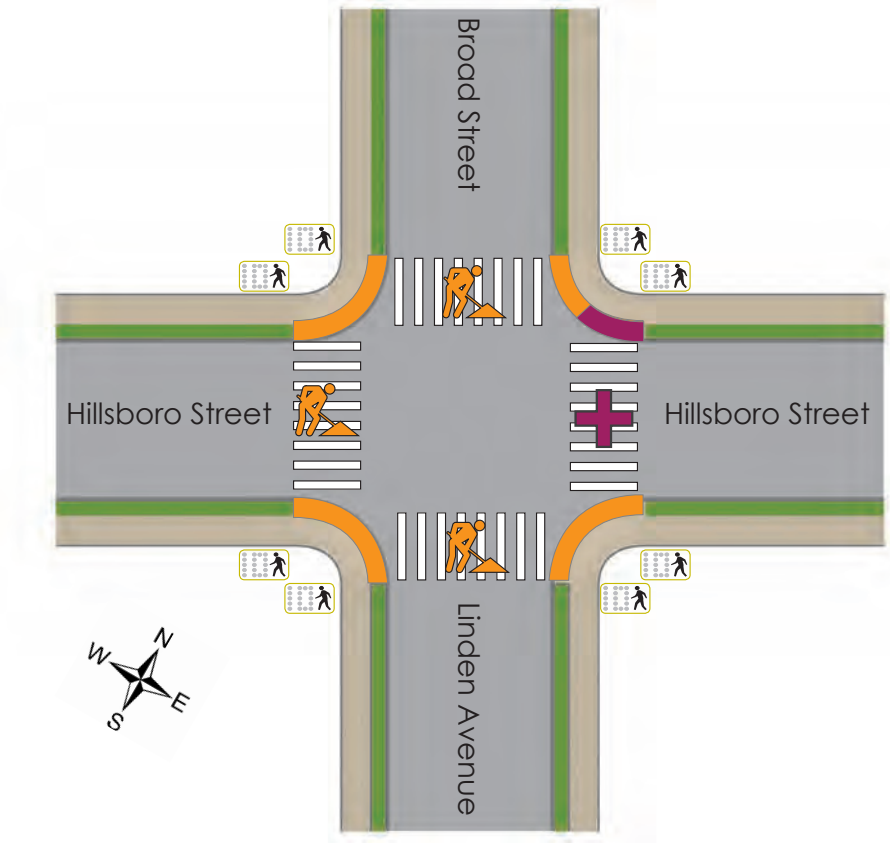
## #23: INTERSECTION OF HILLSBORO AND COLLEGE




- Upgrade 3 existing crosswalks across College St., Bank St., Hillsboro St. to high-visibility.
- Upgrade/retrofit 6 existing curb ramps.
- Add 1 new crosswalk across Hillsboro St.
- Add 1 new curb ramp across Hillsboro St.
- Add 6 pedestrian countdown timers.



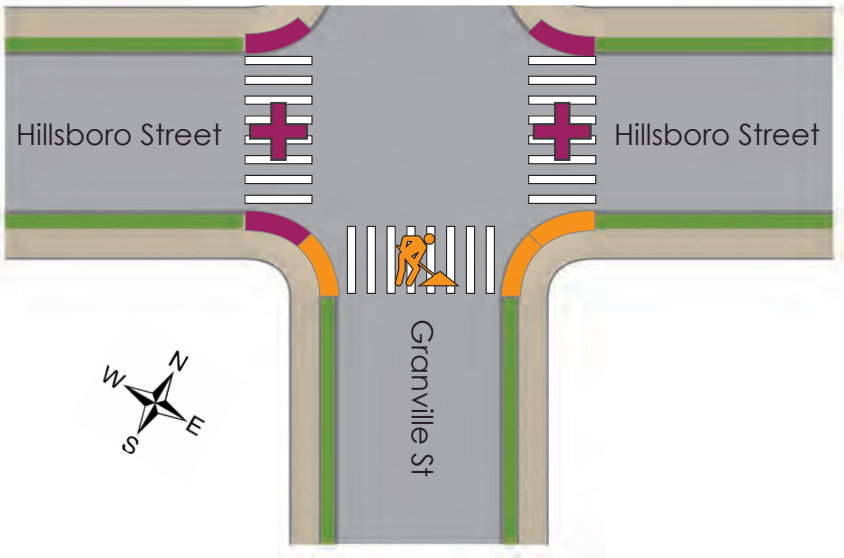

## #24: INTERSECTION OF HILLSBORO AND BROAD/LINDEN





- Upgrade 3 existing crosswalks across Broad/ Linden and Hillsboro St. to high-visibility.
- Upgrade/retrofit 7 existing curb ramps.
- Add 1 new crosswalk crossing Hillsboro St.
- Add 1 new curb ramp.
- Add 8 pedestrian countdown timers in all directions.

## #25: INTERSECTION OF HILLSBORO AND GRANVILLE

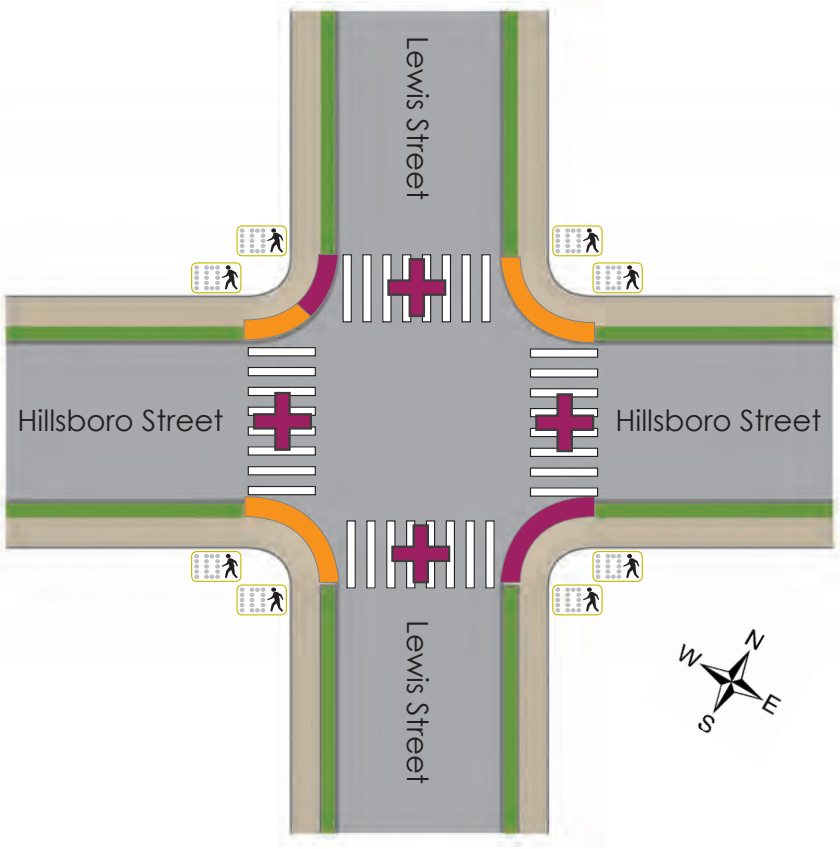




- Add 2 new crosswalks across Hillsboro St.
- Add 3 new curb ramps.
- Upgrade/retrofit 3 existing curb ramps.
- Upgrade 1 existing crosswalk across Granville St. to high-visibility.

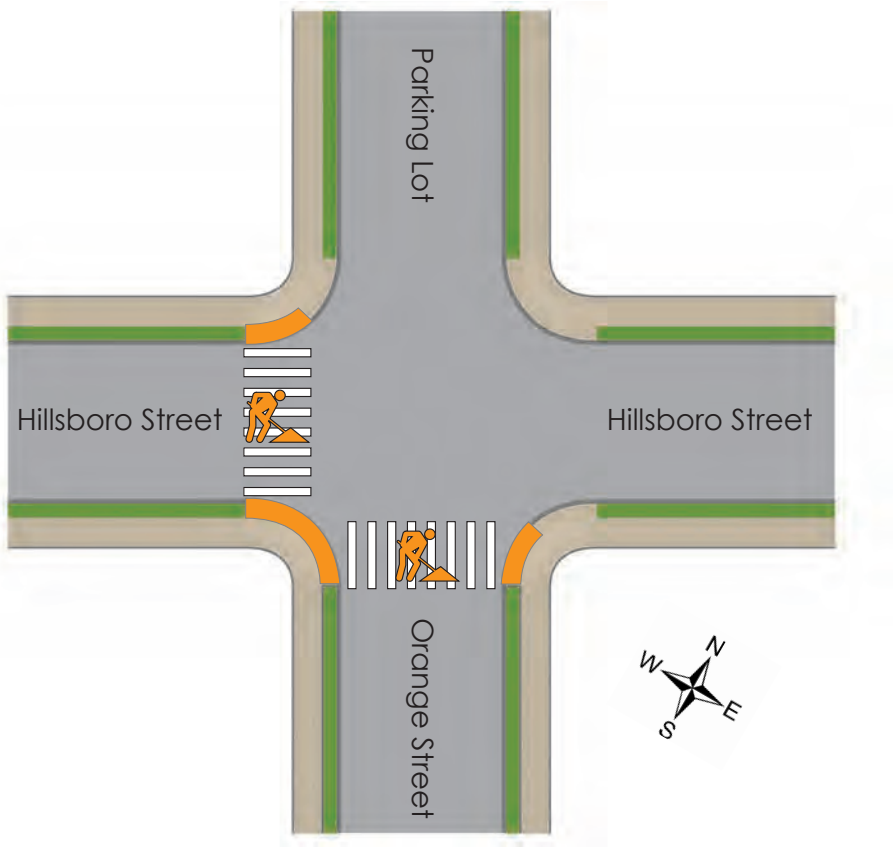
## #26: INTERSECTION OF HILLSBORO AND LEWIS


- Add 4 new crosswalks across Lewis St. and Hillsboro St.
- Add 3 new curb ramps.
- Upgrade/retrofit 5 existing curb ramps.
- Add 8 pedestrian countdown timers in all directions.

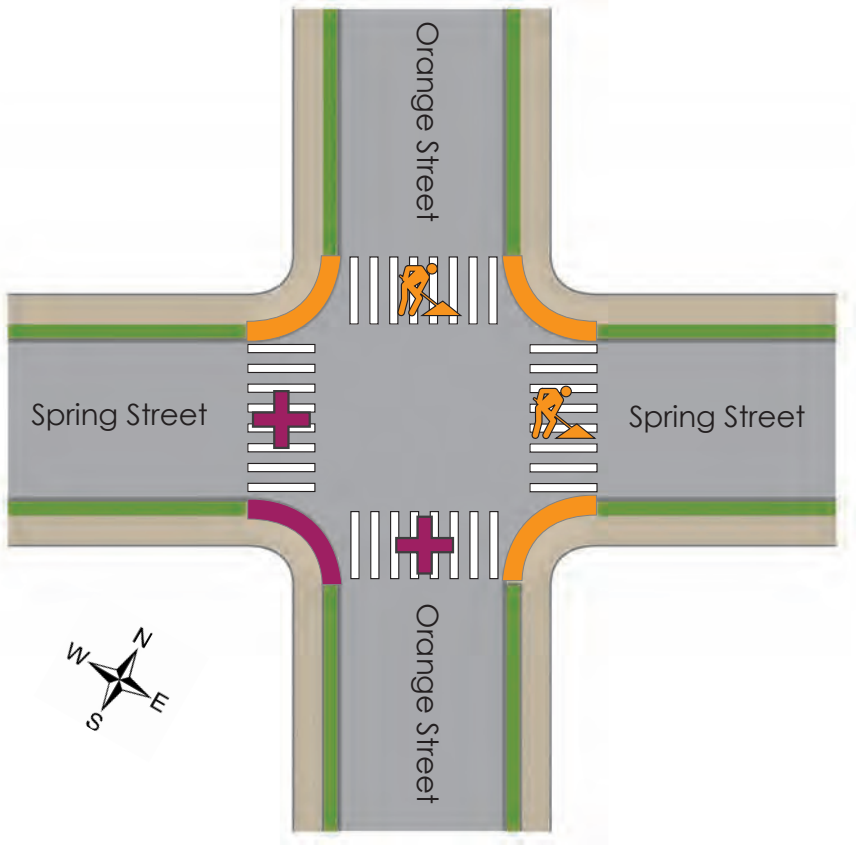


## #27: INTERSECTION OF HILLSBORO AND ORANGE


- Upgrade 2 existing crosswalks across Hillsboro St. and Orange St. to high-visibility.
- Upgrade/retrofit 4 existing curb ramps, 2 crossing Hillsboro St., 2 crossing Orange St.
- Add advanced pedestrian signage on Hillsboro St.



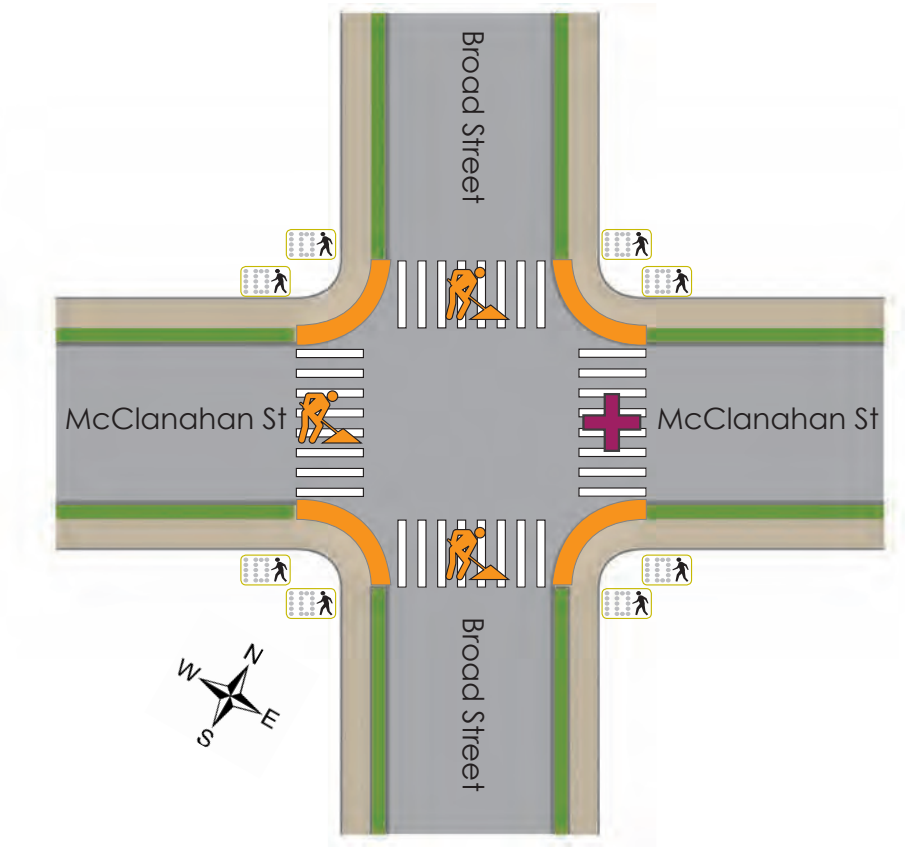

## #28: INTERSECTION OF SPRING AND ORANGE





- Upgrade/retrofit 6 existing curb ramps.
- Upgrade 2 existing crosswalks across Spring St. and Orange St. to high-visibility.
- Add 2 new crosswalks across Orange St. and Spring St.
- Add 2 new curb ramps.

## #29: INTERSECTION OF MCCLANAHAN AND BROAD

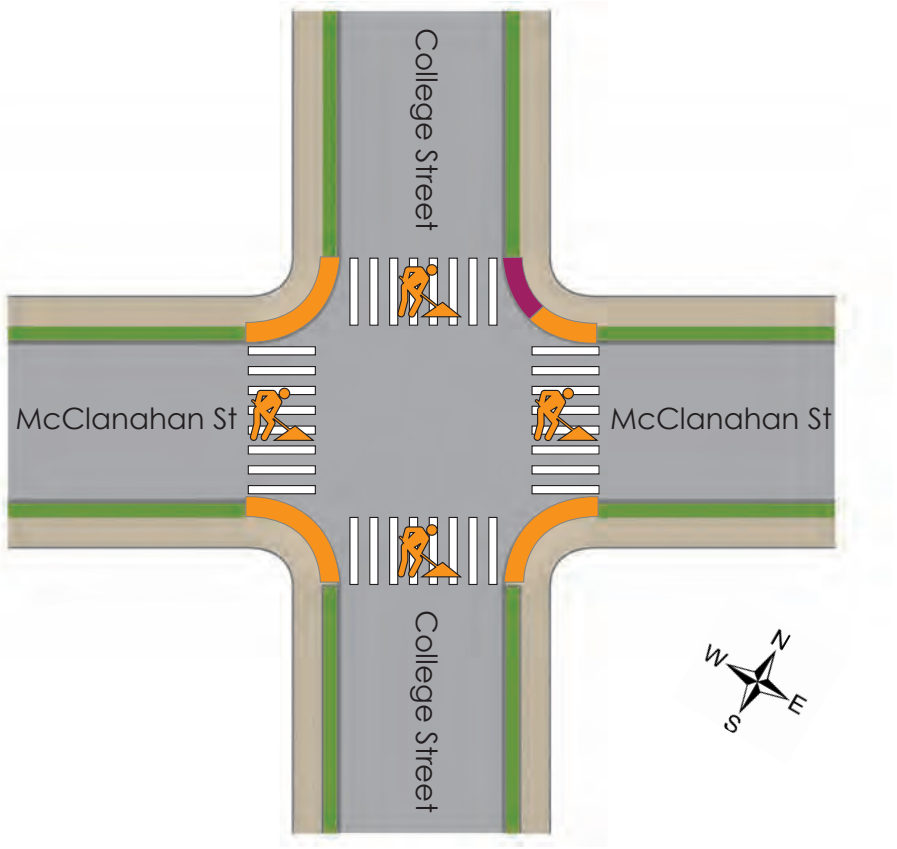




- Upgrade/retrofit 8 existing curb ramps.
- Upgrade 3 existing crosswalks to high-visibility.
- Add 1 new crosswalk across McClanahan St.
- Add 8 pedestrian countdown timers in all directions.

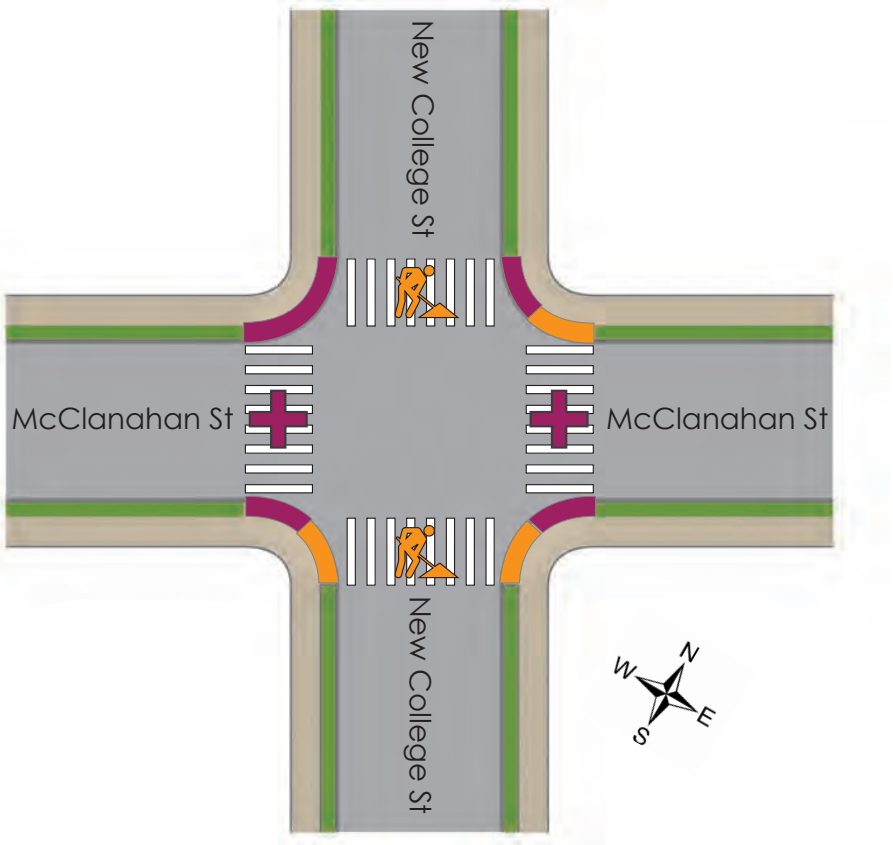
## #30: INTERSECTION OF MCCLANAHAN AND COLLEGE


- Upgrade 4 existing crosswalks to high-visibility.
- Upgrade/retrofit 7 existing curb ramps.
- Add 1 new curb ramp.



## #31: INTERSECTION OF MCCLANAHAN AND NEW COLLEGE


- Upgrade 2 existing crosswalks across New College St. to high-visibility.
- Add 2 new crosswalks across McClanahan St.
- Upgrade/retrofit 3 existing curb ramps.
- Add 5 new curb ramps.

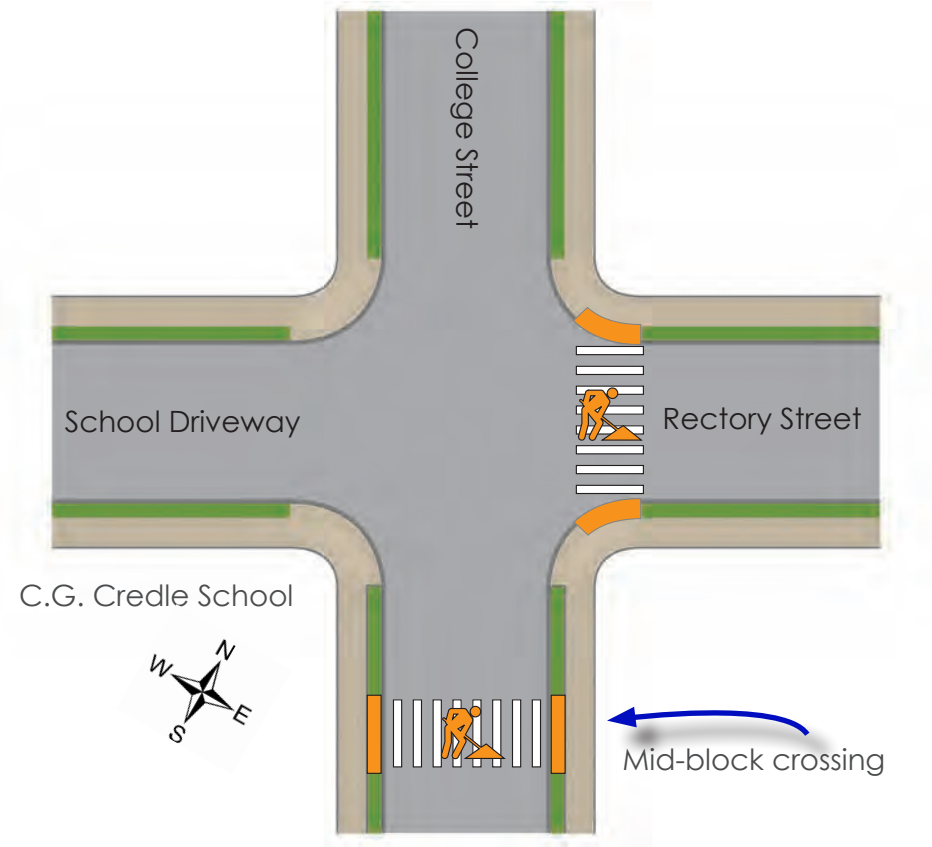


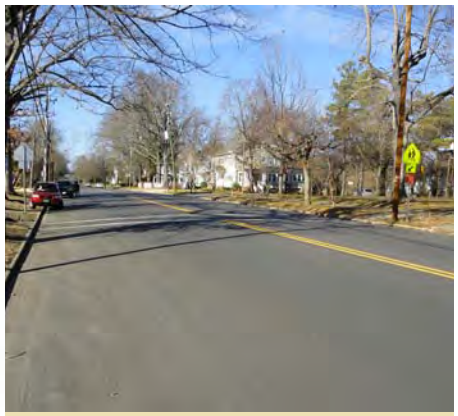

## #32: INTERSECTION OF MCCLANAHAN AND LANIER



- Upgrade 3 existing crosswalks to high-visibility.
- Add 1 new crosswalk across Lanier St.
- Upgrade/retrofit 4 existing curb ramps.
- Add 4 new curb ramps.

## #33: INTERSECTION OF COLLEGE AND RECTORY (AND THE MID-BLOCK CROSSING)

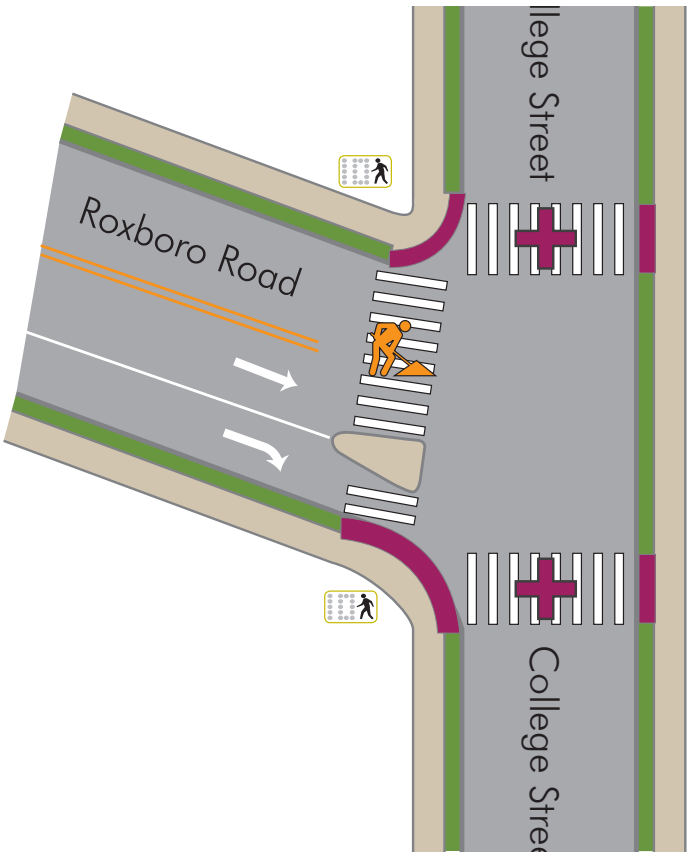


- Upgrade/retrofit existing steps to ADA compliant curb ramps.
- Upgrade 2 existing crosswalks to high-visibility crosswalks.
- Add additional advance pedestrian signage and in-road signage on College St.

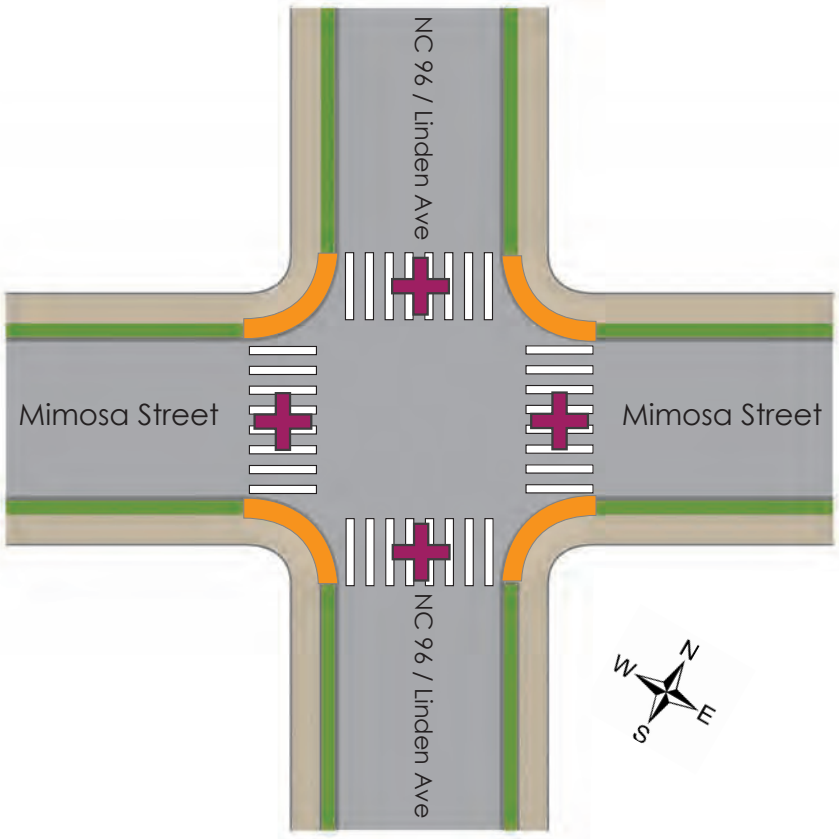
## #34: INTERSECTION OF COLLEGE AND ROXBORO


- Add 2 new crosswalks across College St.
- Upgrade 1 existing crosswalk across Roxboro Rd. to high-visibility.
- Add 6 new curb ramps.
- Add 2 pedestrian countdown timers across Roxboro Rd.
- Add raised pedestrian refuge island on Roxboro Rd.

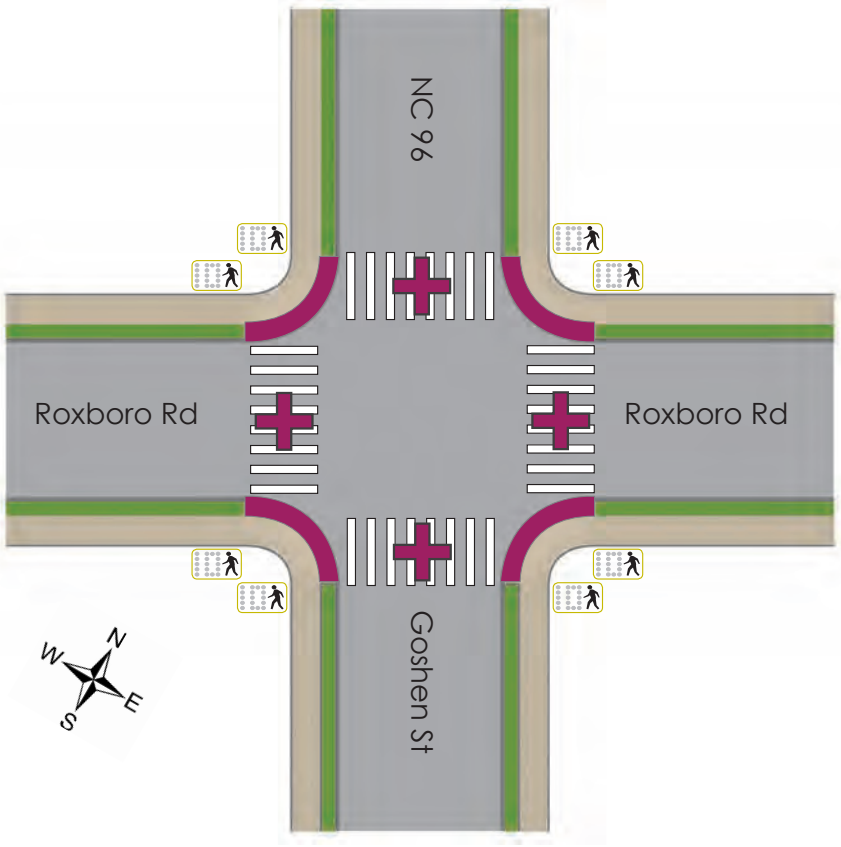


## #35: INTERSECTION OF NC 96 / LINDEN AND MIMOSA


- Add 4 new crosswalks across Linden Ave. and Mimosa St.
- Upgrade/retrofit 8 existing curb ramps.
- Extend existing center median island, or align crosswalks to allow for pedestrian refuge on existing center median island.



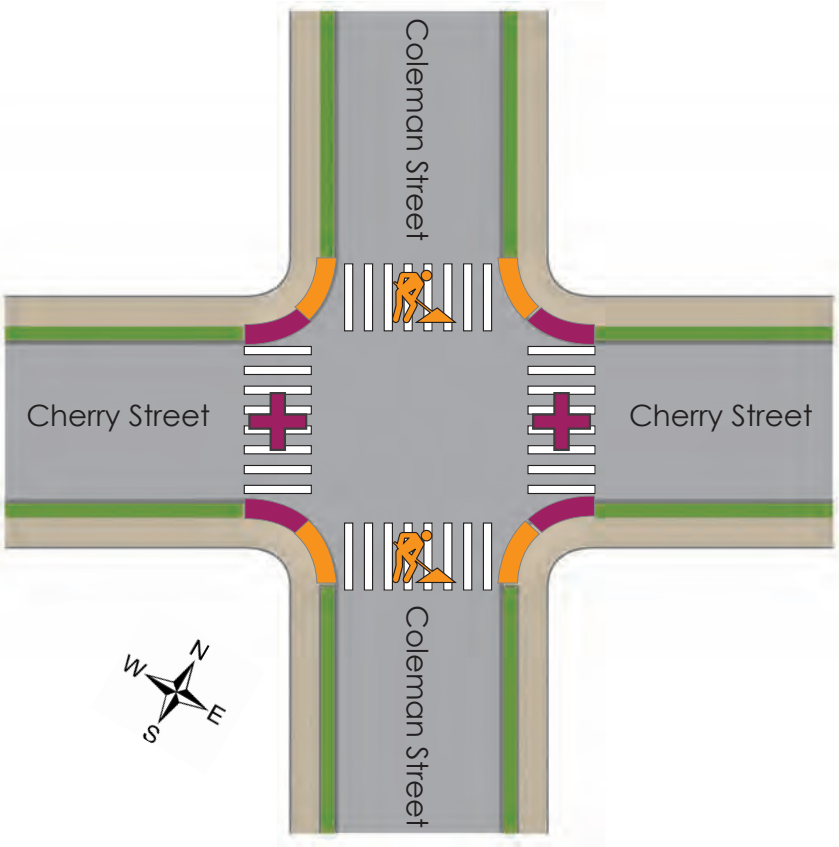

## #36: INTERSECTION OF GOSHEN / NC 96 AND ROXBORO/HWY 158





- Add 8 new curb ramps when sidewalk is constructed in this area.
- Add 4 new crosswalks.
- Add 8 pedestrian countdown timers in all directions.

## #37: INTERSECTION OF CHERRY AND COLEMAN



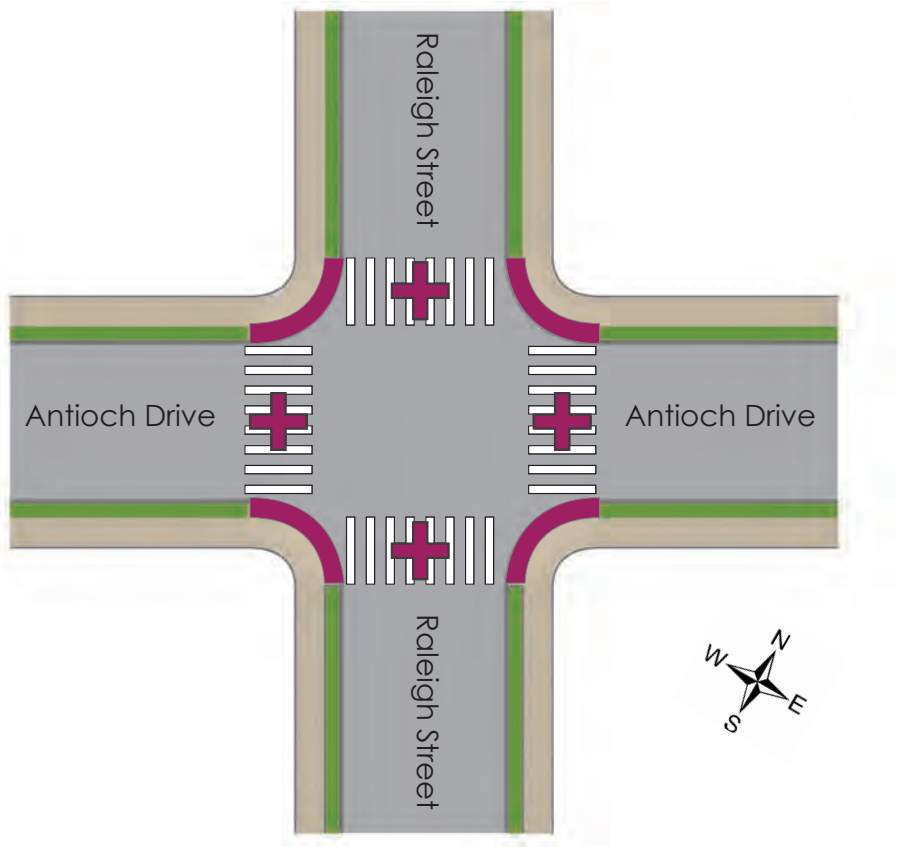


- Upgrade 2 existing crosswalks across Coleman St. to high-visibility.
- Add 2 new crosswalks across Cherry St.
- Add 4 new curb ramps across Cherry St.
- Upgrade/retrofit 4 existing curb ramps.

## #38: INTERSECTION OF RALEIGH AND ANTIOCH


*When this area is further developed or when the Central Children's Home of NC is operational and sidewalks are developed in this area.*

- Add 4 new crosswalks.
- Add 8 new curb ramps.

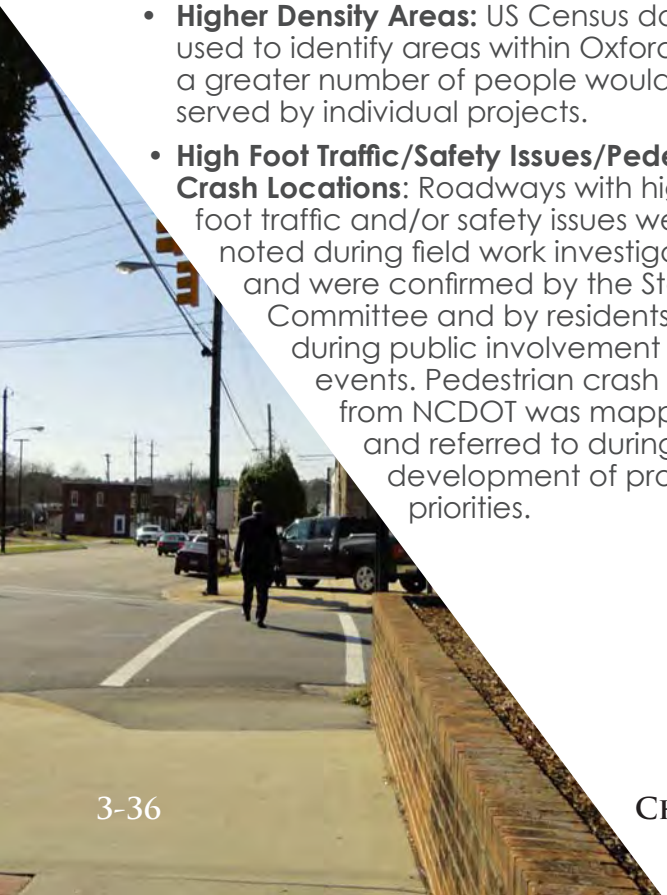


# PROJECT PRIORITIZATION

Prioritization requires a combination of objective and subjective inputs. This plan uses the best information available, including input from the Steering Committee, the public, various City departments, and other sources such as the US Census, existing local and regional planning efforts, and field observations.

Generally speaking, the greater need for improved pedestrian access and mobility is in lower-income areas, higher-density areas, and areas of lower vehicle ownership. In most communities, including Oxford, these tend to be areas in which walking is a necessary form of transportation, not simply a recreational or lifestyle preference. The main area of the City where these factors overlap most is in the neighborhoods that have continued to develop around the periphery of the Downtown Core, and the areas surrounding Granville Street and Raleigh Street. This information and the other factors described in more detail below is all considered during the project prioritization process.

- **Lower Income & Lower Vehicle Ownership:** US Census data was used to identify areas within Oxford with lower average incomes and lower access to vehicles, as compared with the rest of the City.
- **Higher Density Areas:** US Census data was used to identify areas within Oxford where a greater number of people would be served by individual projects.
- **High Foot Traffic/Safety Issues/Pedestrian Crash Locations**: Roadways with high foot traffic and/or safety issues were noted during field work investigations and were confirmed by the Steering Committee and by residents during public involvement events. Pedestrian crash data from NCDOT was mapped and referred to during the development of project priorities.
- **Top Recommendations from the 2012 Public Comments:** After extensive outreach by the Steering Committee, the public comment form for this plan yielded more than 140 responses. However, this was not a statistical survey, and is therefore only one of many factors used for prioritization.
- **Connectivity**: Segments that connect to schools, major shopping areas (e.g., downtown, Food Lion, Lowes Foods), business and healthcare areas, parks, proposed trails, and existing sidewalks were noted as important improvements for overall connectivity.
- **Lower Relative Cost:** Planning-level budget estimates were used to compare the relative costs of projects (including a 15% contingency added into each estimate). Projects estimated to be below $50,000 were noted. The actual cost of each project will vary depending on site conditions and the cost of construction materials at the time of development.



# Table 3.2 Project Prioritization - Sidewalk Projects

| Street Name | From | To | Facility Type | Approximate Length (feet) | Approximate Length (miles) | Planning-Level Budget Estimate | 15% Contingency | 20% Design | Planning-Level Budget Estimate w/ Design & Contingency | US Census Data: Low-Income Area | US Census Data: Higher % Walk to Work Areas | US Census Data: High Density Area | Pedestrian Crash Location | Direct Access to/ from Proposed Trail | Direct Access to/ from Existing SW | Top 1-3 Public Recommendations | Park or Recreation Center (1/2 mile) | School Proximity (1/2 mile) | Direct Access to Shopping Centers | Weighted Score for Project |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Downtown Core Projects (Likely to be developed with Powell Bill Funds - received from NCDOT annually) | | | | | | | | | | *4.29* | *3.71* | *4.29* | *4.43* | *3.43* | *4.14* | *4.14* | *4.00* | *4.57* | *4.29* | *Total* |
| Lewis / US 15 | Penn | Williamsboro | Sidewalk 1-side | 900 | 0.17 | $28,125.0 | $4,218.8 | $5,625.0 | $37,968.8 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 24.43 |
| Rectory | New College | Lanier | Sidewalk 2-sides | 1,260 | 0.24 | $39,375.0 | $5,906.3 | $7,875.0 | $53,156.3 | 0.00 | 0.00 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 21.29 |
| Lanier | Forest | Taylor | Sidewalk 1-side | 1,200 | 0.23 | $37,500.0 | $5,625.0 | $7,500.0 | $50,625.0 | 0.00 | 0.00 | 4.29 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 0.00 | 20.43 |
| Forest | Lanier | Taylor | Sidewalk 1-side | 360 | 0.07 | $11,250.0 | $1,687.5 | $2,250.0 | $15,187.5 | 0.00 | 0.00 | 4.29 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 0.00 | 20.43 |
| Taylor | Forest | Mary Potter School | Sidewalk 1-side | 790 | 0.15 | $24,687.5 | $3,703.1 | $4,937.5 | $33,328.1 | 0.00 | 0.00 | 4.29 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 0.00 | 20.43 |
| Sycamore | Orange | Linden | Sidewalk 1-side | 890 | 0.17 | $27,812.5 | $4,171.9 | $5,562.5 | $37,546.9 | 4.29 | 3.71 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 20.43 |
| Alexander | Broad | College | Sidewalk 1-side | 710 | 0.13 | $22,187.5 | $3,328.1 | $4,437.5 | $29,953.1 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 16.43 |
| | | | | | Totals | $190,937.5 | $28,640.6 | $38,187.5 | $257,765.6 | | | | | | | | | | | |

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# Table 3.2 Project Prioritization - Sidewalk Projects - Continued

| Street Name | From | To | Facility Type | Approximate Length (feet) | Approximate Length (miles) | Planning-Level Budget Estimate | 15% Contingency | 20% Design | Planning-Level Budget Estimate w/ Design & Contingency | US Census Data: Low-Income Area | Higher % Walk to Work Areas | High Density Area | Pedestrian Crash Location | Direct Access to/ from Proposed Trail | Direct Access to/ from Existing SW | Top 1-3 Public Recommendations | Park or Recreation Center (1/2 mile) | School Proximity (1/2 mile) | Direct Access to Shopping Centers | Weighted Score for Project |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Citywide Projects (Likely to be developed as part of future Transportation Improvement Program (TIP) - submitted in 3 year periods) | | | | | | | | | | *4.29* | *3.71* | *4.29* | *4.43* | *3.43* | *4.14* | *4.14* | *4.00* | *4.57* | *4.29* | *Total* |
| Raleigh | Franklin | Industry | Sidewalk 1-side | 3,000 | 0.57 | $93,750.0 | $14,062.5 | $18,750.0 | $126,562.5 | 4.29 | 3.71 | 4.29 | 4.43 | 3.43 | 4.14 | 4.14 | 0.00 | 0.00 | 4.29 | 32.71 |
| Industry | Linden | Lewis | Sidewalk 1-side | 6,150 | 1.16 | $192,187.5 | $28,828.1 | $38,437.5 | $259,453.1 | 4.29 | 3.71 | 0.00 | 4.43 | 3.43 | 4.14 | 4.14 | 4.00 | 0.00 | 4.29 | 32.43 |
| West College | NC 96 | College | Sidewalk 1-side | 2,550 | 0.48 | $79,687.5 | $11,953.1 | $15,937.5 | $107,578.1 | 4.29 | 0.00 | 4.29 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 29.00 |
| Lewis St / US 15 | Maple | Walmart | Sidewalk 1-side | 9,500 | 1.80 | $296,875.0 | $44,531.3 | $59,375.0 | $400,781.3 | 4.29 | 3.71 | 0.00 | 4.43 | 3.43 | 4.14 | 4.14 | 0.00 | 0.00 | 4.29 | 28.43 |
| Hillsboro | Harris | Oxford Loop | Sidewalk 1-side | 3,150 | 0.60 | $98,437.5 | $14,765.6 | $19,687.5 | $132,890.6 | 4.29 | 3.71 | 0.00 | 4.43 | 3.43 | 4.14 | 4.14 | 0.00 | 0.00 | 4.29 | 28.43 |
| Industry | Raleigh | Linden | Sidewalk 1-side | 2,100 | 0.40 | $65,625.0 | $9,843.8 | $13,125.0 | $88,593.8 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 4.14 | 4.00 | 0.00 | 4.29 | 28.00 |
| Roxboro | Satterwhite/Goshen | College | Sidewalk 1-side | 2,950 | 0.56 | $92,187.5 | $13,828.1 | $18,437.5 | $124,453.1 | 4.29 | 0.00 | 0.00 | 4.43 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 25.14 |
| Roxboro | Satterwhite/Goshen | West Oxford Elementary | Sidewalk 2-sides | 5,410 | 1.02 | $169,062.5 | $25,359.4 | $33,812.5 | $228,234.4 | 4.29 | 0.00 | 0.00 | 4.43 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 25.14 |
| Granville | Mimosa | 6th | Sidewalk 1-side | 1,540 | 0.29 | $48,125.0 | $7,218.8 | $9,625.0 | $64,968.8 | 4.29 | 3.71 | 0.00 | 4.43 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 24.86 |
| Mimosa | Orange | Coggeshall | Sidewalk 1-side | 1,100 | 0.21 | $34,375.0 | $5,156.3 | $6,875.0 | $46,406.3 | 4.29 | 3.71 | 4.29 | 4.43 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 0.00 | 24.86 |
| College / US 15 | Clement | Alexander | Sidewalk 1-side | 450 | 0.09 | $14,062.5 | $2,109.4 | $2,812.5 | $18,984.4 | 4.29 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 4.14 | 0.00 | 4.57 | 4.29 | 24.86 |
| Broad | West College | Clement | Sidewalk 1-side | 1,250 | 0.24 | $39,062.5 | $5,859.4 | $7,812.5 | $52,734.4 | 4.29 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 24.71 |
| Cherry | Della | Country Club | Sidewalk 1-side | 1,650 | 0.31 | $51,562.5 | $7,734.4 | $10,312.5 | $69,609.4 | 4.29 | 3.71 | 0.00 | 4.43 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 0.00 | 24.57 |
| Clement | Baker | NC 96 | Sidewalk 1-side | 1,050 | 0.20 | $32,812.5 | $4,921.9 | $6,562.5 | $44,296.9 | 0.00 | 3.71 | 0.00 | 4.43 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 24.57 |
| 8th | Wilmington | Raleigh | Sidewalk 1-side | 1,240 | 0.23 | $38,750.0 | $5,812.5 | $7,750.0 | $52,312.5 | 4.29 | 3.71 | 0.00 | 4.43 | 3.43 | 4.14 | 0.00 | 0.00 | 0.00 | 4.29 | 24.29 |
| Delacroix | Rayland | College | Sidewalk 1-side | 1,900 | 0.36 | $59,375.0 | $8,906.3 | $11,875.0 | $80,156.3 | 0.00 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 4.14 | 0.00 | 4.57 | 4.29 | 24.29 |
| 6th | Granville | Linden | Sidewalk 1-side | 400 | 0.08 | $12,500.0 | $1,875.0 | $2,500.0 | $16,875.0 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 23.86 |
| Quail Ridge | Dove | Country Club | Sidewalk 1-side | 1,900 | 0.36 | $59,375.0 | $8,906.3 | $11,875.0 | $80,156.3 | 4.29 | 0.00 | 0.00 | 4.43 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 0.00 | 20.86 |
| Hicks Mill | College | NC 96 | Sidewalk 1-side | 3,015 | 0.57 | $94,218.8 | $14,132.8 | $18,843.8 | $127,195.3 | 4.29 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 20.71 |
| College / US 15 | Prospect | Hicks Mill | Sidewalk 1-side | 1,200 | 0.23 | $37,500.0 | $5,625.0 | $7,500.0 | $50,625.0 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 4.14 | 0.00 | 4.57 | 4.29 | 20.57 |
| Military | High | Spring | Sidewalk 1-side | 680 | 0.13 | $21,250.0 | $3,187.5 | $4,250.0 | $28,687.5 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 20.43 |
| Salem | Williamsboro | Edgewood | Sidewalk 1-side | 2,730 | 0.52 | $85,312.5 | $12,796.9 | $17,062.5 | $115,171.9 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 20.43 |
| Spring | Military | Williamsboro | Sidewalk 1-side | 1,820 | 0.34 | $56,875.0 | $8,531.3 | $11,375.0 | $76,781.3 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 20.43 |
| Williamsboro | Military | Autumn Park Apts | Sidewalk 1-side | 7,780 | 1.47 | $243,125.0 | $36,468.8 | $48,625.0 | $328,218.8 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 20.43 |
| Antioch | Raleigh | Linden | Sidewalk 1-side | 1,680 | 0.32 | $52,500.0 | $7,875.0 | $10,500.0 | $70,875.0 | 4.29 | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 4.00 | 4.57 | 0.00 | 17.29 |
| Front | Kingsbury | Halifax | Sidewalk 2-sides & 1-side | 3,420 | 0.65 | $106,875.0 | $16,031.3 | $21,375.0 | $144,281.3 | 0.00 | 0.00 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 0.00 | 17.00 |
| Ivey Day | Goshen | West Oxford Elementary | Sidewalk 2-sides | 7,650 | 1.45 | $239,062.5 | $35,859.4 | $47,812.5 | $322,734.4 | 4.29 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 0.00 | 16.43 |
| Franklin | Hancock | Raleigh | Sidewalk 1-side | 800 | 0.15 | $25,000.0 | $3,750.0 | $5,000.0 | $33,750.0 | 4.29 | 3.71 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 0.00 | 0.00 | 4.29 | 16.43 |
| Raleigh St | I-85 | Central Childrens Home | Sidewalk 1-side | 2,400 | 0.45 | $75,000.0 | $11,250.0 | $15,000.0 | $101,250.0 | 0.00 | 0.00 | 0.00 | 4.43 | 3.43 | 0.00 | 4.14 | 0.00 | 0.00 | 4.29 | 16.29 |
| Rayland | College | Delacroix | Sidewalk 1-side | 700 | 0.13 | $21,875.0 | $3,281.3 | $4,375.0 | $29,531.3 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 4.14 | 0.00 | 0.00 | 4.29 | 16.00 |
| King | Kingsbury | Front | Sidewalk 1-side | 790 | 0.15 | $24,687.5 | $3,703.1 | $4,937.5 | $33,328.1 | 0.00 | 0.00 | 4.29 | 3.43 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 0.00 | 15.86 |
| Maple | US 15 / Lewis | to dead end | Sidewalk 1-side | 2,680 | 0.51 | $83,750.0 | $12,562.5 | $16,750.0 | $113,062.5 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 0.00 | 0.00 | 15.57 |
| Linden | 3rd | I-85 ramps | Sidewalk 1-side | 2,870 | 0.54 | $89,687.5 | $13,453.1 | $17,937.5 | $121,078.1 | 0.00 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 0.00 | 4.29 | 15.57 |
| Linden | I-85 on ramps | Antioch | Sidewalk 2-sides | 1,560 | 0.30 | $48,750.0 | $7,312.5 | $9,750.0 | $65,812.5 | 0.00 | 0.00 | 0.00 | 4.43 | 0.00 | 4.14 | 0.00 | 0.00 | 0.00 | 4.29 | 12.86 |
| Country Club | Quail Ridge | Pine Tree | Sidewalk 1-side | 4,000 | 0.76 | $125,000.0 | $18,750.0 | $25,000.0 | $168,750.0 | 4.29 | 3.71 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.57 | 0.00 | 12.57 |
| Country Club | Quail Ridge | Ivey Day | Sidewalk 2-sides | 5,500 | 1.04 | $171,875.0 | $25,781.3 | $34,375.0 | $232,031.3 | 4.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.57 | 0.00 | 8.86 |
| Pine Tree | Dale | Hillsboro | Sidewalk 1-side | 1,800 | 0.34 | $56,250.0 | $8,437.5 | $11,250.0 | $75,937.5 | 4.29 | 3.71 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.00 |
| | | | | | Totals | $3,136,406.3 | $470,460.9 | $627,281.3 | $4,234,148.4 | | | | | | | | | | | |

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# Table 3.3 Project Prioritization - Greenway Trail Projects

| ID from Granville County Plan | Project Name | From | To | Facility Type | Approximate Length (feet) | Approximate Length (miles) | Planning-Level Budget Estimate | 15% Contingency | 20% Design | Planning-Level Budget Estimate w/ Design & Contingency | US Census Data: Low-Income Area | US Census Data: Higher % Walk to Work Areas | US Census Data: High Density Area | Pedestrian Crash Location | Direct Access to/ from Proposed Trail | Direct Access to/ from Existing SW | Top 1-3 Public Recommendations | Park or Recreation Center (1/2 mile) | School Proximity (1/2 mile) | Direct Access to Shopping Centers | Weighted Score for Project |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Multi-Use Trail/Greenway Projects (Likely to be developed as part of future development or major roadway construction)**** | | | | | | | | | | | *4.29* | *3.71* | *4.29* | *4.43* | *3.43* | *4.14* | *4.14* | *4.00* | *4.57* | *4.29* | *Total* |
| G2 | Tally Ho Chase / Trail (G12b) (Rail with Trail) | Downtown | | Multi-Use Trail | 25,000 | 4.73 | $1,375,000.0 | $206,250.0 | $275,000.0 | $1,856,250.0 | 4.29 | 3.71 | 4.29 | 0.00 | 3.43 | 4.14 | 4.14 | 0.00 | 4.57 | 4.29 | 32.86 |
| G9 | Foundry Branch Trail (G10) (including trail spurs) | Industry | Tally Ho Chase / Trail | Multi-Use Trail | 7,530 | 1.43 | $414,150.0 | $62,122.5 | $82,830.0 | $559,102.5 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 4.14 | 4.00 | 0.00 | 4.29 | 28.00 |
| G3 | Aviation Pass (G4) | Downtown and East | | Multi-Use Trail | 15,000 | 2.84 | $825,000.0 | $123,750.0 | $165,000.0 | $1,113,750.0 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 4.14 | 4.00 | 4.57 | 4.29 | 24.57 |
| G5 | Mary Potter School Trail | Mary Potter School | Aviation Pass | Multi-Use Trail | 4,500 | 0.85 | $247,500.0 | $37,125.0 | $49,500.0 | $334,125.0 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 20.43 |
| G1 | Oxford Loop (G6) | US 158 & Industry Drive | | Multi-Use Trail | 55,000 | 10.42 | $3,025,000.0 | $453,750.0 | $605,000.0 | $4,083,750.0 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 0.00 | 0.00 | 0.00 | 4.57 | 4.29 | 20.29 |
| *G8* | Downtown Connector | Coggeshall | Leak | Multi-Use Trail | 740 | 0.14 | $40,700.0 | $6,105.0 | $8,140.0 | $54,945.0 | 4.29 | 3.71 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 0.00 | 0.00 | 4.29 | 16.43 |
| G4 | North Granville Middle School Trail | Oxford Loop | North Granville Middle School | Multi-Use Trail | 2,800 | 0.53 | $154,000.0 | $23,100.0 | $30,800.0 | $207,900.0 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 0.00 | 12.14 |
| G6 | Jordan Creek Trail (G5) | Aviation Pass | Oxford Loop | Multi-Use Trail | 11,000 | 2.08 | $605,000.0 | $90,750.0 | $121,000.0 | $816,750.0 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 0.00 | 4.29 | 11.86 |
| G7 | Rail Trail Connector | Henderson Street | Military St | Multi-Use Trail | 3,380 | 0.64 | $185,900.0 | $27,885.0 | $37,180.0 | $250,965.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 4.57 | 0.00 | 8.57 |
| | | | | | | Totals | $6,872,250.0 | $1,030,837.5 | $1,374,450.0 | $9,277,537.5 | | | | | | | | | | | |

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# Table 3.4 Project Prioritization - Intersection Improvements

| Map ID | Street Names | New Curb Ramps | Retro Fit Curb Ramps | Crosswalks | Pedestrian Count-down Timers | Planning-Level Budget Estimate | 15% Contingency | Planning-Level Budget Estimate w/ Design & Contingency | US Census Data: Low-Income Area | US Census Data: Higher % Walk to Work Areas | US Census Data: High Density Area | Pedestrian Crash Location | Direct Access to/ from Proposed Trail | Direct Access to/ from Existing SW | Top 1-3 Public Recommendations | Park or Recreation Center (1/2 mile) | School Proximity (1/2 mile) | Direct Access to Shopping Centers | Weighted Score for Project |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Citywide Intersection Projects | | | | | | | | | *4.29* | *3.71* | *4.29* | *4.43* | *3.43* | *4.14* | *4.14* | *4.00* | *4.57* | *4.29* | *Total* |
| 24 | Hillsboro & Linden | 1 | 7 | 4 | 8 | $17,428 | $2,614 | $20,042 | 4.29 | 3.71 | 0.00 | 4.43 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 29.43 |
| 37 | Cherry & Coleman | 4 | 4 | 4 | | $12,228 | $1,834 | $14,062 | 4.29 | 3.71 | 0.00 | 4.43 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 28.86 |
| 29 | McClanahan & Broad | | 8 | 4 | 8 | $17,428 | $2,614 | $20,042 | 0.00 | 3.71 | 0.00 | 4.43 | 3.43 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 28.57 |
| 19 | Williamsboro & Lanier / Belle | | 8 | 4 | 4 | $14,828 | $2,224 | $17,052 | 0.00 | 0.00 | 4.29 | 4.43 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 25.71 |
| 21 | Williamsboro & Main | 2 | 6 | 4 | 6 | $16,128 | $2,419 | $18,547 | 0.00 | 0.00 | 4.29 | 4.43 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 25.71 |
| 26 | Hillsboro & Lewis | 3 | 5 | 4 | 8 | $17,428 | $2,614 | $20,042 | 4.29 | 3.71 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 25.29 |
| 27 | Hillsboro & Orange | | 4 | 2 | | $6,114 | $917 | $7,031 | 4.29 | 3.71 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 25.29 |
| 30 | McClanahan & College | 1 | 7 | 4 | | $12,228 | $1,834 | $14,062 | 0.00 | 3.71 | 0.00 | 4.43 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 25.14 |
| 25 | Hillsboro & Granville | 3 | 3 | 3 | | $9,171 | $1,376 | $10,547 | 4.29 | 3.71 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 25.00 |
| 13 | Granville & Spring | | 8 | 4 | 4 | $14,828 | $2,224 | $17,052 | 4.29 | 3.71 | 0.00 | 4.43 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 24.86 |
| 35 | Linden & Mimosa | | 8 | 4 | | $12,228 | $1,834 | $14,062 | 4.29 | 3.71 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 24.71 |
| 1 | Industry & Linden | 5 | | 4 | 8 | $12,928 | $1,939 | $14,867 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 4.14 | 0.00 | 0.00 | 4.29 | 24.00 |
| 2 | Industry & Raleigh | 1 | | 1 | | $1,557 | $234 | $1,791 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 4.14 | 0.00 | 0.00 | 4.29 | 24.00 |
| 11 | Front & Granville | 5 | 2 | 4 | | $10,728 | $1,609 | $12,337 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 23.86 |
| 12 | Granville & Sycamore | 8 | | 4 | | $12,228 | $1,834 | $14,062 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 23.86 |
| 36 | NC 96 & Roxboro | 8 | | 4 | 8 | $17,428 | $2,614 | $20,042 | 0.00 | 0.00 | 4.29 | 4.43 | 0.00 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 21.71 |
| 20 | Williamsboro & New College | | 8 | 3 | 8 | $17,371 | $2,606 | $19,977 | 0.00 | 0.00 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 21.29 |
| 31 | McClanahan & New College | 5 | 3 | 4 | | $12,228 | $1,834 | $14,062 | 0.00 | 0.00 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 21.29 |
| 32 | McClanahan & Lanier | 4 | 4 | 4 | | $12,228 | $1,834 | $14,062 | 0.00 | 0.00 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 21.29 |
| 23 | Hillsboro & College | 1 | 6 | 4 | 6 | $14,628 | $2,194 | $16,822 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.14 | 4.14 | 4.00 | 4.57 | 4.29 | 21.14 |
| 28 | Spring & Orange | 2 | 6 | 4 | | $12,228 | $1,834 | $14,062 | 4.29 | 3.71 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 21.00 |
| 14 | Spring & Linden | 5 | 3 | 4 | 8 | $17,428 | $2,614 | $20,042 | 0.00 | 3.71 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 20.71 |
| 22 | Hillsboro & Wall | | 4 | 2 | | $6,114 | $917 | $7,031 | 0.00 | 3.71 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 20.71 |
| 8 | Main & Front | | 6 | 3 | | $9,171 | $1,376 | $10,547 | 0.00 | 3.71 | 0.00 | 4.43 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 20.57 |
| 10 | Front & Broad | | 8 | 4 | | $12,228 | $1,834 | $14,062 | 4.29 | 3.71 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 20.43 |
| 3 | Linden & I-85 | 8 | | 7 | 8 | $17,599 | $2,640 | $20,239 | 4.29 | 3.71 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 0.00 | 4.29 | 19.86 |
| 15 | Spring & Wall | 4 | 2 | 3 | | $9,171 | $1,376 | $10,547 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 17.00 |
| 16 | Spring & Main | 4 | 2 | 4 | | $9,228 | $1,384 | $10,612 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 17.00 |
| 17 | Spring & Gilliam | 4 | 4 | 4 | | $12,228 | $1,834 | $14,062 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 17.00 |
| 18 | Spring & Belle | 2 | 4 | 3 | | $9,171 | $1,376 | $10,547 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 17.00 |
| 33 | College & Rectory | | 4 | 2 | | $6,114 | $917 | $7,031 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 4.57 | 4.29 | 17.00 |
| 34 | College & Roxboro | 6 | | 3 | | $9,171 | $1,376 | $10,547 | 0.00 | 0.00 | 0.00 | 0.00 | 3.43 | 4.14 | 0.00 | 0.00 | 4.57 | 4.29 | 16.43 |
| 4 | Raleigh & Front | | 6 | 3 | | $9,171 | $1,376 | $10,547 | 0.00 | 3.71 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 0.00 | 16.14 |
| 5 | Front & Gilliam | | 4 | 2 | | $6,114 | $917 | $7,031 | 0.00 | 3.71 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 0.00 | 16.14 |
| 9 | Front & Coggeshall | | 2 | 1 | | $3,057 | $459 | $3,516 | 0.00 | 3.71 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 16.14 |
| 6 | Gilliam & High | 4 | | 4 | | $6,228 | $934 | $7,162 | 0.00 | 0.00 | 4.29 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 0.00 | 12.43 |
| 7 | Main & High | 4 | 2 | 3 | | $9,171 | $1,376 | $10,547 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.14 | 0.00 | 4.00 | 0.00 | 4.29 | 12.43 |
| 38 | Raleigh & Antioch | 8 | | 4 | | $12,228 | $1,834 | $14,062 | 0.00 | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 4.57 | 0.00 | 9.00 |
| | | | | | Totals | $437,181 | $65,577 | $502,758 | | | | | | | | | | | |

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# 4 Policies & Programs

## Chapter Outline



## Overview

Meeting the goals of this Plan will not only require new facilities; it also requires implementation of pedestrian-related programs and policies. A comprehensive approach is necessary to create a pedestrian-friendly community. The approach must focus on overall livability and walkability in all planning decisions involving land use, growth, and transportation. Programs that encourage walking, educate about safety, and enforce safe behavior are also key components.

### Existing Programs

Oxford has participated in pedestrian education and safety initiatives in the recent past, particularly with the Eat Smart Move More program through Granville County (See Chapter 2 for more details), and the regional planning efforts of the Kerr-Tar Regional Council of Governments. This chapter provides a toolbox of recommendations and resources that build on these existing efforts and offer guidance for common and effective programs.

### Program Recommendations and Resources

Pedestrian-related programs fall into three main categories: education, encouragement, and enforcement. The programs listed in this chapter are provided to demonstrate the variety of opportunities available for promoting walking and active lifestyles in Oxford. The City should work closely with local volunteers and community organizations to implement events and activities, research new program ideas, and improve upon existing programs.

## Education

### Public Education and Educational Devices

Oxford could develop a variety of safety materials and distribute them throughout the community. Educational materials focus on safe behaviors, rules, and responsibilities. Information may include bulleted keys for safe pedestrian travel and habits, 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. Information can be distributed through brochures, newsletters, newspapers, bumper stickers, and other print media that can be inserted into routine mailings. It can also be posted on municipal websites and shown on local cable access television.

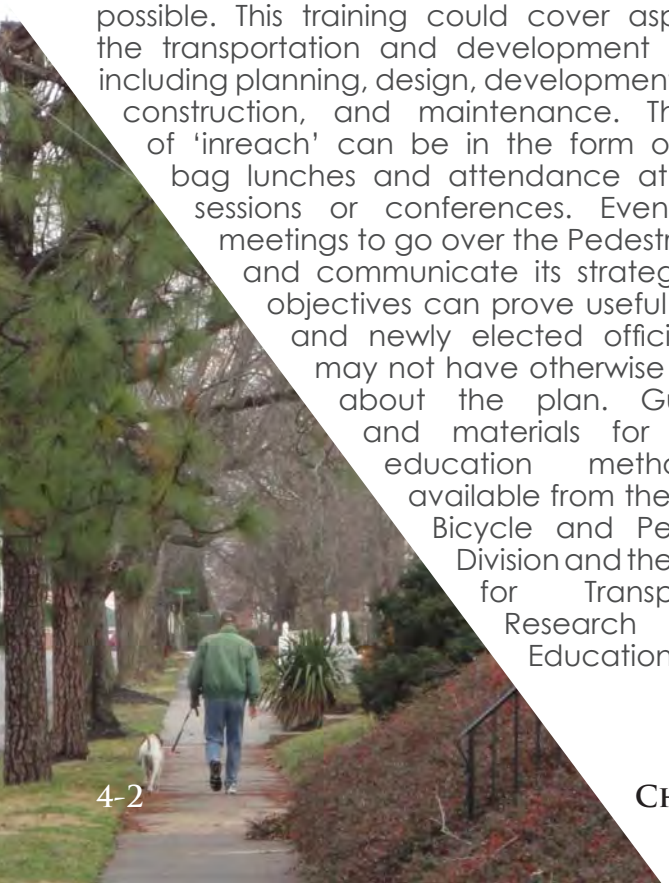
Local programs such Walk to Work Day, walking school bus demonstrations, and summer camps can be organized by the City and can be utilized to distribute information using a booth to display related print media.

## Bicycle and Pedestrian Advocacy Groups

The City of Oxford should support the creation of a local bicycle and pedestrian advocacy group. Even though this is a pedestrian plan, the needs and objectives of bicycle and pedestrian advocates are closely related, and stand to benefit mutually from their combined efforts. Local advocacy groups are beneficial resources for promoting safety, providing feedback on opportunities and obstacles within the bicycle and 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.

## Internal Education

'Internal' education refers to the training of people who are involved in the actual implementation of the Pedestrian Plan. Key City staff, members of the local planning board, RPO, NCDOT Division staff, and Granville County staffs should all be included in training sessions whenever possible. This training could cover 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 and attendance at special sessions or conferences. Even simple meetings to go over the Pedestrian Plan and communicate its strategies and objectives can prove useful for staff and newly elected officials that may not have otherwise learned about the plan. 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).



Below are several training course examples:

www.michaelronkin.com/courses

www.pps.org/training/custom-tailored-training/

www.fhwa.dot.gov/context/trainingguide/ExistingClasses.htm

## Coordinated Campaigns

Through cooperation with NCDOT, local municipalities and organizations should provide strong education, encouragement, and enforcement campaigns whenever a major bicycle and/or pedestrian improvement occurs. When a major improvement is made, the roadway environment changes and proper interaction between all users is critical for overall safety. This type of outreach could take place through the local media outlets, on-site, or at special events.

## Adult Education

Education should span all age groups. Local agencies could partner and consider adding or expanding the following educational program/event offerings:

- Parent courses for Walking School Buses
- Walkability workshops
- Crossing guard programs
- Pedestrian ambassador programs
- Brown bag events and clinics
- Motorist education
- Educational devices (campaigns, billboards, postcards, local television)

## 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 City, using signage to identify the events, architecture, and culture that make Oxford unique, such as historic sites that are listed on the National Registry of Historic Places. 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.

## Education Resources

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

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

**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. Visit their website to receive information about programs, involving media events, device distribution and hands-on educational activities for kids and their families.

http://www.safekids.org/

**Speed Campaign Tool Kit.** The intent of this National Highway Traffic Safety Administration (NHTSA) tool kit is to provide marketing materials, 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.

**Rules of the Road for Grandchildren**: Safety Tips is an information website for grand parenting. If you are a grandparent, you can play an important role in teaching your grandchildren the "rules of the road." AARP.

http://www.aarp.org/confacts/grandparents/rulesroad.html

**'Streets in America are Unsafe and Unforgiving for Kids'**. Article by the Pedestrian Safety Roadshow. U.S. Department of Transportation. Federal Highway Administration.

http://www.tfhrc.gov/safety/pedbike/articles/unsafe.htm

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

**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/

### Weblinks & Resources

The NCDOT Division of Bicycle and Pedestrian Transportation has an extensive selection of how-to manuals, informative guidebooks, and kits that provide comprehensive information on a variety of topics. These educational materials may be used by the general public, event organizers, teachers, or others. All are downloadable in PDF version. Manuals and guidebooks that are available in hard copy may be requested through the Safety Materials Order Form: www.ncdot.gov/bikeped/safetyeducation/manuals/ or www.ncdot.org/transit/bicycle/

For more information and program examples, visit the following websites:

- www.pedbikeinfo.org (Pedestrian and Bicycle Information Center)
- www.bicyclinginfo.org (Pedestrian and Bicycle Information Center)
- www.bikewalk.org/workshops (National Center for Bicycling and Walking)
- www.saferoutesinfo.org (Safe Routes to School)
- www.activelivingresources.org/stories_directory.php (Active Living Resource Center)
- www.active-living.org (Spartanburg, SC - Partners for Active Living).
- www.campo-nc.us/BPSG/BPSG_Home.htm (Capital Area MPO)
- www.smartcommutechallenge.org (Triangle Area - Smart Commute Challenge)
- www.usa.safekids.org (Safe Kids Worldwide)
- www.eatsmartmovemorenc.com (Eat Smart, Move More)
- www.worldcarfree.net (Worldcarfree)
- www.nhtsa.dot.gov/people/injury/pedbimot/bike/resourceguide/index.html
- (National Highway Traffic Safety Administration: Resource Guide on Laws Related to Pedestrian and Bicycle Safety

# 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 50.

### 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:

### Walk to Work Day / International Car Free Day

(September 22) Designate one day a year for people to walk to work to help advance programs, promote active living, and raise awareness for environmental issues. Walk to Work Day can be at the end of an entire week or month of pedestrian promotional activities, including fitness expos, walking and jogging group activities, running and bicycling races and rides, etc.

### Strive Not to Drive Day

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

### National Trails Day

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

### 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 Oxford 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.

### Walking / Running Clubs

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

- Relay for Life (American Cancer Society support)
- Mother's Morning Club (mom's with strollers)
- Walking Wednesdays (senior groups)
- Lunch Bunch (workers who run during their lunch hour)

### Adopt - A - Trail

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

### Revenue Generating Events

Oxford should consider holding events that can help fund future facilities. Program and event ideas that could be used to generate revenue in Oxford, 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 coinciding with other local events such as fairs, festivals, historic/folk events, etc.

### Encouragement Resources

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 two 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. 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. To register walking events, go to the main webpage, and follow the International Walk to School links: 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 NHTSAwebsite. 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/

# Enforcement

### Motorist Enforcement

Based on 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. The goal is for pedestrians and motorists to recognize and respect each other's rights on the roadway.

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 G.S. 20-114.1.

### Enforcement Actions

- Local police should use targeted enforcement to focus on key issues such as motoristsspeeding,notyieldingtopedestrians in crosswalks, parking on sidewalks, etc.
- Establish a crossing guard program for peak school hours and for peak pedestrian activity
- Require crossing guards to complete an NCDOT Crossing Guard Training Program.

### Enforcement Resources

- NCDOT School Crossing Guard Program: www.ncdot.org/transit/bicycle/safety/ programs_ initiatives/crossing.html

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

# Pedestrian Policies

City planning staff should become familiar with (and, in many cases, continue to support) the following policies and regulations. Walkability should be an item considered with all future development and growth decisions. More people will walk when their proximity to key destinations is reasonable. For example, a mixed use development will engage more walking while the development of a school at the outskirts of town will promote less walking and more driving. Suggested policy statements and paragraphs by category are provided below, and notes are made where such policies are already included in the City's draft Comprehensive Development Ordinance.

## 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.
- Follow NCDOT's Complete Streets Policy, Implementation and Design Guideline development (under development in 2011). 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

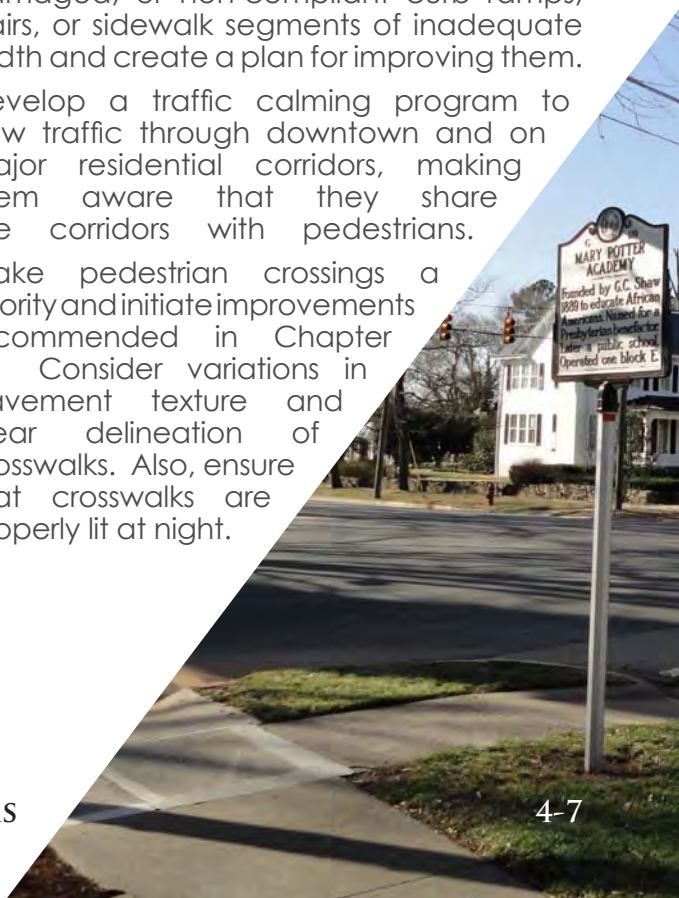
**Goal:** Create and maintain a pedestrian network that provides direct connections between downtown, trip attractors, schools, and residential/commercial areas.

- To the maximum extent possible, make walkways accessible to people with physical disabilities.
- Develop a system of informational and directional signage for pedestrian facilities and greenways.
- Provide sidewalks on all roads surrounding schools with safe crosswalks.
- Provide pedestrian access through cul-de-sacs and large parking lots, which are typical obstacles to pedestrian connectivity.
- Accommodate pedestrians and bicyclists on future 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). 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, 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 (included in the City's draft Comprehensive Development Ordinance).
- Develop and expand the City's maintenance program of sidewalk repairs, debris removal, and trimming of encroaching vegetation.
- Follow design guidelines in Chapter 6 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 near 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.

## Greenways

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

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

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# TABLE 4.1 SUBDIVISION REGULATION ORDINANCE REVIEW

| | A | B | C |
|---|---|---|---|
| 77 | ***City of Oxford -- Subdivision Regulation Ordinance Review Comments*** | | |
| 78 | **Article** | **Contents & revisions** | **Additional Comments** |
| 79 | **50.6 Street** | *A dedicated and accepted public right-of-way for vehicular traffic* | Non-inclusive definition that does not acknowledge non-vehicular road users, including pedestrians. Suggest updating this definition to current MUTCD definition. |
| 80 | **71.2 Sidewalks** | *Sidewalks shall be constructed on such streets as the Planning Board considers sidewalks necessary* | Sidewalks, provided on both sides of a street, are generally the preferred pedestrian facility. They provide the greatest degree of comfort for pedestrians and increase safety for pedestrians. Suggest totally revising this provision to create policy requiring sidewalks on all streets, both sides. Could include an exception policy with criteria that need to be met before exempting street from policy. Suggest referring to FHWA Design Guidance Accommodating Bicycle and Pedestrian Travel: A Recommended Approach. Another suitable reference may be PEDSAFE. |
| 81 | **80.1 Conformity to Existing Maps or Plans** | *The location and width of all proposed streets shall be in conformity with existing maps and plans…* | |
| 82 | **80.3 Access to Adjacent Property** | *When…it is desirable to provide for street access to an adjoining property….* | Only seems to be considering possible future vehicular access: suggest separating the ideas of vehicular and pedestrian access. Even when vehicular access is not to be provided, pedestrian connection should be provided. |
| 83 | **80.5 Large Tracts and Parcels** | *….such parcels shall be arranged so as to allow for the opening of future streets…* | Similar to previous comment: suggest separating the ideas of vehicular and pedestrian connectivity. |
| 84 | **81.11 Right-of-Way Widths** | *Minimum street right-of-way widths shall be in accordance with the Thoroughfare Plan….* | Suggest examining the relationship between these stated road widths and pedestrian safety: narrower streets will decrease pedestrian crossing distances, reduce speeding. |
| 85 | **81.3 Blocks** | *The maximum and minimum block lengths shall be as follows:…* | Suggest examining the block lengths. Reduced block lengths can improve the pedestrian environment. |
| 86 | **81.62** | *A crosswalk easement of eight feet in width…* | Unclear about this provision -- a crosswalk easement should not be necessary for a public road so it may be for some other application. |
| 87 | | | |

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# TABLE 4.2 ZONING ORDINANCE REVIEW

| | A | B | C |
|---|---|---|---|
| 1 | | **City of Oxford -- Code of Ordinances Review Comments -- RED FONT FACE indicates sample text to add to Code of Ordinance Language** | |
| 2 | **Article** | **Contents & revisions** | **Additional Comments** |
| 3 | **ARTICLE 100 - PURPOSE AND AUTHORITY** | | |
| 4 | **102 Purpose** | *"...and are designed to less e n congestion and improve access, mobility and safety i n the streets; to secure safety from fire, panic and other dangers; to* | Suggest looking at expanding the stated purpose, particularly as it relates to street operation and the range of uses and the impact of the street operation on non-motorized users |
| 5 | **118 Visibility at Intersections** | *On a corner lot in all districts except the B-I Central Business District, nothing shall be erected, planted, or allowed to grow in such a manner as to impede vision within a triangular area measured thirty (30) feet along street right-of-way lines from the point at which they intersect at the corner.* | While it is very important that they have included a definition for sight distance, the stated definition is limited in nature and does not take into account that sight distance requirements vary depending on the speed of approaching traffic as well as heights. The requirement also does not acknowledge that sight distance needs may extend beyond corners lots/visibility at intersections. More comprehensive-type definitions cover a broader range of situations where sight distance may pose a problem and express the sight distance required as a function of speed and height. Requirements generally include a vertical reference point to account for the eight of the eye of the driver as well as the height of an object in the road (e.g. low profile sports car, travelling at speed). In addition, this requirement does not seem to cover on-intersection/corner locations where sight distance may also be of concern: mid-block crossings, trail crossing, and driveways (particularly commercial driveways).Adequate sight distance is critical for to allow pedestrians adequate time to see and be seen for intersection crossings, mid-block and trail crossings and driveway crossings. Drivers need to be able to see, react and have adequate time to respond (i.e. brake and cope to a complete stop) once they see pedestrian. Pedestrians need to adequate sight distance to make a decision on whether they should attempt to cross and have adequate time to make it to the side, once committed. This includes the full range of pedestrians: the elderly, those with mobility impairments and those with small children in tow (i.e. parent pushing stroller while holding toddlers hand also). |
| 6 | **ARTICLE 200 - DEFINITIONS** | | |
| 7 | **201 Definitions** | *201.19 Collector Street: A minor thoroughfare as identified in the Thoroughfare Plan for the City of Oxford* | Town needs to review definitions in Throughfare Plan. Suggest adding the definitions in Code of Ordinance also so that readers do not have to search a second source (which they are less likely to follow up and do.) |
| 8 | | *201.73 Street: A public thoroughfare that affords the principal means of access to abutting property.* | Suggest use standard MUTCD definition for 'thoroughfare'. |
| 9 | | *Suggest adding more definitions: pedestrians, trail, sidewalk, right-of-way. Suggest modifying the definition of 'street'.* | Suggest use standard MUTCD definitions for each. The pedestrian definition is of particular importance as it illustrates the fact that pedestrians covers a range of which includes those using mobility devices. It is also useful to clarify whether people operating such devices as skateboards are covered under the definition of pedestrians. MUTCD: Pedestrian -- A person on foot, in a wheelchair, on skates, or on a skateboard |

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| 10 | **Article** | **Contents & revisions** | **Additional Comments** |
| 11 | **ARTICLE 300 - DISTRICT REGULATIONS** | | |
| 12 | **ARTICLE 400 - SIGNS** | | |
| 13 | | *The purpose of these sign regulations are: …….. to improve and not impede pedestrian and traffic safety; to minimize the possible adverse effect of signs on nearby public and private property; and to enable the fair and consistent enforcement of these sign regulations.* | |
| 14 | **402.35 Temporary Sign** | *Any sign that is displayed for a limited period of time and is not permanently mounted.* | *Temporary* signs can be particular culprits in causing unnecessary pedestrian issues (i.e. blocking or unnecessarily impairing sight distance, blocking or impairing access, providing inadequate vertical clearance). Where possible, I have added wording to address this issue. |
| 15 | **403 General Sign Regulations** | *403.1 No Sign or sign structure shall be erected or constructed to interfere with required vehicle sight easement setbacks. This includes both temporary as well as permanent signs.* | |
| 16 | **403 General Sign Regulations** | *403.5 All signs shall be located in such a way that they maintain vertical and horizontal clearance from all electrical power lines and communication lines. All Signs must also be located so as to avoid obstruction of vehicular traffic and so as to avoid obstruction of pedestrians and creating safety problems.* | Where are the minimum values for vertical and horizontal clearance defined? (80 inches vertical clearance per FHWA. Refer to AASHTO Pedestrian Guide, Page 65 for details of obstacle clearance). PEDSAFE recommendation: "The distance to the bottom of signs placed in or right next to a sidewalk should be at least 2 m (7 ft.) above the sidewalk surface to avoid injury to pedestrians." |
| 17 | **405 Signs That Do Not Require A Permit** | *The following signs are permitted in all zoning districts and may be erected without a permit provided they conform to the specifications outlined in Table 404. Signs must be located outside public Right-of-Way (ROW) and outside any sight distance easement area.* | This requirement shows up in the notes on the table but is a very important safety issue for pedestrians. Temporary signs are frequently the worst culprits blocking sight distance at intersections (e. July 4th Firework signs). There is value to highlighting this issue upfront. |

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| 18 | **Article** | **Contents & revisions** | **Additional Comments** |
| 19 | **ARTICLE 500 - OFF-STREET PARKING AND LOADING** | | |
| 20 | **502.6 Access** | *Each required off-street parking space shall open directly upon an aisle or driveway of such width and design as to provide safe and efficient means of vehicular access to such parking space. All off-street parking facilities shall be designed with appropriate means of vehicular access to a street or alley in a manner which will least interfere with traffic movement or pedestrian access and safety. No driveway across public property shall exceed a width of twenty-five (25) feet, not including curb cuts.* | The existing language is about the safety of the vehicles only not that of the pedestrians -- either walking through the facility to access the property or the vehicle occupants after they exit the vehicle to access their destination. |
| 21 | **504.3 Access** | *Each required off-street loading space shall be designed with appropriate means of vehicular access to a street or alley in a manner which will least interfere with traffic movement and pedestrian access and safety.* | |
| 22 | **504.8 Ingress and Egress:** | *Each required off-street loading space shall be provided with a means of unobstructed ingress and egress to a public street or alley. Where such ingress and egress is made into a public street, it shall be through driveways or openings which comply with the driveway requirements of the City of Oxford. Permanent type wheel stops or masonry or similar type material curbing shall be provided to prevent any vehicle using the loading area from encroaching either on the required front yards, side yards, public right-of-way, pedestrian facilities and access or adjacent property.* | This text references 'driveway requirements of City of Oxford' -- is this a separate document? The design of driveways have considerable bearing on the usability of pedestrian facilities, particularly for pedestrians with mobility issues or using mobility devices such as wheelchairs. Should take a closer look at driveway requirements. Refer to FHWA Sidewalk Design Guidelines for detailed information on the issues and recommendations. |
| 23 | **ARTICLE 600 LANDSCAPING & TREE PRESERVATION REQUIREMENTS** | | |
| 24 | | *This article does not have introductory information stating the purpose. See notes for why it may be useful to add information so that it can highlight the related pedestrian impacts.* | Landscaping and plants impact pedestrian safety in several ways: sight distance, over-hanging and over grown plants impairing or blocking paths; roots from big trees breaking up paths; maintenance and clear-up after storms. Neglect of any of these items can really impair the use of existing facilities or make it particularly difficult for users with limited mobility. Bushes, trees, and other landscaping should be maintained to prevent encroachment into the sidewalk. Suggesting adopting ordinance requiring local property owners to trim the vegetation to maintain clear and unobstructed sidewalks. |
| 25 | **602.2 Planting Area descriptions.** | *A) Street Planting Yard: A planting area parallel to a public street designed to provide continuity of vegetation along the right-of-way and a pleasing view from the road. No more than fifteen (15%) percent of the street planting yard may be used for walkways or signs. Parking, merchandise display and off-street loading are prohibited in the street planting yard.* | Need some mechanism to require property owners to maintain vegetation so it does not grow to obstruct facility and create sight distance problem: propose possible ordinance for adjacent property owners to keep vegetation trimmed |
| 26 | **605.11 Encroachments Permitted in Required Planting Yards:** | *The following are permitted in required planting yards provided there is no interference with any sight area and they are maintained trimmed :* | |
| 27 | **605.13 Location of Planting Material Outside Shade of Building:** | *Where a building is located less than ten (10) feet from a property line, and the planting yard would be heavily shaded by buildings on both sides line, the required trees and shrubs may be planted outside the shaded area to improve survivability provided they do not interfere with sight easements.* | |
| 28 | **605.14 Obstructions:** | *Landscaping shall not obstruct the view of motorists using any street, driveway or parking aisle and shall not obstruct the view of pedestrians using any street, driveway, parking aisle or crossing.* | |
| 29 | **605.17 Maintenance** | *The owner is responsible for maintaining all required plant materials and planting areas in good health and appearance. Any dead, unhealthy, or missing plants must be replaced within one hundred and eighty (180) days with vegetation which conforms to the initial planting rates and standards. The required replanting period may be extended by the Zoning Officer if it is determined that the plant material has been severely damaged due to catastrophic events or other extremely severe weather conditions.* | Keeping plans trimmed so that they don't obstruct either passage or sight lines should be part of maintenance also. |

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| 30 | **Article** | **Contents & revisions** | **Additional Comments** |
| 31 | **ARTICLE 700 - DEVELOPMENT STANDARDS** | | |
| 32 | **722.9 Fencing** | *Areas being excavated shall be enclosed with a cyclone-type fence no less than six feet in height, or wire mesh, located no less than 10 feet from the excavation edge, wherever in the determination of the Zoning Administrator it shall be necessary for safety.* | For all sections of Article 700, consider adding language referring to the location, visibility, protection, movement, signage, obstruction, safety, etc for pedestrians and cyclists. |
| 33 | **722.7 Flooding** | *No extractive use or processing shall be conducted in such a way as to produce a flooding hazard to adjacent or neighboring properties at any time. Dikes, dams, or other barriers necessary to prevent such flooding shall be erected before beginning said operations or as necessary during the course of such operations. The barriers shall afford the same protection as if no excavation or processing had been made* | |
| 34 | **723.4 Maintenance Required.** | *Any fence which, through neglect, lack of repair, type, or manner of construction, method of placement or otherwise, constitutes a hazard or endangers any person, animal, or property is hereby deemed a nuisance. If such conditions exist, the Zoning Administrator shall require the owner or occupant of the property upon which the fence is located to repair, replace, or demolish the fence causing the nuisance.* | |
| 35 | **723.8 General Fence Requirements** | *(A) Obstruction of View. No fence shall be placed or retained in such a manner as to obstruct vision at any intersection of public or private streets.* | |
| 36 | **723.8 General Fence Requirements** | *(C) Obstruction of Access. No fence shall block access from doors or windows. Fences must have a clearance at least two (2) ft. from building walls, except where fences project from or to a building wall.* | |
| 37 | **729 - Hospitals** | *729.1 Such institutions shall abut a major thoroughfare or a collector street and shall have direct access thereto.* | |
| 38 | **729 - Hospitals** | *729.2 Points of ingress and regress shall consist of a driveway or roadway at least twenty feet in width and no wider than twenty-five (25) feet, and shall be located a sufficient distance from highway intersections to minimize traffic hazards, inconvenience and congestion.* | |
| 39 | **729 - Hospitals** | *729.3 The number, width and location of curb cuts shall be such as to minimize traffic hazards, inconvenience and congestion* | |
| 40 | **729 - Hospitals** | *729.4 The parking areas shall have a paved surface as approved by the Director of Public Works, and all parking areas and traffic lanes shall be clearly marked.* | |
| 41 | **746 - Schools, Public, Parochial and Private Elementary and High Schools, Colleges or Seminaries** | *746.1 The site for any public, parochial or private elementary school shall have an area of at least five (5) acres, plus one (1) acre for each 100 pupils, or major portion thereof, in excess of 300 pupils. Such site shall have a frontage of at least two hundred (200) feet on a suitably Improved public street.* | |
| 42 | **746 - Schools, Public, Parochial and Private Elementary and High Schools, Colleges or Seminaries** | *746.2 The site for any college or Seminary shall have an area of at least 100 acres, plus 5 acres for each 100 students. Such a site shall have a frontage of at least 500 feet on a suitably improved public street.* | |
| 43 | **748 - Shopping Centers** | *748.5 Accessory Outdoor Sales Area: All merchandise for sale or rent shall be contained within the building envelope or under cover of attached canopies except…..* | |

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| 44 | **Article** | **Contents & revisions** | **Additional Comments** |
| 45 | **ARTICLE 700 - DEVELOPMENT STANDARDS** | | |
| 46 | **753 - Unified Business Development** | *753.3 Points of access and egress shall consist of a driveway or roadway at least twenty (20) feet in width and no wider than twenty-five (25) feet shall be located a sufficient distance from highway intersections to minimize traffic hazard, inconvenience and congestion.* | |
| 47 | **753 - Unified Business Development** | *753.4 The number, width and location of curb cuts shall be such as to minimize traffic hazards, inconvenience and congestion.* | |
| 48 | **753 - Unified Business Development** | *753.5 Parking areas shall have a paved surface as approved by the Director of Public Works, and all parking areas and traffic lanes shall be clearly marked.* | |
| 49 | **753 - Unified Business Development** | *753.8 Plans shall be submitted, showing: (G) Proposed pedestrian access and facilities* | |
| 50 | **754 Unified Housing Development** | *754.3 Points of access and egress shall Consist of a driveway or roadway at least twenty (2O) feet in width and no wider than twenty-five (25) feet, and shall be located a sufficient distance from highway intersections to minimize traffic hazards, inconvenience and congestion.* | |
| 51 | **754 Unified Housing Development** | *754.4 The number, width and location of curb cuts shall he such as to minimize traffic hazards, inconvenience and congestion.* | |
| 52 | **754 Unified Housing Development** | *754.8 Plans shall be submitted showing: (G) Proposed pedestrian access and facilities* | |
| 53 | **Article** | **Contents & revisions** | **Additional Comments** |
| 54 | **ARTICLE 800 - NONCONFOMING USES** | | |
| 55 | **Article** | **Contents & revisions** | **Additional Comments** |
| 56 | **ARTICLE 900 - PERMITS AND PROCEDURES** | | |
| 57 | **904.2 Map Standards** | *The following information shall be provided on all site and plot plans: (R ) Show the location of existing pedestrian sidewalks, trails and access facilities.* | |
| 58 | **Article** | **Contents & revisions** | **Additional Comments** |
| 59 | **ARTICLE 1000 - ADMINISTRATION & ENFORCEMENT** | | |

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| 60 | **Article** | **Contents & revisions** | **Additional Comments** |
| 61 | **ARTICLE 1100 – FLOOD DAMAGE PREVENTION** | | |
| 62 | **1101.2 Statement of Purpose** | *1101.2.5 To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone, and sewer lines, and pedestrian sidewalks, paths and trails, streets and bridges located in areas of special flood hazard.* | |
| 63 | | *9) the safety of access to the property in times of flood for ordinary and emergency vehicles;* | |
| 64 | **Article** | **Contents & revisions** | **Additional Comments** |
| 65 | **ARTICLE 1200 – VESTED RIGHTS** | | |
| 66 | | | |
| 67 | **ARTICLE 1300 – WATERSHED PROTECTION ORDINANCE** | | |
| 68 | | | |
| 69 | **ARTICLE 1400 - PLANNED UNIT DEVELOPMENTS (PUD's)** | | |
| 70 | **Article** | **Contents & revisions** | **Additional Comments** |
| 71 | **1411 - Procedures for PUD Application Review and Approval Consideration:** | *c) Pre-filing Meeting:…..5) A schematic description of utility, pedestrian and circulation improvements for the planned unit development.* | |
| 72 | **1411 - Procedures for PUD Application Review and Approval Consideration:** | *2) The application shall be accompanied…..(d) Planned parks, trails, playgrounds, and open space areas to be developed, reserved, or dedicated, including acreage in common open space and dedicated open space;* | |
| 73 | **1411 - Procedures for PUD Application Review and Approval Consideration:** | *(2) Vehicular and Pedestrian Circulation Plan showing primary and secondary traffic circulation patterns including an analysis of both safety issues and anticipated traffic volumes and all planned street connections, proposed sidewalks, and greenways, with special attention on impact of traffic flow patterns on adjacent arterial and major connector roads;* | The primary concern of this wording appears to be related to the possibility of interfering with vehicular traffic rather than the safety, access and connectivity of pedestrian movement. It is unclear whether the 'safety issues' referenced related to vehicular traffic or pedestrians. Suggest rewording to made it less vehicular/traffic-centric and focus more on pedestrian movement and safety priority. |
| 74 | **1411 - Procedures for PUD Application Review and Approval Consideration:** | *(3) Buffers, Open Space and Recreational Facilities Plan showing planned parks, trails, playgrounds, and open areas to be developed, preserved or dedicated in accordance with the provisions of this ordinance. Acreage in common open spaces and acreage in dedicated open space (including acreage of common open space and acreage in dedicated open space within the 100-year floodplain, if any) shall be noted. This plan shall include the means of providing for the organization, arrangements for the ownership, maintenance, and preservation of common open space, trails, and private recreational facilities. .....* | |
| 75 | **1417 - Changes to Approved Master Land Use Plans:** | *5) That the circulation pattern provides for the safe, controlled, and orderly flow of pedestrians and vehicles;* | Suggest separating pedestrians and vehicles in his sentence -- their needs differ. Alternative suggestion: That the circulation pattern provides for the safe, controlled and orderly flow of vehicles and the safe, connected, accessible and comfortable flow of pedestrians; |
| 76 | | | |

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# 5 Implementation Strategies

## Chapter Outline

Overview | Key Action Steps | Key Partners
Performance Measures | Facility Development Methods

## Overview

The three main ways to improve pedestrian conditions in Oxford are through facility construction, program implementation, and policy enforcement. This chapter outlines the implementation priorities, key partners in implementation, and facility development methods.

The following action steps are integral to achieving the goals and vision of this Plan. As guiding recommendations and the clearest representation of specific items to accomplish, they should be referred to often. Table 4.1 summarizes these action steps, along with all other recommendations made throughout the Plan, and defines recommended actions, responsible agencies, and phasing. Finally, this Plan's appendices provide a variety of in-depth resources for assisting in carrying out these tasks.

## Key Action Steps

**Adopt This Plan**

Before any other action takes place, the City of Oxford 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 transportation plan, Oxford 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.

**Designate Staff**

Designate staff to oversee the implementation of this plan and the proper maintenance of the facilities that are developed. It is recommended that a combination of existing Transportation Planning (Kerr-Tar Council of Governments), Planning, Engineering, Parks and Recreation, and Public Works staff oversee the day-to-day implementation of this Plan. In many municipalities, this task is covered by a full-time bicycle and pedestrian coordinator, but in Oxford, it will make more sense to fold these responsibilities into current staff responsibilities. In the long term, a full-time Bicycle and Pedestrian Coordinator position could be considered.

### Create a Bicycle and Pedestrian Advisory Commission (BPAC)

The Steering Committee for this Comprehensive Pedestrian Plan should be invited to create and serve on a Bicycle and Pedestrian Advisory Commission (BPAC) to assist in the implementation of this Plan. The BPAC would be comprised of local pedestrian and bicycle champions and work to support the implementation of the recommendations of this Plan. The formation of a BPAC will also represent a significant step in becoming a Walk-Friendly Community. The BPAC's role would be to provide a communications link between the citizens of the community and City government. The BPAC should meet periodically, be tasked with assisting the City staff in community outreach, marketing and educational activities recommended by this Plan. Models for BPAC exist throughout the country, including many communities in North Carolina. These organizations, and others like them, traditionally focus on education, advocacy, partnerships, events and community service. Each BPAC member could represent one key functional area: planning, design, safety, maintenance, education, health, recreation, etc. The City of Oxford would greatly benefit by supporting the creation of such an organization.

### Begin Quarterly 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 different City departments. 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 reconfirmed by participants. The meetings could also occasionally feature special training sessions on bicycle, pedestrian, and trail issues.

### Seek 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 priority projects but also to develop a long-term funding strategy to allow continued development of the overall system. A 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, compliment, 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. These funding options are described in Appendix D: Funding.

### Improve Pedestrian Policies

While the Oxford Code of Ordinances addresses non-motorized transportation in a number of important ways, some policy updates are recommended to ensure future development provides pedestrian and bicycle facilities and improves bicycle/pedestrian friendliness. Suggested policy changes are included in Chapter 4.

### Develop Sidewalk & Trail Construction Documents

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. The public should have an opportunity to comment on the design of new facilities.

### Launch Programs as New Projects are Built

Through cooperation with the City of Oxford, the BPAC, and groups such as walking clubs, strong education, encouragement, and enforcement campaigns could occur as new facilities are built. When an improvement has been made, the roadway environment has changed and proper interaction between motorists and pedestrians is critical for the safety of all users. A campaign through local television, on-site enforcement, education events, and other methods will bring attention to the new facility, and educate, encourage, and enforce proper use and behavior. Chapter 4, Programs and Policies provides program ideas for the City and the BPAC to choose from.

### Offer Training for Enforcement

Law enforcement officers have many important responsibilities, yet pedestrians and bicyclists remain the most vulnerable forms of traffic. The Oxford Police Department should be involved in implementation. In many cases, citizens (and even sometimes officers) are not fully aware of state and local laws related to bicyclists and pedestrians. Training on this topic can lead to additional education and enforcement programs that promote safety. Training for Oxford' officers could be done through free online resources available from the National Highway Traffic Safety Administration (NHTSA) (see links at www.bicyclinginfo.org/enforcement/training.cfm) and through webinars available through the Association of Pedestrian and Bicycle Professionals (APBP).

### Become Designated as a Walk Friendly Community

One of the goals for this Pedestrian Plan is to transform Oxford 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, 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. 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 the Local NCDOT, Division 5

Division 5 of the NCDOT is responsible for the construction and maintenance of pedestrian facilities on NCDOT-owned and maintained roadways in the City of Oxford, OR is expected to allow for the City to do so with encroachment agreements. Division 5 should be prepared to:

- Recognize this Plan as not only an adopted plan of the City of Oxford, 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.
- 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 Kerr-Tar COG, Oxford's Public Works Department, and Oxford's Planning Department of all upcoming roadway reconstruction or resurfacing/restriping projects in Oxford, 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 Kerr-Tar COG

The Kerr-Tar COG is the transportation planning agency serving Granville County and it's communities. 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 COG 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 BPAC and for quarterly meetings with project partners.
- Ensure recommendations from this Pedestrian Plan are integrated into the COG's regional planning and project implementation. Specifically, during the development of the Kerr-Tar Lake District Regional Bicycle Plan, the COG should review the recommendations of this Pedestrian Plan, as well as other plans that have been adopted by the City of Oxford, to ensure consistency and regional connectivity.
- 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.

## Role of the Bicycle and Pedestrian Advisory Committee

- See pages 4-1 and 4-3 for more information. The Committee should be prepared to:
- Meet with staff from the COG, Granville County, the Granville-Vance District Health Department, and the City's Planning, Engineering, Parks and Recreation, and Public Works Department to evaluate the progress of plan implementation and offer input regarding pedestrian and trail-related issues.
- Assist City and County 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 Granville County

Granville County has already made pedestrian planning a priority and in 2006, developed the Granville County Greenway Master Plan (http://www.granvillegreenways.org/master-plan). Granville County should continue to engage in greenway planning and development by supporting the City of Oxford during the implementation of the recommendations included in this Pedestrian Plan. Prior to the beginning of each fiscal year, Granville County should meet with municipalities to adopt a budget for expenditures of funding that supports the implementation of greenway projects, even if only for small amounts. Granville County staff should review future local municipality and regional plans to ensure greenway connectivity between jurisdictional borders. County planners (and engineers) should aim for uniform standards in greenway facilities, especially for signage and wayfinding. As grant regional, state and federal opportunities become available, Granville County staff should support the City of Oxford in the development of grant applications to

implement the recommendations included in this Pedestrian Plan.

## Role of Oxford 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' section starting on page 1-3). 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, County departments, and the local NCDOT, Division 5.

Adoption of this Plan is in line with public support. Oxford's online comment form (which yielded over 100 responses) showed strong support for improving pedestrian conditions. Though not a statistical survey, the comment form results do represent the opinions of hundreds of local residents. The comment form asked, "How important to you is improving walking conditions in Oxford?" Over 94% responded "important" or "very important".

See Appendix B on Public Involvement for more information on public involvement and the results of the comment form.

## Role of the City of Oxford Planning Board

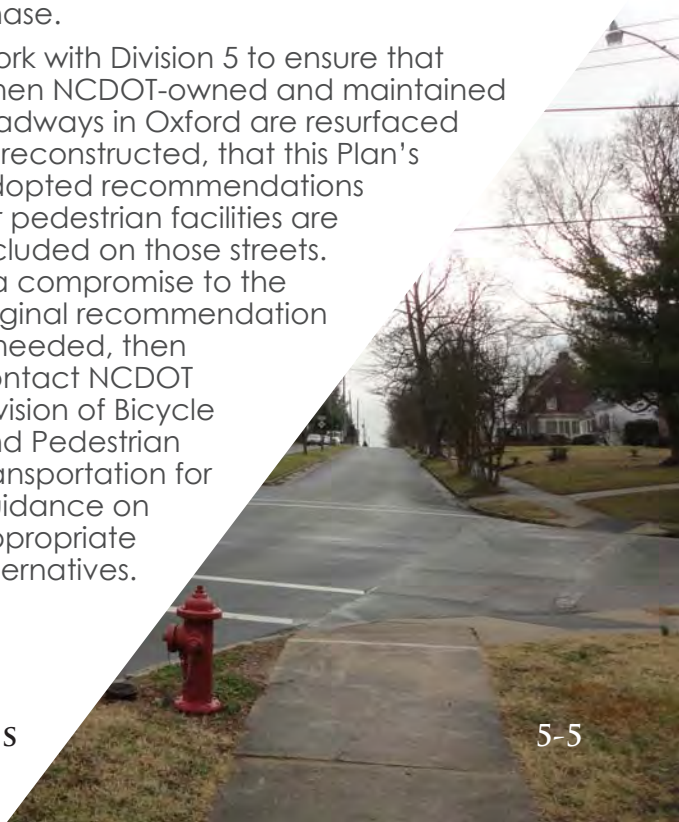
The City of Oxford Planning Board serves as an advisory board to the Council on matters of planning and zoning. The Planning Board should be prepared to:

- Become familiar with the recommendations of this Plan, and support its implementation.
- Learn about pedestrian-related policies, as described in detail in Chapter 4.
- Follow upcoming roadway reconstruction and resurfacing projects and work early in the design process with City and NCDOT to ensure pedestrian facilities are incorporated 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 Oxford 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 should be prepared to:

- Communicate and coordinate with other City departments and the BPAC on priority 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.
- Construct and maintain pedestrian facilities.
- Communicate and coordinate with NCDOT Division 5 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 5 to ensure that when NCDOT-owned and maintained roadways in Oxford 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 City of Oxford Engineering Department

The Engineering Department manages improvements to the city's infrastructure and manages construction inspections, traffic engineering, traffic signals, and street signage. 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.
- Prepare sidewalk, trail, and pedestrian crossing striping and construction documents following design standards in Appendix A.
- 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 Oxford Planning and Zoning Department

The planning staff will take primary responsibility for the contact with new development to implement the plan (with support from the Engineering and 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.
- Work to apply recommended policy revisions as recommended in Chapter 4 of this Plan.

## Role of the City of Oxford Parks & Recreation Department

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

- Meet with the BPAC; provide progress updates for plan implementation and gather input regarding pedestrian and trail-related issues.
- Pursue grants for funding priority projects and priority programs.
- Select and carry out walking-related programs; Work with locale advocacy groups and the BPAC to assist in organizing walking/running events, educational activities, and enforcement programs.
- Communicate and coordinate with the Kerr-Tar COG, Granville County, and neighboring municipalities and counties on regional trail facilities; partner for joint-funding opportunities.
- Identify safety concerns and work with citizens to improve trail safety and the perception of safety.

## Role of the City of Oxford Police Department

The City of Oxford 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 Oxford. 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 walking, such as speeding, running red lights, aggressive driving, etc.
- Participate in local pedestrian-related education programs, and become familiar with regional and state programs such as the Watch for Me NC program.
- Review safety considerations with the Public Works Department before projects are implemented.

## Role of Local & Regional Stakeholders

Stakeholders for pedestrian facility development and related programs, such as Granville County, Granville-Vance District Health Department, Granville County School System, 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.
- 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 Developers

Developers in Oxford 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 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 Oxford.
- Assist City and County staffs and BPAC by volunteering for pedestrian-related events and educational activities and/or participate in such activities.
- Assist City and County staffs and BPAC by speaking at City Council meetings and advocating for local pedestrian project and program funding.

## Role of Volunteers

Services from volunteers, student labor, and senior assistance, 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 4 of this Plan. Advantages of utilizing volunteers include reduced or donated planning and construction costs, community pride and personal connections to the City of Oxford pedestrian networks.

# Performance Measures

## (Evaluation & Monitoring)

The City of Oxford 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 success and failures in implementing this Plan and making Oxford 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 Oxford:

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.

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

Counts. Measures of pedestrian traffic at specific locations throughout City including schools.

# Facility Development Methods

This section describes different construction methods for the proposed pedestrian network 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 facilities 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 facilities into routine transportation and utility projects, the City should keep track of NCDOT's projects and any other local transportation improvements. While doing this, the City should be aware of the different procedures for local and state roads.

### 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 stand alone such as a trail project, not related to a particular roadway.

The City of Oxford, guided by the priority projects within this Plan, should present pedestrian projects along state roads to the COG and NCDOT. Local requests for small pedestrian projects, such as crosswalks and smaller segments of sidewalk, can be directed to the COG or the local NCDOT Division 5 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 Oxford should take advantage of any upcoming construction projects, including roadway projects outlined in local comprehensive and transportation plans. Also, case law surrounding the ADA has found that roadway resurfacing constitutes an alteration, which requires the addition of curb ramps at intersections where they do not yet exist.

**Residential and Commercial Development**

The construction of sidewalks and safe crosswalks should be required during development. 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.

**Retroftit Roadways with New Pedestrian Facilities**

For priority 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 Oxford 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 Oxford 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.

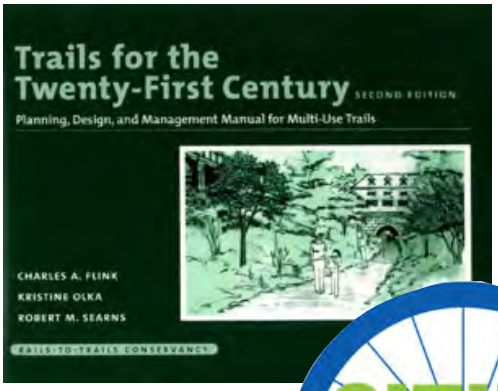
# A Design Resources

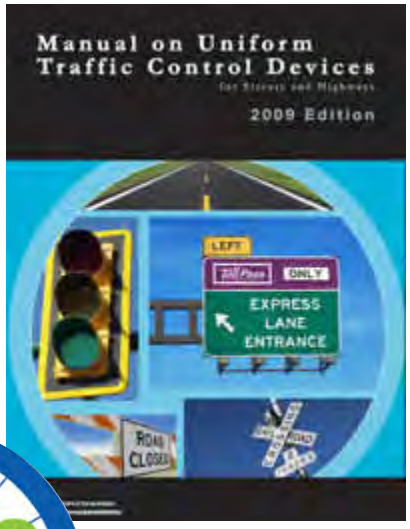
## Design Toolbox Contents

# Overview

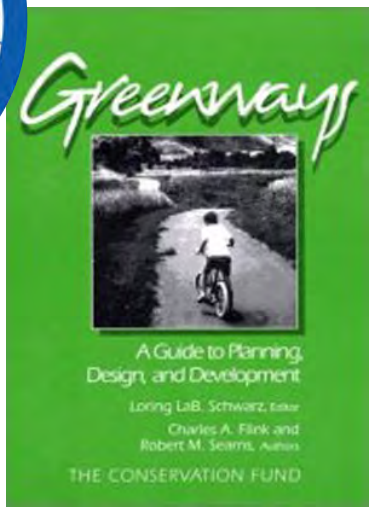
This appendix provides design guidelines for bicycle, pedestrian and trail-related facilities that are used in various locations across the United States. The guidelines should be used with the understanding that design adjustments will be necessary in certain situations in order to achieve the best results. Facility installation and improvements should be evaluated on a case-by-case basis, in consultation with local or state bicycle coordinators, and/or a qualified engineer and landscape architect. Some new treatments may require formal applications to the Arkansas State Highway and Transportation Department (AHTD)and the Federal Highway Administration (FHWA) for approval as experimental uses. Should national standards be revised in the future and result in discrepancies with this report, the national standards should prevail for design decisions. On facilities maintained by AHTD, the State's design guidelines will apply.

These resources (and those listed on B-3) can be consulted for more information on design standards.







## Design Resources:

Greenways: A Guide to Planning, Design and Development.
Island Press, 1993. Authors: Charles A. Flink and Robert Searns

Trails for the Twenty-First Century
Island Press, 2nd ed. 2001. Authors: Charles A. Flink, Robert Searns, Kristine Olka

Pedestrian and Bicycle Information Center, 2010
www.walkinginfo.org/engineering/
www.bicyclinginfo.org/engineering/

Bicycle Parking Design Guidelines
www.bicyclinginfo.org/engineering/parking.cfm

Guide for the Development of Bicycle Facilities*
American Association of State Highway Transportation Officials , 1999
www.transportation.org

Manual on Uniform Traffic Control Devices (MUTCD)
U. S. Department of Transportation, Washington, DC, 2009
http://mutcd.fhwa.dot.gov

Policy on Geometric Design of Streets and Highways.
American Association of State Highway Transportation Officials , 2001
http://transportation.org

Universal Access to Outdoor Recreation: A Design Guide. PLAE, Inc., Berkeley, CA, 1993.

Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities:
An ITE Proposed Recommended Practice.
www.ite.org/css

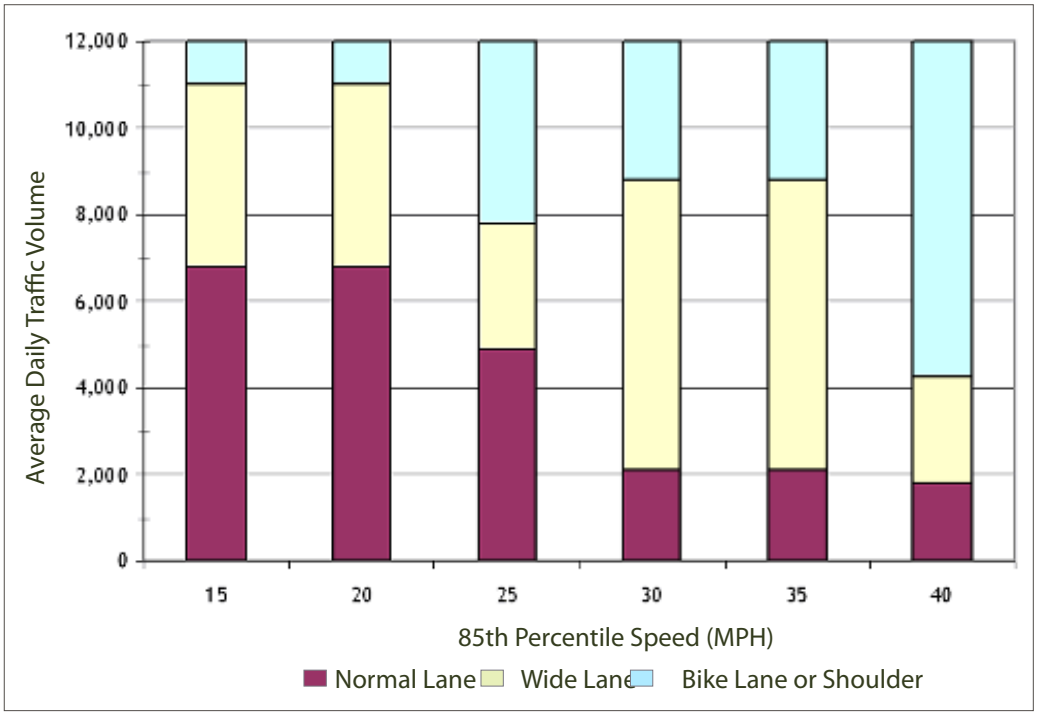
Cities for Cycling Urban Bikeway Design Guide. National Association of City Transportation Officials.
www.nacto.org/citiesforcycling.html

*Once available, the updated AASHTO Bicycling Guide should be used.

# Bicycle Facilities and Related Streetscape Improvements

A wide variety of on-road bicycle facilities are recommended to meet different transportations needs in different roadway situations. The appropriate bicycle facility for any particular roadway, whether new or existing, should be dictated primarily by vehicle volume and speed of the roadway. The figure below provides a matrix for evaluating bicycle facilities. The speed of the travel lane is shown along the x-axis and total traffic volumes per day are shown along the y-axis. The different colors represent the type of bikeway facility prescribed given the volume and speed of the travel lane. This chart represents a broad guideline, rather than a hard standard.

## North American Speed-Volume Chart




Source: M. King: Bicycle Facility Selection: A Comparison of Approaches

# Neighborhood Streets

Many bicyclists can safely share the road with vehicles on low volume (less than 3,000 cars per day), low speed roadways (e.g., a residential or neighborhood street).

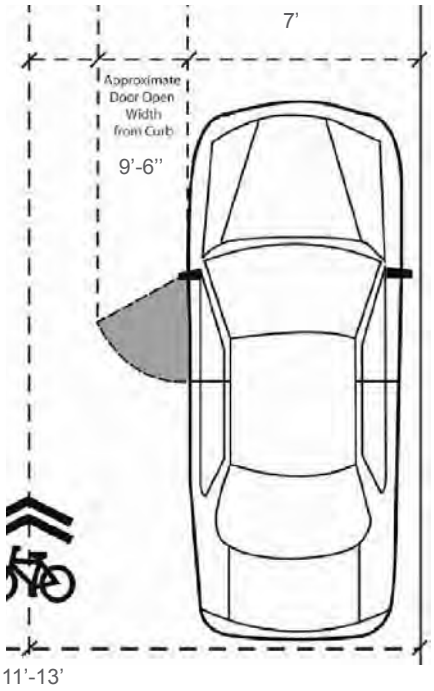
Left: Neighborhood street examples.

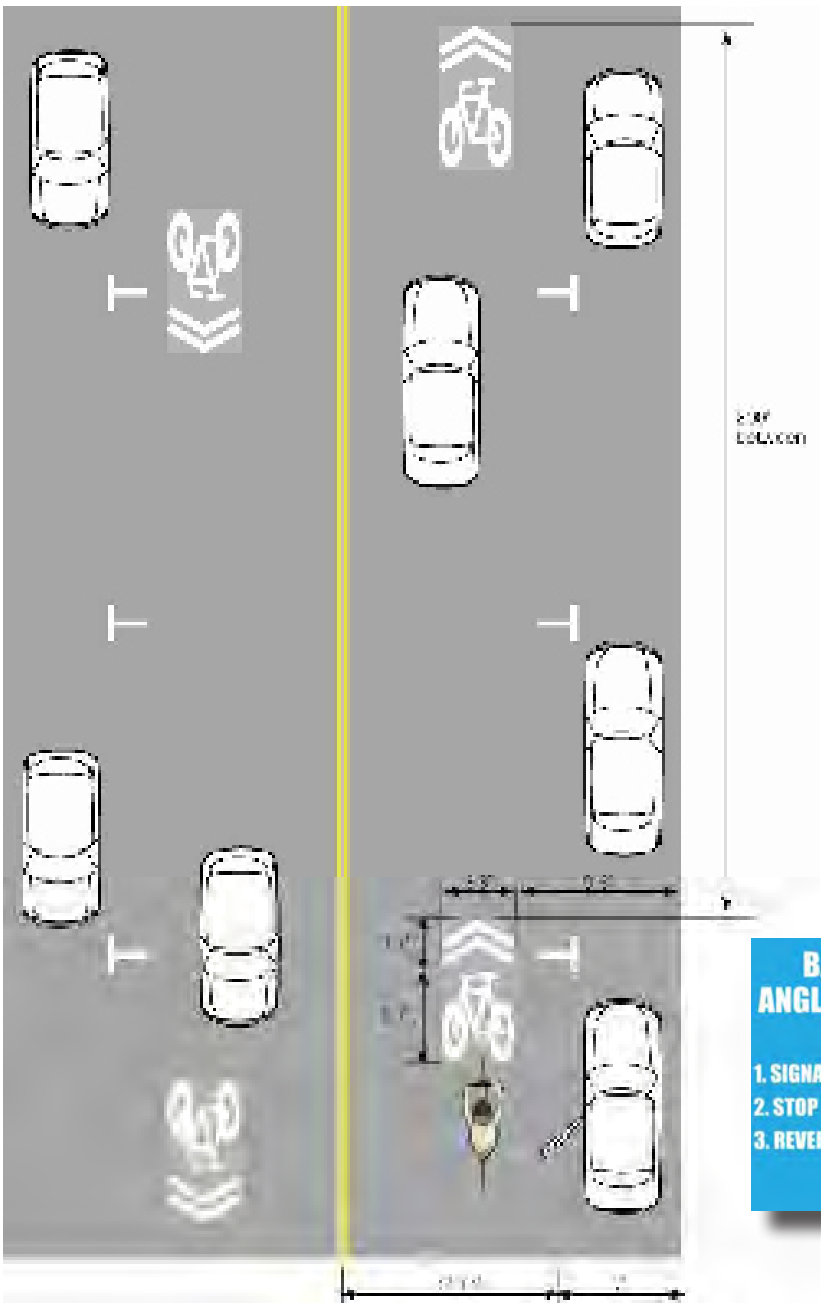
# Shared Lane Marking

A bicycle shared lane marking (or 'sharrow') can serve a number of purposes, such as making motorists aware of bicycles potentially traveling in their lane, showing bicyclists the appropriate direction of travel, and, with proper placement, reminding bicyclists to bike further from parked cars to prevent "dooring" collisions. The shared lane marking stencil is used:

- Where lanes are too narrow for striping bike lanes
- Where the speed limit does not exceed 35 MPH
- With or without on-street parking (with on-street parking, the center of the sharrow should be placed a minimum of 11 feet from the curb face; without on-street parking, the center of the sharrow shall be placed 4 feet from the curb face or edge of pavement)

Cities throughout the United States have effectively used this treatment for many years; it is now officially part of the 2009 Manual for Uniform Traffic Control Devices (MUTCD). Additional guidance will also be available in the update of the AASHTO Bike Guide.



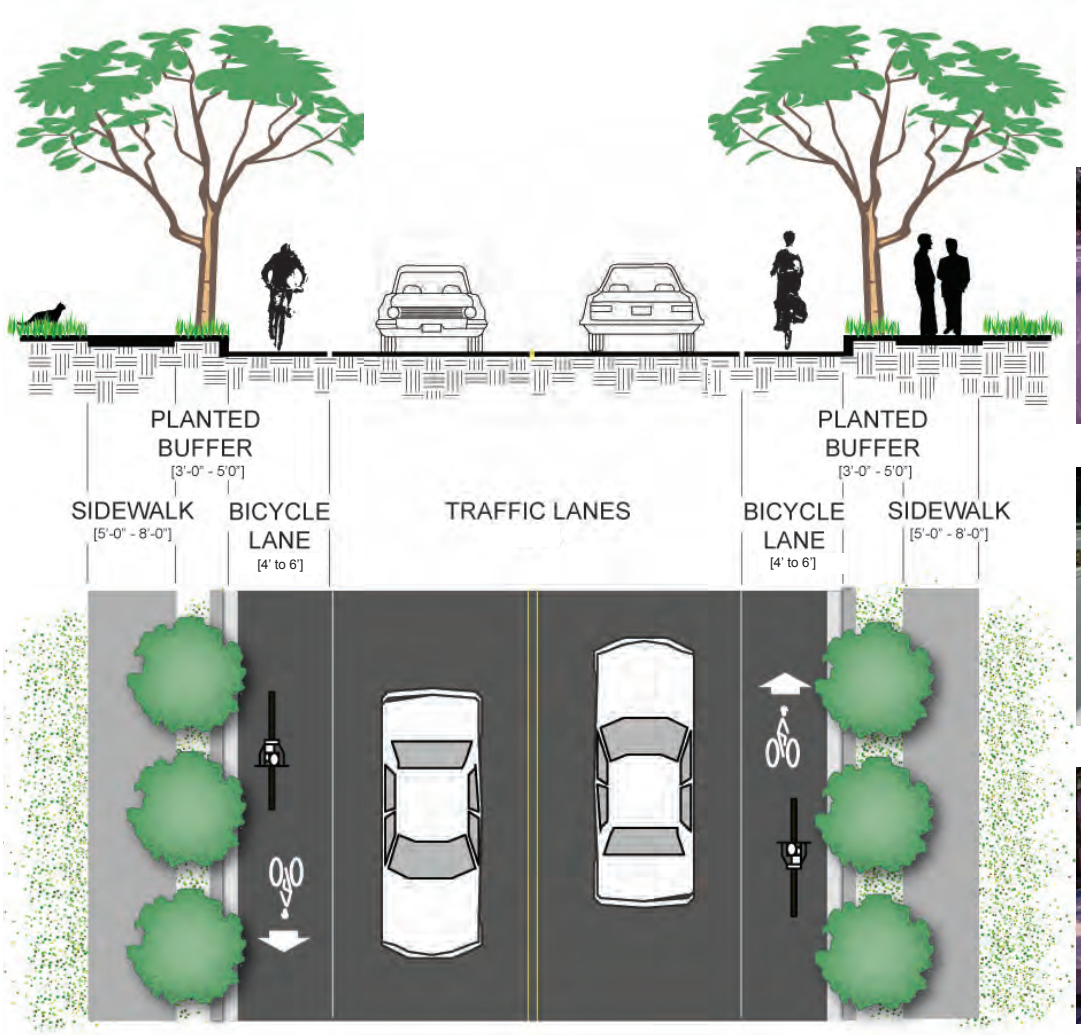
## Sharrows with Back-in Angle Parking

Back-in/head-out diagonal parking and conventional head-in/back-out diagonal parking have common dimensions, but the back-in/headout is superior for safety reasons due to better visibility when leaving. This is particularly important on busy streets or where drivers find their views blocked by large vehicles, tinted windows, etc. (drivers do not back blindly into an active traffic lane). Furthermore, with back-in/head-out parking, drivers can see bicyclists as they prepare to pull out. See the "Back-in/Head-out Angle Parking" study by Nelson\Nygaard Consulting Associates for more information: www.bicyclinginfo.org/library/details.cfm?id=4413

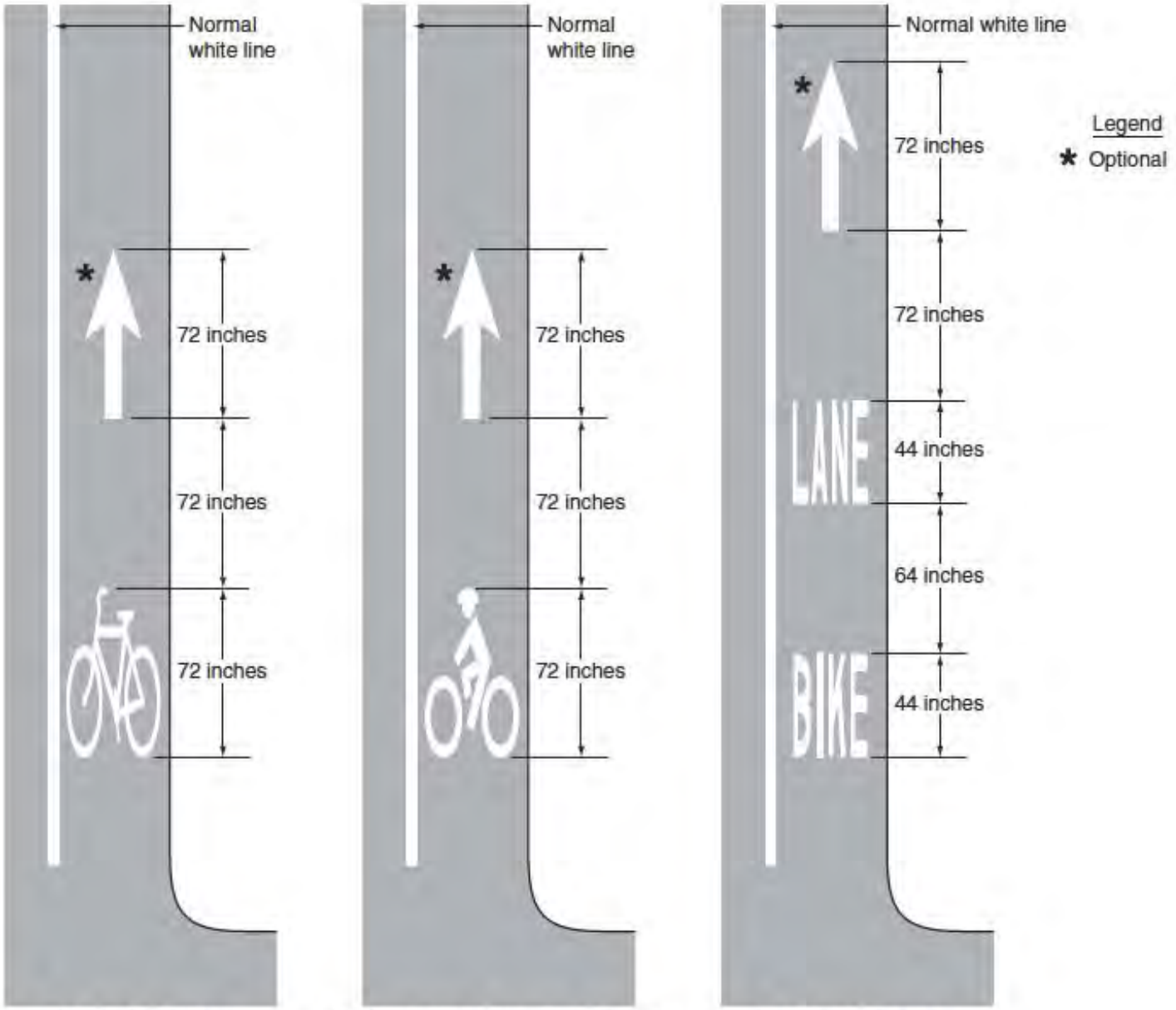
# Bicycle Lanes

A bicycle lane is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential and exclusive use of bicyclists. Bicycle lanes are located on both sides of the road, except one way streets, and carry bicyclists in the same direction as adjacent motor vehicle traffic. In some communities, local cyclists may prefer to use striped shoulders as an alternative to bicycle lanes (see guidelines for 'Striped/Paved Shoulders').

- Recommended bicycle lane width: 6' from the curb face when a gutter pan is present (or 4' from the edge of the gutter pan); 4' from the curb face when no gutter pan is present.
- As speed and volume increase, greater width is preferred. Per the AASHTO Guidebook, page 23, a width of 5 feet or greater is preferable and additional widths as desirable where substantive truck traffic is present, or where motor vehicle speeds exceed 50 mph.
- Should be used on roadways with average daily traffic (ADT) counts of 3,000 or more
- Not suitable where there are a high number of commercial driveways
- Suitable for 2-lane facilities and 4-lane divided facilities




Below: 2009 MUTCD examples of word, symbol, and pavement markings for bicycle lanes.



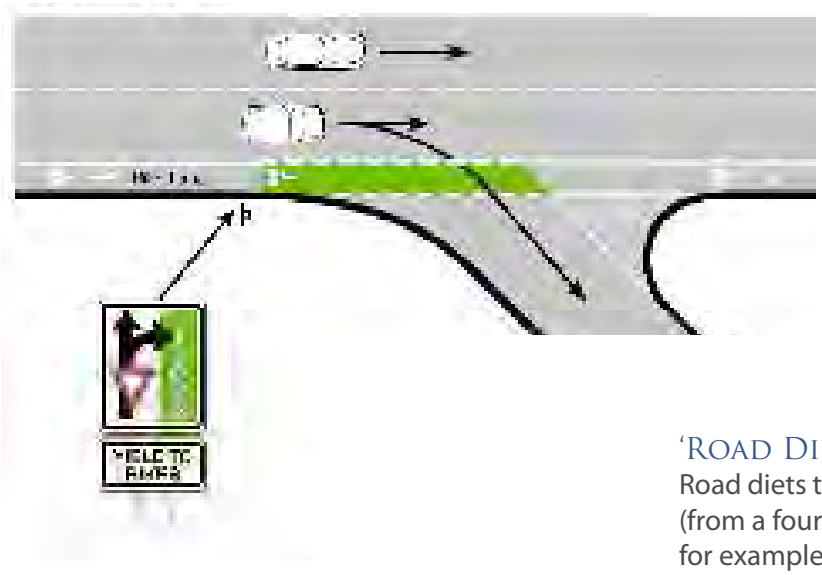
## Colorized Bike Lanes (Not part of the 2009 MUTCD)

In addition to markings presented in the MUTCD, the following experimental pavement markings may be considered. Colored pavement is used for bicycle lanes in areas that tend to have a higher likelihood for vehicle conflicts. Examples of such locations are freeway on- and off-ramps and where a motorist may cross a bicycle lane to move into a right turn pocket. In the United States, the City of Portland and New York City have colorized bike lanes and supportive signing with favorable results. Studies after implementation showed more motorists slowing or stopping at colored lanes and more motorists using their turn signals near colored lanes. Green is the recommended color (some cities that have used blue are changing to green, since blue is associated with handicapped facilities).

Below: Henry Street in Brooklyn, NY.

Consideration:

- Colorized bike lanes are not currently included in the MUTCD but there are provisions for jurisdictions to request permission to experiment with innovative treatments (and thus with successful application, future inclusion of colorized bike lanes in the MUTCD could occur).



Left: colorized bicycle lane application at a potential conflict area.

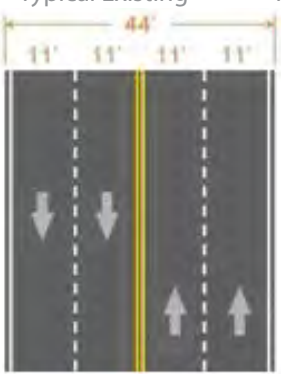
## Bike Lanes with On-Street Parking

Where on-street parking is permitted, and a bike lane is provided, the bike lane must be between parking and the travel lane. Appropriate space must be allocated to allow passing cyclists room to avoid open car doors. The distance between the curb face and the outer marking of the bicycle lane is typically 13 to 15 feet (parking stall of 8 to 10 feet and bike lane of 5 feet).

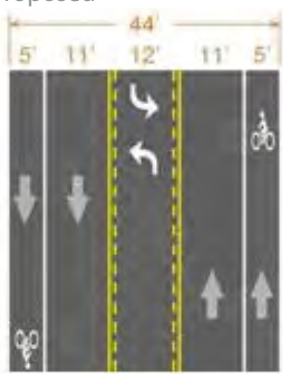
## 'Road Diets' for Bicycle Lanes

Road diets typically involve reducing the number of travel lanes (from a four-lane road to a two-lane road with center turn lane, for example) allowing adequate space for bicycle lanes. These are generally recommended only in situations where the vehicular traffic count can be safely and efficiently accommodated with a reduced number of travel lanes. Study may be necessary for recommended road diets to ensure that capacity and level-of-service needs are balanced against bicycle level of service needs.

Typical Existing




Typical Proposed



# Striped/Paved Shoulder

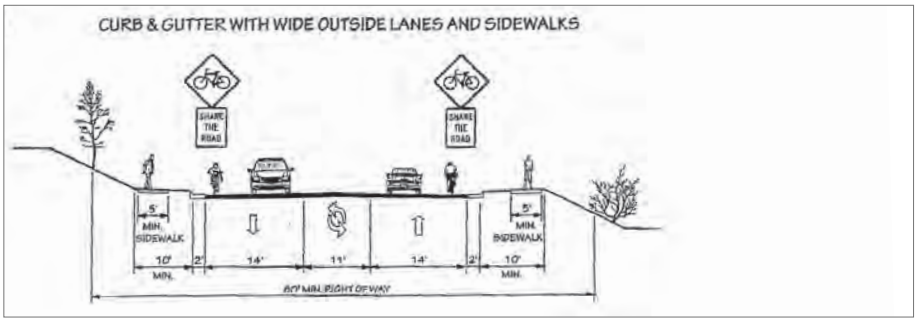
Paved shoulders are the part of a roadway which is contiguous and on the same level as the regularly traveled portion of the roadway. There is no minimum width for paved shoulders, however a width of at least four feet is preferred. Ideally, paved shoulders should be include in the construction of new roadways and/or the upgrade of existing roadways, especially where there is a need to more safely accommodate bicycles.

- Most often used in rural environments, although not confined to any particular setting
- Should be delineated by a solid white line, and provided on both sides of the road
- Should be contiguous and on the same level as the regularly traveled portion of the roadway
- 4' minimum width; however, if site conditions are constrained, then the option of a smaller shoulder should be weighed against simply having a wider outside lane.
- For roads with speeds higher than 40 MPH with high ADT, a shoulder width of more than 4' is recommended.
- Rumble strips should be avoided, but if used, then a width of more than 4' is needed.
- Paved shoulders should not be so wide as to be confused with a full automobile travel lane.

# Wide Outside Lanes

Even without a bicycle facility or marking, the conditions for bicycling are improved when the outside travel lane in either direction is widened to provide enough roadway space so that bicyclists and motor vehicles can share the roadway without putting either in danger (e.g., higher volume roadways with wide (14') outside lanes). For outside lanes wider than 14', striping a bicycle lane should be considered.

Below: Wide Outside Lane on a Typical Three- Lane Roadway



# Bicycle Boulevards

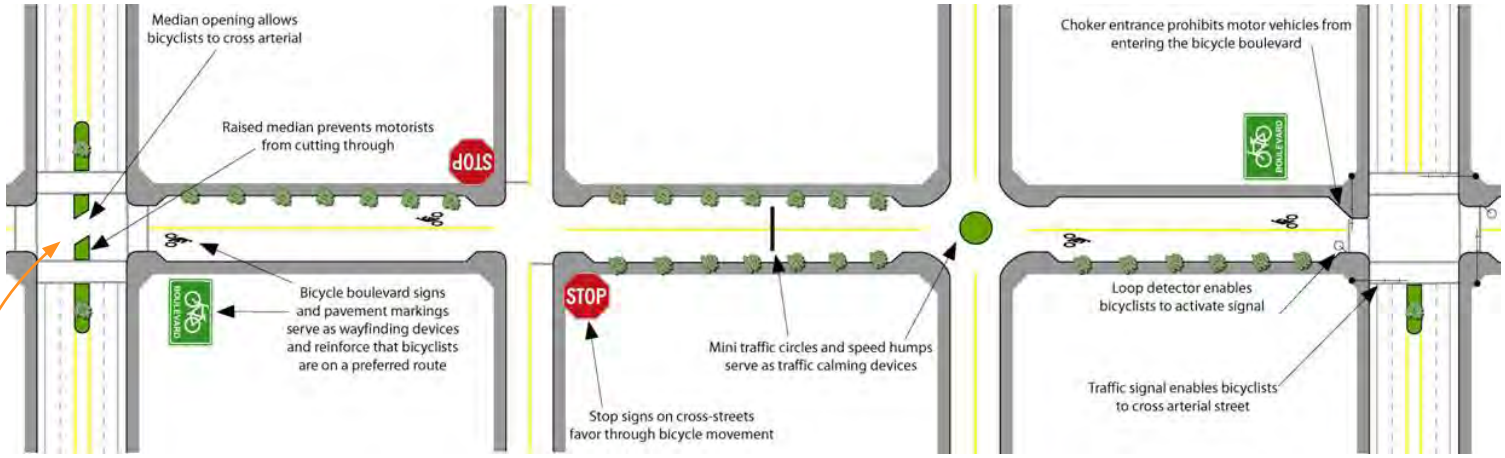
To further identify preferred routes for bicyclists, the operation of lower volume roadways may be modified to function as a through street for bicycles while maintaining local access for automobiles. Traffic calming devices reduce traffic speeds and through trips while limiting conflicts between motorists and bicyclists, as well as give priority to through bicycle movement.

For a complete overview, see www.ibpi.usp.pdx.edu/guidebook.php



Above: Bike boulevard pavement markings and choker entrance.

Below: A bicycle boulevard.




Bikeway planners and engineers may pick and choose the appropriate mix of design elements needed for bicycle boulevard development along a particular corridor. Mix and match design elements to:

- Reduce or maintain low motor vehicle volumes;
- Reduce or maintain low motor vehicle speeds;
- Create a logical, direct, and continuous route;
- Create access to desired destinations ;
- Create comfortable and safe intersection crossings;
- Reduce cyclist delay.

Image and text source: Fundamentals of Bicycle Boulevard Planning and Design, www.ibpi.usp.pdx.edu/guidebook.php

# Bicycle Facilities at Intersections

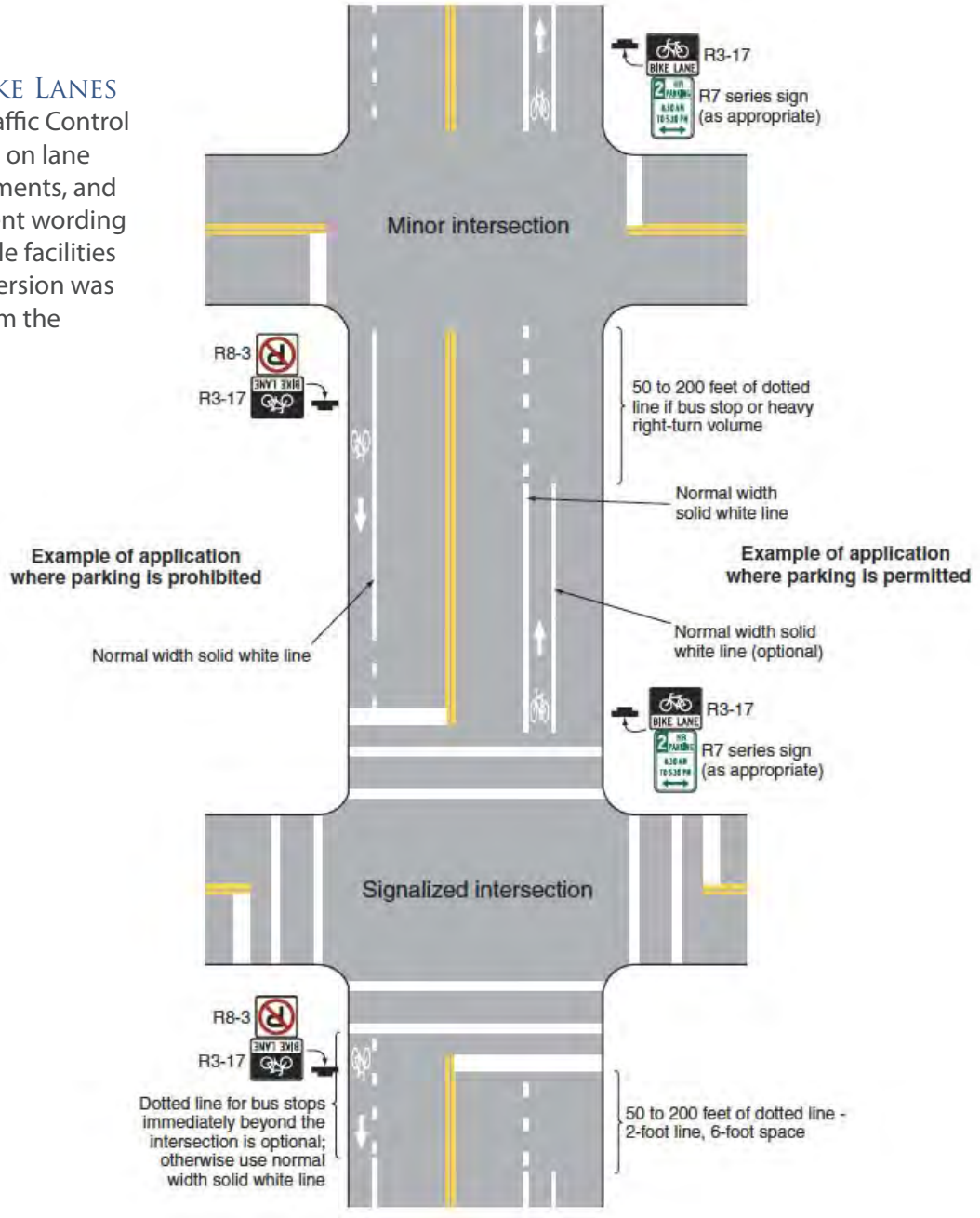
Intersections represent one of the primary collision points for bicyclists, with many factors involved:

- Larger intersections are more difficult for bicyclists to cross.
- On-coming vehicles from multiple directions and increased turning movements make it more difficult for motorists to notice non-motorized travelers.
- Most intersections do not provide a designated place for bicyclists.
- Loop and other traffic signal detectors, such as video, often do not detect bicycles.
- Bicyclists making a left turn must either cross travel lanes to a left-turn lane, or dismount and cross as a pedestrian.
- Bicyclists traveling straight may have difficulty maneuvering from the far right lane, across a right turn lane, to a through lane of travel.

Solutions to some these issues are illustrated below and in the following pages, including intersection configurations for bicycle lanes, pega-tracking, signage, and bicycle-activated detector loops.

## Typical Intersection Configuration for Bike Lanes

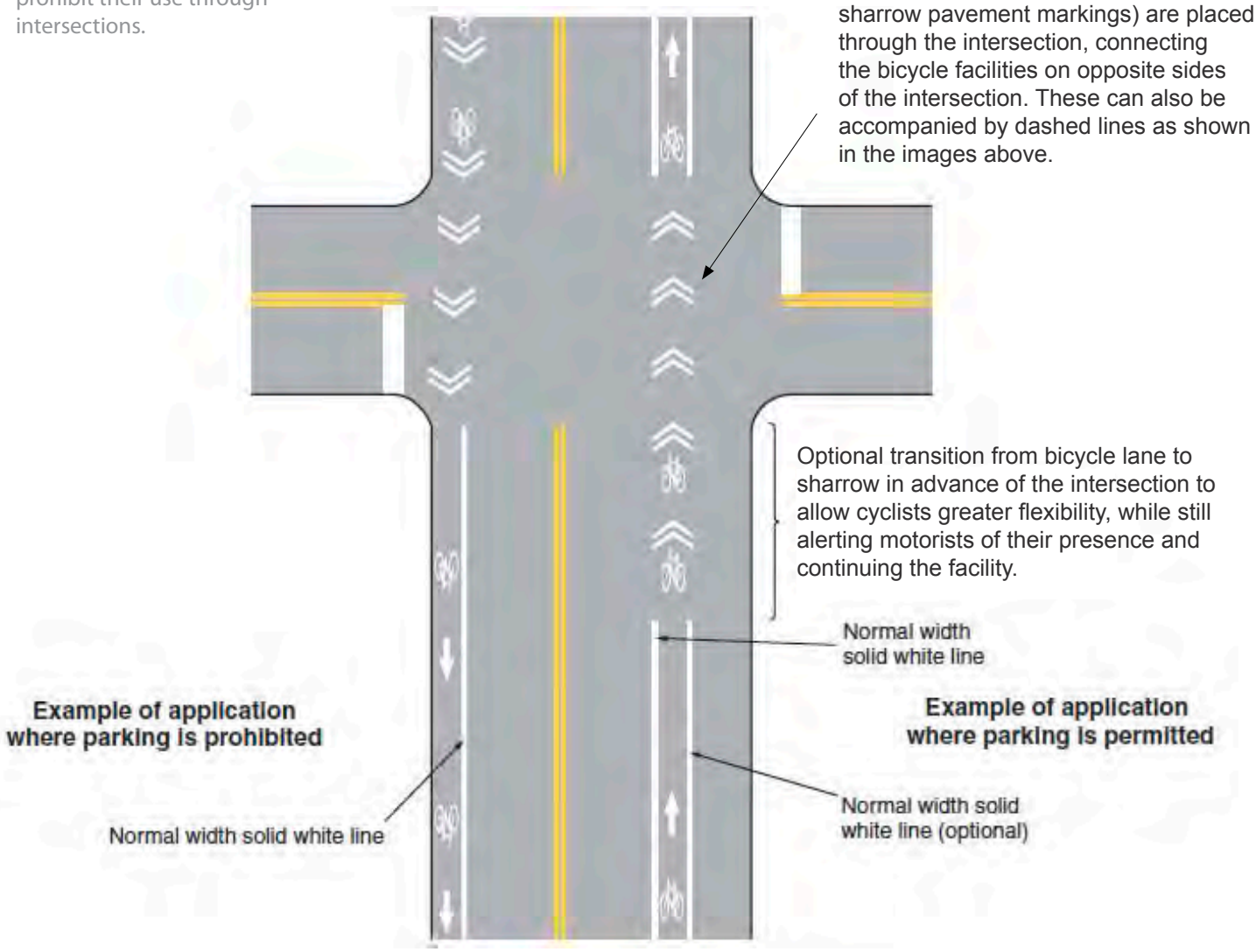
See the Manual on Uniform Traffic Control Devices (MUTCD) for guidance on lane delineation, intersection treatments, and general application of pavement wording and symbols for on-road bicycle facilities and off-road paths (updated version was released in 2009); example from the MUTCD at right.



## Pega-tracking for Bike Lanes & Sharrows at Intersections

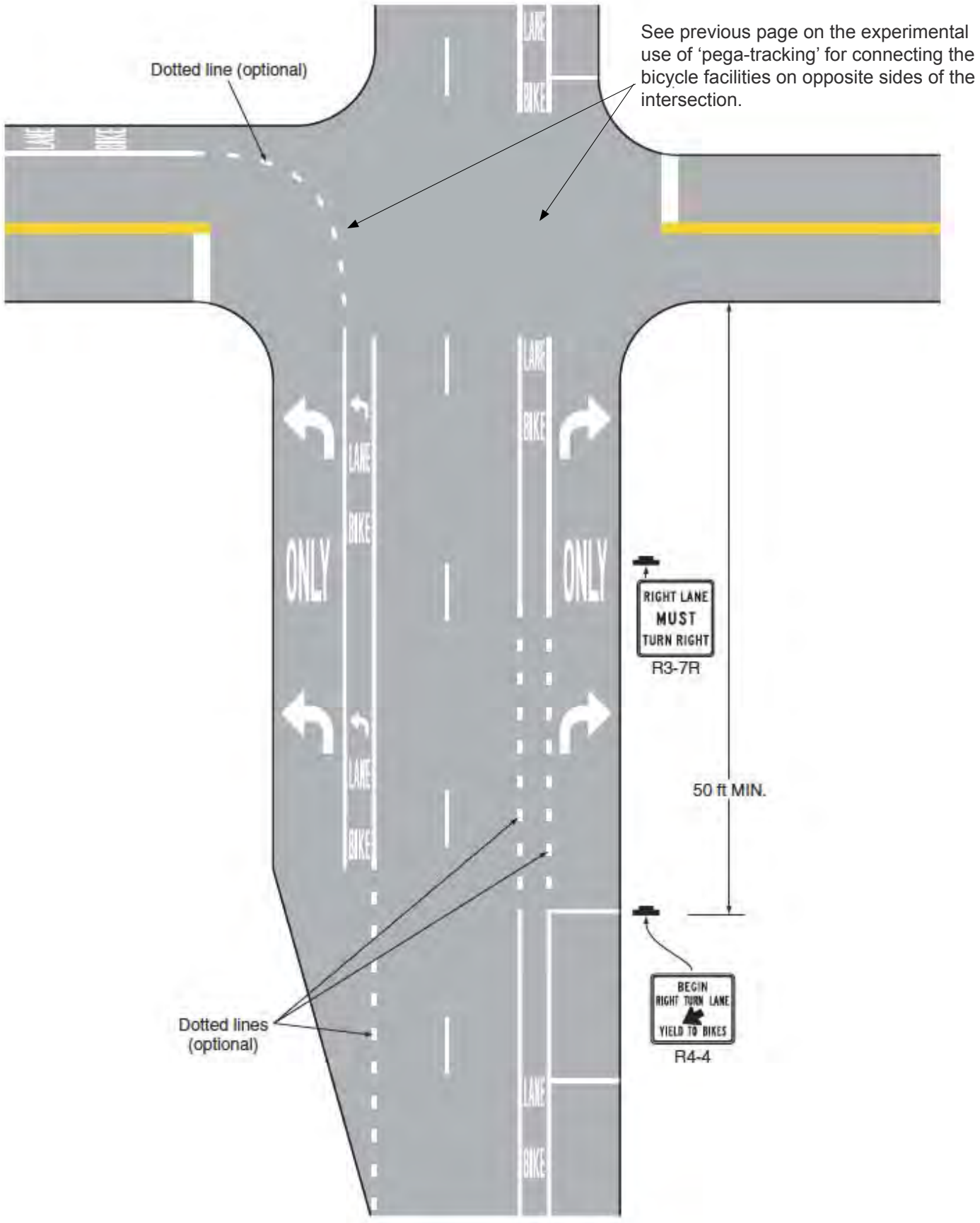
Pega-tracking is a type of pavement marking that connects bicycle facilities on opposite sides of the intersection, placed along the desired path for bicyclists. This use of the sharrow marking carries the bicycle facility through the intersection, rather than entirely 'dropping' the facility before the intersection. This treatment is being used in major cities throughout North America.

Sharrows are included in 2009 MUTCD, which does not specifically prohibit their use through intersections.



## Example of Intersection Pavement Marking - Designated Bicycle Lane with Left-Turn Area, Heavy Turn Volumes, Parking, One-Way Traffic, or Divided Highway

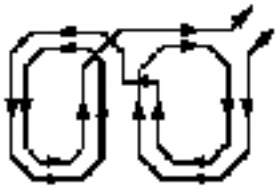
(Image below from the 2009 MUTCD, Figure 9C-1).



## Bicycle-Activated Detector Loop

Changing how intersections operate can help make them more "friendly" to bicyclists. Improved traffic signal timing for bicyclists, bicycle-activated loop detectors, and camera detection make it easier and safer for cyclists to cross intersections. Bicycle-activated loop detectors are installed within the roadway to allow the weight of a bicycle to trigger a change in the traffic signal. This allows the cyclist to stay within the lane of travel and avoid maneuvering to the side of the road to trigger a push button, which ultimately provides extra green time before the light turns yellow to make it through the light. Current and future loops that are sensitive enough to detect bicycles should have pavement markings to instruct cyclists on how to trip them. These common loop detector types are recommended:

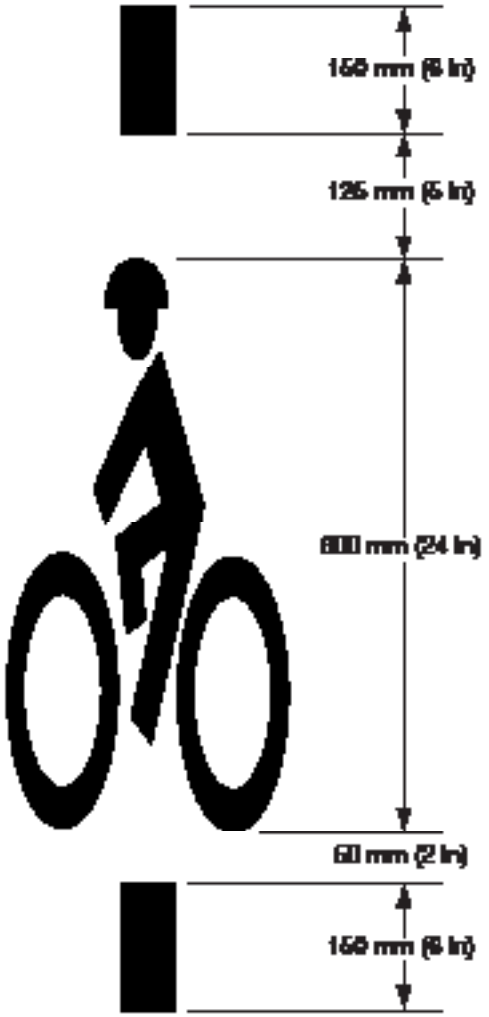
Use pavement marking to aid bicyclists in locating loop detectors at intersections.



Quadruple Loop
(Recommended for bike lanes)
- Detects most strongly in center
- Sharp cut-off sensitivity

Diagonal Quadruple Loop
(Recommended for shared lanes)
- Sensitive over whole area
- Sharp cut-off sensitivity

Standard Loop
(Recommended for advanced detection)
- Detects most strongly over wires
- Gradual cut-off




(See: Implementing Bicycle Improvements at the Local Level, FHWA, 1998, p. 70)

## Bicycle Specific Traffic Control Signals

A bicycle signal is an electrically-powered traffic control device that may only be used in combination with an existing traffic signal. Bicycle signals direct bicyclists to take specific actions and may be used to address an identified safety or operational problem involving bicycles. A separate signal phase for bicycle movement will be used. Alternative means of handling conflicts between bicycles and motor vehicles shall be considered first. When bicycle traffic is controlled, green, yellow or red bicycle symbols are used to direct bicycle movement at a signalized intersection. Bicycle signals shall only be used at locations that meet MUTCD warrants. A bicycle signal may be considered for use only when the volume and collision, or volume and geometric warrants have been met:

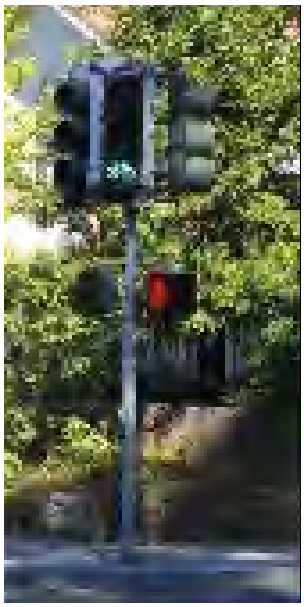
1. Volume. When W = B x V and W > 50,000 and B >50.

Where:
W is the volume warrant.
B is the number of bicycles at the peak hour entering the intersection.
V is the number of vehicles at the peak hour entering the intersection.
B and V shall use the same peak hour.

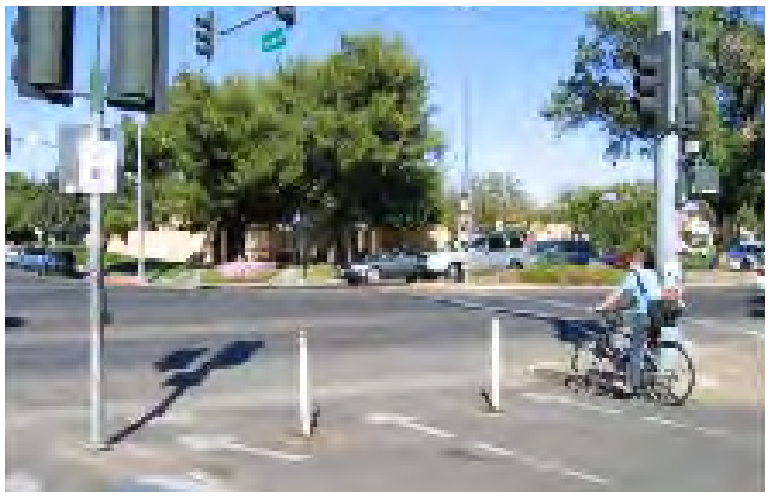
2. Collision. When 2 or more bicycle/vehicle collisions of types susceptible to correction by a bicycle signal have occurred over a 12-month period and the responsible public works official determines that a bicycle signal will reduce the number of collisions.

3. Geometric.
(a) Where a separate bicycle/multi use path intersects a roadway.
(b) At other locations to facilitate a bicycle movement that is not permitted for a motor vehicle.

See: MUTCD 2003 and MUTCD 2003 California Supplement (May 20, 2004), Sections 4C.103 and 4D.104 - www/dot.ca.gov/hq/traffopps/signtech/mutcdsupp/



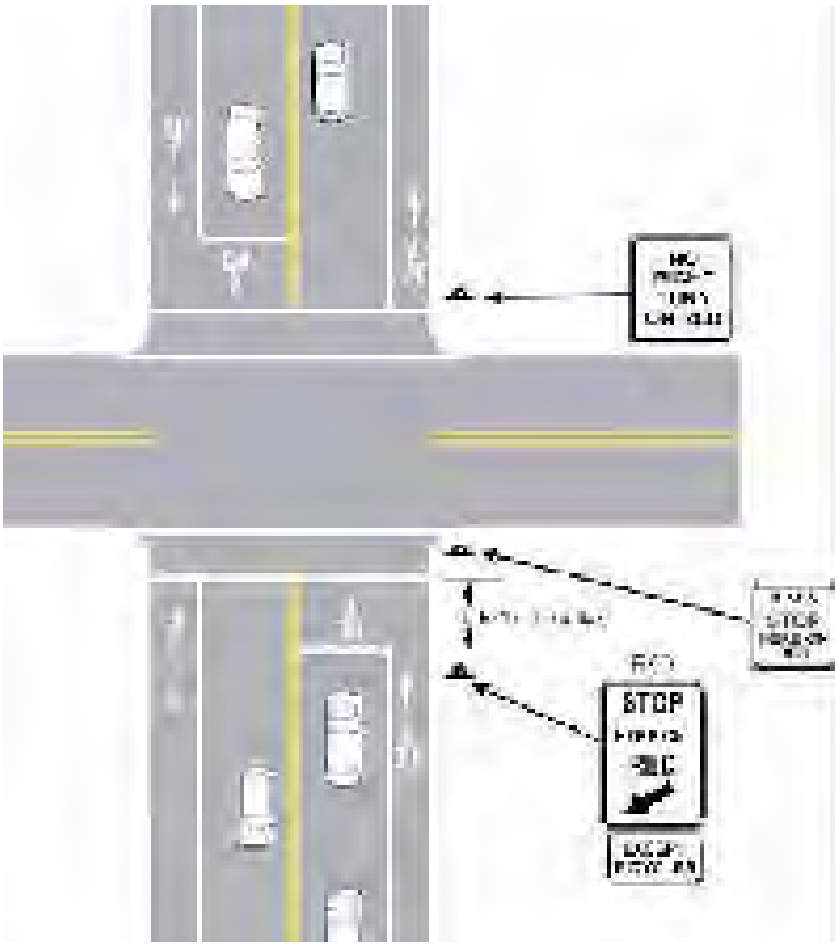
Bicycle traffic signal used to bring bicycles leaving the UC Davis campus back into the road network.



## Bike Box / Advance Stop Line

(Not part of the 2009 MUTCD)

A bike box is a relatively simple innovation to improve turning movements for bicyclists without requiring cyclists to merge into traffic to reach the turn lane or use crosswalks as a pedestrian. The bike box is formed by pulling the stop line for vehicles back from the intersection, and adding a stop line for bicyclists immediately behind the crosswalk. When a traffic signal is red, bicyclists can move into this "box" ahead of the cars to make themselves more visible, or to move into a more comfortable position to make a turn. Bike boxes have been used in Cambridge, MA; Eugene, OR; and European cities.




Plan view of a bike box.

Potential Applications:

- At intersections with a high volume of bicycles and motor vehicles
- Where there are frequent turning conflict and/or intersections with a high percentage of turning movements by both bicyclists and motorists
- At intersections with no right turn on red (RTOR)
- At intersections with high bicycle crash rates
- On roads with bicycle lanes
- Can be combined with a bicycle signal (optional)

Considerations:

- Bike boxes are not currently included in the MUTCD but there are provisions for jurisdictions to request permission to experiment with innovative treatments (and thus with successful application, future inclusion of bike boxes in the MUTCD could occur).
- If a signal turns green as a cyclist is approaching an intersection, they should not use the bike box.
- Motorists will need to be educated to not encroach into the bike box.

Above and below: Bike boxes filled in with color to emphasize allocation of space to bicycle traffic.

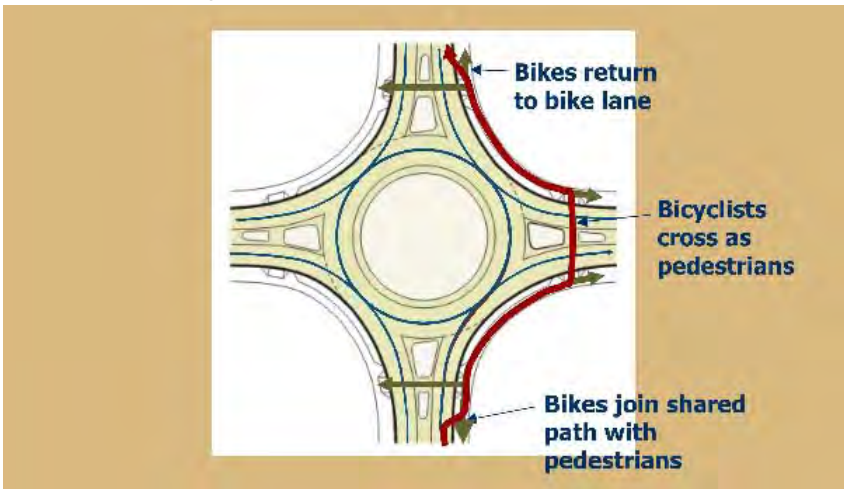
# Roundabouts/Traffic Circles

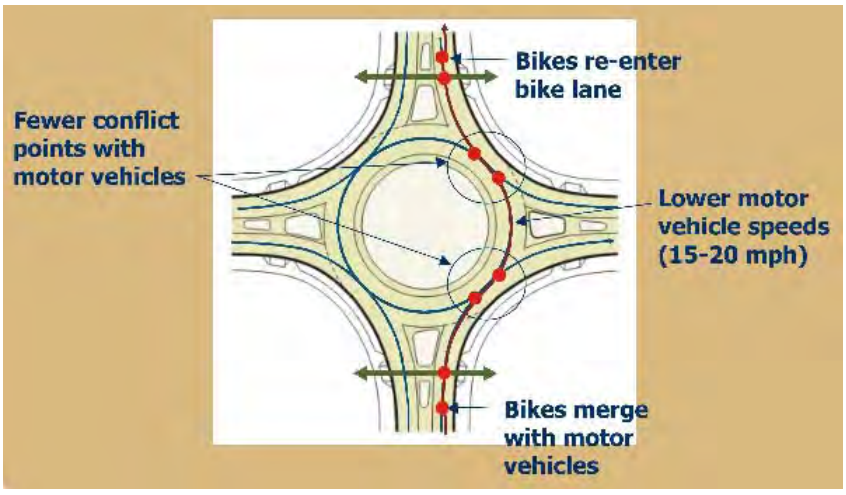
Roundabouts are one-way circular intersections in which traffic flows around a center island without stop signs or signals. Because roundabout traffic enters and exits through right turns only and speeds are reduced, the occurrence of severe crashes is substantially less than in many traditional four-way intersections. The lower speeds within roundabouts also allow entering traffic to access smaller gaps between circulating vehicles, increasing traffic volume and decreasing delays, congestion, fuel consumption and air pollution.

Modern roundabouts greatly reduce the potential for high-speed, right-angle, rear-end and left turn/head-on collisions. In traditional four-way traffic intersections, there are 32 points of conflict in which two vehicles may collide. Modern roundabouts have only eight conflict areas, greatly reducing potential crashes.

- Roundabouts with only one circulating lane are much safer to navigate than are multi-lane roundabouts, especially for bicyclits.
- The diagrams below show two ways for bicyclists to navigate roundabouts, depending on comfort and skill level.

Below: Circulating as a Pedestrian: If a cyclist is uncomfortable riding with traffic, a cyclist can choose to travel instead as a pedestrian.



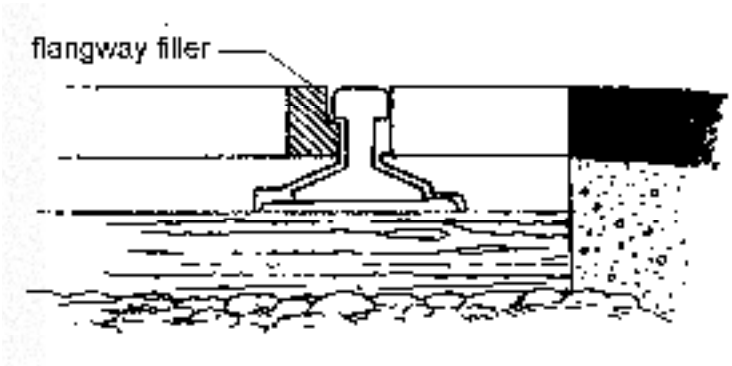

Above: Circulating as a Vehicle: Bike lanes are not recommended within a roundabout. Instead, cyclists merge with traffic before entering the roundabout, circulate with traffic, and then re-enter the bike lane after existing.

# Bicycle Facilities at Railroad Crossings

Railroad crossings are particularly hazardous to those who rely on wheeled devices for mobility (railroad crossings have flangeway gaps that allow passage of the wheels of the train, but also have the potential to catch wheelchair casters and bicycle tires). In addition, rails or ties that are not embedded in the travel surface create a tripping hazard. Recommendations:

- Make the Crossing Level: Raise approaches to the tracks and the area between the tracks to the level of the top of the rail.
- Bikes Should Cross RR at Right Angle
- When bikeways or roadways cross railroad tracks at grade, the roadway should ideally be at a right angle to the rails. When the angle of the roadway to the rails is increasingly severe, the approach recommended by Caltrans (Highway Design Manual, Section 1003.6) and AASHTO (Guide for the Development of Bicycle Facilities, 1999, p.60) is to widen the approach roadway shoulder or bicycle facility, allowing bicycles to cross the tracks at a right angle without veering into the path of passing motor vehicle traffic.
- Use Multiple Forms of Warning: Provide railroad crossing information in multiple formats, including signs, flashing lights, and audible sounds.
- Clear Debris Regularly: Perform regular maintenance to clear debris from shoulder areas at railroad crossings.
- Fill Flangeway with Rubberized Material or Concrete Slab: Normal use of rail facilities causes buckling of paved-and-timbered rail crossings. Pavement buckling can be reduced or eliminated by filling the flangeway with rubberized material, concrete slab, or other treatments. A beneficial effect of this is a decrease in long-term maintenance costs.

Installing a rubber surface rather than asphalt around railroad flangeways reduces changes in level and other maintenance problems.

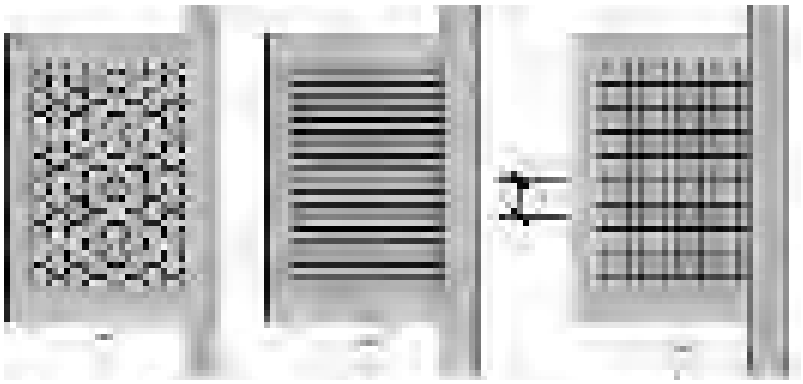



The "flangeway filler" eliminates the gap in the path of travel for pedestrians crossing railroad tracks. The filler, consisting of a rubber insert, will deflect downward with the weight of a train and does not affect railway function.

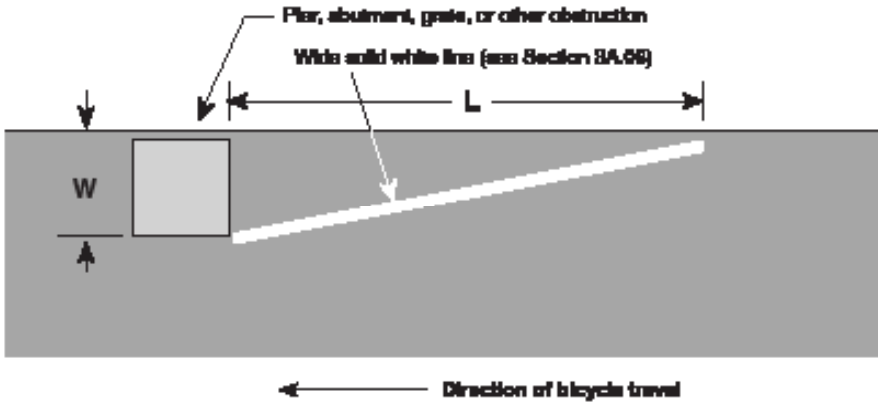
# Bicycle Friendly Drainage Grates

Drainage grates usually occupy portions of roadways, such as bicycle lanes, where bicycles frequently travel. Often drainage grates are poorly maintained or are of a design that can damage a bicycle wheel or in severe circumstances, cause a bicyclist to crash. Improper drainage grates create an unfriendly obstacle a cyclist must navigate around, often forcing entrance into a motor vehicle lane in severe cases. Bicycle friendly drainage grates should be installed in all new roadway projects and problem grates should be identified and replaced.

Right: Bicycle Friendly Drainage Grate Designs




Right: MUTCD example of obstruction pavement marking; if dangerous drainage grates (or other obstructions) are not to be fixed in the short term, then this pavement marking should direct cyclists away from the obstruction.




Dangerous Drainage Grate Condition; this example is dangerous due to the grate running parallel to the roadway, creating a trap for bicycle tires.

Dangerous Drainage Grate Condition; this example is dangerous due to the surrounding paving condition (when the road was resurfaced the drainage grate remained at the same height).

Bicycle-Friendly Drainage Grate

# Bicycle Parking and Bicycle Stations

## Bicycle Parking

As more bikeways are constructed and bicycle usage grows, the need for bike parking will climb. Long-term bicycle parking at transit stations and work sites, as well as short-term parking at shopping centers and similar sites, can support bicycling. Bicyclists have a significant need for secure long-term parking because bicycles parked for longer periods are more exposed to weather and theft, although adequate long-term parking rarely meets demand. These bicycle parking standards should also be shared with local colleges.

When choosing bike racks, there are a number of things to keep in mind:

- The rack element (part of the rack that supports the bike) should keep the bike upright by supporting the frame in two places allowing one or both wheels to be secured.
- Install racks so there is enough room between adjacent parked bicycles. If it becomes too difficult for a bicyclist to easily lock their bicycle, they may park it elsewhere and the bicycle capacity is lowered. A row of inverted "U" racks should be installed with 15" minimum between racks.
- Empty racks should not pose a tripping hazard for visually impaired pedestrians. Position racks out of the walkway's clear zone.
- When possible, racks should be in a covered area protected from the elements. Long-term parking should always be protected.

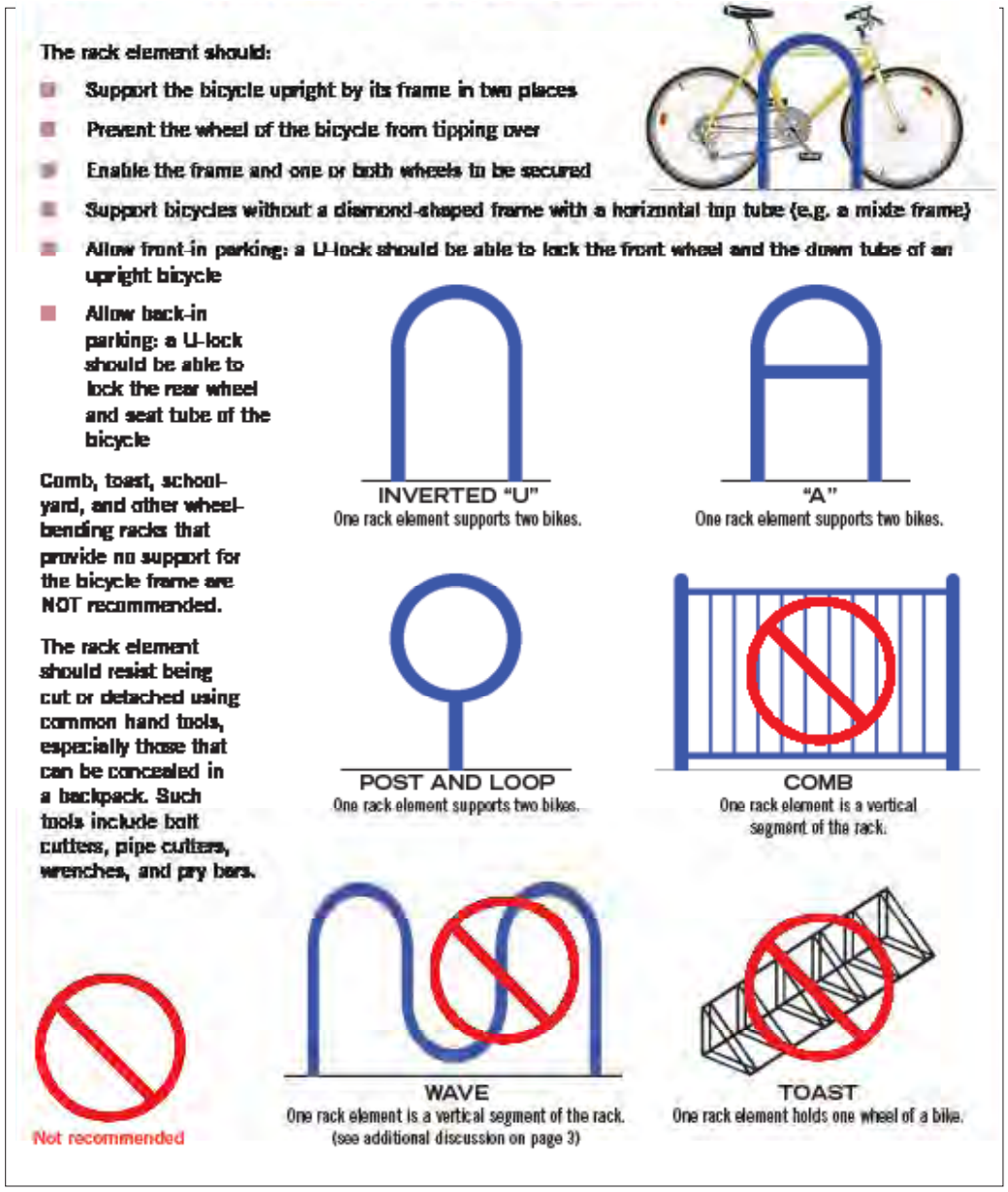
The table below provides basic guidelines on ideal locations for parking at several key activity centers as well as an optimum number of parking spaces.

## Bicycle Parking Locations and Quantities

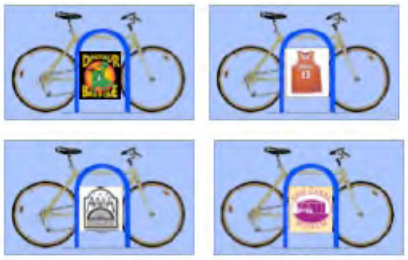
| Use Category | Specific Use | Required Long-term Parking Spaces | Required Short-term Parking Spaces |
|---|---|---|---|
| Residential | Boarding houses | 2, or 1 per ten sleeping rooms | None |
| | Hotels, motels | 2, or 1 per 50 employees | None |
| Commercial / Industrial | Retail sales, service operations * | 2, or 1 per 50,000 square feet of gross floor area | 2, or 1 per 25,000 square feet of gross floor area |
| | Office buildings ** | 2, or 1 per 50,000 square feet of gross floor area | 2, or 1 per 50,000 square feet of gross floor area |
| | Museums, libraries | 2, or 1 per 50 employees | 4, or 1 per 25,000 square feet of gross floor area |
| | Movie theaters | 2, or 1 per 50 employees | 4, or 1 per 50 seats |
| | Restaurants, ice cream shops, coffee shops | 2, or 1 per 50 employees | 4, or 1 per 50 seats |
| | Recreation centers | 2, or 1 per 50 employees | 4, or 1 per 25,000 square feet of gross floor area |
| | Major event entertainment (e.g., stadiums, arenas) | 2, or 1 per 50 employees | 8, or 1 per 500 seats |
| | Manufacturing | 2, or 1 per 50 employees | None |
| | Warehousing | 2, or 1 per 50 employees | None |
| Institutional | Medical centers | 2, or 1 per 50 employees | 2, or 1 per 25,000 square feet of gross floor area |
| | Transit park and ride lots | 1 per 50 daily boardings | None |

* Retail businesses below 3,000 square feet of gross floor area are exempt from bicycle parking requirements
** Office buildings below 10,000 square feet of gross floor area are exempt from bicycle parking requirements

## Bicycle Rack Standards




Recommended guidelines for bicycle parking from the Association of Pedestrian and Bicycle Professionals, 2002, www.apbp.org.

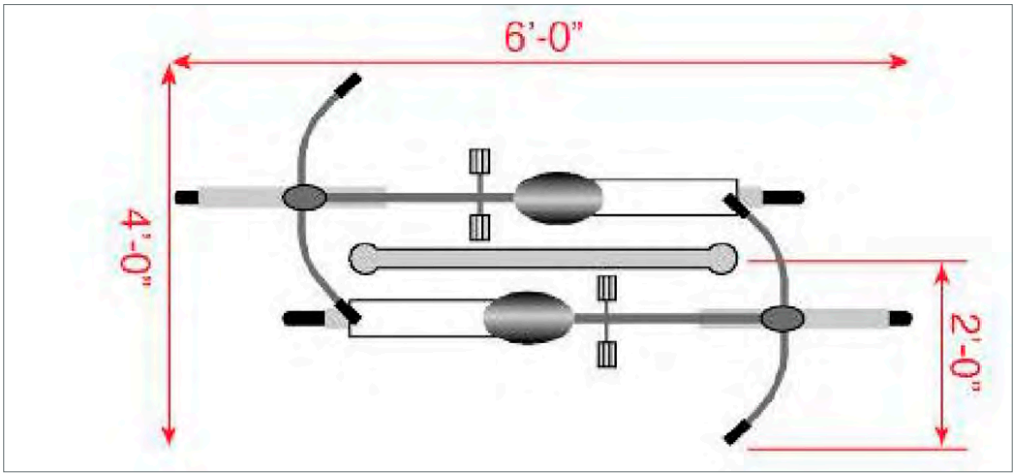


Bicycle racks that incorporate advertising can be sponsored by local merchants.

Provision of shelter from rain greatly increases usefulness of this bicycle parking facility during inclement weather.

A single inverted "U" rack can accommodate two bicycles.

Recommended guidelines for bicycle parking spacing dimensions.



## Bicycle Parking and the Public vs. Private Right-of-Way

Bicycle parking can be located either in the public right of way or on private property, depending on the adjacent land uses and streetscape. For example, an office park may provide short-term bicycle parking racks near building entrances, and may also provide secure indoor parking for employees. For on street bike parking, the following example from the Portland, OR offers guidelines for city policy.

### Example On-Street Bicycle Parking Requirements (City of Portland, OR, Administrative Rule for On-Street Bicycle Parking)

- Sidewalk racks are at capacity on a recurring basis.
- City staff and applicant jointly determine time of day and day of week for highest bicycle use. This assessment must be independent of any special event that may inflate the average daily use.
- City staff visits site to assess bicycle use, based on the formula listed below, and whether or not it can be met by normal sidewalk rack installations. Due to seasonal variations and weather dependence, determination of bicycle use may need to be delayed pending suitable conditions to assess actual needs.
- Formula used to determine supply and demand for the areas:
    1. Bicycles parked within 50 feet of proposed site multiplied by 1.5
    2. Bicycles parked more than 50 feet, but less than 150 feet, of proposed site multiplied by 1.0
    3. Bicycles parked more than 150 feet, but less than 200 feet, of proposed site multiplied by 0.5
- City staff inventories parked bicycles and available bicycle racks within 200 feet of the site, measured using marked and unmarked crosswalks, including street crossing distances. City staff also will assess the possibilities for additional sidewalk racks.
- If sidewalk bicycle parking cannot be installed to meet 80 percent of inventoried, parked bicycles, then a bicycle corral is warranted. City staff will determine this.
- At a minimum there must be 100 percent agreement with adjacent property owners, established through petition.
- A Maintenance Agreement must be signed by the requestors and the City and kept on file with the City.
- If the business owner that originally requested the bicycle parking closes, sells or transfers ownership the new owner must give written approval of the bicycle parking to the City within 30 days of taking ownership.

Below: An example of replacing on-street vehicular parking with a 'bicycle corral' (in Portland, OR).

## Attended Bike Parking and Bike Lockers

Attended bike parking is analogous to a coat check – your bike is securely stored in a supervised location. An organization called The Bikestation Coalition is promoting enhanced attended parking at transit stations.

The Bikestation concept is now in use in Palo Alto, Berkeley and San Francisco and Seattle. Bikestations offer secured valet bicycle parking near transit centers. What makes Bikestations distinctive are the other amenities that may be offered at the location – bicycle repair, cafes, showers and changing facilities, bicycle rentals, licensing, etc. Bikestations become a virtual one-stop-shop for bicycle commuters.

Attended bicycle parking can be offered at some special events. For example, the Marin County Bicycle Coalition sponsors valet parking at many festivals in the county, the Sonoma County Bicycle Coalition sponsors valley parking at the downtown Santa Rosa Farmer's Market, and secured bicycle parking is offered at Pac Bell Park in San Francisco.


A bicycle station with attended parking in Long Beach, CA.


Bike lockers should be constructed of opaque materials and be clearly labelled as bicycle parking. Parking rates are reasonable at about 3-5 cents per hour (www.bikelink.org).

## Bike Sharing Programs

Many cities including Boston, Chattanooga, Washington, DC, Montreal and Louisville are implementing innovative bike-sharing programs using a variety of revenue generating and fee-for service programs. Copenhagen, Denmark, pioneered the concept of providing a fleet of bicycles for free public use throughout the urban center. Paris has made this concept popular with the development of the city-wide Velib system of credit-card operated bike rentals. The Danish free bikes are subsidized by advertising sales on the bicycles, and they require a coin or credit card deposit for use. The bicycles are single speed, durable and suitable only for short trips. Their design makes them less likely to be stolen. They can be picked up and dropped off at a variety of destinations – making them an easy choice for in-town travel by residents and visitors. A variety of similar programs utilize recycled bicycles or bicycles painted in a common color for free public use.

See www.altabicycleshare.com for more information.

Lousiville's "Freewheelin" bike sharing system is supported by Humana Healthcare. The City is working with public private partnerships to provide a fleet of shared bicycles.

## Bicycle Stations and Repair Stands

Bicycle repair stands and bicycle stations are fixtures in highly successful bicycle-friendly communities. Popular locations include farmer's markets or public areas that are centers for activity, easily accessible by foot or bicycle. Local bike shops and local events could provide similar services. The presence of smaller scale operations that primarily provide maintenance and repair functions within semi-permanent structures like the tent and tarp shown below allow for a lower cost operation, thereby passing on savings to the customer in terms of lower repair and maintenance costs.

In North Carolina communities (Durham and Carborro, for example), local, volunteer-run bicycle non-profit organizations offer maintenance training and space for local residents to work on their bikes. The City of Durham, for example, granted funding to their local bicycle co-op for their provision of this important bicycle support facility.

A bicycle maintenance stand at a farmers' market in Durham, NC.

# Bicycle Access on Transit

Integrating bicycle facilities with transit modes allows bicyclists to greatly expand the area accessible. Below are examples of commuter trains and bus services with customized facilities allowing for simple and secure storage of bicycles without hindering or impeding other passengers. All GREAT buses should have bike racks, and should support similar options if and when light-rail or similar transit options become available. ECU should also progress towards adding bike racks on all buses.

**1.** Have your bike ready to load—always approach the bus from the curbside. Remove water bottles or other loose items.

**2.** Make eye contact with the driver to alert him/her to your presence.

**3.**If the rack is empty, lift the metal handle and pull the folded bike rack down flat.

**4.** Load the bike in the space nearest the bus.

If another bike is on the rack, load your bike in the open position. You are responsible for loading and securing your bike on the rack. Drivers are not allowed to load or unload bicycles.

**5.** Lift the support arm and hook it over the front tire.

Make sure the support arm clamps the tire and not the fender or frame. Your bike now is securely fastened in the rack.

**6.** Hop on and pay your fare.

**7.** When you reach your stop, tell the driver before you exit the bus that you'll be removing your bike.

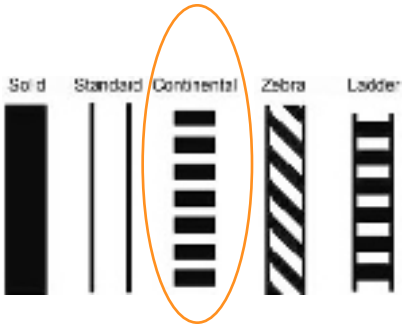
Raise the support arm, lower it into place and lift your bike off the rack.

Fold up the rack if it is empty, and step onto the sidewalk with your bike.

NEVER cross in front of the bus—wait until the bus has left the stop.

If the rack is full, please wait for the next bus.

Instructions on how to load a bicycle onto a bus equipped with a bicycle rack, developed for a bicycle user map by Fremont, CA




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

# 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 more seemingly convenient and potentially dangerous locations 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. 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.

## Crosswalk Guidelines:

- Should not be installed in an uncontrolled environment [at intersections without traffic signals] where speeds exceed 40 mph. (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 average daily traffic (ADT) 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.

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. http://www.oregonmetro.gov

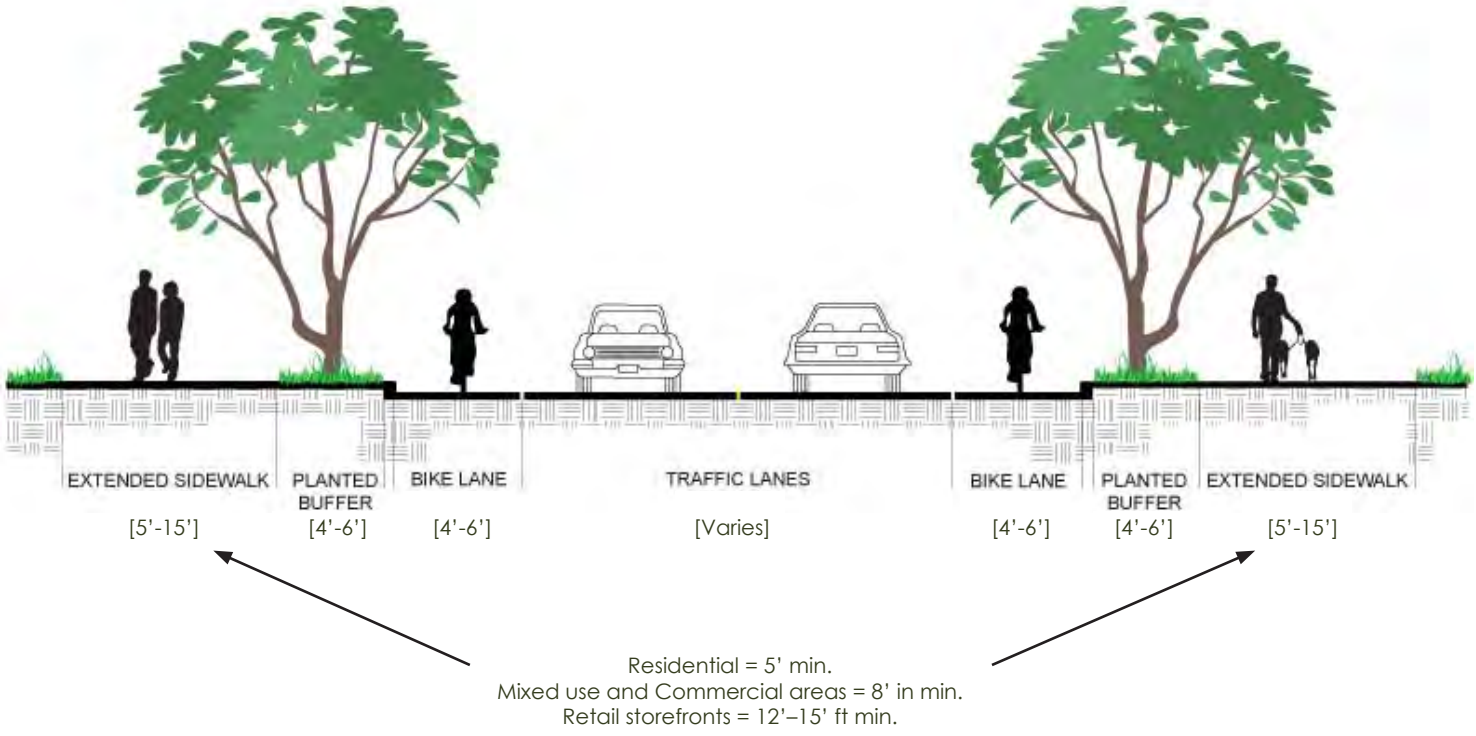
# Sidewalks and Walkways

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.

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 and adjacent sidewalk.



Sidewalk Guideline Sources:

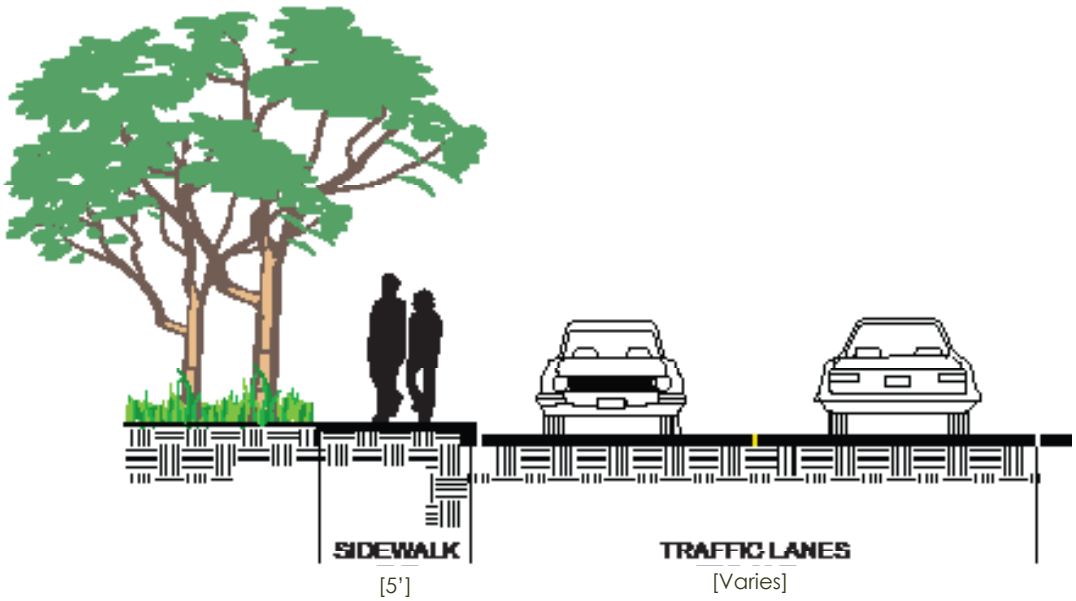
American Association of State Highway and Transportation Officials. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

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

## Sidewalks and Walkway Guidelines:

- Concrete is preferred surface, providing the longest service life and requiring the least maintenance. Permeable pavement such as porous concrete may be considered to improve water quality.
- Sidewalks should be built as flat as possible to accommodate all pedestrians; 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.
- Residential sidewalks should be a minimum of 5 ft in width. 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.



# 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: www.walkinginfo.org/engineering/roadway-ramps.cfm). In addition, these federal regulations require that all new constructed or altered roadways include curb ramps.

Two separate curb ramps should be provided at each intersection (see image below). With only one large curb ramp serving the entire corner, there is not safe connectivity for the pedestrian. Dangerous conditions exist when the single, large curb ramp inadvertently directs a pedestrian into the center of the intersection, or in front of an unsuspecting, turning vehicle.

The use of texture and bright color at curb ramps helps the visually impaired to cross safely.

## 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.
-

Curb Ramp Guideline Sources:

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

Left: The corner shown has two separate ramps leading across the intersection (Image from http://www.walkinginfo.org).

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 Extensions/Bulb-Outs

Curb extensions extend the sidewalk or curb line out into the parking lane, which reduces the effective street width. Curb extensions significantly improve pedestrian crossings by reducing the pedestrian crossing distance, visually and physically narrowing the roadway, improving the ability of pedestrians and motorists to see each other, and reducing the time that pedestrians are in the street.

## Curb Extension/Bulb-Out Guidelines (Source: Bicycle and Pedestrian Information Center).

- Curb extensions are only appropriate where there is an on-street parking lane.
- Curb extensions must not extend into travel lanes, bicycle lanes, or shoulders (curb extensions should not extend more than 1.8 m (6 ft) from the curb).
- The turning needs of larger vehicles, such as school buses, need to be considered in curb extension design. However, it is important to take into consideration that those vehicles should not be going at high speeds, and most can make a tight turn at slow speeds. In some situations, curb bulbs can actually make it easier for trucks to turn by bringing them out, away from the curb, thereby giving them a better angle to enter the receiving lane.
- It is not necessary for a roadway to be designed so that a vehicle can turn from a curb lane to a curb lane. Vehicles can often encroach into adjacent lanes safely where volumes are low and/or speeds are slow. Speeds should be slower in a pedestrian environment.
- Emergency access is often improved through the use of curb extensions if intersections are kept clear of parked cars. Fire engines and other emergency vehicles can climb a curb where they would not be able to move a parked car. At midblock locations, curb extensions can keep fire hydrants clear of parked cars and make them more accessible.
- Ensure that curb extension design facilitates adequate drainage.


# Medians & Crossing Islands

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 & Crossing Island Resources:

Bicycle and Pedestrian Information Center

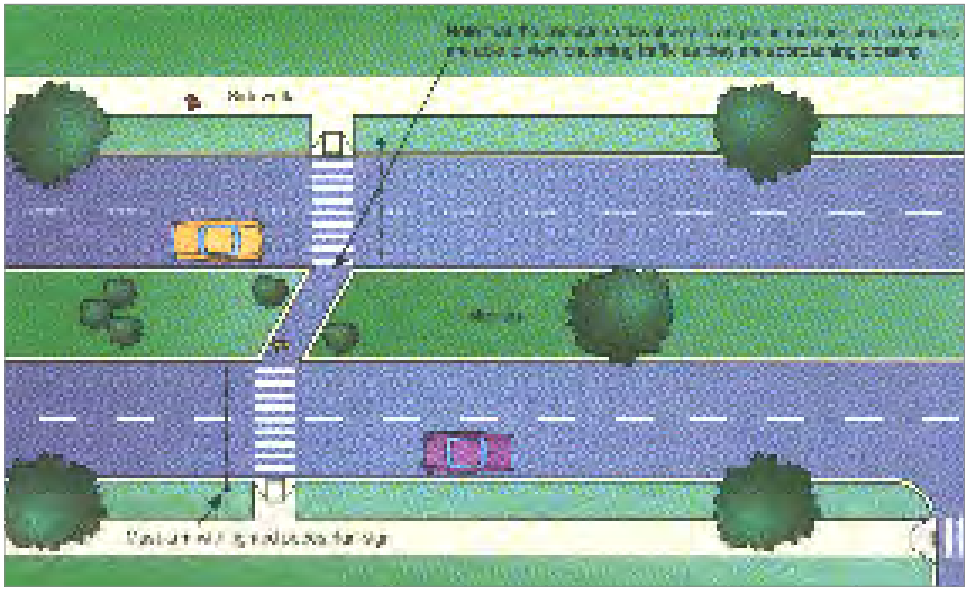
American Association of State Highway and Transportation Officials. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

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

## Crossing Island Guidelines:

- 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.
- Crossing islands are appropriate at signalized crossings though they should never be used to create a two-phased pedestrian crossing at a signalized intersection (don't leave pedestrian stuck on a crossing island between moving lanes of traffic)
- Bicycle lanes (or shoulders, or whatever space is being used for bicycle travel) must not be eliminated or squeezed in order to create the curb extensions or islands.
- Illuminate or highlight islands with street lights, signs, and/or reflectors to ensure that motorists see them.
- Design islands to accommodate pedestrians in wheelchairs.
- Crossing islands at intersections or near driveways may affect left-turn access.
- Medians can incorporate trees and plantings to change the character of the street and reduce motor vehicle speed. However, 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 8 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.


Crossing island in Greenville, NC, on Charles Blvd.



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

# 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.


International symbols used in a crosswalk to designate WALK and DON'T WALK (Image from www.walkinginfo.org).

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.

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).

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

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).

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.

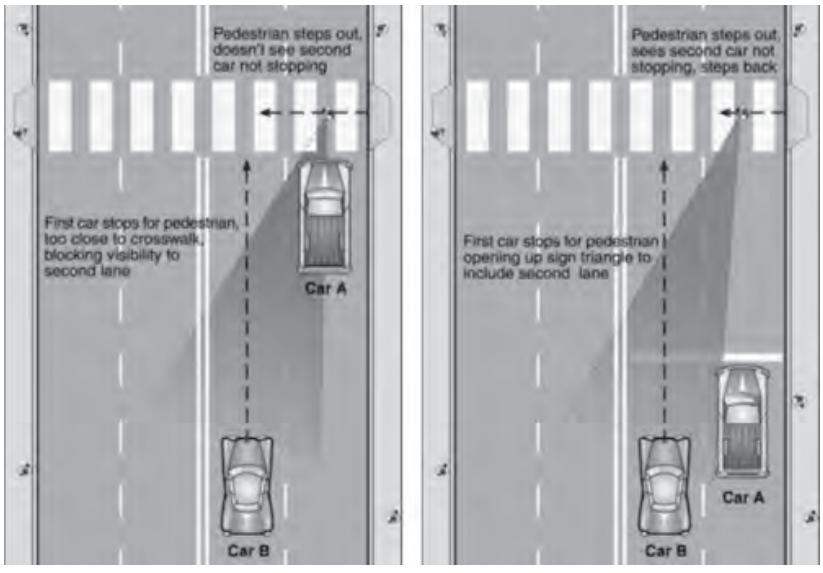
### Pedestrian Signal Guidelines:

- 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.

## Advance Stop Bars

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

Below: Advance stop bars enhance visibility for pedestrians (Image from www.walkinginfo.org).



# High Intensity Activated Crosswalk (HAWK)

The FHWA's Office of Safety Research recently completed a report on the High Intensity Activated Crosswalk (HAWK)— also known as the Pedestrian Hybrid Signal in the Manual on Uniform Traffic Control Devices (MUTCD). The HAWK is a pedestrian activated beacon located on the roadside and on mast arms over major approaches to an intersection. The HAWK signal head consists of two red lenses over a single yellow lens. It displays a red indication to drivers when activated, which creates a gap for pedestrians to use to cross a major roadway. The HAWK is not illuminated until it is activated by a pedestrian, triggering the warning flashing yellow lens on the major street. From the evaluation that considered data for 21 HAWK sites and 102 unsignalized intersections, the following changes in crashes were found after the HAWK was installed: a 29 percent reduction in total crashes, a 15 percent reduction in severe crashes, and a 69 percent reduction in pedestrian crashes. The HAWK is now an MUTCD approved device, so a request for experimentation is not necessary. For more details, visit this website: http://mutcd.fhwa.dot.gov/htm/2009/part4/part4f.htm (Source: FHWA Office of Safety, Pedestrian Forum, Fall 2010)


Above: HAWK signal.

# Rectangular Rapid Flashing Beacons (RRFB)

The Federal Highway Administration (FHWA) issued an interim approval for the optional use of rectangular rapid flashing beacons (RRFBs, shown below, left) as warning beacons supplementing pedestrian crossing or school crossing warning signs at crossings across uncontrolled approaches. Studies have found them to have much higher levels of effectiveness in making drivers yield at crosswalks than the standard over-head and side-mount round flashing beacons. See the study "Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks" (FHWA, 2010), which showed installation of the two-beacon system increased yielding compliance from 18 to 81 percent, which was statistically significant.

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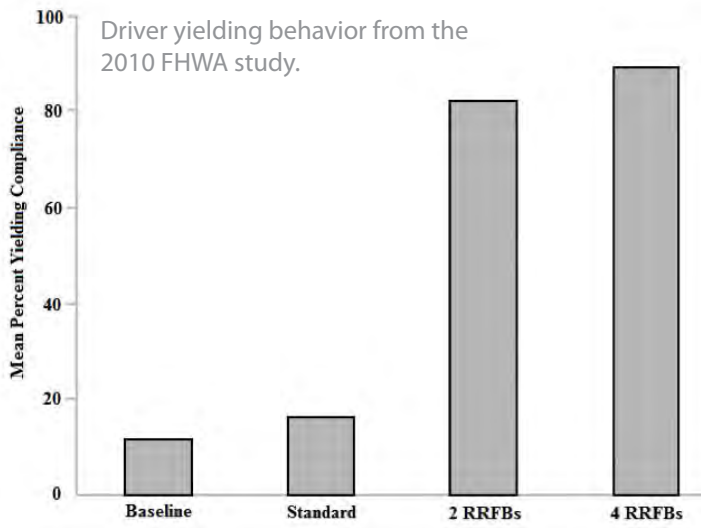
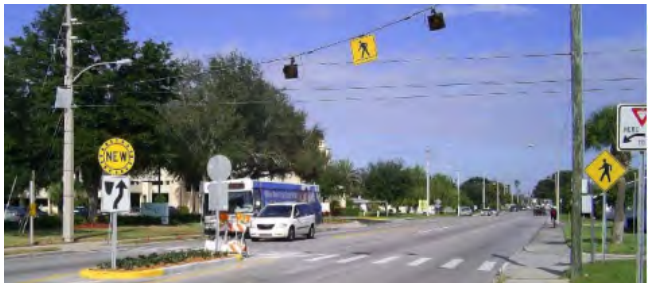
Left: RRFB with two forward-facing LED flashers and a side-mounted LED flasher.




Driver yielding behavior from the 2010 FHWA study.



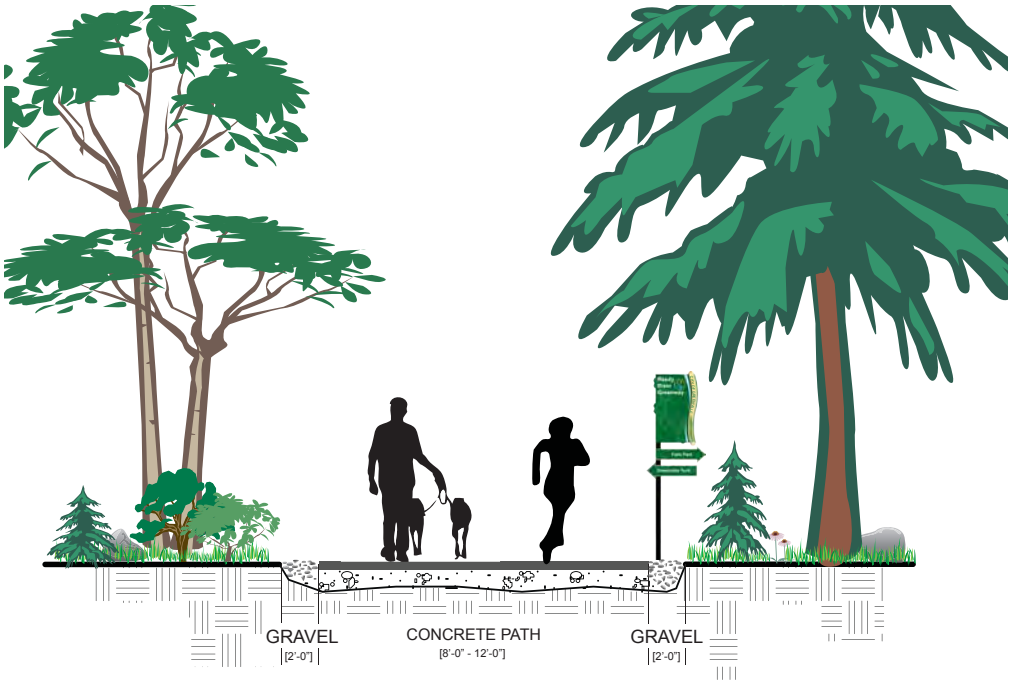
Right: standard overhead beacon system

# Multi-use Trails / Greenways

## Paved Multi-use Trail: Overview

Multi-use paths are completely separated from motorized vehicular traffic and are constructed in their own corridor, often within an open-space area. Multi-use trails typically have a concrete or paved asphalt surface and are capable of being constructed within flood-prone landscapes as well as upland corridors.

- Concrete is the recommended surface treatment. Paved asphalt or permeable paving can be used as alternatives.
  1. It is recommended that concrete be used for its superior durability and lower maintenance requirements—especially in areas prone to frequent flooding, and for intensive urban applications; Consider using high albedo pavement in place of conventional concrete surfaces (it reflects sunlight, reducing radiated heat).
  2. As an alternative to concrete, paved asphalt trails offer substantial durability for the cost of installation and maintenance. As a flexible pavement, asphalt can also be considered for installing a paved trail on slopes.
  3. Consider the following for permeable paving: a) It can be twice the cost of asphalt, b) A maintenance schedule for vacuuming debris is required to retain permeability, and c) Not suitable in the floodplain, or in areas without proper drainage (sheet flow or pooling of water with sediment clogs pours).
- Proper trail foundation will increase the longevity of the trail; two inches surfacing material over four inches (min.) of base course gravel over geotextile fabric is recommended. Soil borings may need to be conducted to determine adequate material depths; it should be designed to withstand the loading requirements of occasional maintenance and emergency vehicles.
- Typically 10' wide, 2% cross slope, with two-foot wide graded shoulders; the shoulders help prevent edges from crumbling and provide an alternate walking and jogging surface.
- Centerline stripes should be considered for trails that generate substantial amounts of traffic, and are particularly useful along curving sections of trail.
- Trail landscaping and maintenance should enhance conditions for wildlife by planting only native species in the trail corridor, removing invasive species when possible, and avoiding harmful pesticides and herbicides. The overall shape of protected natural landscapes along trail corridors also influences wildlife: single, large, contiguous natural areas are more beneficial to wildlife than the same acreage split into smaller segments.

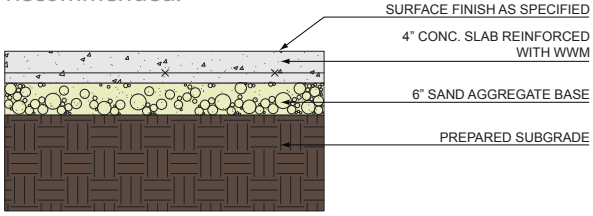


## Multi-use Trail : Floodplain Areas

'Paved Multi-use Trail' guidelines apply, with the following considerations and exceptions:

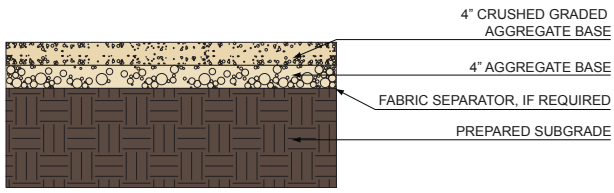
- Typically positioned outside the floodway, within the floodplain; significant vegetative buffer between the stream and trail should be left intact.
- Use existing cleared corridors for trail routing whenever possible, to avoid unnecessary vegetative clearing.
- Subject to occasional flooding, during large storm events.
- Concrete recommended, though an aggregate stone surface may be adequate in some locations.


Recommended:




CONCRETE PAVING ON AGGREGATE

Alternative:




GRAVEL PAVING ON AGGREGATE

# Sidepaths

Multi-use paths located within the roadway corridor right-of-way, or adjacent to roads, are called 'Sidepaths'. Sidepaths provides a comfortable walking space for pedestrians and enables children and recreational bicyclists to ride without the discomfort of riding in a busy street.

This configuration works best along roadways with limited driveway crossings and with services primarily located on one side of the roadway, or along a riverfront or other natural feature. Not recommended in areas with frequent driveways or cross streets.

- A minimum 10' width is necessary on sidepaths for bicyclists to pass one another safely (12' for areas expecting high use)
- A 6' or greater vegetated buffer between the sidepath and the roadway should be provided where possible.
- Roadway corridors where side paths are recommended should also have adequate on-road bicycle facilities (such as shared lane markings, paved shoulders, or bicycle lanes), so that all levels of bicyclists are accommodated.
- Well-designed transitions from sidepaths to on-road facilities will direct bicyclists to the correct side of the roadway (see guidelines for Trail-Roadway Intersections)

# Natural Surface Trails

Sometimes referred to as footpaths or hiking trails, the natural surface trail is used along corridors that are environmentally-sensitive but can support bare earth, wood chip, or boardwalk trails. Natural surface trails are a low-impact solution and found in areas with limited development.

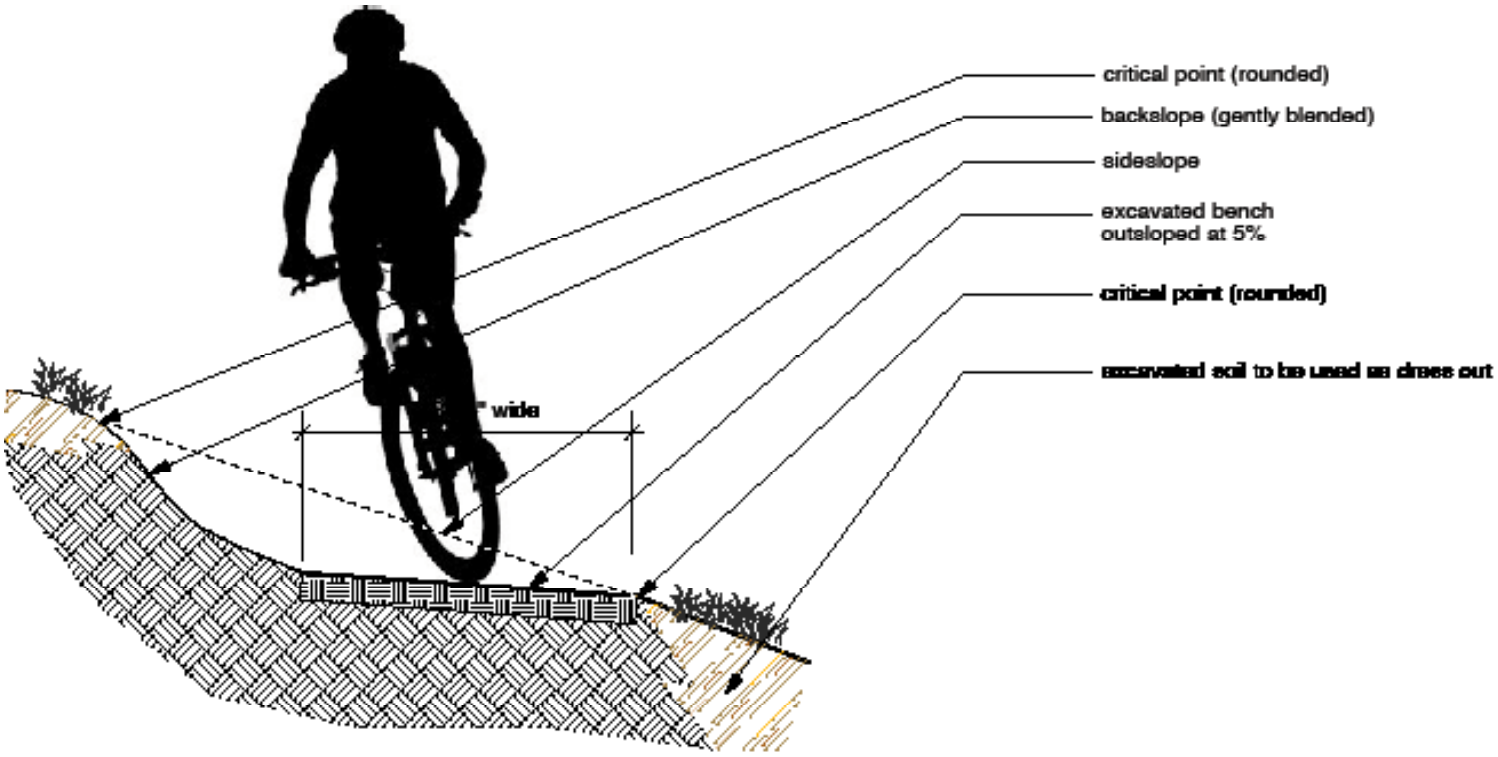
- The trail can vary in width from 18-inches to 6-feet; vertical clearance should be maintained at nine-feet above grade.
- Preparation varies from machine-worked surfaces to those worn only by usage.
- Trail surface can be made of dirt, rock, soil, forest litter, or other native materials. Some trails use crushed stone (a.k.a. "crush and run") that contains about 4% fines by weight, and compacts with use.
- At the time of this writing, a new, environmentally sound trail surface is being researched in Greenville County, SC. The organic soil stabilizer, called Roadzyme, is non-toxic, made from sugar beet extract.
- Provide positive drainage for trail tread without extensive removal of existing vegetation; maximum slope is five percent (typical).
- Trail erosion control measures include edging along the low side of the trail, steps and terraces to contain surface material, and water bars to direct surface water off the trail; use bedrock surface where possible to reduce erosion.
- Consider implications for accessibility when weighing options for surface treatments.
- For the purposes of this Plan, 'Natural Surface Trails' do not include bicycles. See following page for guidelines on mountain bike trails.

Natural surface trails provide options in areas that are environmentally sensitive.

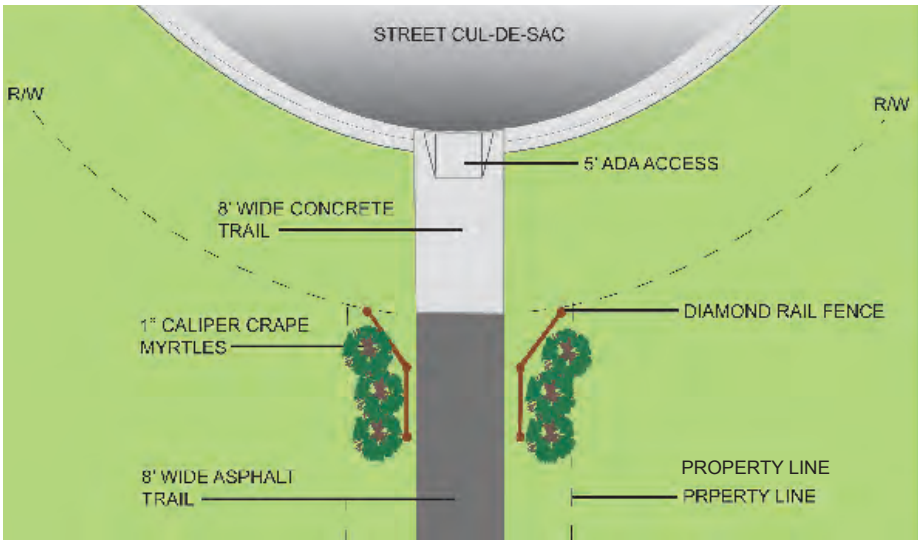
# Single-Track Mountain Bike Trails

Due to their narrow width and ability to contour with the natural topography, single-track mountain bike trails (or off-road bicycling trails) require the least amount of disturbance and support features of all types of trails.

- Their minimal footprint provides opportunities for localized stormwater management solutions. Localizing the stormwater features at small scales along the network keeps the trails available for use year-round and requires very little long term maintenance.
- If trails remain unused during storm events, and are constructed correctly, they can remain virtually maintenance free.
- Mountain bike trails are typically 18-24 inches wide and have compacted bare earth or leaf litter surfacing.
- Mountain bike trails are constructed using hand tools or low impact machinery such as a mini excavator.
- Refer to the International Mountain Bicycling Association (IMBA) standards for more information.



# Neighborhood Spur Trail




Neighborhood entrance trail diagram.

Neighborhood spur trails provide residential areas with direct bicycle and pedestrian access to parks, trails, greenspaces, and other recreational areas. They most often serve as small trail connections to and from the larger trail network, typically having their own rights-of-way and easements. Additionally, these smaller trails can be used to provide bicycle and pedestrian connections between dead-end streets, culs-de-sac, and access to nearby destinations not provided by the overall street network. Neighborhood and homeowner association groups are encouraged to identify locations where such connects would be desirable.

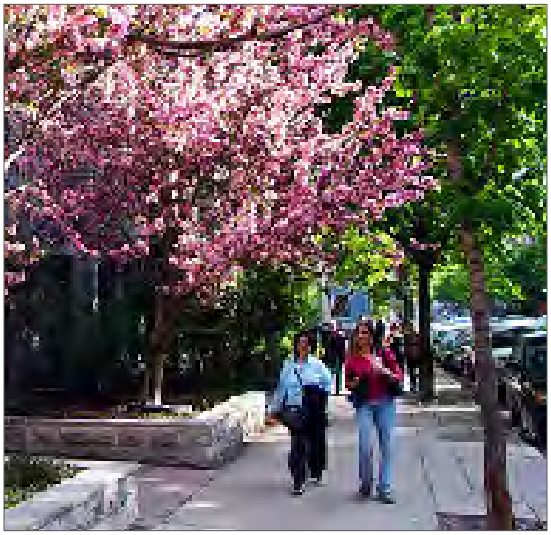
- Neighborhood spur trails should remain open to the public.
- Trail pavement shall be at least 8' wide to accommodate emergency and maintenance vehicles, meet ADA requirements and be considered suitable for multi-use.
- Trail widths should be designed to be less than 8' wide only when necessary to protect large mature native trees over 18" in caliper, wetlands or other ecologically sensitive areas.
- Access trails should meander whenever possible.
- Landscaping shall be included at the street frontage of the access trail based upon input from the residents of the cul-de-sac or dead-end street. If the access is not in a cul-de-sac, the adjacent property owners and property owners directly across from the access trail will be invited to provide landscape design input. See following section related to landscaping.
- Two sections of diamond rail fencing should be included on each side of the trail near the street frontage. Diamond rail will not be included if the respective neighborhood deeds and covenants do not permit it.

Example of a neighborhood entrance trail, featuring landscape signage.

# Vegetation Buffer, Landscaping, and Street Trees

Vegetated buffers are used to separate trails not only for floodplain protection and noise from the road, but also, where desired, to screen trail corridors from nearby properties.

- Use native plant species and plants appropriate to the region that are already adapted to the local soil and climate, reducing overall maintenance costs and enhancing local identity. Landscape materials should be installed during the appropriate planting season for the particular species.
- Design the buffer with a combination of evergreen and deciduous plants for year-round interest.
- Plant buffers with a combination of trees and large shrubs, understory plantings, and ground cover.
- Keep the vegetation buffer maintained so that it does not impede views or interefere with trail circulation.
- Avoid vegetation "walls" that box-in trail users.
- Select and place trail vegetation to provide seasonal comfort: shade on trails in the warmer months and warming sunlight on trails in colder months.



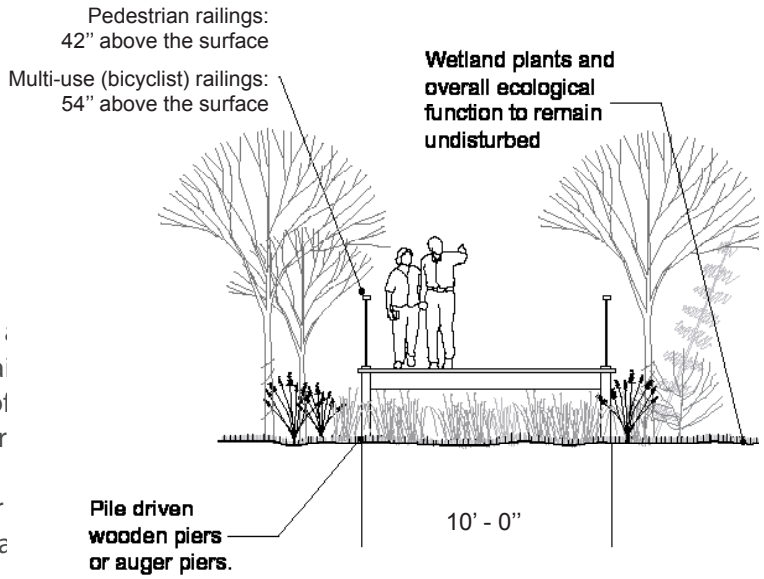
Street trees and other plantings provide comfort, a sense of place, and a more natural and inviting setting for pedestrians.

- Street and sidewalk landscaping can be used to provide a separation buffer between pedestrians and motorists (see image at left), 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.
- Growth pattern and space for maturation, particularly with larger tree plantings, are important to avoid cracking sidewalks and other pedestrian obstructions.
- Islands of vegetation can be 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. See Seattle's Green Streets Program as a model.

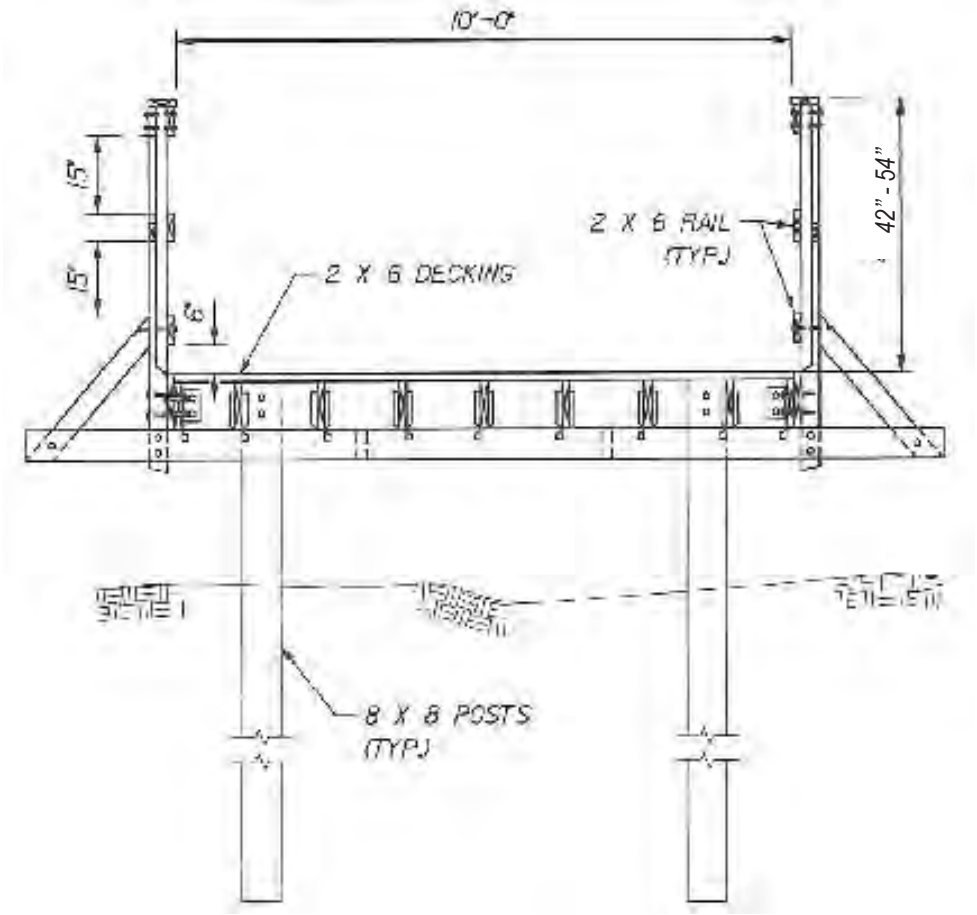
Landscaping used on the Capital Crescent Trail, Washington DC, shows how stormwater treatment can be tied to aesthetically pleasing plantings.

# Boardwalk

Boardwalk or wood surface trails are typically required when crossing wetlands or other poorly drained areas. They are constructed of wooden planks or recycled material planks that form the top layer of the boardwalk. The recycled material has gained popularity in recent years since it lasts much longer than wood, especially in wet conditions. A number of low-impact support systems are also available that reduce the disturbance within wetland areas to the greatest extent possible.




- When the height of a boardwalk exceeds 30", railings
  required (see section on 'Railings and Fences' for deta
- The thickness of the decking should be a minimum of
- Decking should be either non-toxic treated wood or r
  cycled plastic.
- The foundation normally consists of wooden posts or
  ger piers (screw anchors). Screw anchors provide grea
  support and last much longer.
- Opportunities exist to build seating and signage into boardwalks.
- In general, building in wetlands should be avoided.
- Note: muddy bicycle tires may be slick on wood surfaces.



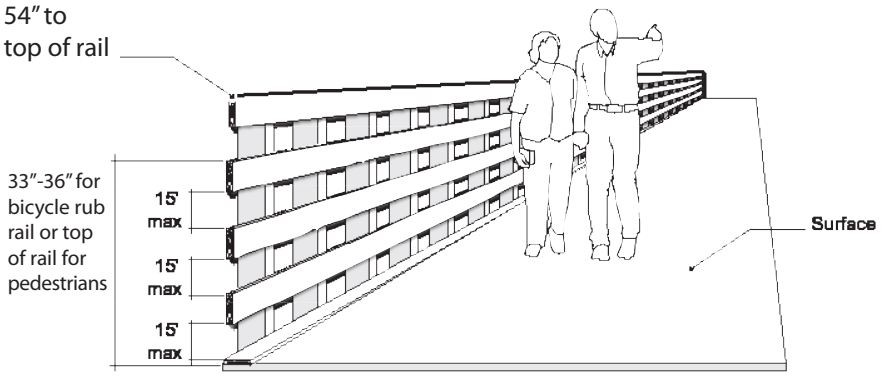

A boardwalk allows for travel through wet areas..

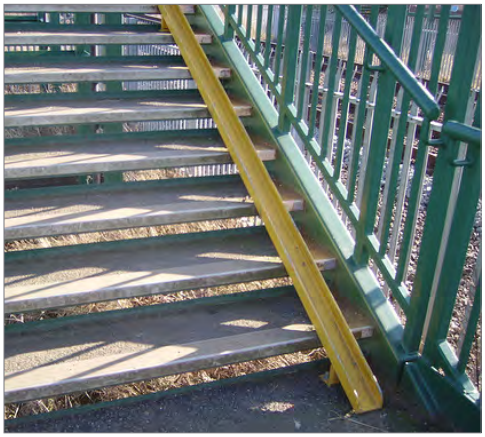
# Railings and Fences

Railing and fences are important features on bridges, some boardwalks, or in areas where there may be a hazardous drop-off or hazardous adjacent land uses (such as active rail lines).

- At a minimum, railings and fences should consist of a vertical top, bottom, and middle rail. Picket style fencing should be avoided as it presents a safety hazard for bicyclists.
- A pedestrian railing should be 42-inches above the surface.
- A bicyclist railing should be 54-inches above the surface.
- The middle railing functions as a "rub rail" for bicyclists and should be located 33-and 36-inches above the surface.
- Local, state, and/or federal regulations and building codes should be consulted to determine when it is appropriate to install a railing.

Example image of fence used along a rail with trail (Grand Rounds Parkway).



# Innovative Accessways

There are also other innovative ways to provide direct access, particularly in topographically constrained areas (e.g., on steep hills, over waterways, etc.) Stairs, alleyways, bridges, and elevators can provide quick and direct connections throughout the city and can be designed so they are safe, inviting, and accessible to most trail users. For example, stairways can have wheel gutters so that bicyclists can easily roll their bicycles up and down the incline and boardwalks can provide access through sensitive wet areas and across small waterways.

Left and above: Bicycle wheel gutters on stairs.

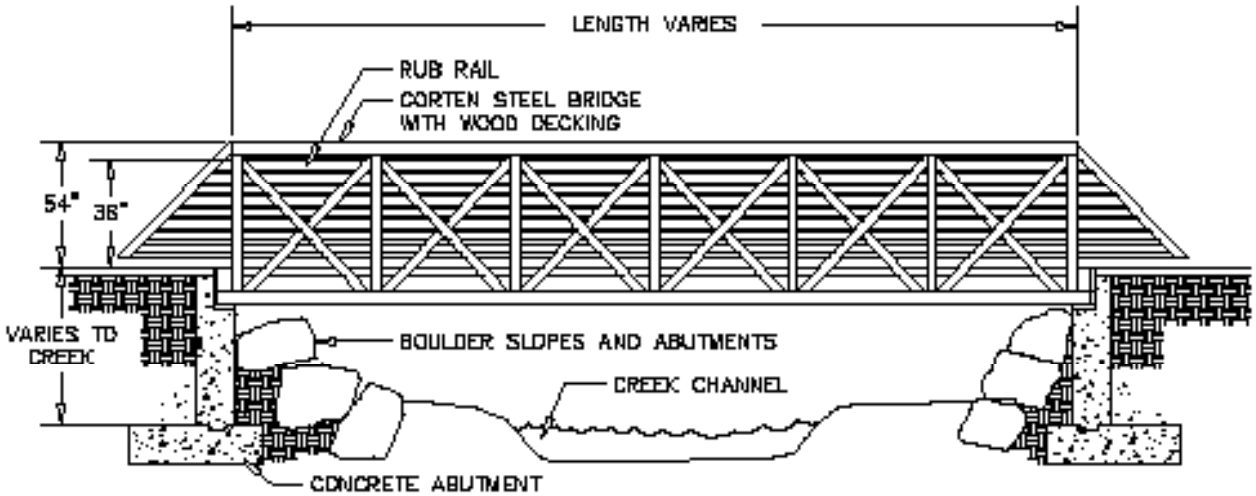
Below: A boardwalk bridge

# Trail Bridges, Overpasses and Underpasses

## Trail Bridges

Multi-Use Trail bridges (also 'bicycle/pedestrian bridges' or 'footbridges') are most often used to provide trail access over natural features such as streams and rivers, where a culvert is not an option. The type and size of bridges can vary widely depending on the trail type and specific site requirements. Some bridges often used for multi-use trails include suspension bridges, prefabricated span bridges and simple log bridges. When determining a bridge design for multi-use trails, it is important to consider emergency and maintenance vehicle access.

- If a corridor already contains a bridge such as an abandoned rail bridge, an engineer should be consulted to assess the structural integrity before deciding to remove or reuse it.
- A trail bridge should support 6.25 tons; Information about the load-bearing capacity of bridges can be found in the American Association of State Highways and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges.
- There are many options in terms of high quality, prefabricated pedestrian bridges available. Prefabricated bridges are recommended because of their relative low cost, minimal disturbance to the project site, and usually, simple installation.
- All abutment design should be sealed by a qualified structural engineer and all relevant permits should be filed.



## Trail Overpass

Trail overpasses are most often used to provide trail access over large man-made features such as highways and railroads.

- Overpasses work best when existing topography allows for smooth transitions.
- Safety should be the primary consideration in bridge/overpass design.
- Specific design and construction specifications will vary for each bridge and can be determined only after all site-specific criteria are known.
- Always consult a structural engineer before completing bridge design plans, before making alterations or additions to an existing bridge, and prior to installing a new bridge.
- A 'signature' bridge should be considered in areas of high visibility, such as over major roadways. While often more expensive, a more artistic overpass will draw more attention to the trail system in general, and could serve as a regional landmark.
- For shared-use facilities, a minimum width of 14' is recommended.
- Trail overpasses are prohibitively expensive and should only be placed in areas of substantial need.

## "Vehicular" Bridges And Underpasses

All new or replacement bridges and tunnels should accommodate pedestrians and bicyclists. Even though bridge replacements do not occur regularly, it is important to consider these in longer-term pedestrian planning.

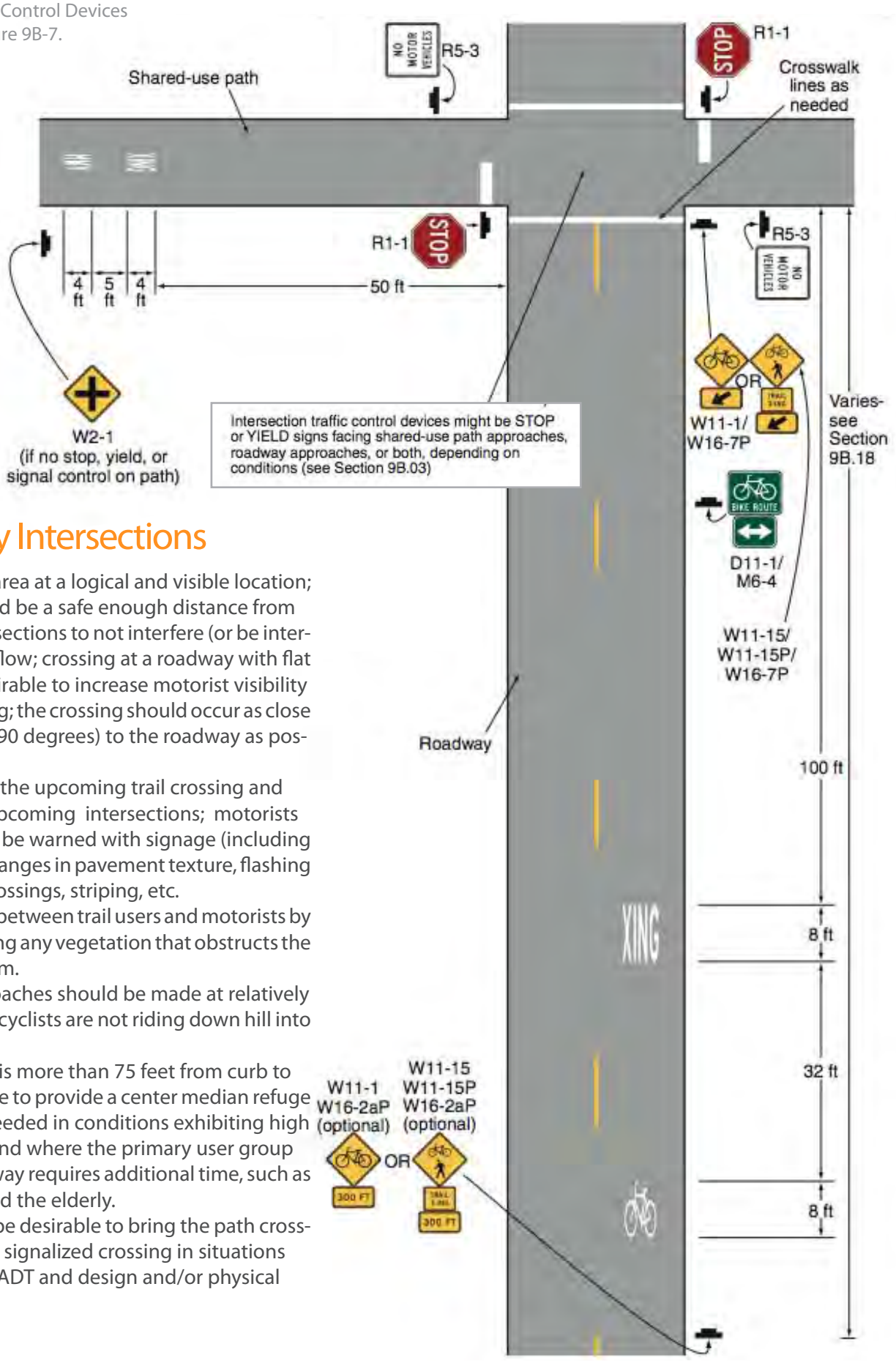
- Sidewalks should be included on roadway bridges on both sides, minimum 5' wide, with minimum handrail height of 42"
- Sufficient bridge deck width should be provided on new bridges, including approaches, to accommodate bicyclists
- In roadway underpasses, where vertical clearance allows, the pedestrian walkway should be separated from the roadway by more than a standard curb height.
- On bridges built for controlled access roadways, a separated, mult-use sidepath should be provided, minimum 12 ' wide, with connections made to bike/ped facilities on both sides of the bridge.

## Trail Underpass

- 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.
- Underpasses work best with favorable topography when they are open and accessible, and exhibit a sense of safety.
- 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.
- Typically utilize existing overhead roadway bridges adjacent to steams or culverts under the roadway that are large enough to accommodate trail users
- Vertical clearance of the underpass is ideally at least 10'; minimum clearance is 8'.
- Width of the underpass is ideally at least 12'; minimum width is 10'.
- Proper drainage must be established to avoid pooling of stormwater, however, some undepasses can be designed to flood periodically (after significant rainfall, for instance). See image below, at top right, as an example).

Curb-cut used for drainage.


The diagram on this page is from the 2009 Manual for Urban Traffic Control Devices (MUTCD), page 803, Figure 9B-7.



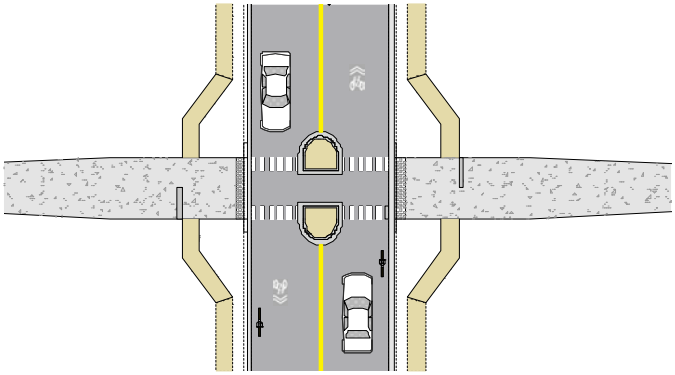

# Trail-Roadway Intersections

- Site the crossing area at a logical and visible location; the crossing should be a safe enough distance from neighboring intersections to not interfere (or be interfered) with traffic flow; crossing at a roadway with flat topography is desirable to increase motorist visibility of the path crossing; the crossing should occur as close to perpendicular (90 degrees) to the roadway as possible.
- Warn motorists of the upcoming trail crossing and trail users of the upcoming intersections; motorists and trail users can be warned with signage (including trail stop signs), changes in pavement texture, flashing beacons, raised crossings, striping, etc.
- Maintain visibility between trail users and motorists by clearing or trimming any vegetation that obstructs the view between them.
- Intersection approaches should be made at relatively flat grades so that cyclists are not riding down hill into intersections.
- If the intersection is more than 75 feet from curb to curb, it is preferable to provide a center median refuge area; a refuge is needed 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.
- 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.

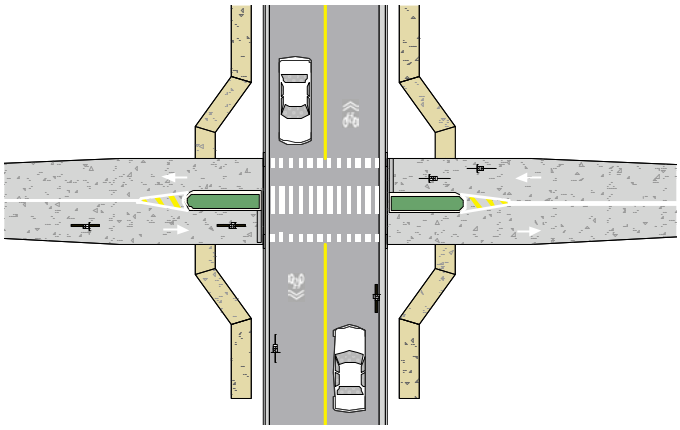
# Trail-Roadway Intersections (Continued)

Also see page B-32 for information on High Intensity Activated Crosswalks (HAWK) and Rectangular Rapid Flashing Beacons (RRFB).

Median Refuge
Shared Use Path with Sidewalks



Mid-block Crossing
Shared Use Path with Sidewalks and Medians



# Trail Amenities

**Benches:** There are a wide variety of benches to choose from in terms of style and materials. The illustrated bench is a custom design that reflects the industrial feel of the warehouse district it is found in. Material selection should be based on the desired design theme as well as cost.

- Due to a wide range of users, all benches should have a back rest.
- A bench should normally be 16 - 20" above ground with sturdy handrails on either side.
- The seating depth should be 18-20" and the length should vary between 60 - 90".
- Provide wheelchair access alongside benches, at least a 30-by-48-inch area for adequate maneuvering. If benches are next to each other (either side by side or face to face), allow 4 feet between them.

**Other Seating:** Other more informal seating opportunities may exist along a trail or near a parking area where other furniture like a picnic table may be appropriate.

- This type of furniture can be triangulated with cooking facilities, and a trash receptacle.
- Wheelchair access spacing recommendations, as noted in the preceding section on 'benches,' also applies to other seating.

**Trash Receptacles:** Trash receptacles should be constructed of a suitable material to withstand the harsh elements of the outdoor environment. Adequate trash receptacles will combat littering and preserve the natural environment for all trail users.

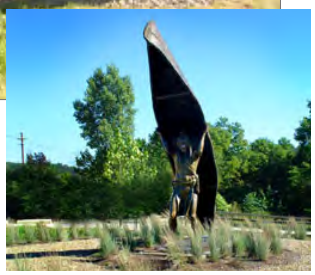
- Trash receptacles should be placed along the trail and at all trailheads.
- Trash receptacles should ensure that litter is contained securely preventing contamination or spillage into the surrounding environment.

## Public Art on Trails

Explore opportunities to include public art within the overall design of the trail system. Local artists can be commissioned to provide art for the trail system, making it uniquely distinct. Many trail art installations are functional as well as aesthetic, as they may provide places to sit and play on. According to American Trails,

"Art is one of the best ways to strengthen the connection between people and trails. Across America and elsewhere, artists are employing a remarkably wide range of creative strategies to support all phases of trail activities, from design and development to stewardship and interpretation. In particular, art can be an effective tool for telling a trail's story compellingly and memorably."

Example art programs for trails can be found at:
www.americantrails.org/resources/art/ArtfulWays.html



## Trail Heads

Major access points should be established near commercial developments and transportation nodes, making them highly accessible to the surrounding communities. Minor trailheads should be simple pedestrian and bicycle entrances at locally known spots, such as parks and residential developments.

A minor trailhead could include facilities such as parking, drinking fountains, benches, a bicycle rack, trash receptacles, and an information kiosk and/or signage. Major trailheads could include all of the above plus additional facilities, such as rest rooms, shelters, picnic areas, a fitness course, an emergency telephone, and a larger parking area.

Partnerships could also be sought with owners of existing parking lots near trails. Benefits are three fold: Business benefit from trail-user patronage; trail owners benefit from not having to buy more land and construct a parking facility; and the environment benefits from less development in the watershed.


Air compressor (for bicycle tires).

A major trail head at the Capital Crescent Trail in Maryland, featuring concessions and bicycle, canoe, and kayak rentals.

A water fountain and pet-water fountain.

## Trail Lighting

Lighting for multi-use trails should be considered on a case-by-case basis in areas where 24-hour activity is expected (such as college campuses or downtown areas), with full consideration of the maintenance commitment lighting requires. In general, lighting is not appropriate for off-road trails where there is little to no development.

- A licensed or qualified lighting expert should be consulted before making any lighting design decisions. Doing so can reduce up-front fixed costs as well as long-term energy costs.
- Use full cut-off, energy-efficient lighting that is IDA Approved Dark Sky Friendly to avoid excess light pollution and save costs (See www.darksky.org for more info)
- If a main trail corridor is unlit and closes at dark, extended hours for commuters should be considered, particularly during winter months when trips to and from work are often made before sunrise and after dusk. See the American Tobacco Trail in Durham, NC, as an example, which is unlit and remains open to commuters until 10 PM.
- Consider lighting at the following locations:
    - — Entrances and exits of bridges
    - — Public gathering areas along the greenway
    - — Trail access points
- Only use lighting along a trail if:
    - — Night usage is desired or permitted
    - — It is acceptable to residents living along or near the trail
    - — The area is not a wildlife area

## Roadway Lighting

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 ambience for motorists to see pedestrians. To be most effective, lighting should be consistently and adequately spaced.

In commercial or downtown areas and other areas of high pedestrian volumes, lower level, pedestrian-scale lighting with emphasis on crossings and intersections may be employed to generate a desired ambiance. 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'.

- 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
- As also noted above, use full cut-off, energy-efficient lighting that is IDA Approved Dark Sky Friendly to avoid excess light pollution and save costs (See www.darksky.org for more info)

# Crime Prevention Through Environmental Design (CPTED)

CPTED is the proper design and effective use of the built environment which may lead to a reduction in the fear and incidence of crime, and an improvement of the quality of life. CPTED is realized for trail design in many ways, some of which are described below and at right.

Natural Surveillance: For trails and greenways, natural surveillance occurs through increased numbers of trail users, creating an environment where behavior on the trail is monitored by trail users themselves. This type of surveillance can, of course, be supplemented with a volunteer-based trail patrol group, park service staff, or the local police (often on bicycle, horseback, and electric cart respectively).


Emergency Call Boxes: Callboxes can be installed at various locations on trails so that trail users can contact the police in case of an emergency. Often, these are voice call boxes using a mobile phone service, and solar-powered so no wiring need be extended to the middle of a remote location.

Lighting in Select Areas: Most trails operate as linear parks, officially closing at dusk. Certain high-use areas of trails are sometimes kept open after dark to serve the needs of trail commuters who use the trail after dark. For sections of the trail open after dark, lighting can serve as a tool of CPTED.


911 Trail Address Locations: There are several key factors involved in properly developing a 911 trail address system:

- Awareness: Ensure trail users understand 911 address marking system and how to use it
- Visibility: 911 Address Marking should be easy to see and understand but NOT interfere or overwhelm natural ambience of trail environment
- Cooperation: Critical to have cooperation among: Trail System Management, 911 Call Center, and Emergency Services
- Integration: 911 Trail Addresses MUST be properly and promptly integrated into 911 Emergency System – Addresses are useless if not incorporated into system



Model Case Study Community:
Cedar Valley Trails 911 Signs Project
Black Hawk County, Iowa
Improving Multi-Use Recreational Trail Safety
through a Coordinated 911 Sign Project
www.americantrails.org/awards/NTS06awards/TECH06.html

# Signage and Wayfinding

A comprehensive system of signage ensures that information is provided regarding the safe and appropriate use of all trails, both on-road and off-road. The greenway network should be signed seamlessly with other alternative transportation routes, such as bicycle routes from neighboring jurisdictions, trails, historic and/or cultural walking tours, and wherever possible, local transit systems. Signage is divided into several categories: Network signs, directional/wayfinding signs, regulatory signs and warning signs, and educational/Interpretive signs

Trail signage should conform to the (2001) Manual on Uniform Traffic Control Devices and the American Association of State Highway Transportation Official Guide for the Development of Bicycle Facilities. Trail signage should also be coordinated with county as well as citywide networks.

## Network Signs

A standardized trail network logo should be developed and used to aid in reinforcing the trail's identity. Additionally, local trail logos should compliment the greenway network signage.

- Network signage should be simple, direct, and easy to identify.
- A skilled graphic designer should be consulted when generating the design for the trail logo.
- Be consistent with the logo throughout the trail network by using it as a stand alone sign, on other signage, or incorporating it into trail furnishings, such as benches or waste receptacles.

## Directional/Wayfinding Signs

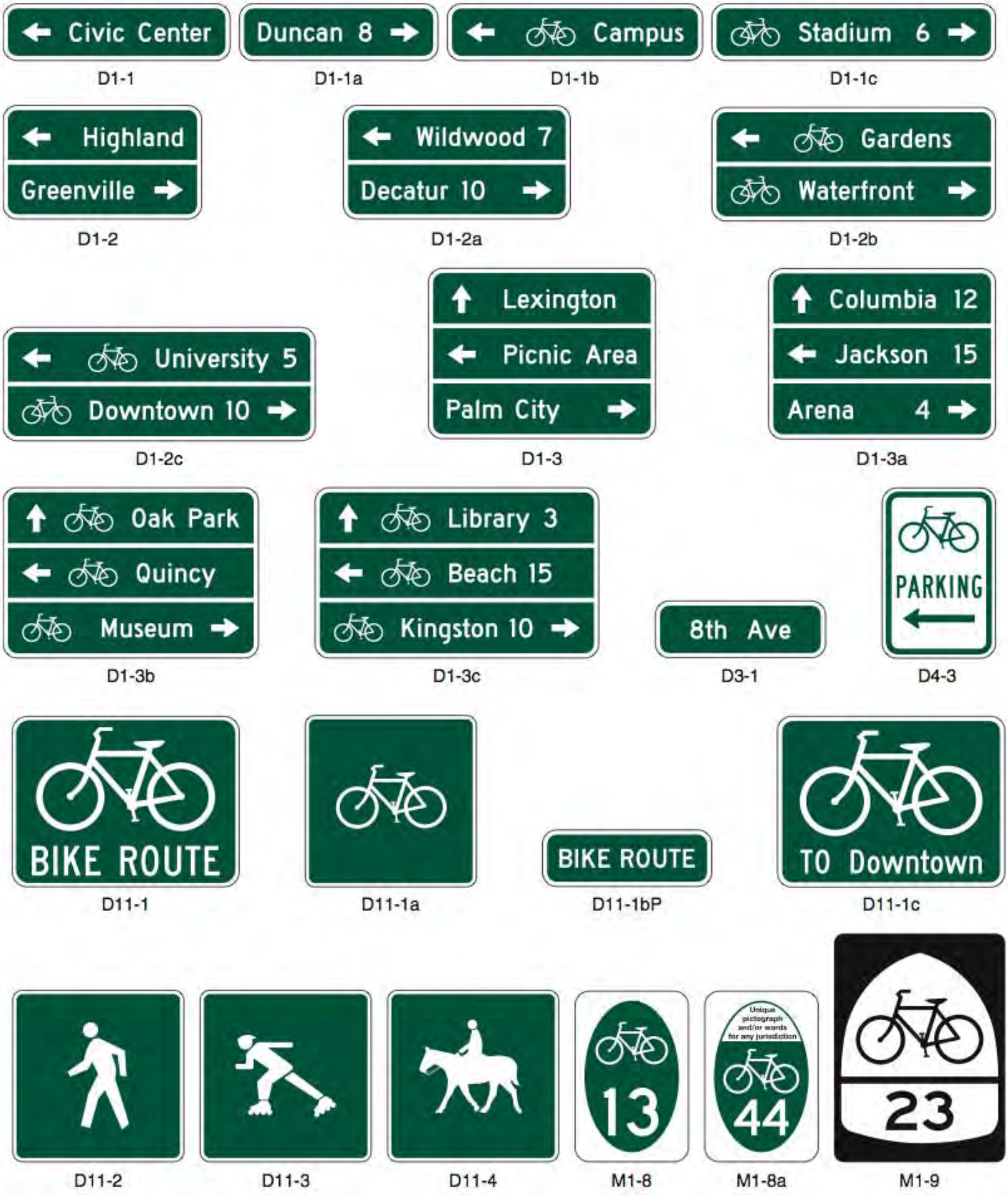
The purpose of the directional sign is to direct trail users and motorists to the location of trail heads, provide incremental distances along the trail, as well as illustrate overall maps of the trail network.

- Kiosks are a great facility for directional signage by providing a wealth of information at once, including trail opportunities, regional maps, or local/seasonal events occuring along the greenway.
- Locate informative signs and overall trail maps at trail access points to help users entering the trail determine their next destination.
- Locate directional signs at intervals along the trail to help users identify their locations or orient their position.
- Locate mile markers 3-feet from the edge of the trail and approximately one mile intervals beginning at the northern and southern ends of the trail network.

## Regulatory/Warning Signs


Examples from the City of Greenville's 2010 Wayfinding & Signage Program.

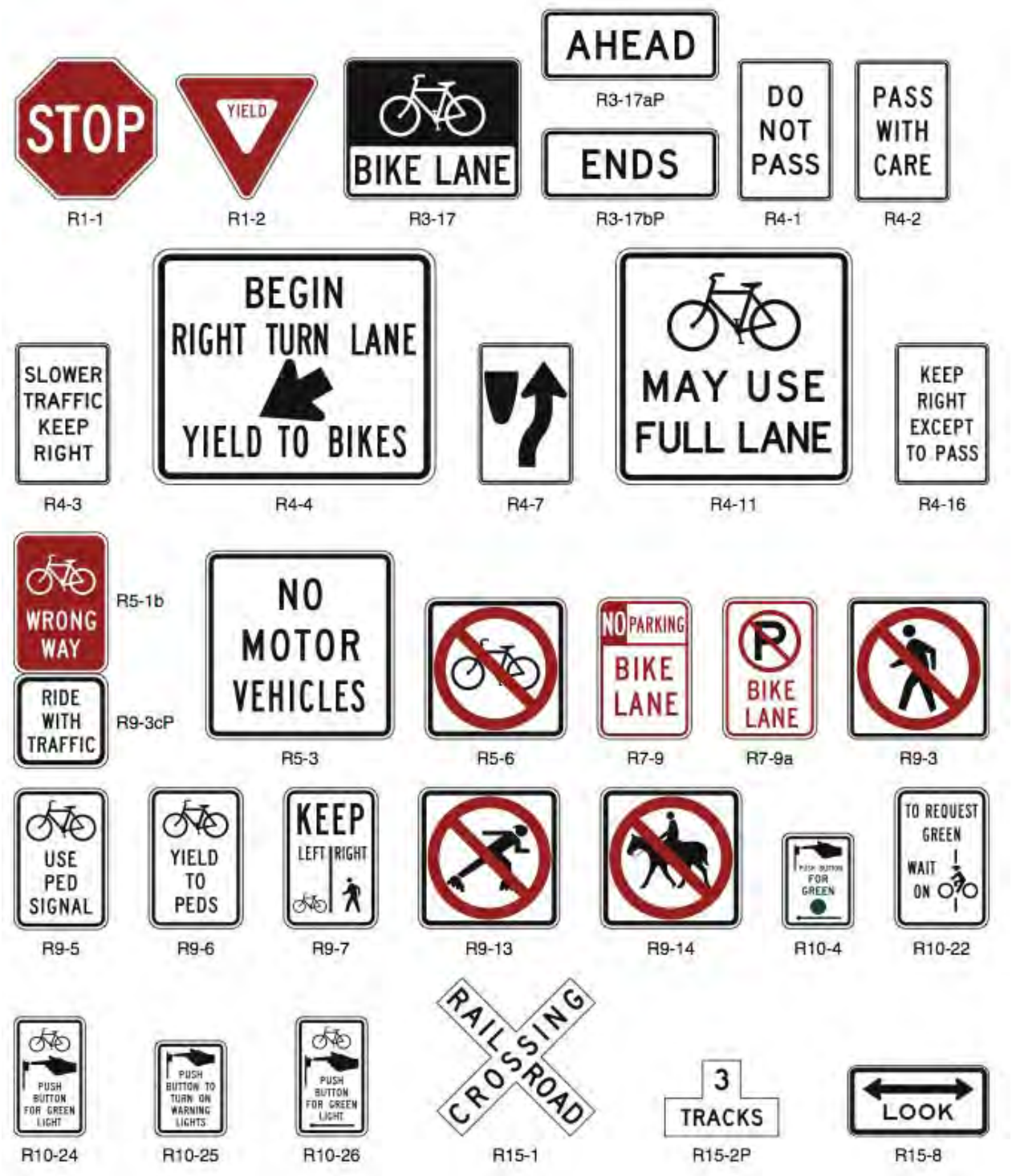
## Examples of bicycle-related directional Signs (from the 2009 MUTCD)



Located throughout the trail system, these signs inform trail users of rules and regulations along the trail, hours of trail operation, upcoming street and trail crossings and other potential hazards such as trail width changes.

- Post trail rules and regulations as well as hours of operation at trail heads or in kiosks.
- Locate warning signs appropriately ahead of the specific hazards to which they refer, such as road crossings, steep terrain, trail narrowing, and stop signs.
- All signage should conform to the Manual on Uniform Traffic Control Devices (MUTCD).

## Examples of bicycle-related regulatory signs (from the 2009 MUTCD)



## Examples of bicycle-related warning signs (from the 2009 MUTCD)


* A fluorescent yellow-green background color may be used for this sign or plaque. The background color of the plaque should match the color of the warning sign that it supplements.

## Educational/Interpretive Signage

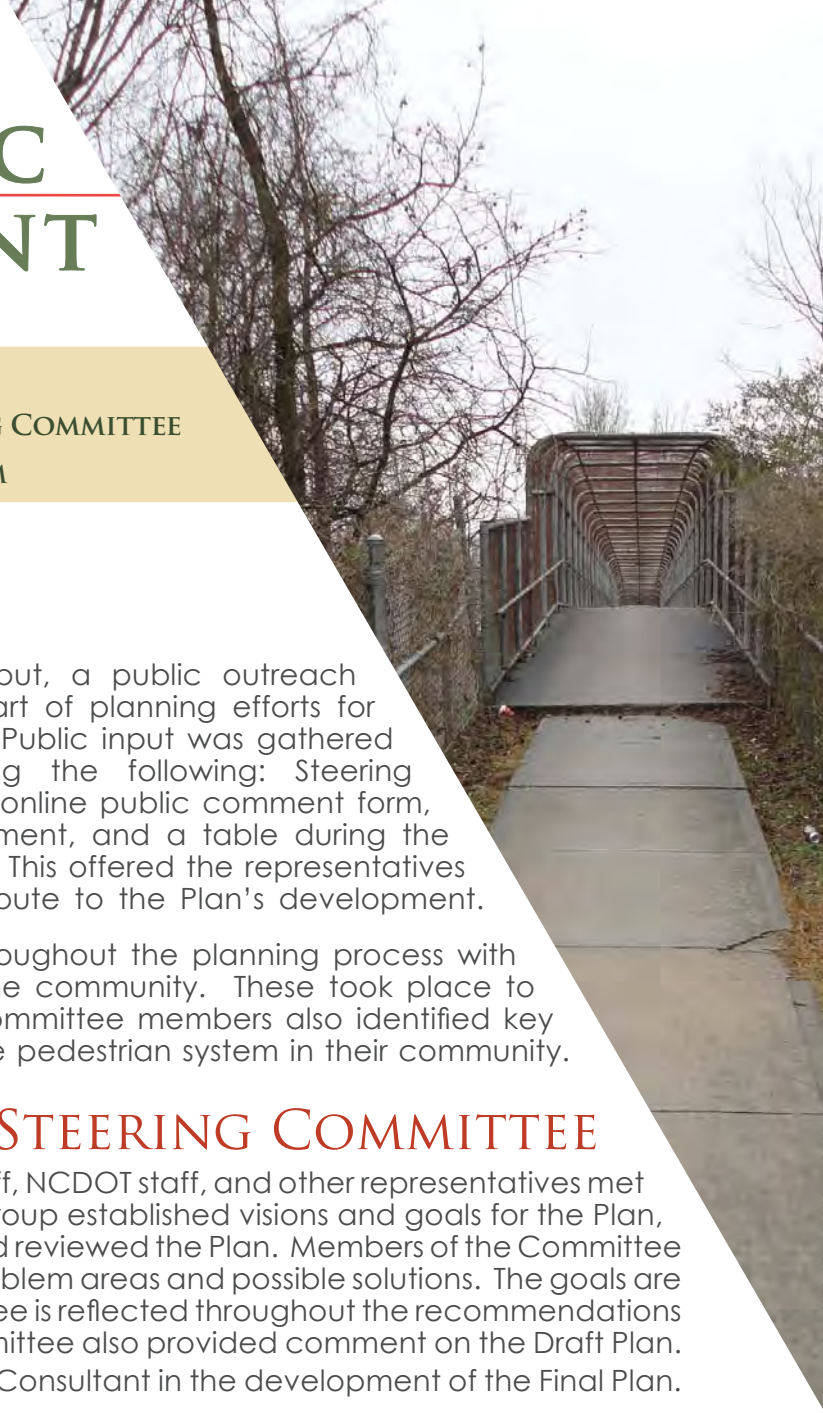
Educational signage provides trail users with information about the greenway, native flora and fauna, history and culture, and significance of elements along the trail.

- There is a wide variety of interpretive signage styles and the amount/type of information they provide.
- Consider the character of the trail and surrounding elements when designing educational signage.
- A skilled graphic designer should be used for sign design.
- Locate interpretive signage 3-feet from the edge of the trail.



Educational signage provides opportunities for gathering and learning about local environment.

# B Public Involvement



## Appendix Outline

Overview | Citizen & Staff-Based Steering Committee
Public Workshops | Public Comment Form

## Overview

In order to gain local knowledge and input, a public outreach component was included as an integral part of planning efforts for the Oxford Comprehensive Pedestrian Plan. Public input was gathered through several different means including the following: Steering Committee meetings, a project website, an online public comment form, a workshop at Oxford Public Works Department, and a table during the Strawberry Day Festival in Downtown Oxford. This offered the representatives and citizens of Oxford opportunity to contribute to the Plan's development.

Steering Committee meetings were held throughout the planning process with representatives from Oxford, NCDOT, and the community. These took place to establish visions and goals for this effort. Committee members also identified key opportunities and strategies for improving the pedestrian system in their community.

## Citizen & Staff-based Steering Committee

This Committee, composed of citizens, City staff, NCDOT staff, and other representatives met four times during the planning process. The group established visions and goals for the Plan, identified areas of need in the Oxford area, 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 the Oxford Public Works Department on March 29, 2012. 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 during a the Strawberry Day Festival in Downtown Oxford. 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 the Consultant and City staff. In addition, a hardcopy public comment form was developed and distributed for hand written responses during each meeting.

# Public Comment Form

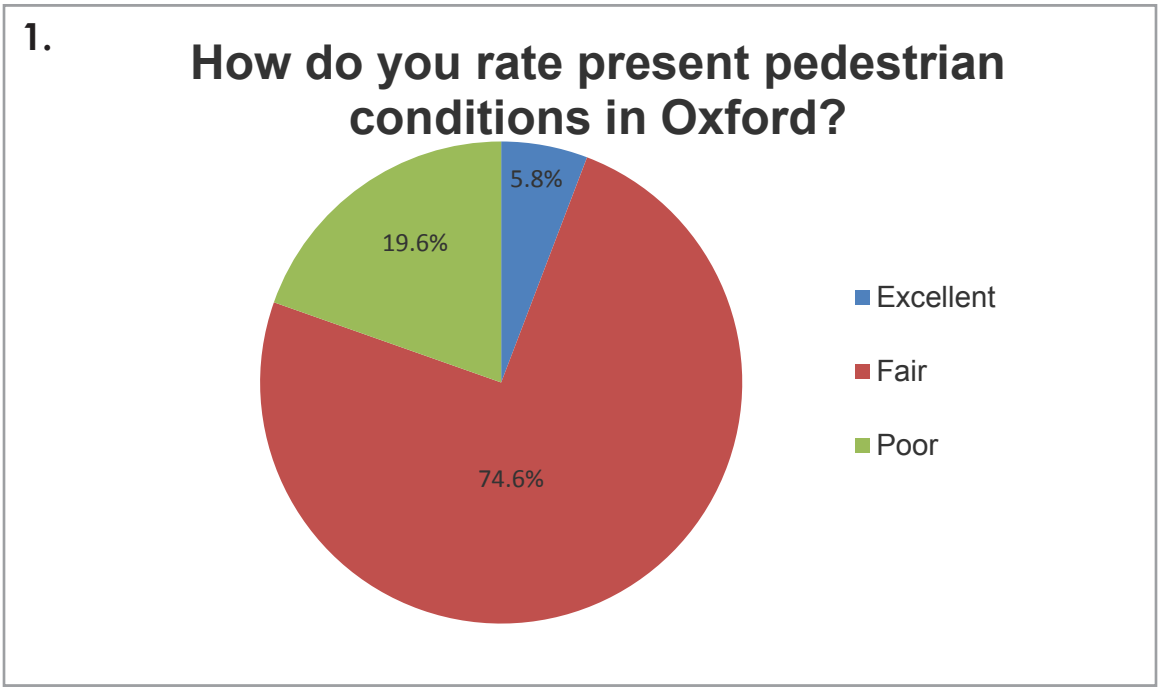
A comment form was developed for Oxford during this process and made available in both hardcopy and online form. The comment form was available online throughout the duration of the project. To maximize the responses to the online form, the web address was distributed at the public meeting, to local interest groups, in newsletters, and on flyers that were distributed around the City. Over 160 persons completed the comment form.

The comment form results shown on the following pages have been tabulated by the Consultant to provide insight into local residents' opinions and values. Feedback received through the comment form served to guide the development of the recommendations included in this Plan.

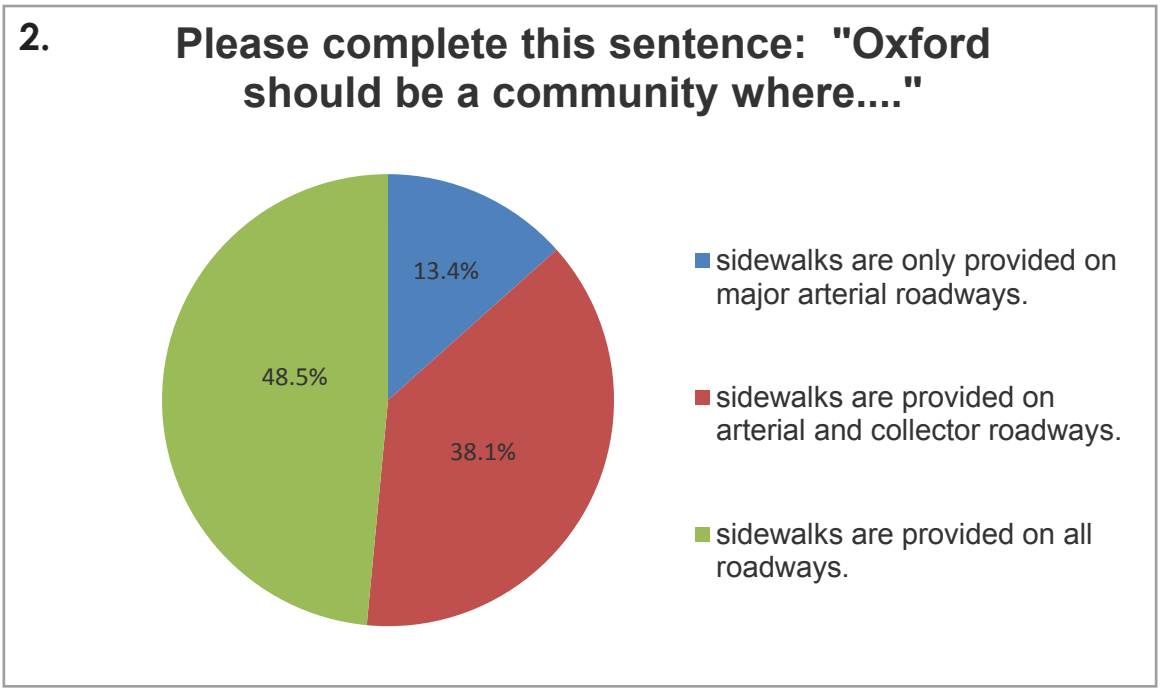
Public Involvement Event During
Strawberry Day Festival
May 12, 2012

Public Involvement Event During
Strawberry Day Festival
May 12, 2012

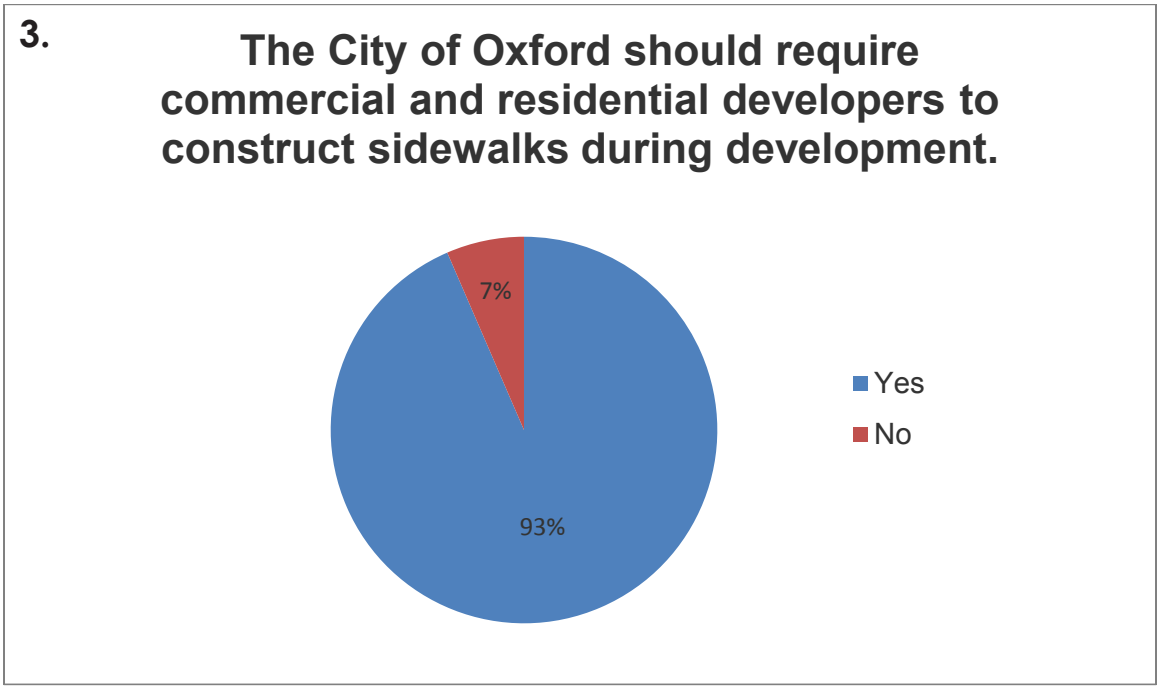
1.

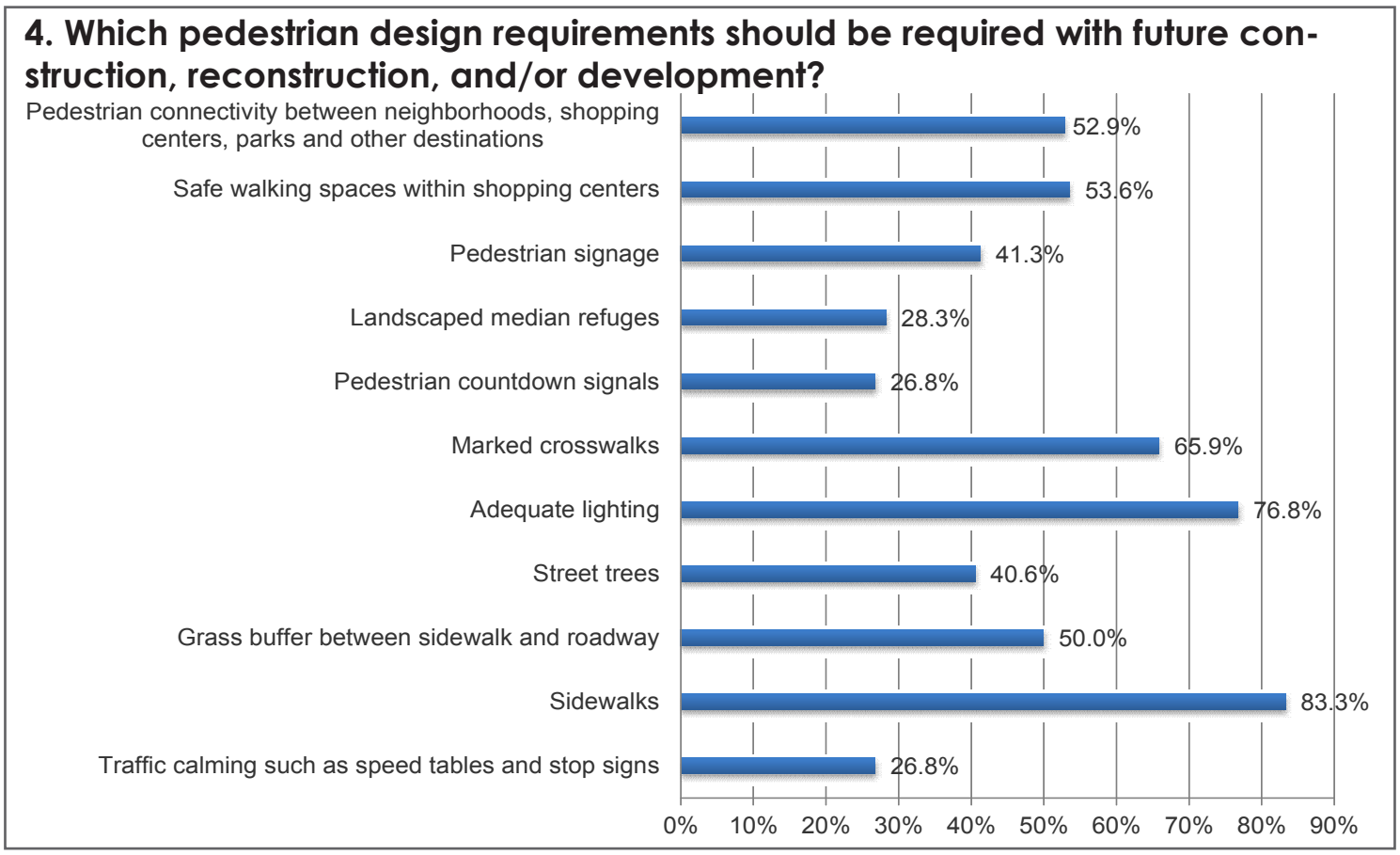

How do you rate present pedestrian conditions in Oxford?
5.8%
19.6%
74.6%
Excellent
Fair
Poor

2.

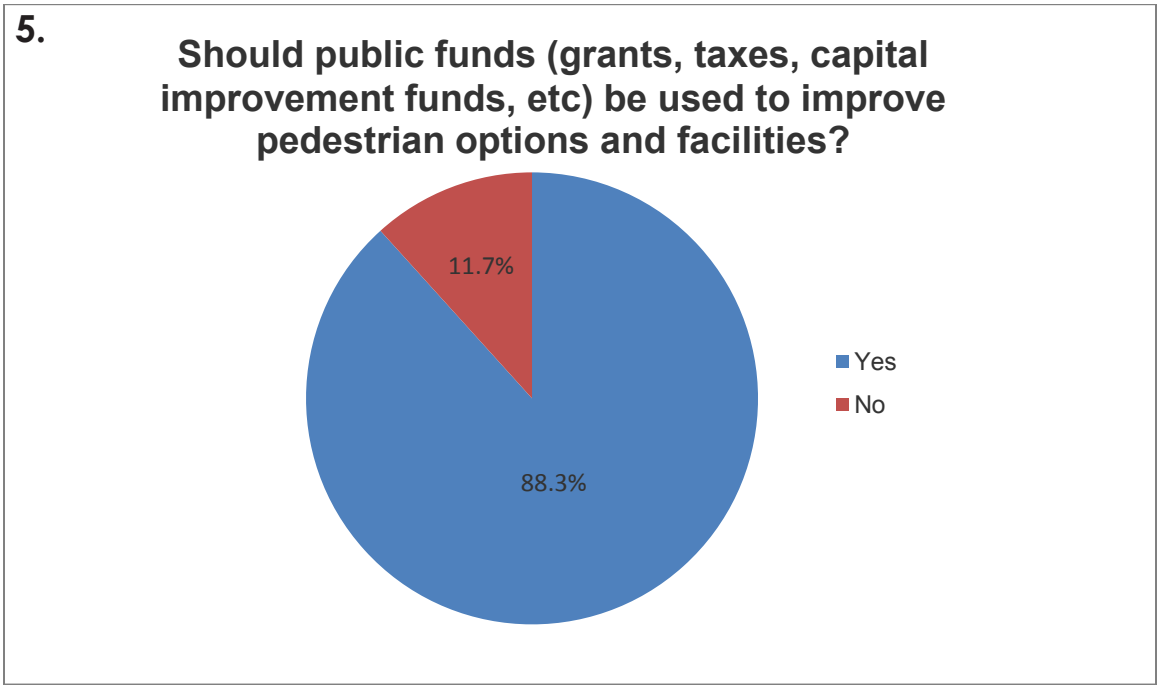

Please complete this sentence: "Oxford should be a community where...."
13.4%
48.5%
38.1%
sidewalks are only provided on major arterial roadways.
sidewalks are provided on arterial and collector roadways.
sidewalks are provided on all roadways.

**3.**

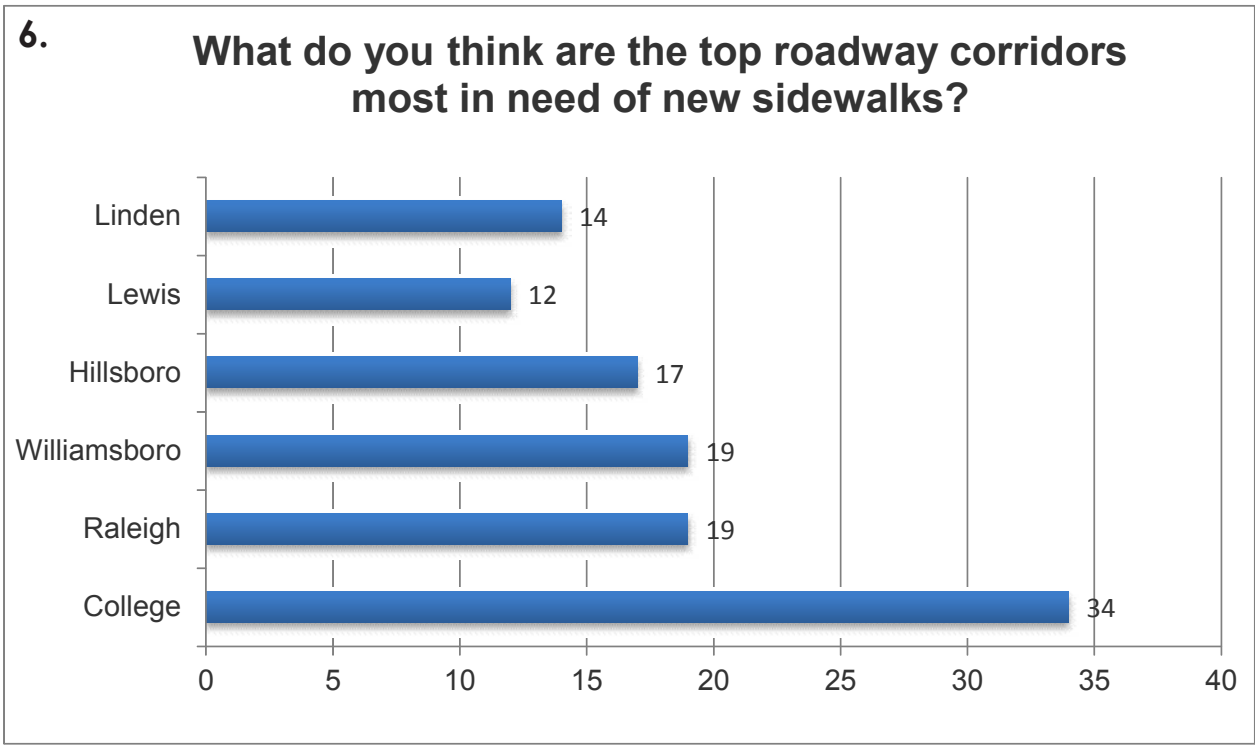

The City of Oxford should require commercial and residential developers to construct sidewalks during development.
7%
93%
Yes
No


4. Which pedestrian design requirements should be required with future construction, reconstruction, and/or development?
Pedestrian connectivity between neighborhoods, shopping centers, parks and other destinations
52.9%
Safe walking spaces within shopping centers
53.6%
Pedestrian signage
41.3%
Landscaped median refuges
28.3%
Pedestrian countdown signals
26.8%
Marked crosswalks
65.9%
Adequate lighting
76.8%
Street trees
40.6%
Grass buffer between sidewalk and roadway
50.0%
Sidewalks
83.3%
Traffic calming such as speed tables and stop signs
26.8%
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%

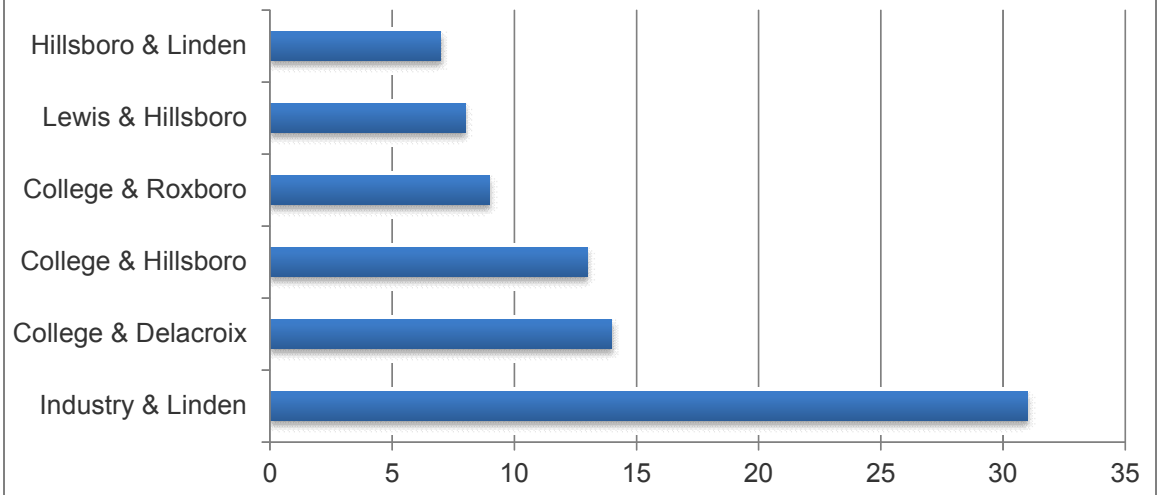
5.


Should public funds (grants, taxes, capital improvement funds, etc) be used to improve pedestrian options and facilities?
11.7%
88.3%
Yes
No

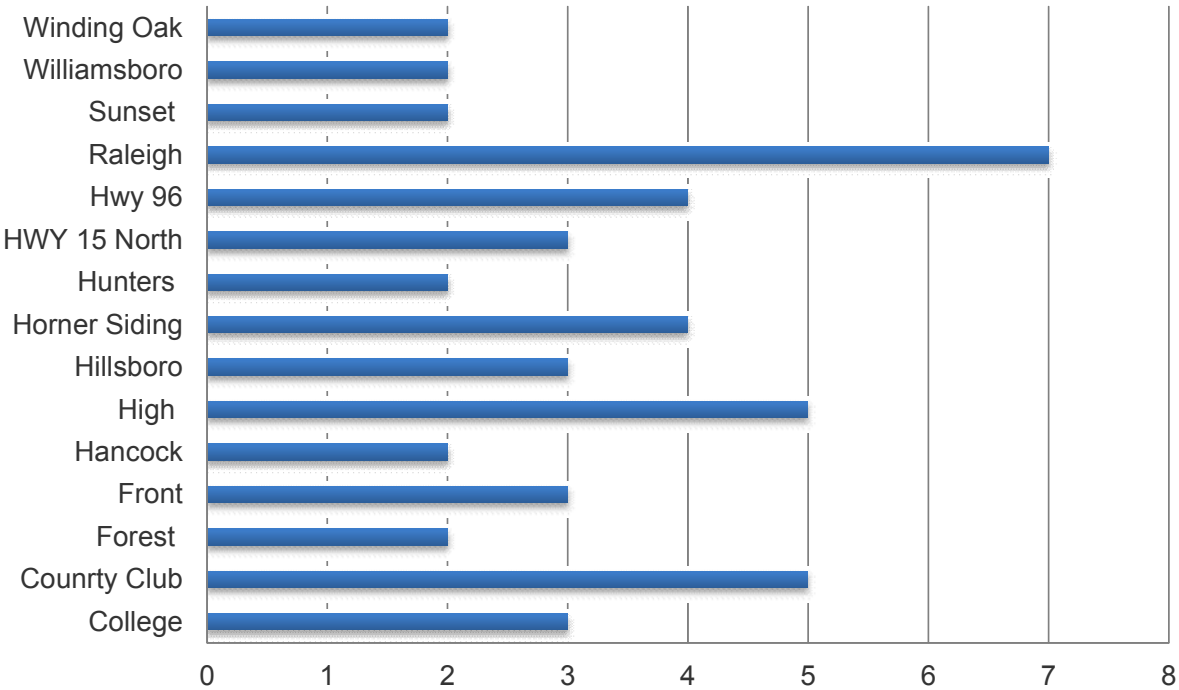
6.


What do you think are the top roadway corridors most in need of new sidewalks?
Linden
14
Lewis
12
Hillsboro
17
Williamsboro
19
Raleigh
19
College
34
0
5
10
15
20
25
30
35
40

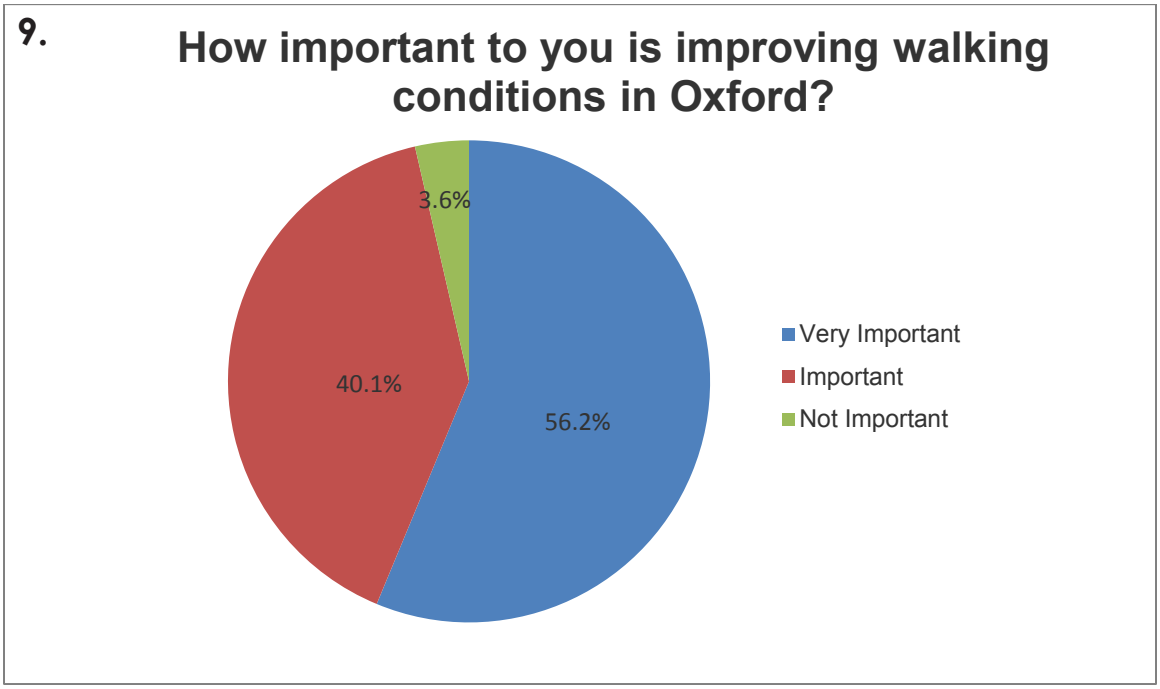
**7.** **What do you think are the top roadway intersections most in need of crossing improvements?**



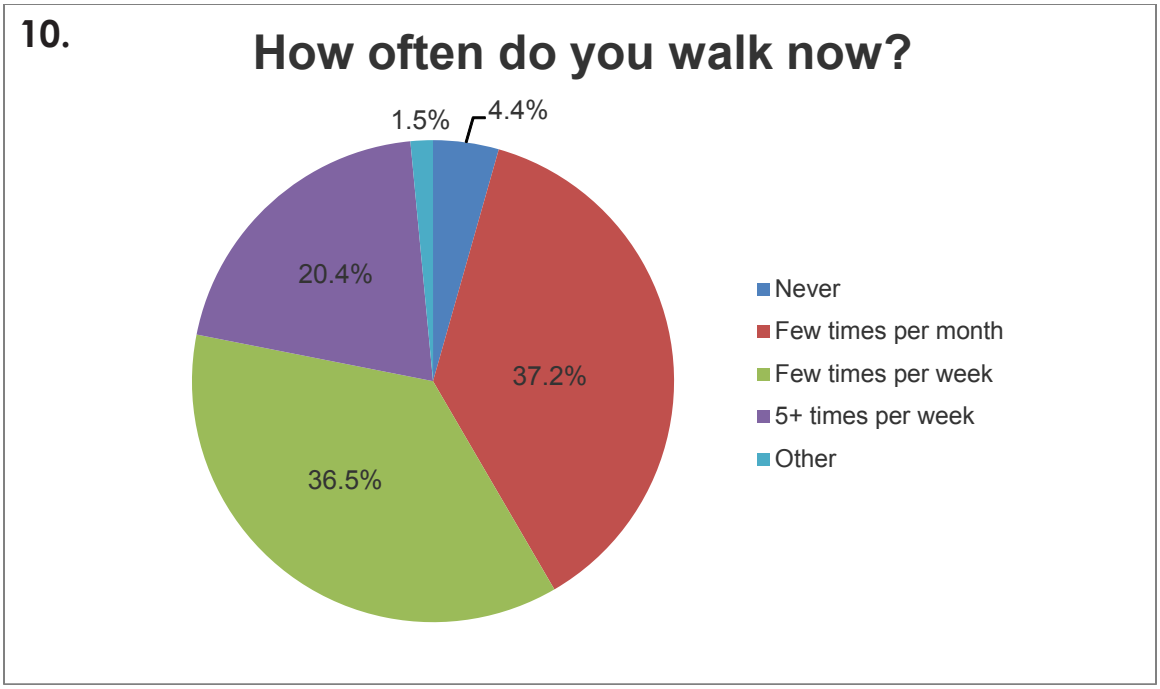

**8.** **What road do you live on (or near)?**



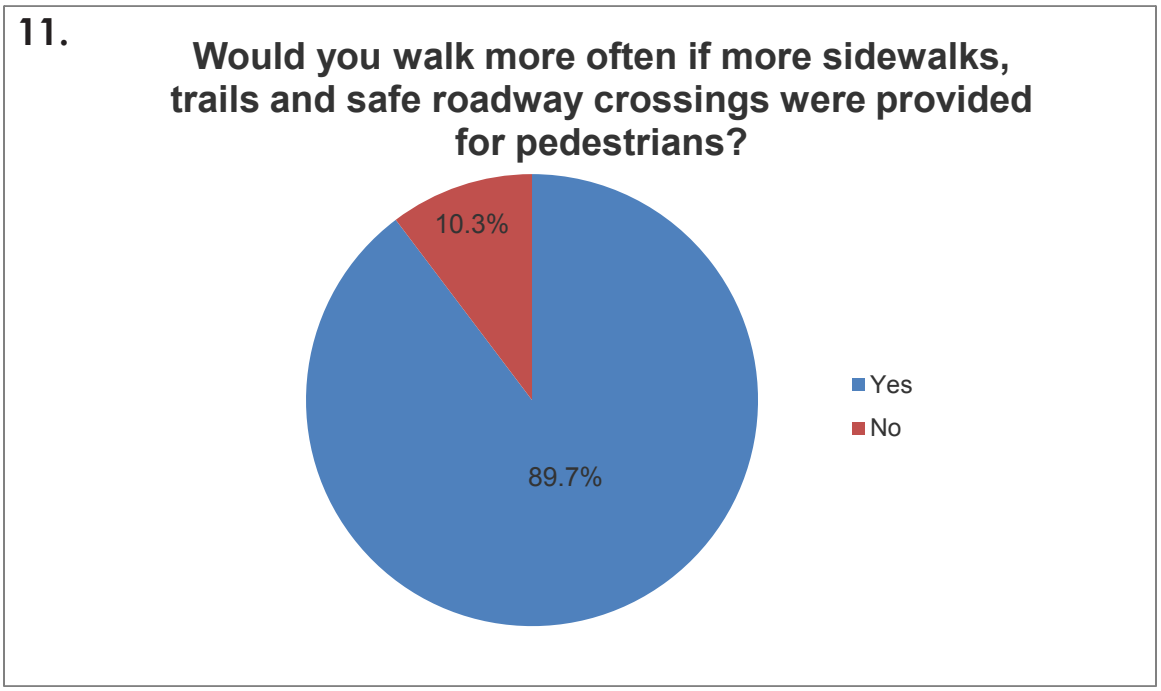
9.


How important to you is improving walking conditions in Oxford?
3.6%
40.1%
56.2%
Very Important
Important
Not Important

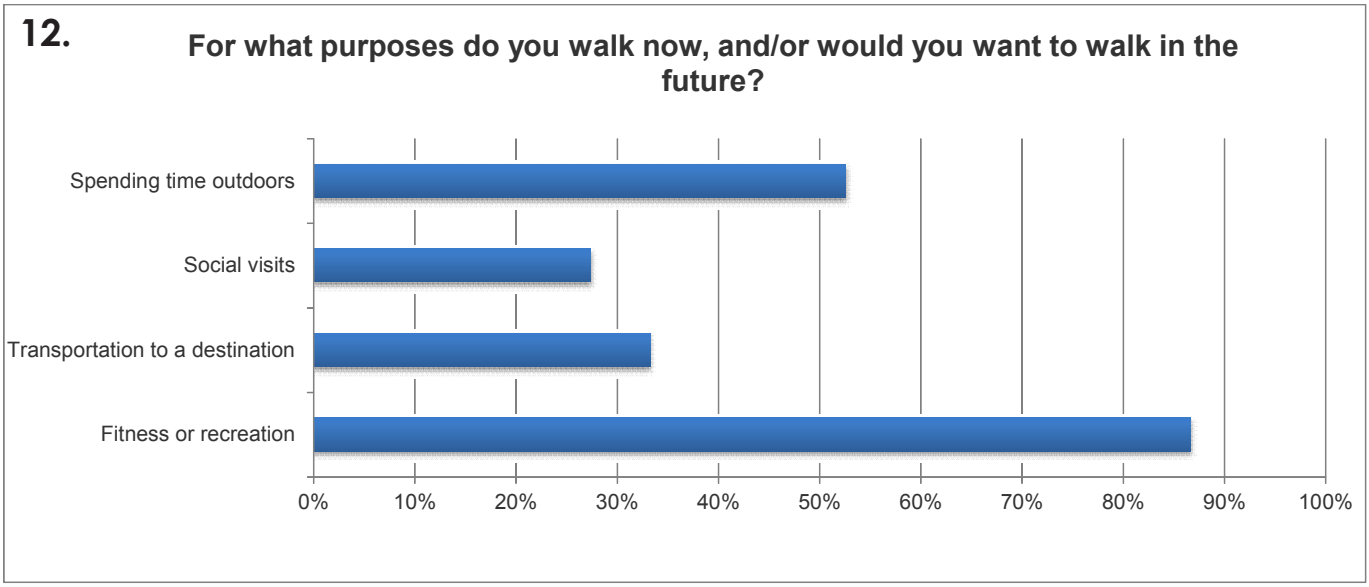
10.


How often do you walk now?
1.5%
4.4%
20.4%
37.2%
36.5%
Never
Few times per month
Few times per week
5+ times per week
Other

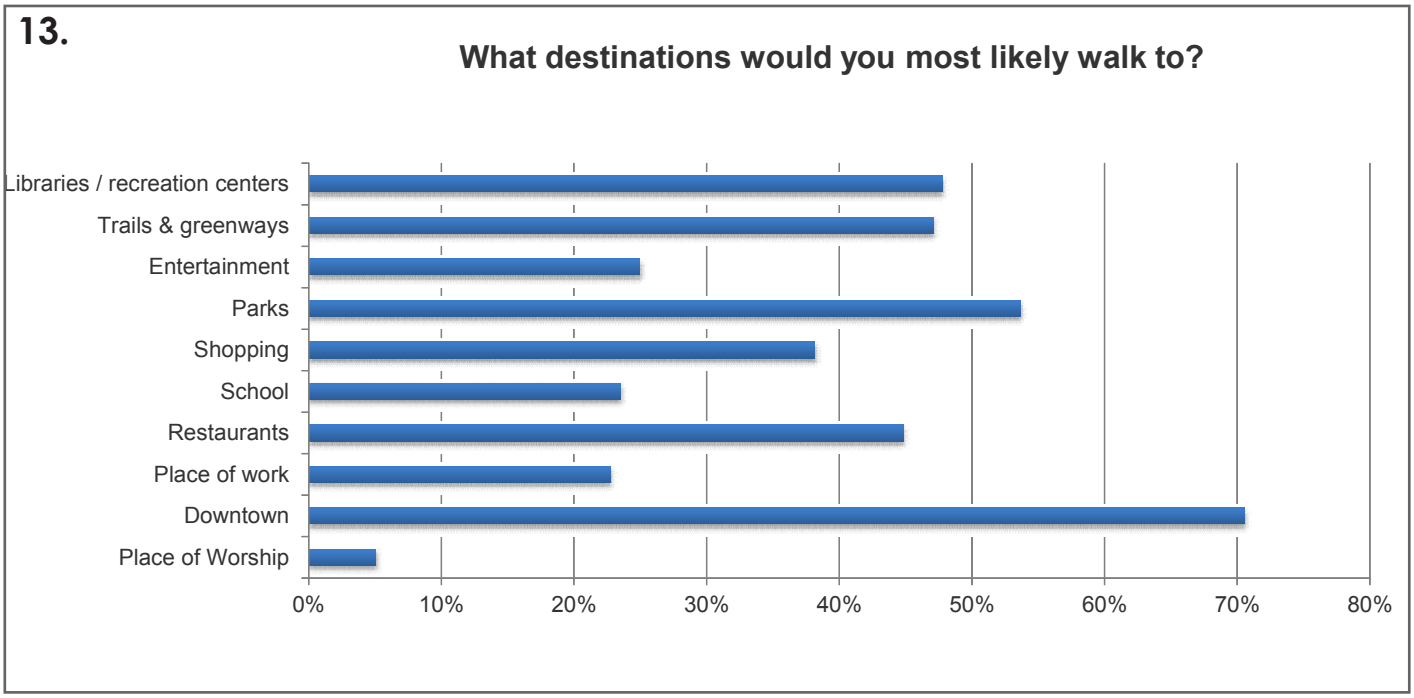
**11.**


Would you walk more often if more sidewalks, trails and safe roadway crossings were provided for pedestrians?
10.3%
89.7%
Yes
No

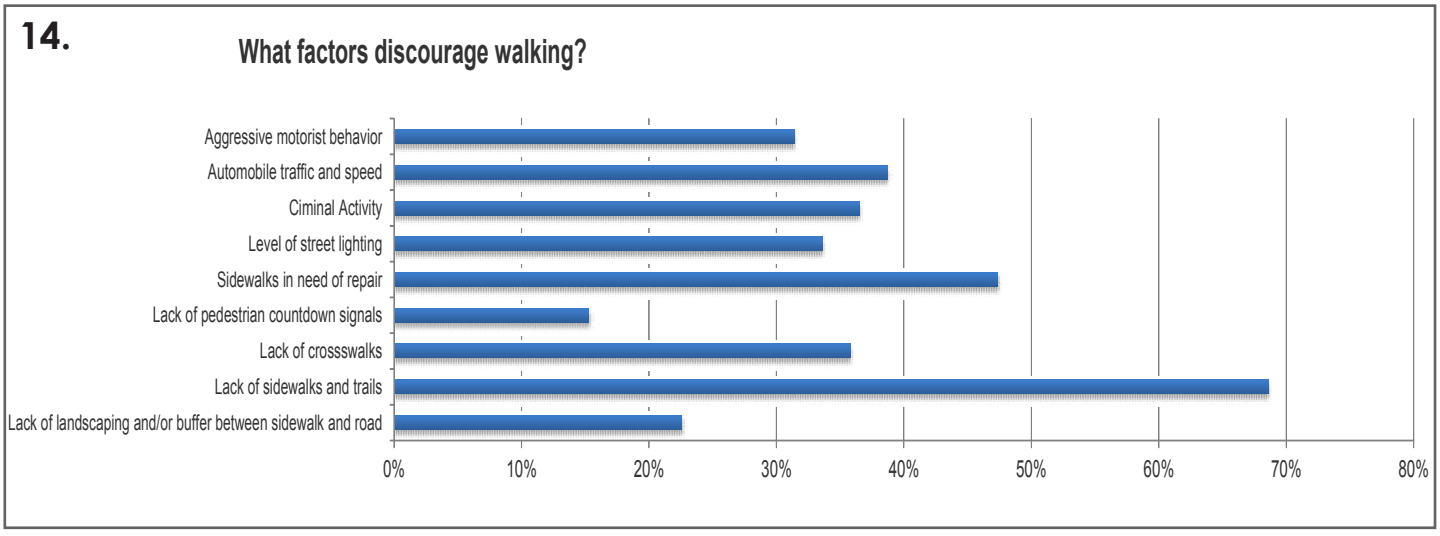
**12.**


For what purposes do you walk now, and/or would you want to walk in the future?
Spending time outdoors
Social visits
Transportation to a destination
Fitness or recreation
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

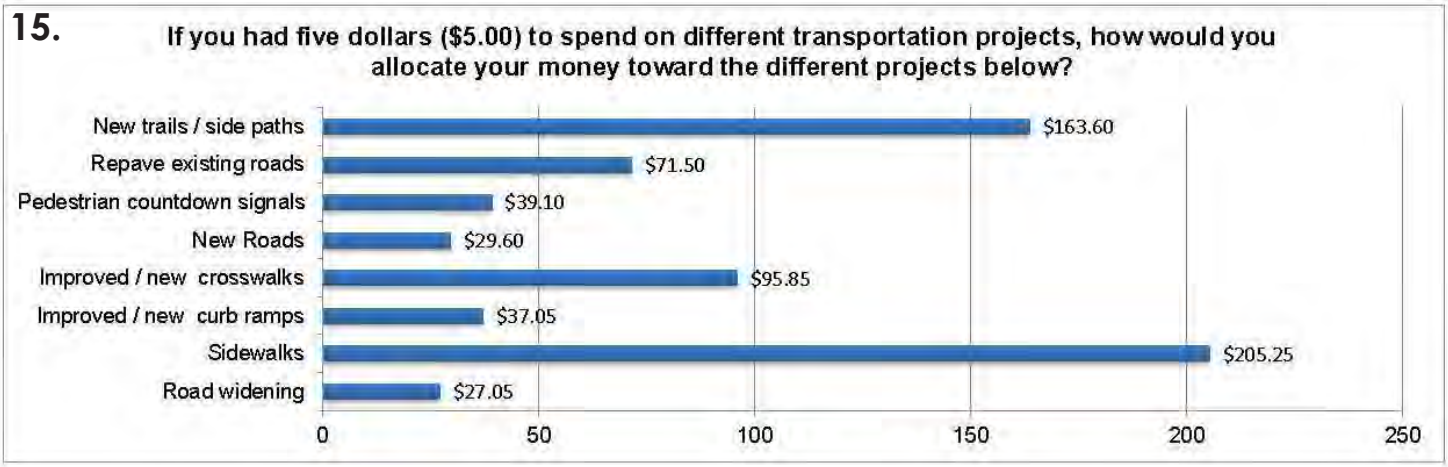
**13.**


What destinations would you most likely walk to?
Libraries / recreation centers
Trails & greenways
Entertainment
Parks
Shopping
School
Restaurants
Place of work
Downtown
Place of Worship
0%
10%
20%
30%
40%
50%
60%
70%
80%

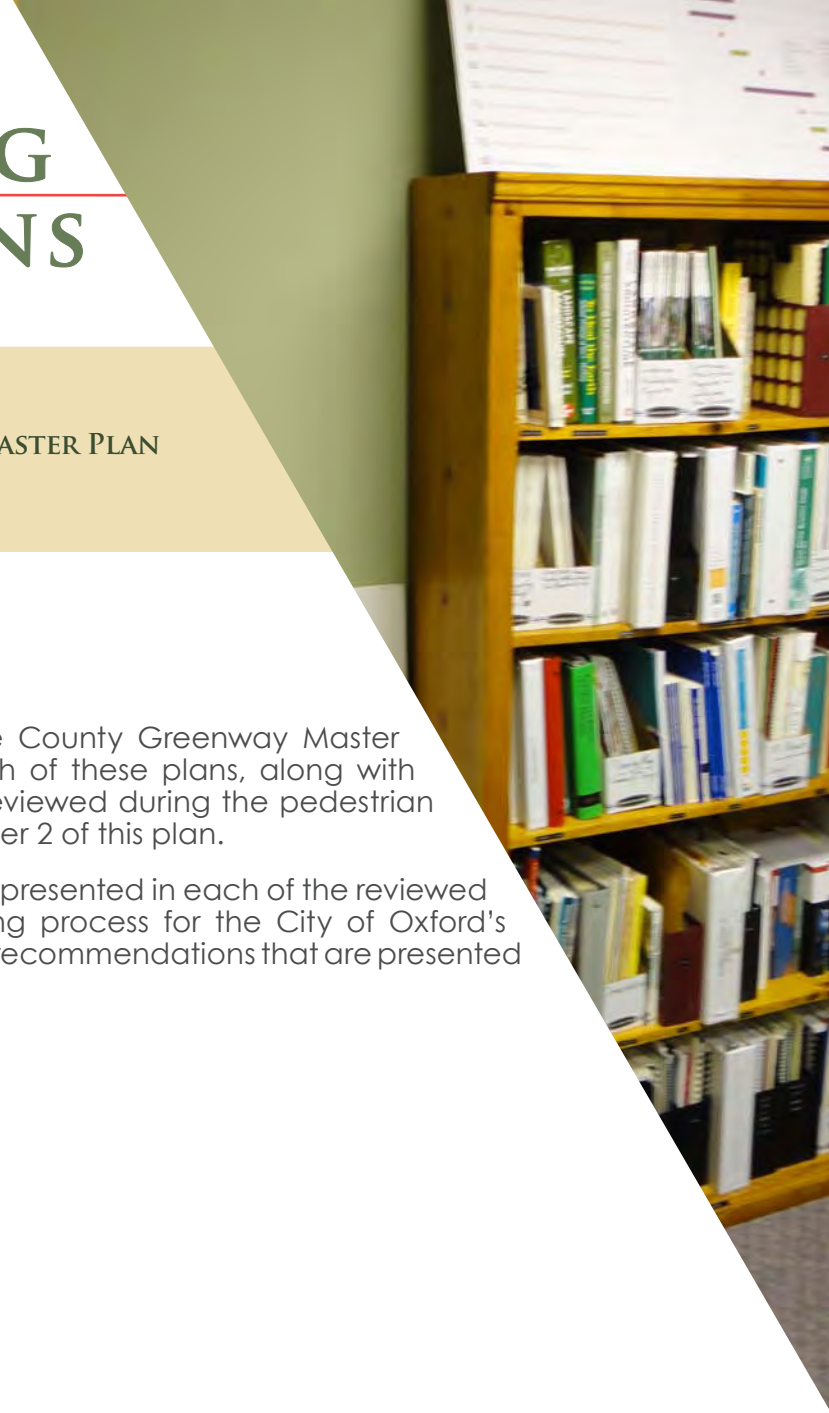
**14.**


What factors discourage walking?
Aggressive motorist behavior
Automobile traffic and speed
Ciminal Activity
Level of street lighting
Sidewalks in need of repair
Lack of pedestrian countdown signals
Lack of crossswalks
Lack of sidewalks and trails
Lack of landscaping and/or buffer between sidewalk and road
0%
10%
20%
30%
40%
50%
60%
70%
80%

**15.** If you had five dollars ($5.00) to spend on different transportation projects, how would you allocate your money toward the different projects below?



# C Existing Plans



## Appendix Outline

Overview | Granville County Greenway Master Plan

Oxford Comprehensive Plan

## Overview

This appendix contains copies of the Granville County Greenway Master Plan and the Oxford Comprehensive Plan. Both of these plans, along with the Downtown Streetscape Master Plan were reviewed during the pedestrian planning process and are summarized in Chapter 2 of this plan.

The mission, vision, goals and recommendations presented in each of the reviewed plans were considered throughout the planning process for the City of Oxford's Comprehensive Pedestrian Plan and guided the recommendations that are presented in Chapter 3.

# D Funding Strategies

## Appendix Outline

Overview | State & Federal | Local Government
Private & Non-Profit Sectors

## Overview

When considering possible funding sources for the City of Oxford's pedestrian projects, it is important to remember that not all construction activities will be accomplished with a single funding source. It will be necessary to consider several sources of funding, that when combined, would support full project construction. This appendix outlines the most likely sources of funding for the projects at the federal, state, local government level and from the private sector.

## State and Federal

Federal funding is typically directed through State agencies to local governments either in the form of grants or direct appropriations. State budget shortfalls may make it extremely difficult to accurately forecast available funding for future project development. The following is a list of possible Federal and State funding sources that could be used to support construction of the many pedestrian projects. Federal funding sometimes requires a 20% local match, however the recent stimulus money does not require a match. Since these funding categories are difficult to forecast, it is recommended that the City continue to work with the Kerr-Tar Regional Council of Governments on submitting pedestrian projects to NCDOT for inclusion in the STIP (State Transportation Improvement Program), as discussed below.

### NCDOT's Department of Energy (DOE)

The Department of Energy's Energy Efficiency and Conservation Block Grants (EECBG) grants may be used to reduce energy use 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 bicycle lanes and pathways and pedestrian walkways. Although this grant period has passed, more opportunities may arise. More information can be found at http://www.eecbg.energy.gov/.

### NC Department of Transportation and SAFETEA-LU

The most likely source of funding for bicycle and pedestrian projects would come from the North Carolina Department of Transportation and the federal funding program SAFETEA-LU. Some of the sub-programs within SAFETEA-LU and within NCDOT are listed below.

State Transportation Improvement Program (STIP): The STIP is a 3-5 year transportation project financial plan, containing funding for various transportation divisions of NCDOT including: highways, aviation, enhancements, public transportation, rail, bicycle and pedestrian, and the Governor's Highway Safety Program. STIP is the largest single funding strategy within SAFETEA-LU and NCDOT.

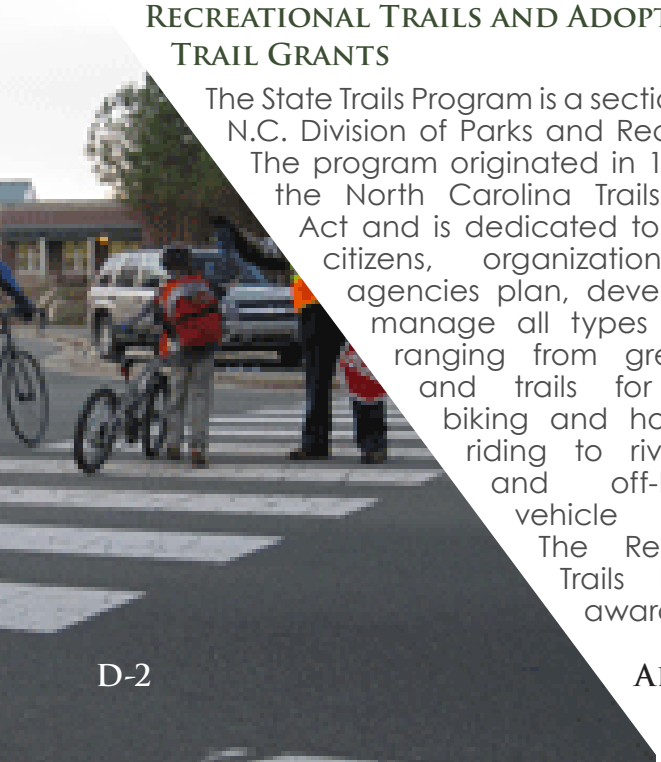
NCDOT Discretionary Funds: The Statewide Discretionary Fund consists of $10 million and is administered by the Secretary of the Department of Transportation. This fund can be used on any project at any location within the State. Primary, urban, secondary, industrial access, and spot safety projects are eligible for this funding. The City would have to make a direct appeal to the Secretary of NCDOT to access these funds.

NCDOT Contingency Fund: The Statewide Contingency Fund is a $10 million fund administered by the Secretary of Transportation. Again, the City would have to appeal directly to the Secretary.

NCDOT Enhancement Funding: Federal Transportation Enhancement funding is administered by NCDOT and serves to strengthen the cultural, aesthetic, and environmental aspects of the State's intermodal transportation system. Transportation Enhancement (TE oe ENH) funding is awarded through NCDOT. 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 or natural environment and create a sense of place.

NCDOT Bicycle and Pedestrian Project: Funds for bicycle and pedestrian projects come from several different sources. Allocation of funds depends on the type of project/ program and other criteria. Projects can include independent and incidental projects.

## NC Department of Environment – Recreational Trails and Adopt-A-Trail Grants



The State Trails Program is a section of the N.C. Division of Parks and Recreation. The program originated in 1973 with the North Carolina Trails System Act and is dedicated to helping 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. The Recreation Trails Program awards grants up to $75,000 per project. The Adopt-A-Trail Program awards grants up to $5,000 per project.

## Powell Bill Funds

Annually, State street-aid (Powell Bill) allocations are made to incorporated municipalities which 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.

## Community Development Block Grant Funds

Community Development Block Grant (CDBG) funds are available to local municipal or county governments that qualify for projects to 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. 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. These community improvement projects are administered by the Division of Community Assistance and the Commerce Finance Center under eight grant categories. Two categories might be of support to bicycle and pedestrian projects in 'entitlement communities': infrastructure and community revitalization.

## Land and Water Conservation Trust Fund

The Land and Water Conservation Fund (LWCF) has historically been a primary funding source of the US Department of the Interior for outdoor recreation development and land acquisition by local governments and state agencies. In North Carolina, the program is administered by the Department of Environment and Natural Resources (DENR).

### N.C. Parks and Recreation Trust Fund (PARTF)

The Parks and Recreation Trust Fund (PARTF) provide dollar-for-dollar matching grants to local governments for parks and recreational projects to serve the general public. Counties, incorporated municipalities and public authorities, as defined by G.S. 159-7, are eligible applicants.

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. http://www.ncparks.gov/About/grants/partf_main.php

### Safe Routes to School Program (managed by NCDOT, DBPT)

The NCDOT Safe Routes to School Program is a federally funded program that was initiated by the passing of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, which establishes a national SRTS program to distribute funding and institutional support to implement SRTS programs in states and communities across the country. SRTS programs facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. The Division of Bicycle and Pedestrian Transportation at NCDOT is charged with disseminating SRTS funding.

The state of North Carolina was allocated $15 million in Safe Routes to School funding for fiscal years 2005 through 2009 for infrastructure or non-infrastructure projects. In 2009, more than $3.6 million went to 22 municipalities and local agencies for infrastructure and non-infrastructure projects. All proposed projects must relate to increasing walking or biking to and from an elementary or middle school. An example of a non-infrastructure project is an education or encouragement program to improve rates of walking and biking to school. An example of an infrastructure project is construction of sidewalks around a school. Infrastructure improvements under this program must be made within 2 miles of an elementary or middle school. The state requires the completion of a competitive application to apply for funding. For more information, visit www.ncdot.org/programs/safeRoutes/ or contact DBPT/NCDOT, (919) 807-0774.

### Rivers, Trails and Conservation Assistance Program

The Rivers, Trails and Conservation Assistance Program (RTCA) is a National Park Service program which provides technical assistance via direct 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 that include 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.

## Local Government

Local funding sources that would support bicycle and pedestrian facility project construction will most likely be limited but should be explored.

### Kerr-Tar Regional Council of Governments

The Kerr-Tar Regional Council of Governments (COG) manages the transportation planning process required by Federal law. The COG plans for the area's surface transportation needs, including highways, transit, bicycle, and pedestrian facilities. An important part of the transportation planning process is to identify transportation needs and to explore feasible alternatives to meet those needs. Plans and programs are often conducted in partnership with the NC Department of Transportation to identify needs and projects to enhance Oxford's transportation infrastructure.

It is suggested that the City work closely with the COG on getting pedestrian projects included in the STIP since this may be the primary source of funding for

theproject.ProjectsintheSTIPrequirealocalmatch.

### City of Oxford's Capital Improvement programming and Reserve Funds

The City of Oxford may have funding available to support some elements of construction or repair. It will be important to meet with City Council representatives and the City Manager to judge the availability of this funding.

### Other local funding options

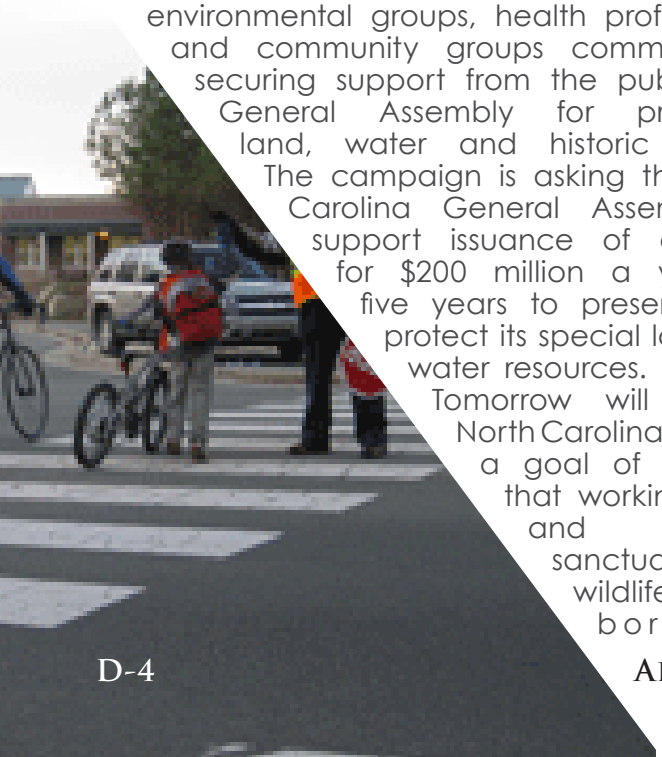
- Bonds/Loans
- Taxes
- Impact fees
- Exactions
- Tax increment financing
- Partnerships

## Private and Non-Profit Sectors

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

### Land for Tomorrow Campaign

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



### The Robert Wood Johnson Foundation

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

- To assure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs
- For more specific information about what types of projects are funded and how to apply, visit www.rwjf.org/applications/.

### North Carolina Community Foundation

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

### Z. Smith Reynolds Foundation

This Winston-Salem-based Foundation has

been assisting the environmental projects of local governments and non-profits in North Carolina for many years. They have two grant cycles per year and generally do not fund land acquisition. However, they may be able to offer support in other areas of open space and greenways development. More information is available at www.zsr.org.

### Bank of America Charitable Foundation, Inc.

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

### Duke Energy Foundation

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

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

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

### American Greenways Eastman Kodak Awards

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

### National Trails Fund

American Hiking Society created the National Trails Fund in 1998, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. 73 million people enjoy foot trails annually, yet many of our favorite trails need major repairs due to a $200 million backlog of badly needed maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than $240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project.

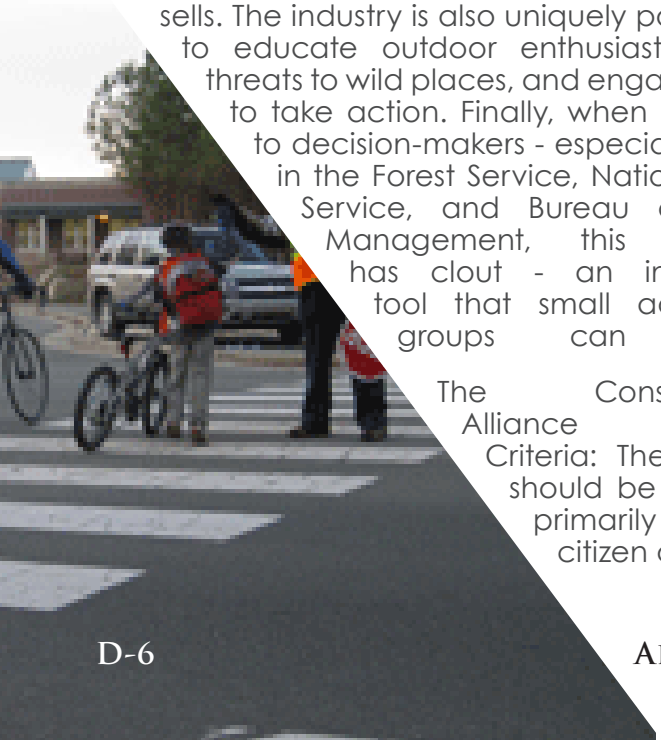
Projects the American Hiking Society will consider include:

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

## The Conservation Alliance

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

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



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

Web site: www.conservationalliance.com/index

E-mail: john@conservationalliance.com.

## National Fish and Wildlife Foundation (NFWF)

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

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

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

## The Trust for Public Land

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities. TPL's legal and real estate specialists work with landowners, government agencies, and community groups to:

- Create urban parks, gardens, greenways, and riverways.
- Build livable communities by setting aside open space in the path of growth.

Conserve land for watershed protection, scenic beauty, and close-to home recreation safeguard the character of communities by preserving historic landmarks and landscapes.

The following are TPL's Conservation Services:

Conservation Vision: TPL helps agencies and communities define conservation priorities, identify lands to be protected, and plan networks of conserved land that meet public need.

Conservation Finance: TPL helps agencies and communities identify and raise funds for conservation from federal, state, local, and philanthropic sources.

Conservation Transactions: TPL helps structure, negotiate, and complete land transactions that create parks, playgrounds, and protected natural areas.

Research and Education: TPL acquires and shares knowledge of conservation issues and techniques to improve the practice of conservation and promote its public benefits.

Since 1972, TPL has worked with willing landowners, community groups, and national, state, and local agencies to complete more than 3,000 land conservation projects in 46 states, protecting more than 2 million acres. Since 1994, TPL has helped states and communities craft and pass over 330 ballot measures, generating almost $25 billion in new conservation-related funding. For more information, visit www.tpl.org/.

## BlueCross BlueShield of North Carolina Foundation (BCBS)

Blue Cross Blue Shield (BCBS) focuses on programs that 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 concentrates on increased physical activity and healthy eating habits. 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 an audit.

http://www.bcbsncfoundation.org/

## Alliance for Biking & Walking: Advocacy Advance Grants

Bicycle and pedestrian advocacy organizations play the most important role in improving and increasing biking and walking in local communities, states, and provinces. Advocacy Advance Grants enable state and local bicycle and pedestrian advocacy organizations to develop, transform, and provide innovative strategies in their communities. Thanks to remarkable support from SRAM, Planet Bike, and Bikes Belong, the Alliance for Biking & Walking has awarded more than $500,000 in direct grants, technical assistance and scholarships to advocacy organizations across North America since the Advocacy Advance Grant program's inception. In 2009 and 2010, these one-year grants were awarded twice annually to startup organizations and innovative campaigns to dramatically increase biking and walking. Through the Advocacy Advance Partnership with the League of American Bicyclists, the Alliance also provided necessary technical assistance, coaching, and training to supplement the grants. For more information, visit www.peoplepoweredmovement.org

## Health and Wellness Trust Fund: Fit Community Program

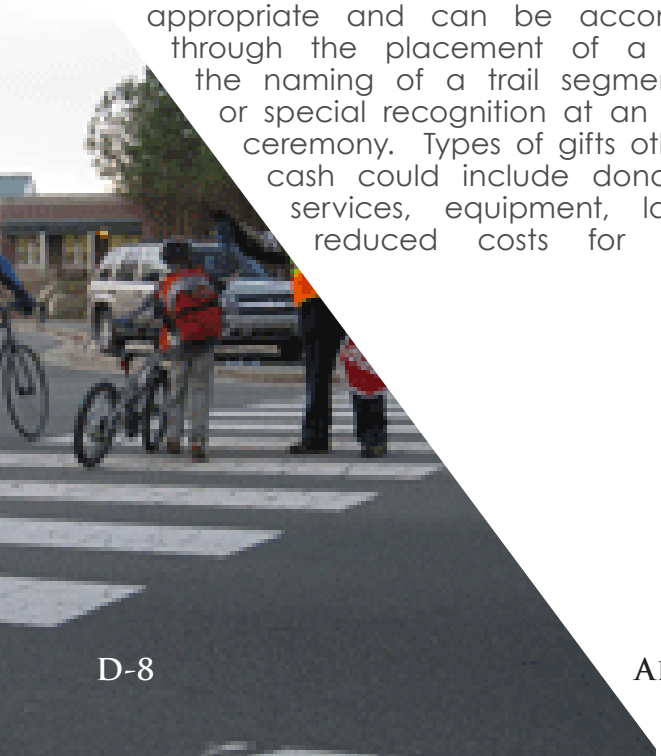
To address the growing obesity epidemic, commissioners of the Health and Wellness Trust Fund created a comprehensive program that would promote and help implement proven and innovative interventions to increase people's physical activity and improve nutrition choices.

HWTF partnered with Blue Cross and Blue Shield of North Carolina to launch Fit Together in 2004, a statewide campaign designed to raise awareness around the dangers of unhealthy weight and to equip individuals and communities with the tools they need to address this serious health concern.

In 2005, Fit Together unveiled Fit Community, a program to recognize and reward municipality and county-wide efforts to promote physical activity, healthy eating and tobacco-free programs, policies, environments and lifestyles. The Fit Community application process is a thorough evaluation that can and will benefit your community in numerous unexpected ways. For 2011, all applications due for designation had to have been submitted to Active Living by Design by 5:00 p.m. on March 18, 2011. For more information, visit www.fitcommunitync.com

## Local Trail Sponsors

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



## Volunteer Work

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