YOUNGSVILLE, NC
BICYCLE & PEDESTRIAN PLAN

FINAL PLAN | 2015

Prepared for the Town of Youngsville & NCDOT
Prepared by Alta Planning + Design

ACKNOWLEDGEMENTS

Thanks to the local residents, community leaders, and government staff that participated in the development of this plan through meetings, events, comment forms, and plan review. Special thanks to those who participated as steering committee members, listed below.

PROJECT STEERING COMMITTEE

The Steering Committee is made up of local residents, government staff, and community leaders.

Scott Anderson	Youngsville Planning Board
Donald R. Belk	Youngsville Planning & Zoning
Robert Bickerstaffe	Spokes Cycles
Mary Jo Buffaloe	Youngsville Woman's Club
Bob Clark	Youngsville Planning & Zoning
Candace Davis	Wake Forest Planning Department
Ritchie Duncan	Franklin County Economic Development Commission
Ronald Edwards	Youngsville Planning Board
Shanta Garner	Franklin County Health Department
Pete Gibson	Youngsville Parks and Recreation Department
Scott Hammerbacher	Franklin County Planning & Inspections
Terry Hedlund	Youngsville Board of Commissioners and CAMPO TAC
Daren Kirts	Youngsville Police Department
Cindy Miller-Walker	Franklin County Schools
Sheldon Patterson	Youngsville Maintenance
Bryan Poole	NCDOT Division of Bicycle and Pedestrian Transportation
Catherine Redd	Youngsville Board of Commissioners
Chip Russell	Wake Forest Planning Department
Berry Stevens	Spokes Cycles
Bill Tatum	Youngsville Administration
Kathryn Tucker	Youngsville Administration
Steven Winstead	NCDOT Division 5
Kenneth Withrow	Capital Area Metropolitan Planning Organization

Prepared for the Town of Youngsville, North Carolina
Project Contact: Donald R. Belk, AICP, Senior Planner, Town of Youngsville
Post Office Box 190 , Youngsville, NC 27596 | 919-556-5073 | Townyngs@townofyoungsville.org

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Prepared by Alta Planning + Design, 111 East Chapel Hill Street, Suite 100, Durham, NC 27701 | www.altaplanning.com

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CHAPTER ONE:
INTRODUCTION & OVERVIEW

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PROJECT BACKGROUND

The Youngsville Bicycle & Pedestrian Plan was made possible by joint funding from the Town of Youngsville and the North Carolina Department of Transportation (NCDOT). In 2014, Youngsville 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. To date, the initiative has funded planning efforts in more than 164 municipalities across the state. The program is administered through NCDOT's Division of Bicycle and Pedestrian Transportation.

PLANNING PROCESS

The planning process began with a Kickoff Meeting in April 2015, which was the first of four project Steering Committee meetings. The Steering Committee was made up of a combination of local residents, Town staff and representatives, business owners, health professionals, and regional transportation planners. This Steering Committee guided the plan's development throughout the planning process. Key steps included communicating their overall vision for the plan, identifying opportunities and constraints for walking and bicycling, and providing feedback on plan recommendations.

Above: Steering Committee members mark up base maps at the project Kick-Off Meeting.

Aside from the Steering Committee input, the planning process included several other important methods of public outreach and involvement. The project website, public comment form, press releases, and public workshops were all used to gather input for the plan and ask for feedback on the draft plan. The plan and planning process were also promoted through the Town's Facebook page. Key outreach dates in the process included:

Key Steps in the Planning Process:

APRIL 2015
1st Steering Committee Meeting, Field Review, & 1st Public Workshop

MAY 2015
2nd Steering Committee Meeting: Working Draft Recommendations

AUGUST 2015
2nd Public Workshop & 3rd Steering Committee: Full Draft Plan

AUGUST-SEPTEMBER 2015
Draft Plan Review by Town, Committee, NCDOT and Public

SEPTEMBER 2015
4th Steering Committee Meeting: Final Plan Review

SEPT-OCT 2015
Complete Final Plan/ Public Hearing for Plan Adoption

WHY THIS PLAN IS IMPORTANT

As growth and development continue in Youngsville, bicycle and pedestrian planning will be critical to the efficient accommodation of this growth and enhancement of the overall quality of life.

Through this plan, the Town of Youngsville aims to:

- Improve pedestrian and bicyclist safety;
- Foster better access to community destinations;
- Stimulate economic development in the downtown;
- Create opportunities for active and healthy lifestyles; and
- Enhance overall quality of life.

Above: During this planning process, streetscape improvements along Main St. (NC 96) were considered in order to create safer walking and bicycling conditions.

VISION STATEMENT

The Town of Youngsville is a family friendly community rich in history and full of promise. In an effort to maintain its rural charm, the town aims to revitalize its Downtown and promote it as the cultural and retail center of the town. In order to do this, efforts to attract business and make Downtown more enjoyable and safe for pedestrians and bicyclists have become a top priority.

The above Vision Statement combines language from Envision Youngsville (see page 2-10 for summary) and input from the Steering Committee, outlining the overall vision for the outcomes of this plan. While downtown improvements are highlighted in the Vision Statement, this bicycle & pedestrian is comprehensive for the Town of Youngsville.

In absence of research focused directly on Youngsville, the sections that follow highlight national and statewide trends for each topic.

SAFETY FOR PEDESTRIANS & BICYCLISTS

Trends and Challenges

According to a survey of 16,000 North Carolina residents for the 2011 North Carolina Bicycle and Pedestrian Safety Summit, the most commonly reported safety issue for walking and bicycling was inadequate infrastructure (75%).[1] A lack of bicycle and pedestrian facilities, such as sidewalks, bike lanes, trails, and safe crossings, lead to unsafe conditions for bicyclists and pedestrians:

- Each year on average (2008-2012), 168 pedestrians and 22 bicyclists are killed in collisions with motor vehicles on North Carolina roads, while many more are seriously injured.[2]
- North Carolina is ranked as one of the least safe states for walking (41st) and bicycling (44th).[3]
- 13% of all traffic fatalities in North Carolina are bicyclists and pedestrians.
- During the five-year period from 2008 to 2012, a total of 4,889 bicycle-motor vehicle crashes and 13,186 pedestrian-motor vehicle crashes were reported to North Carolina authorities.[2]
- In Youngsville, from 2007-2012, there was one crash involving a pedestrian.

Improving Safety

Separate studies conducted by the Federal Highway Administration and the University of North Carolina Highway Safety Research Center demonstrate that installing pedestrian and bicycle facilities directly improves safety by reducing the risk and severity of pedestrian-automobile and bicycle-automobile crashes. For example, installing a sidewalk along a roadway reduces the risk of a pedestrian "walking along roadway" crash by 88 percent. Furthermore, according to the aforementioned survey, 70% of respondents said they would walk or bicycle more if safety issues were addressed, citing a lack of bicycle and pedestrian facilities as the top issues[1] (see Pedestrian Crash Countermeasures below).

The following web addresses link to more comprehensive research on safety.

- http://www.walkbikenc.com/
- http://www.pedbikeinfo.org/data/factsheet_crash.cfm

HEALTH IMPACTS OF ACTIVE TRANSPORTATION

Trends and Challenges

North Carolina's transportation system is one of the most important elements of our public environment. Unfortunately, it includes many streets that are unsafe for walking and bicycling, posing barriers to healthy living and active transportation. In the next column are some key trends and challenges related to health and transportation in North Carolina:

- 65% of adults in North Carolina are either overweight or obese.[5] The state is also ranked 5th worst in the nation for childhood obesity.[6]
- In a 2012 survey, 88% of North Carolinians responded that they spend no time walking or biking as a means of transportation.[5]
- Recent reports have estimated the annual direct medical cost of physical inactivity in North Carolina at $3.67 billion, plus an additional $4.71 billion in lost productivity.[7] However, every dollar invested in pedestrian and bicycle trails can result in a savings of nearly $3 in direct medical expenses.[8]
- Of North Carolinians surveyed, 60% would increase their level of physical activity if they had better access to sidewalks and trails.[5]
- A Charlotte study found that residents who switched to walking by using light rail for their commute weighed an average of 6.5 pounds less than those who continued to drive to work.

Better Health through Active Transportation

Using active transportation to and from school, work, parks, restaurants, and other routine destinations is one of the best ways that children and adults can lead measurably healthier lives. Increasing one's level of physical activity through walking and bicycling reduces the risk and impact of cardiovascular disease, diabetes, chronic disease, and some cancers. It also helps to control weight, improves mood, and reduces the risk of premature death.[10]

PEDESTRIAN CRASH COUNTERMEASURES	PEDESTRIAN CRASH REDUCTION FACTOR
Install pedestrian overpass/underpass	90%
Install sidewalk (to avoid walking along roadway)	88%
Provide paved shoulder (of at least 4 feet)	71%
Install raised median at unsignalized intersection	46%
Install pedestrian refuge island	36%
Install pedestrian countdown signal heads	25%

Active Transportation: Pathway to Health

Source: Alta Planning + Design; WalkBikeNC

ECONOMIC IMPACTS OF ACTIVE TRANSPORTATION

Economic Trends in North Carolina

Bicycle and pedestrian facilities generate economic returns by raising property values, supporting local businesses and jobs, and attracting visitors. Below are some key economic trends related to walking and bicycling in North Carolina:

- North Carolina is the 6th most visited state in the United States and visitors spend as much as $18 billion a year, many of whom partake in activities related to walking or biking.[11]
- The annual return to local businesses and state and local governments on bicycle facility development in the Outer Banks is approximately nine times higher than the initial investment.[12]
- Walking and biking are economically efficient transportation modes. Many North Carolinians cannot afford to own a vehicle and are dependent on walking and biking for transportation (6.6% of occupied housing units in North Carolina do not own a vehicle).[13]
- The report, *Walking the Walk: How Walkability Raises Housing Values in U.S. Cities*, analyzed data from 94,000 real estate transactions in 15 major markets provided by ZipRealty and found that in 13 of the 15 markets, higher levels of walkability, as measured by Walk Score, were directly linked to higher home values.

MOBILITY AND ACCESSIBILITY BENEFITS OF ACTIVE TRANSPORTATION

Opportunity to Increase Walking and Bicycling Rates

According to the 2011 Bicycle and Pedestrian Safety Survey, at least 70 percent of North Carolinians would walk or bike more for daily trips if walking and bicycling conditions were improved.[1] With appropriate accommodations, walking and bicycling can provide alternatives to driving for commuting to work, running errands, or making other short trips.

Commute rates for walking and bicycling in North Carolina currently fall below the national average, with just 0.2% of North Carolina commuters bicycling to work and 1.8% walking to work, compared to 0.6% bicycling and 2.9% walking nationwide. This places North Carolina 42nd for walking commute rates and 41st for bicycling commute rates in nationwide state rankings.[3]

Charts in Chapter 2 show national model communities for walking and biking rates, model communities in North Carolina, and peer communities in the Triangle region.

An estimated 40% of all trips (commute and non-commute) taken by Americans each day are less than two miles, equivalent to a bike ride of 10 minutes or less; however, just 13% of all trips are made by walking or bicycling nationwide.[3] To put these numbers into perspective, 34% of all trips are made by walking or bicycling in Denmark and Germany, and 51% of all trips in the Netherlands are by foot or by bike.[14] Germany, Denmark, and the Netherlands are wealthy countries with high rates of automobile ownership, just like the United States. Yet, an emphasis has been placed on providing quality walking and bicycling environments which has alleviated the reliance on motor vehicles for short trips.

Some cities in the U.S. have made great strides in bicycling and walking commute rates, showing that significant improvements are possible across the U.S. Boston, MA (17%), Washington, DC (14%), and San Francisco (13%) are examples of large cities with the highest rates.[3] See page 2-3 for additional comparisons showing bicycling and walking commute rates for small and medium sized cities.

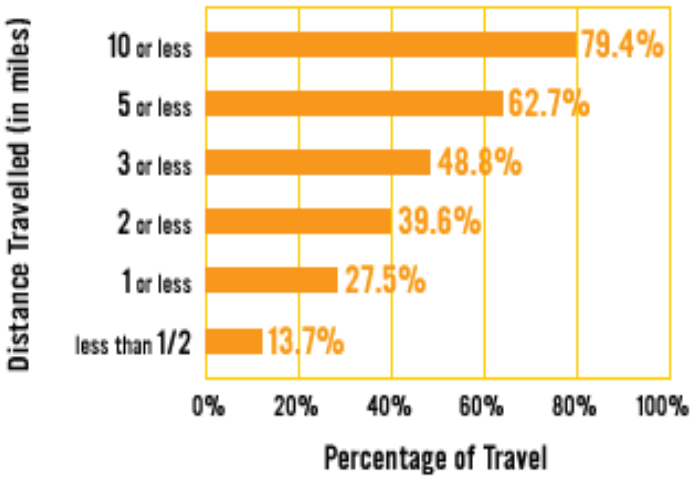
Reduced Vehicle Miles Traveled (VMT) & Congestion

Taking short trips by foot or by bike can help to greatly reduce motor vehicle miles driven and traffic congestion. Under the Nonmotorized Transportation Pilot Program, walking and bicycling investments contributed to an estimated 23% increase in the number of walking trips and an estimated 48% increase in the number of bicycling trips in four pilot communities between 2007 and 2013.[15] These individual changes in travel behavior can add up to produce significant societal benefits. Traffic on arterials and other streets can be mitigated as people use sidewalks, bike lanes, paths, and other alternatives to get around. Parking lots can also be made less congested by reducing crowding, circling, and waiting for open spots.

The following web addresses link to more comprehensive research on transportation efficiency.

» http://www.walkbikenc.com/
» http://www.pedbikeinfo.org/data/factsheet_general.cfm

Daily Trip Distances of Americans



Most driving trips are for a distance of five miles or less. Chart from the Bicycle and Pedestrian Information Center website, www.pedbikeinfo.org

STEWARDSHIP BENEFITS OF ACTIVE TRANSPORTATION

Stewardship addresses the impact that transportation decisions (both at the government/policy level and individual level) can have on the land, water and air that Youngsville residents and visitors enjoy.

Trends and Challenges

Below are some key trends and challenges related to stewardship and transportation in North Carolina:

- Even a modest increase in walking and bicycling trips (in place of motor vehicle trips) can have significant positive impacts for the environment. For example, replacing two miles of driving each day with walking or bicycling will, in one year, prevent 730 pounds of carbon dioxide from entering the atmosphere.[16]
- According to the National Association of Realtors and Transportation for America, 89% of Americans believe that transportation investments should support the goal of reducing energy use.[17]
- North Carolina's 2009-2013 Statewide Comprehensive Outdoor Recreation Plan (SCORP) found "walking for pleasure" to be the most common outdoor recreational activity, enjoyed by 82% of respondents, and bicycling by 31% of respondents.[18]

Providing safe accommodations for walking and bicycling can help to reduce automobile dependency, which in turn leads to a reduction in vehicle emissions – a benefit for residents and visitors and the surrounding environment. As of 2003, 27 percent of U.S. greenhouse gas emissions are attributed to the transportation sector, and personal vehicles account for almost two-thirds (62 percent) of all transportation emissions.[16] Primary emissions that pose potential health and environmental risks are carbon dioxide, carbon monoxide, volatile organic compounds, (VOCs), nitrous oxides (NOx), and benzene. Children and senior citizens are particularly sensitive to the harmful affects of air pollution, as are individuals with heart or other respiratory illnesses. Increased health risks such as asthma and heart problems are associated with vehicle emissions.[19]

The following web addresses link to more comprehensive research on active transportation and stewardship.

- http://www.walkbikenc.com/
- http://www.pedbikeinfo.org/data/factsheet_environmental.cfm

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CHAPTER TWO:
CURRENT CONDITIONS

Local Context | Current Conditions, Opportunities and Challenges | | Related Plans & Initiatives | Public Input

LOCAL CONTEXT

The Town of Youngsville is located in Franklin County, North Carolina. The town initially developed as a train depot and is located approximately 20 miles northeast of Raleigh, the state capital. Youngsville maintains a rural environment even as part of the rapidly growing Triangle region. As of the 2013 5-year ACS estimate, the population of Youngsville was 1,340 and the median age of the population was 32 years.

Two of the major highways that cross through town and intersect in downtown Youngsville are NC 96 and US 1A. NC Bike Route 2 (also known as the N.C. Mountains-to-Sea Bike Route) also connects through town. Bicycle and pedestrian infrastructure, however, are either non-existing or inadequate in most parts of town. The beginning of a sidewalk network is found along Main Street, but only a small amount exists outside of Main Street and are not ADA accessible. Heavy truck traffic and a lack of crossing infrastructure make it difficult to cross Main Street on foot or bike.

A small grid of quiet streets adjacent to downtown are conducive to bicycling and can be effective connections to Main Street and other local destinations.

Bicycling and Walking Rates

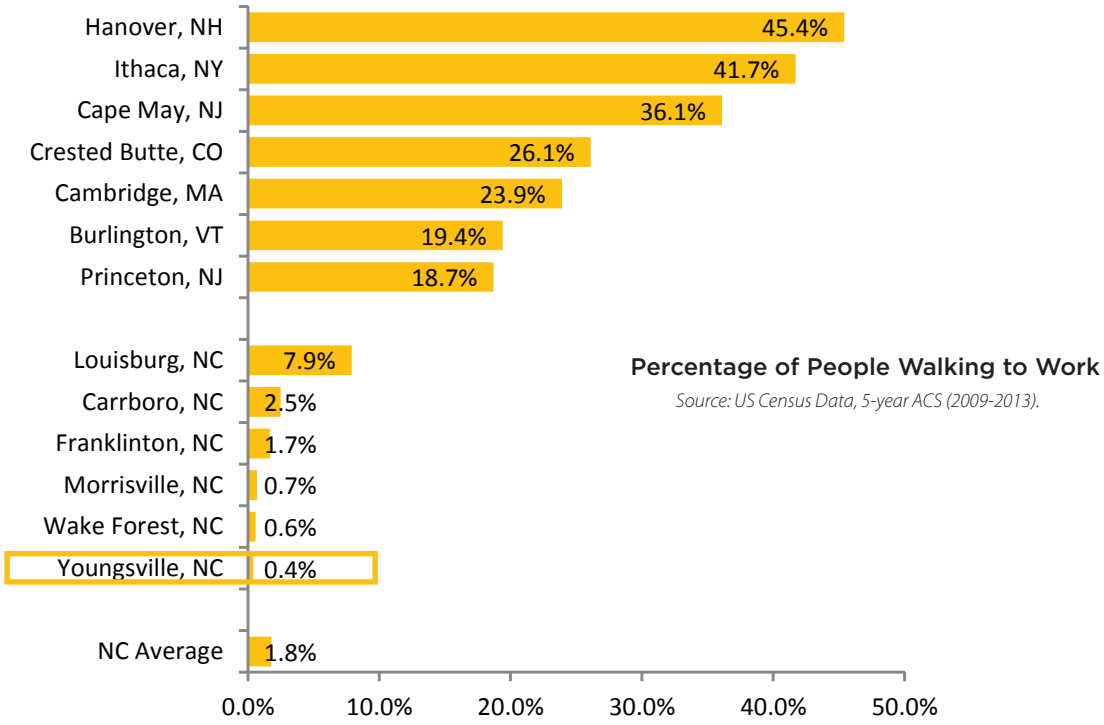
In many communities, walking and biking commute rates are used as an indicator of overall walking and biking. According to the latest census data, 0% of Youngsville residents bike to work, and 0.4% of Youngsville residents walk to work. For those who do live and work in Youngsville, there is ample opportunity to increase rates as compared to other communities statewide and nationally.

The charts on the following page also provide bicycle- and walk-to-work rates for model communities across the country, model communities in North Carolina, and peer communities for Youngsville. These numbers show that, with some effort to improve infrastructure, policies, and programs, high rates of walking and bicycling to work are possible in communities of all sizes. In the long-term, Youngsville should strive to raise bike- and walk-to-work rates to 2.5%, which would match the Carrboro, NC walk-to-work rate and would be over half of Carrboro's impressive bike-to-work rate of 4.6%. As bicycling and walking become more popular, Youngsville should work toward even higher rates to match Carrboro's bike-to-work rate as well, and work toward rates seen in national peer communities.

Table 2-1. Demographic Comparison

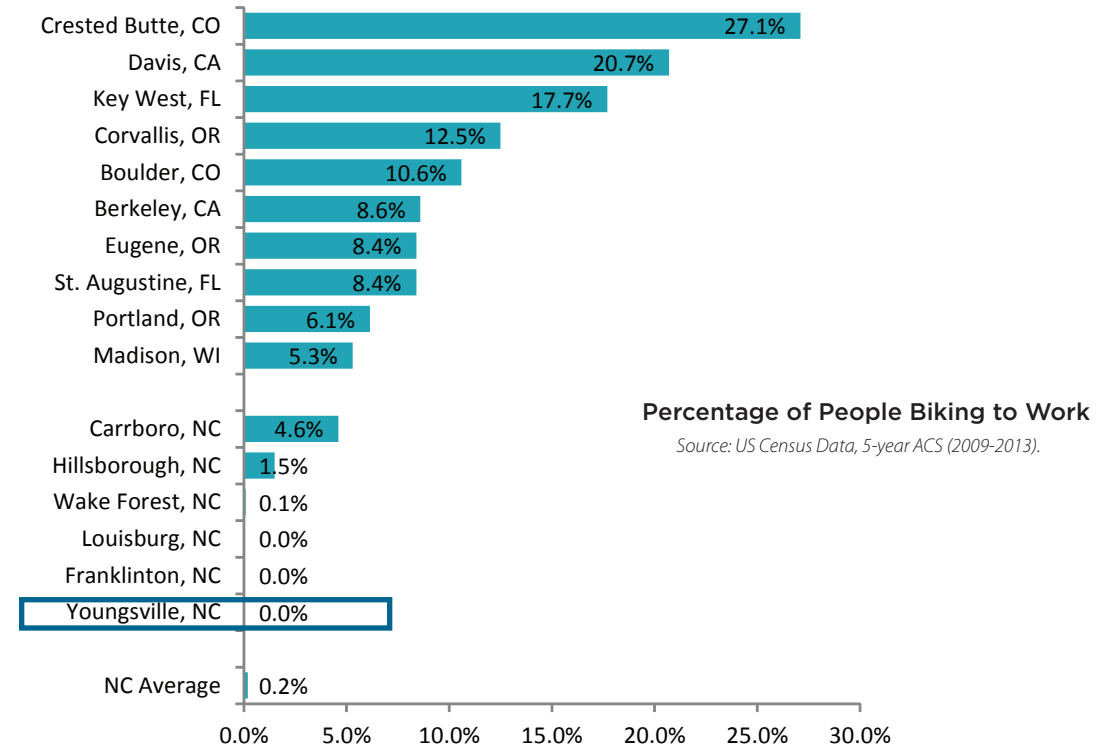
	YOUNGSVILLE	FRANKLIN COUNTY	NORTH CAROLINA
Population[1]	**1,340**	**61, 154**	**9,651,380**
Median Age[1]	**32**	**39.6**	**37.6**
Median Household Income[1]	**$34,795**	**$41,696**	**$46,344**
% Households without a Vehicle[1]	**4.1%**	**5.3%**	**6.6%**
% Walk to Work[1]	**0.4%**	**1.7%**	**1.8%**
% Bike to Work[1]	**0.0%**	**0.0%**	**0.2%**

[1] *US Census Bureau, 2009-2013 American Community Survey 5-Year Estimates*



Percentage of People Walking to Work

Source: US Census Data, 5-year ACS (2009-2013).



Percentage of People Biking to Work

Source: US Census Data, 5-year ACS (2009-2013).

CURRENT CONDITIONS

OPPORTUNITIES & CHALLENGES

Current walking and bicycling conditions in Youngsville are variable. A small grid network exists near the downtown core that features low traffic volume, low speed neighborhood streets and the start of a sidewalk network. Main Street is the focal point of Youngsville. Most destinations are within a mile from the downtown core, thus easy to reach for all levels of bicyclists and pedestrians. However, several key transportation corridors carry higher traffic volumes and speeds without dedicated space for bicyclists and pedestrians. The section below describes key opportunities and challenges in Youngsville.

NC 2 of the State bike route system at the Holden Road/ Youngsville Boulevard intersection

Existing pedestrian infrastructure across Cross Street

Opportunities

An analysis of existing conditions reveals several opportunities and challenges for bicycle and pedestrian network development in Youngsville. Opportunities include:

- **Downtown Youngsville:** Strong vision provided by Envision Youngsville (summary on page 2-10) - A revitalization plan for downtown Youngsville provides a clear analysis of the community's strengths, weaknesses, opportunities and threats and also highlights specific goals and a prioritized list of recommended strategies to achieve those goals.
- **NC State Bike Route 2:** As part of the state bike route system from western NC to the Outer Banks (NC 2 Mountains to Sea), this route passes east/west through downtown Youngsville; entering town from the west on Holden Road, passing through downtown on Main Street, then leaving town to the east on Tarboro Road. By improving this route through town for bicyclists, Youngsville has a chance to become a destination for through-bicyclists. For more information on NC 2 and the state bike route system, see - http://ncbikeways.com/.
- **Quiet neighborhood streets:** Several streets in the downtown core such as Winston Street, Franklin Street, Persimmon Street, Pine Street, and Railroad Street are quiet low traffic volume/speed streets that are safer for walking and bicycling and connect key locations in town. These can serve as important links as the pedestrian and bicycle network develops.
- **Sewer line easements:** Town maintained sewer lines could serve as key trail connections to the west side of town including the grocery store (Food Lion). A future PSNC energy line serves as a similar opportunity.
- **Residential development:** Residential growth in Youngsville serves as an opportunity for bicycle and pedestrian improvements to be incorporated into all future neighborhood development. One future

development that has strong bicycle and pedestrian connectivity potential includes the Holden Creek Preserve south of Holden Road and west of Camille Circle.

» **Riparian corridors:** Riparian corridors such as Richland Creek serve as excellent trail opportunities due to a generally flat grade and limited development possibilities in the floodplain.

» **Railroad corridor:** The CSX railroad line running north/south through the heart of Youngsville is a rail-with-trail opportunity.

» **Proposed roundabout at Main Street and Youngsville Boulevard:** A new roundabout at this intersection could incorporate bicycle and pedestrian infrastructure and serve as a key conduit for safely crossing this intersection and slowing traffic through town.

» **Connectivity to Wake Forest trails:** The developing Wake Forest greenway system (shared use paths) is an opportunity to ultimately link into the northern end of the Raleigh/Wake County Greenway system that continues to expand to Youngsville. Possible future connections include utilizing the Richland Creek corridor, rail-with-trail developments, and connecting to the recently constructed sidepath along Traditions Grande Boulevard which connects to Gilcrest Farm Road in southern Youngsville.

Challenges

The following list is an overview of key issues of the existing bicycle and pedestrian network in Youngsville. These observations are based on input from the Steering Committee, general public, field review, and available data.

» **Limited bicycle and pedestrian infrastructure:** Youngsville does have the beginning of a sidewalk network, mostly along Main Street; but generally speaking, bicycle and pedestrian facilities such as trails, bike lanes, and crossing facilities are lacking.

» **High building vacancy rate on Main Street:** Vacant and unused buildings in downtown Youngsville limit the amount of visits to Main Street by local residents and visitors.

» **Heavy truck traffic on Main Street (NC 96):** Main Street, in downtown Youngsville, is also State Highway NC 96 and carries significant traffic through the middle of town. While some traffic that brings people to downtown is encouraged, heavy truck traffic can limit the flow of bicycle and pedestrian users through downtown.

» **High-volume, high-speed roadways:** There are several high-volume roadways throughout town with high speeds and little shoulder with no off-road facility for bicyclists and pedestrians. Examples include Holden Road Tarboro Road, Youngsville Boulevard, and NC 96.

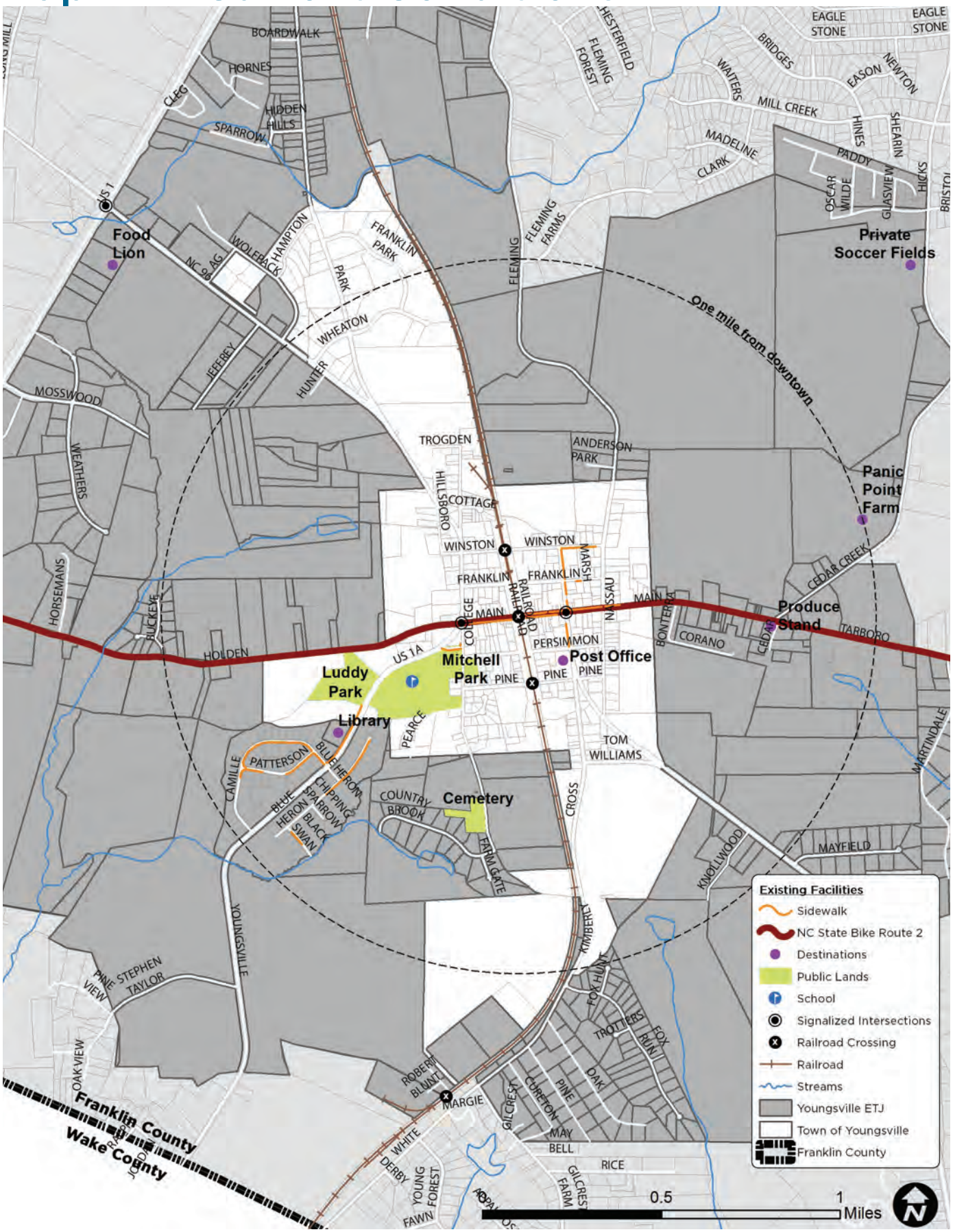
» **Railroad crossings:** The CSX railroad line running north/south through the heart of Youngsville can presently be crossed in only three locations in downtown Youngsville.

» **Lack of signage:** There is an overall lack of traffic and wayfinding signage for bicyclists and pedestrians. More signage is needed to make drivers aware of non-motorized traffic, direct bicyclists and pedestrians to safe routes and crossings, and provide directions between popular destinations.

» **Lack of programs:** Building and growing recurring programs that promote and educate all road users on bicycle and pedestrian safety, encourage bicycling and walking in town, and enforce traffic laws and safe traffic behavior could all contribute to a safer and more attractive environment for bicycling and walking.

Railroad crossing improvements needed

Map 2.1 - Current Conditions



NCDOT-Reported Pedestrian and Bicycle Crashes

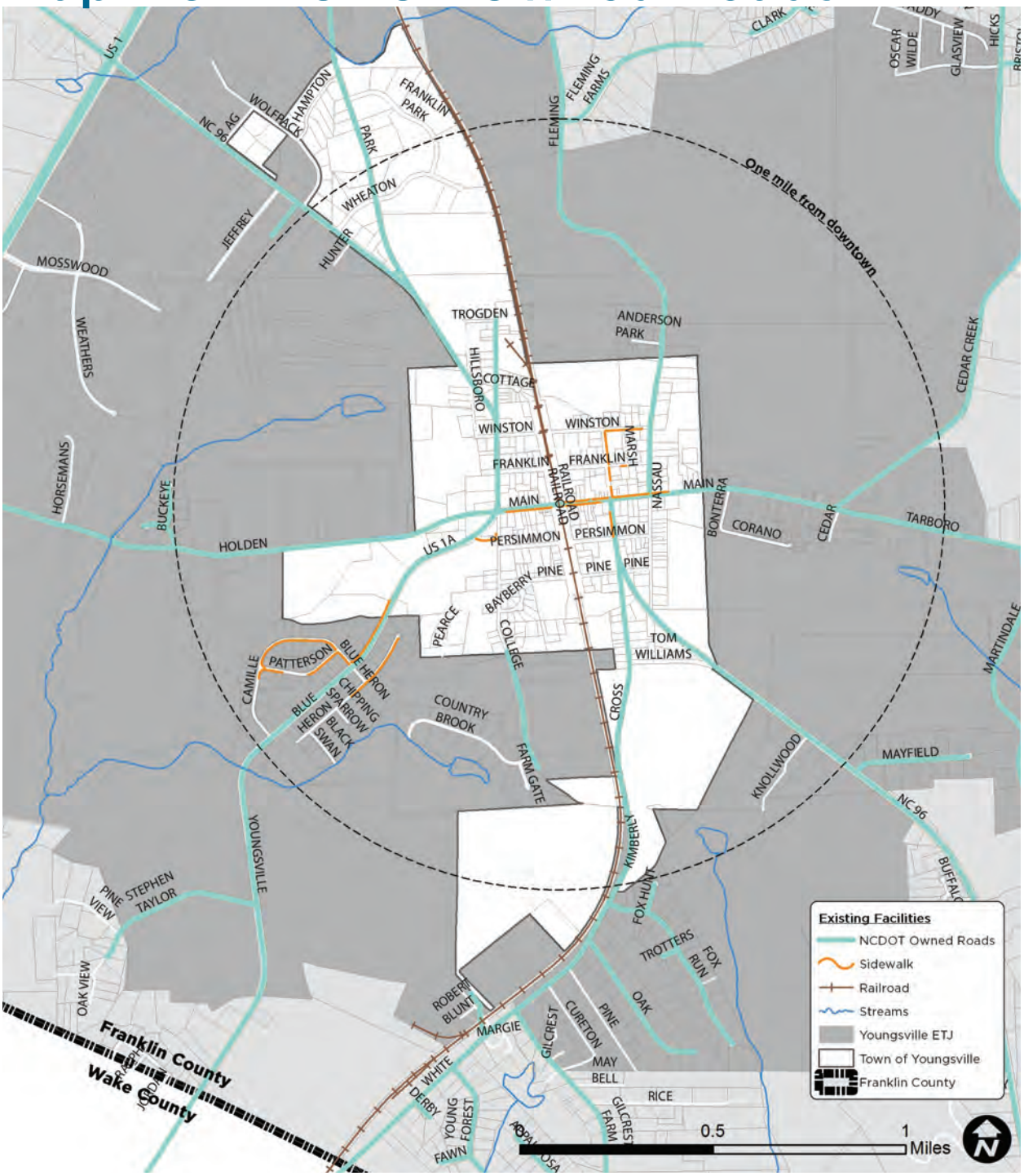
Map 2.2 below shows pedestrian and bicycle crashes in Youngsville that were reported to the NCDOT between 2007 and 2012. During this period, one pedestrian crash was recorded on Holden Road and zero bicycle crashes were recorded. The lack of crashes during this time period is likely related to the limited walk/bike commute rates noted on page 2-3. Keeping crash numbers low while raising walk/bike commute rates is a key reason why this plan is an important step for the Town of Youngsville.

Map 2.2 - Crashes

Roadway Jurisdictions

The roadway network in Youngsville is a combination of town-owned and state-owned roads. Knowledge of roadway ownership is important for determining the types of facilities that can be recommended along a roadway, the agency in charge of maintaining the roadway and implementing bicycle and pedestrian recommendations, and how improvements are scheduled, funded, and constructed. Map 2.3 below shows which roadways in Youngsville are state-versus- locally-owned. The town will need to coordinate with NCDOT Division 5 and the Division of Bicycle and Pedestrian Transportation to implement this plan's recommended improvements along these roadways.

Map 2.3 - NCDOT Owned Roads



Related Plans and Initiatives

The 2014 Franklin County & Louisburg Comprehensive Transportation Plan

This is a long-range multi-modal transportation plan that covers transportation needs through 2035. The modes of transportation considered in this plan include:

- Highway
- Public transportation
- Rail
- Bicycle
- Pedestrian

The findings of the study that led to the plan were based on an analysis of the transportation system, environmental screening, and public input. In Youngsville, two multi-use paths are recommended:

- Along the CSX rail line through town and;
- Along the riparian corridor extending west from Youngsville Boulevard to Richland Creek toward Wake Forest.

Holden Road, Tarboro Road, Youngsville Boulevard, NC 96, Fleming Road, and Cedar Creek Road are highlighted as needing improvement on the bicycle map on page xix of the plan.

The plan is available online at www.franklincountync.us in the section for Franklin County Planning and Inspections.

Capital Area Metropolitan Planning Organization (CAMPO) Northeast Area Study 2014

The Northeast Area Study encompasses parts of Wake and Franklin Counties including the Town of Youngsville. It includes a series of concept designs for four corridors and twelve hot spots geographically distributed throughout the study area. These involve several intersection and roadway locations where problems (i.e., operational, design, and/or aesthetics) were occurring. The intent of the concept designs and hot spots are to identify priority investment strategies to alleviate or address these problems through low cost, but effective improvements.

One of the concept design corridors is Main Street through Youngsville from Cross Street to Holden Road/Youngsville Boulevard (US 1A) intersection. Key recommendations specific to this corridor include:

- Holden Road/Youngsville Boulevard (US 1A) intersection redesign - the construction of a roundabout to replace the existing stop light.
- Sidewalk improvements along Main Street and extending in all directions from the proposed roundabout.
- Crossing improvements at strategic locations along Main Street.
- Landscaping/Streetscape improvements along the corridor.

This plan is available online at www.neareastudy.com/.

Graphic of Main Street Streetscape improvements in Youngsville from the 2014 CAMPO Northeast Area Study

Envision Youngsville (2013)

Envision Youngsville is a downtown revitalization plan that highlights four primary goals and issues: downtown business/economic development; pedestrian/bicycle accessibility; traffic; and streetscaping. The plan identifies some of the strengths, weakness, opportunities and threats of downtown Youngsville and also offers some priority recommendations for future planning. The recommended strategies for the pedestrian and bicycle accessibility plan are the following:

- Submit an application for a NCDOT bicycle and pedestrian planning grant (Completed in 2014).
- Develop a comprehensive plan that identifies the community needs for bicycle and pedestrian accessibility (Underway in 2015).
- Implement bicycle and pedestrian plan.
- Work with Wake Forest on bicycle path and extension into Youngsville.
- Communicate with local schools regarding parent involvement in pedestrian accessibility planning efforts.
- Coordinate with other towns in region to consider joint promotions directed at bicyclists and others using the area for recreational purposes.

The plan is available online at www.townofyoungsville.com in the section for Envision Youngsville Summary Report.

Potential pocket park location along Main Street (

ENVISION YOUNGSVILLE

"Just because something has always been this way doesn't mean it should stay that way. Growth and prosperity can be achieved, while still retaining the small town charm."

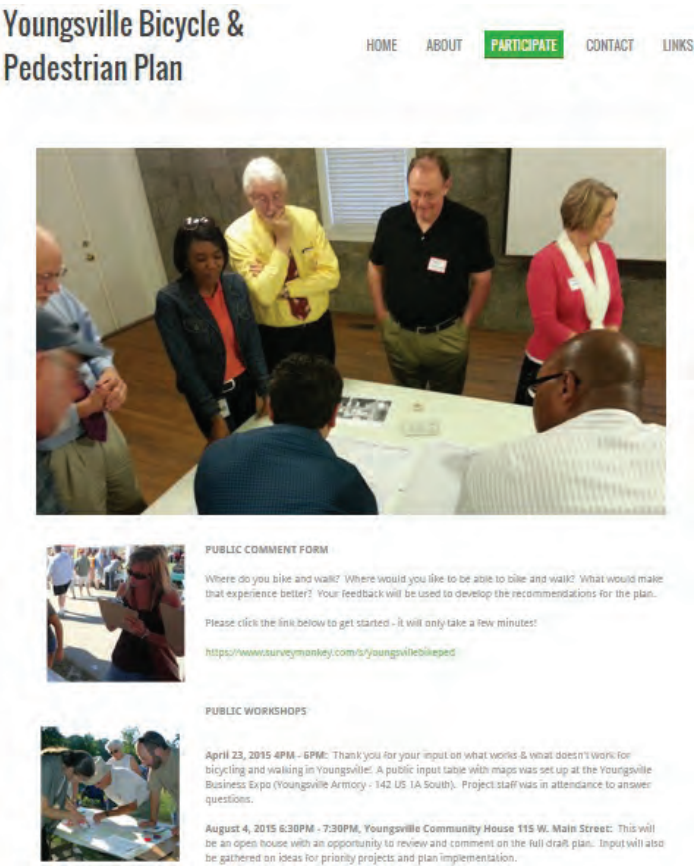
Quote from community survey

Public Input

Public Input on Existing Conditions

Public input for this plan was collected through the project website, public comment form, and public workshops. Generally, the feedback from residents, visitors, and property owners is that they feel the current bicycling and walking conditions are fair (28%) to poor (71%) and that improving them is very important (83%). Safety, opportunities for recreation and exercise, and increased overall quality of life/livability were the main topics identified by the public through the comment form as being important for this plan to address.

These issues were reflected in the public comments received about the desire to connect safely to Main Street and other local destinations such as Youngsville Elementary School, Food Lion shopping center, Luddy and Mitchell Parks, churches, and residential areas outside the downtown areas.

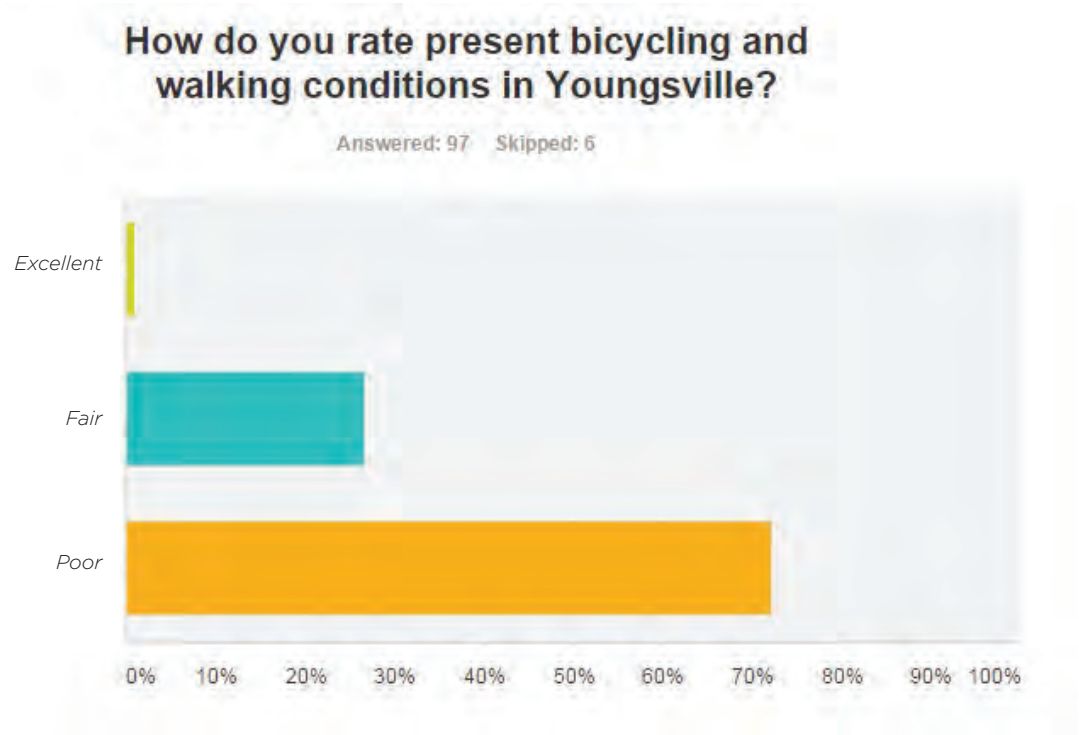


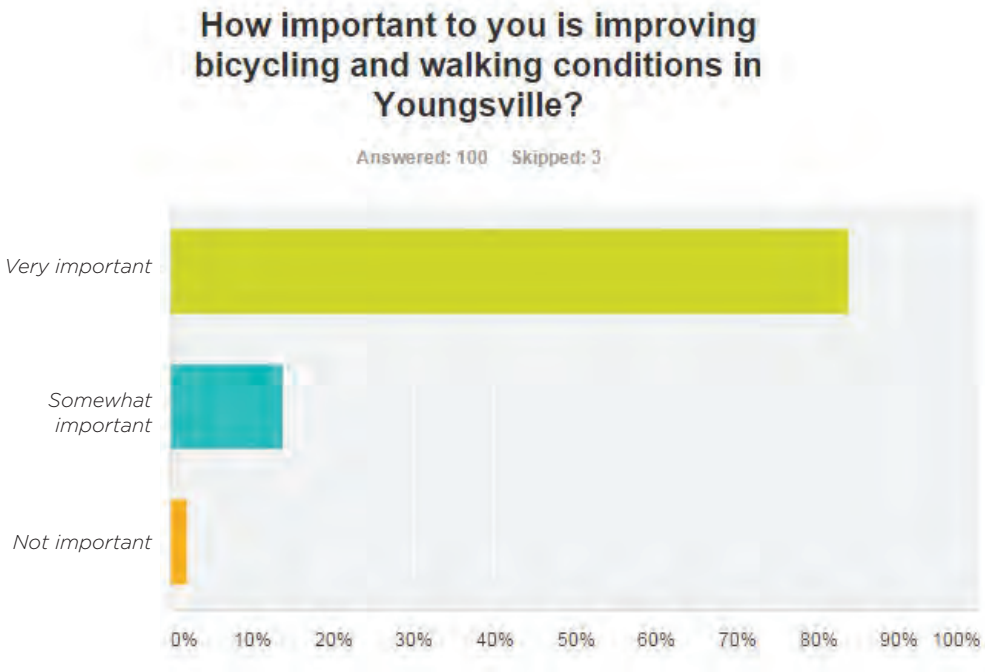
Project website

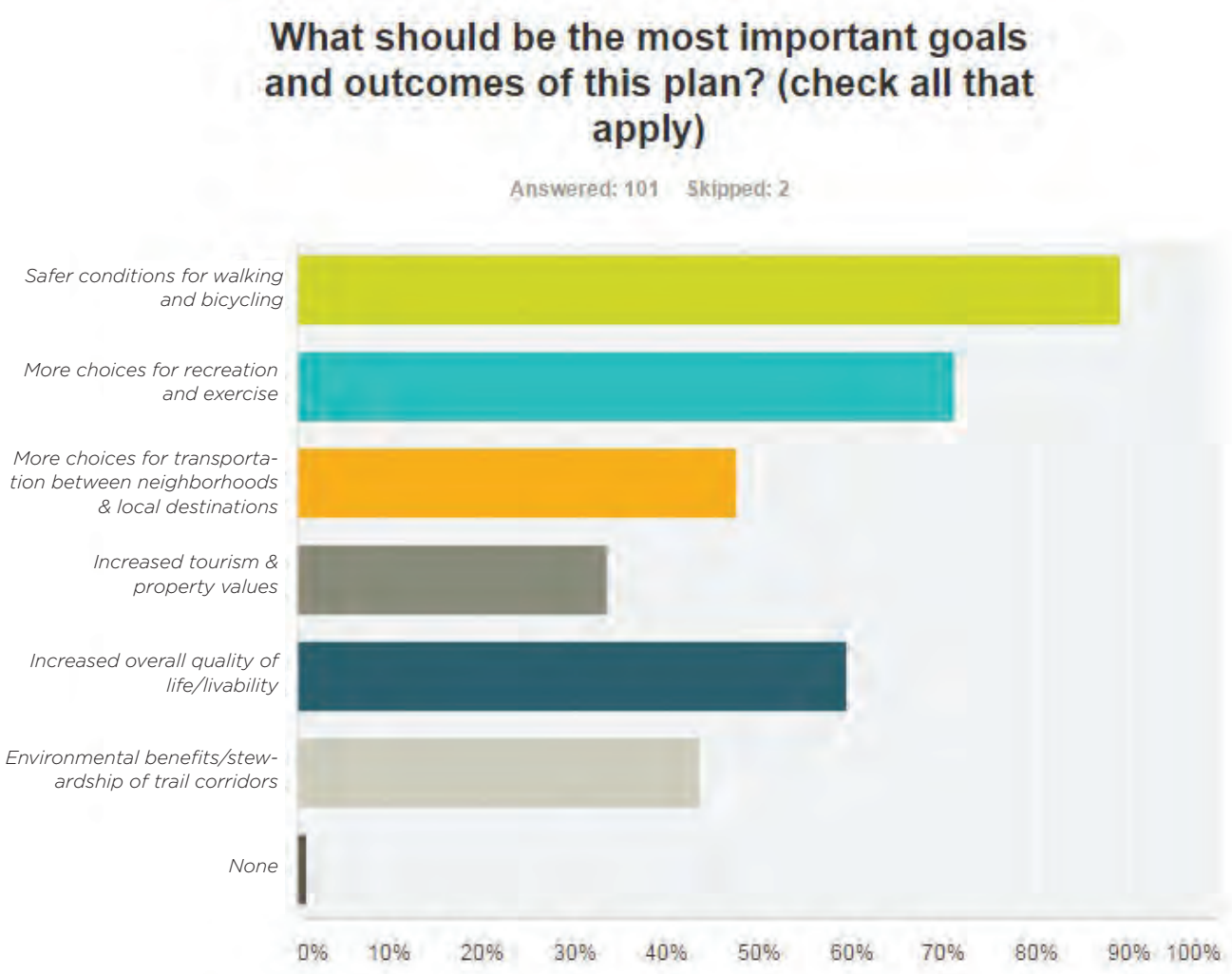
Community engagement at the Business Expo in April 2015

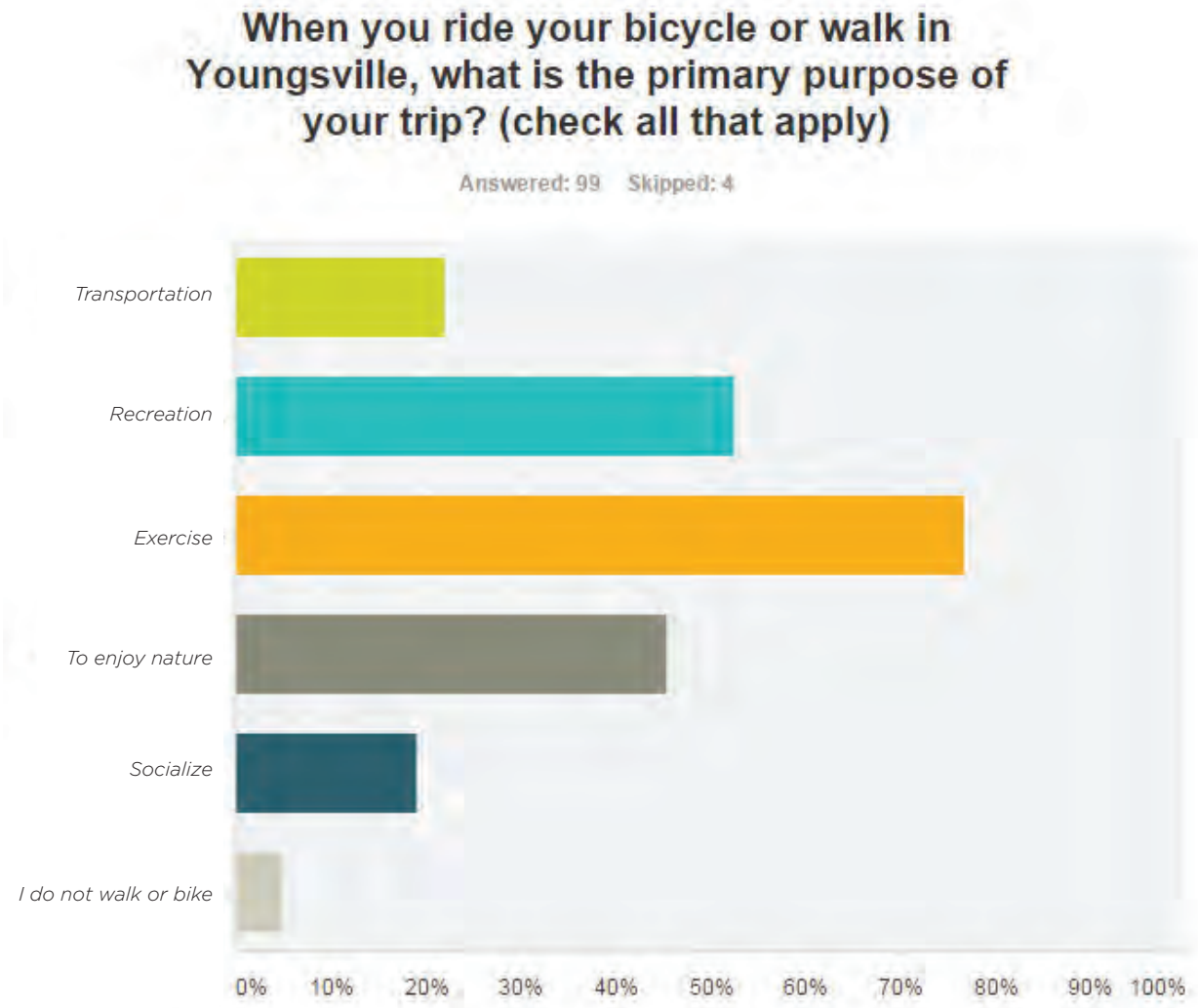
PUBLIC COMMENT FORM RESULTS

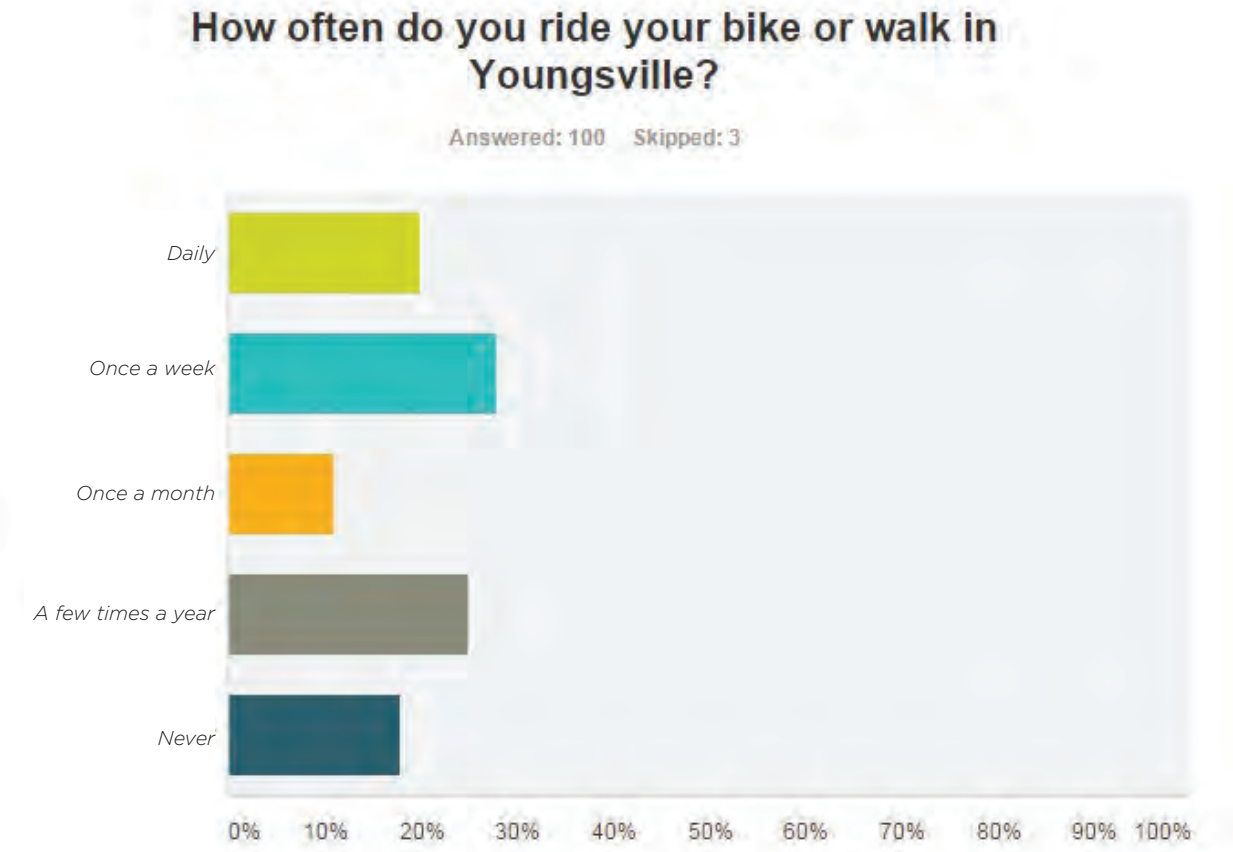
The charts below summarize public input collected during this planning process in Spring/Summer 2015. 103 local residents, property owners, employees, and visitors contributed their input.






What should be the most important goals and outcomes of this plan? (check all that apply)
Answered: 101 Skipped: 2
Safer conditions for walking and bicycling
More choices for recreation and exercise
More choices for transportation between neighborhoods & local destinations
Increased tourism & property values
Increased overall quality of life/livability
Environmental benefits/stewardship of trail corridors
None
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

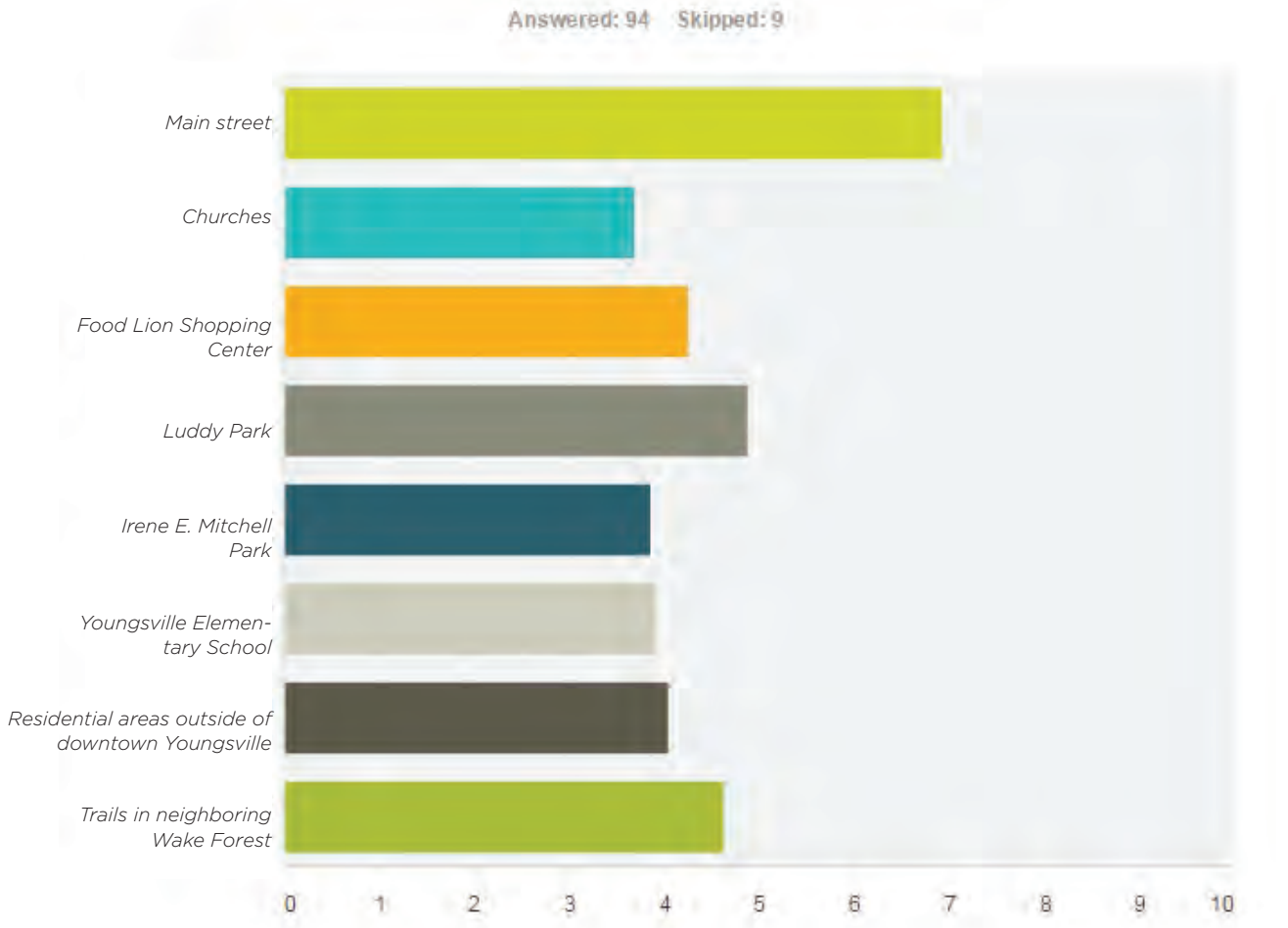

When you ride your bicycle or walk in Youngsville, what is the primary purpose of your trip? (check all that apply)
Answered: 99 Skipped: 4
Transportation
Recreation
Exercise
To enjoy nature
Socialize
I do not walk or bike
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

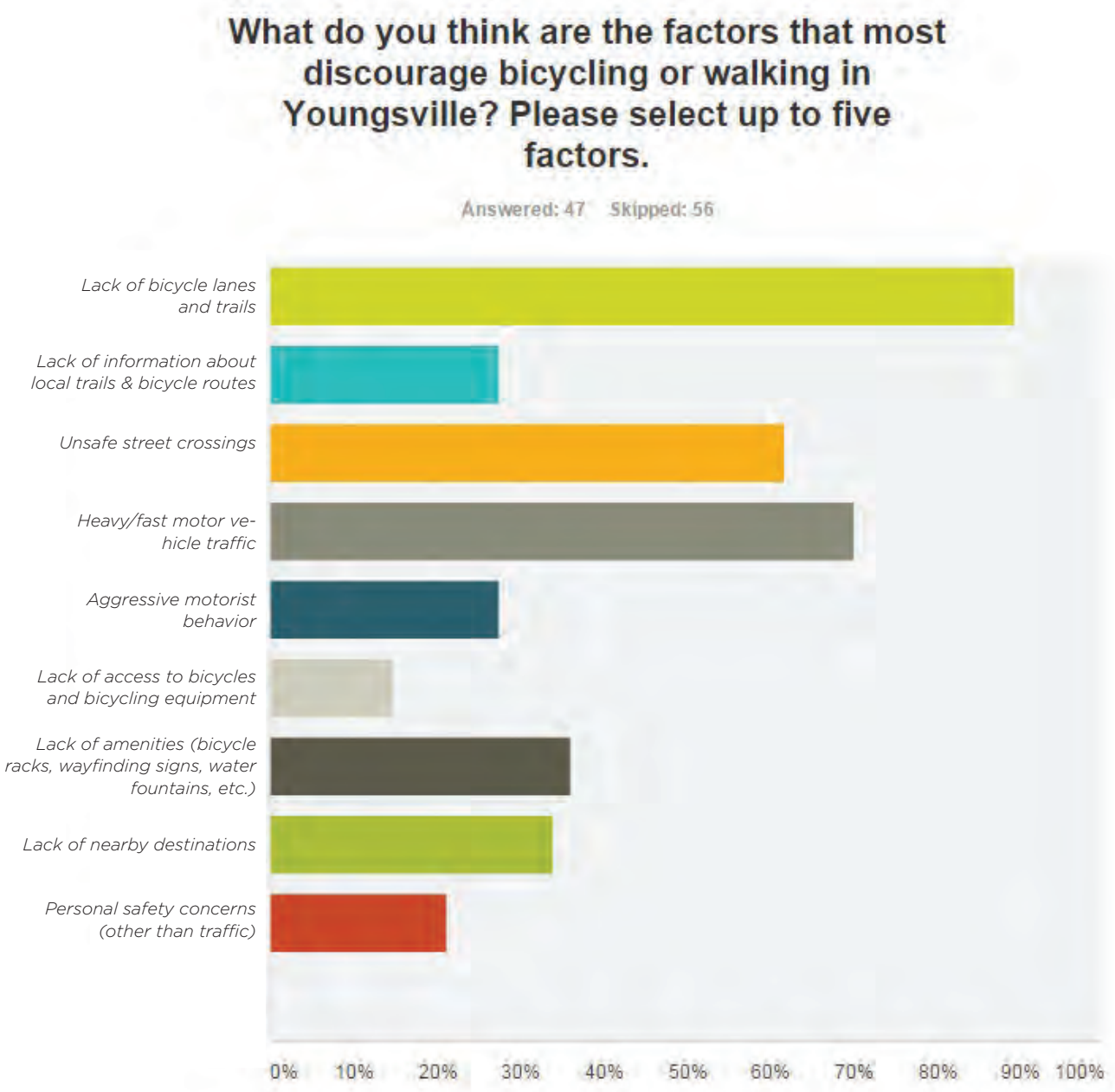

How often do you ride your bike or walk in Youngsville?
Answered: 100 Skipped: 3
Daily
Once a week
Once a month
A few times a year
Never
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

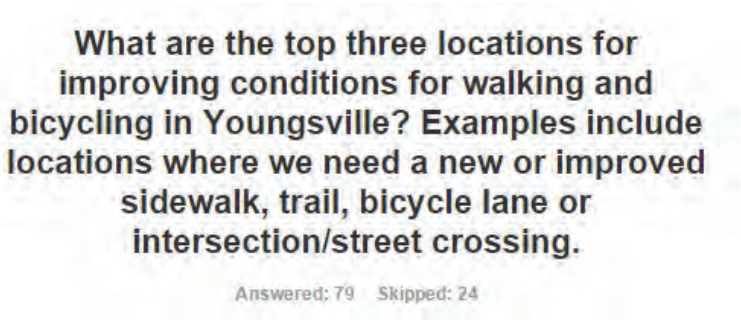

Would you walk and/or ride your bike more often if there were more sidewalks and bikeways in Youngsville?
Answered: 100 Skipped: 3
Yes
No
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

What destinations would you most desire to reach by bicycling or walking? Please rank

*higher number in bar chart corresponds to highest desire to reach




What do you think are the factors that most discourage bicycling or walking in Youngsville? Please select up to five factors.
Answered: 47 Skipped: 56
Lack of bicycle lanes and trails
Lack of information about local trails & bicycle routes
Unsafe street crossings
Heavy/fast motor vehicle traffic
Aggressive motorist behavior
Lack of access to bicycles and bicycling equipment
Lack of amenities (bicycle racks, wayfinding signs, water fountains, etc.)
Lack of nearby destinations
Personal safety concerns (other than traffic)
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%



The three most often cited locations were as follows:

1. Main Street/Downtown

2. Youngsville Elementary School/Youngsville Blvd

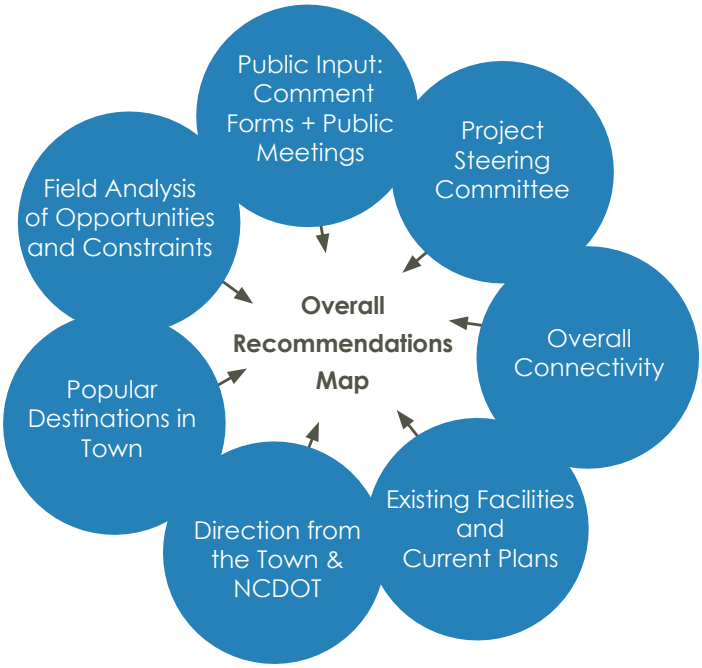
3. Holden Road

CHAPTER THREE: RECOMMENDATIONS

Overview | Key Inputs for Recommendations | Types of Bicyclists | Bicycle and Pedestrian Facilities | Recommendations | Priority Projects & Investments | Program Recommendations

OVERVIEW

This chapter details the infrastructure improvements that are recommended to create a safe, accessible, and connected pedestrian and bicycle network in the Town of Youngsville. A diverse mix of facilities are recommended to create this comprehensive network, including sidewalks, crossing improvements, on-road bicycle facilities, and multi-use paths. Conceptually, the network recommendations and the destinations they connect can be seen as a network of 'hubs and spokes'. Schools, parks, Main Street, neighborhoods, and other places people walk or bike to and from are the 'hubs', whereas the pedestrian and bicycle facilities are the 'spokes' that connect them (see diagram at left).



KEY INPUTS FOR RECOMMENDATIONS

Recommendations were developed based on information from several sources: input from the town staff and Steering Committee, public input obtained through public comment forms and in-person workshops, previous plans and studies, review of existing bicycle and pedestrian facilities, noted bicycle and pedestrian destinations, and the consultant's field analysis. Field work examined the potential and need for facilities along key roadway corridors and to make connections between key destinations in Youngsville. Input sources for the plan are summarized by the diagram to the left.

Two projects were selected as the highest priorities for the Town of Youngsville and were provided with further detail and cost estimates (see beginning on page 3-10). These projects were selected based on committee approval in linking key Youngsville destinations - Main Street, Youngsville Elementary School, Luddy Park, and the downtown core of businesses and residences. These significant first steps can serve as catalyst projects that create momentum toward efficient network connectivity.

TYPES OF BICYCLISTS

Bicyclists can be categorized into four distinct groups based on comfort level and riding skills. Bicyclists' skill levels greatly influence expected speeds and behavior, both in separated bikeways and on shared roadways. Each of these groups has different bicycle facility needs, so it is important to consider how a bicycle network will accommodate each type of cyclist when creating a non-motorized plan or project. The bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people. In the US population, people are generally categorized into one of four cyclist types. The characteristics, attitudes, and infrastructure preferences of each type are described below.

Source: Four Types of Cyclists. (2009). Roger Geller, City of Portland Bureau of Transportation. Supported by data collected nationally since 2005.

HIGHLY EXPERIENCED (~1% OF POPULATION)

Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections -- even if shared with vehicles -- over separate bicycle facilities such as shared use paths.

ENTHUSED AND CONFIDENT (~ 5-10% OF POPULATION)

This user group encompasses bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or multi-use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.

INTERESTED BUT CONCERNED (~ 60% OF POPULATION)

This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become "Enthused & Confident" with encouragement, education and experience.

NO WAY, NOW HOW (~ 30% OF POPULATION)

Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.

BICYCLE AND PEDESTRIAN FACILITIES

The descriptions on this page offer a brief overview of the primary facility types recommended in this plan. For more information on facility design, please see Appendix A: Design Guidelines.

Shared Use Paths (Independent Right-of-Way (ROW)

A shared use path is a facility that is separated from the roadway and designed for a variety of users, including bicyclists, walkers, hikers, joggers, wheelchair users, and skaters.

- Shared use paths may be paved or unpaved and are the preferred facility for novice and average bicyclists.
- These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors, away from roadway ROW where there are few conflicts with motorized vehicles.
- Path facilities can also include amenities such as lighting, signage, and fencing (where appropriate).

Shared use path (independent ROW) example, paved shared use path.

Sidepaths

A sidepath is a type of shared use path that follows a road corridor but is separated from on-road traffic. Sidepaths are more transportation-oriented in character and used by bicyclists and pedestrians. Because of operational concerns, it is generally preferable to place paths within independent rights-of-way away from roadways. However, there are situations where existing roads provide the only corridors available.

- Sidepaths are most appropriate in corridors with few driveways and intersections.
- Signage should be included along sidepaths to direct users to access points with high-visibility crosswalks.
- Families and novice bicyclists are most comfortable on shared use paths. Therefore, a comprehensive network of shared use paths, that includes trails built in open space as well as sidepaths is an integral part of the overall bicycle facility network, and its development should be a priority of Youngsville.
- The key difference between a sidepath and a typical sidewalk is the extra width. A 10' wide path, for example, allows for safer shared use by bicyclists, pedestrians, and other users, whereas the typical 5'-wide sidewalk does not allow for safe passing.

Sidepath example without curb and gutter in Conover, NC.

Paved Shoulders

Typically found in less-dense areas, paved shoulders are striped shoulders (4'+) wide enough for bicycle travel along paved roadways.

- Paved shoulders often, but not always, include signage alerting motorists to expect bicycle travel along the roadway.
- Paved shoulders should be considered a temporary treatment, with full bike lanes planned for construction when the roadway is widened or completed with curb and gutter.
- This type of treatment is not typical in urban areas and should only be used where constraints exist.
- As roadways are widened to accommodate increasing traffic volumes, upgrades to road-separated sidepaths should be considered for previous shoulder improvement recommendations.

Shared Lane Markings (Sharrows)/ Bike Routes

Roadways with shared lane markings (also known as Sharrows) have become popular as a pavement marking treatment to help align bicyclists properly in both urban and rural landscapes that may feature on-street parking, a variety of lane widths, and other factors.

- On roads with shared lane markings, bicyclists and motor vehicles use the same roadway space.
- These facilities are typically used on roads with low speeds and/or traffic volumes,
- A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist.
- Roads with shared lane markings employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, chicanes, chokers, and/or other traffic calming devices to reduce vehicle speeds or volumes.

Paved shoulder example

Marked shared roadway (sharrow) example

Sidewalks

Sidewalks are a fundamental component of a pedestrian network and can serve a complementary function to bicycle facilities.

- Sidewalks in Youngsville should be at least 5' wide, and, where possible, should include a landscaped buffer between the sidewalk and roadway.
- Areas of higher pedestrian volume may require 7' wide sidewalks, and sidewalks serving as part of the shared use path system should be at least 10' in width (sidepaths).

High-Visibility Crosswalk Improvements

Consultant fieldwork, committee input, and previous planning efforts helped to identify important pedestrian crossing points that are in need of minor to significant improvements. High-visibility crosswalks are recommended at signalized intersections. High-visibility crosswalks use continental markings as shown in the picture below and detailed on page A-12 in the Design Guidelines. Signage is also recommended to alert approaching drivers.

- Crossings that link to a sidewalk on each side of the road should possess curb cuts with ramps (which helps to satisfy the standards set forth by the American Disability Act of 1991).

High-visibility crosswalk in Holly Springs, NC.

Standard Crosswalk Improvements

Standard crosswalk markings should be installed throughout the downtown core at all unsignalized intersections. These are not shown individually on the map due to the map scale and the frequency of locations. These marked crosswalks will help to guide pedestrians and bicyclists on sidewalks and sidepaths across the many intersections with side streets.

- Signage should be included on side streets to alert approaching drivers to look both ways for crossing pedestrian and bicycle traffic before turning.
- Crossings that link to sidewalk on each side of the road should possess curb cuts with ramps (which helps to satisfy the standards set forth by the American Disability Act of 1991).

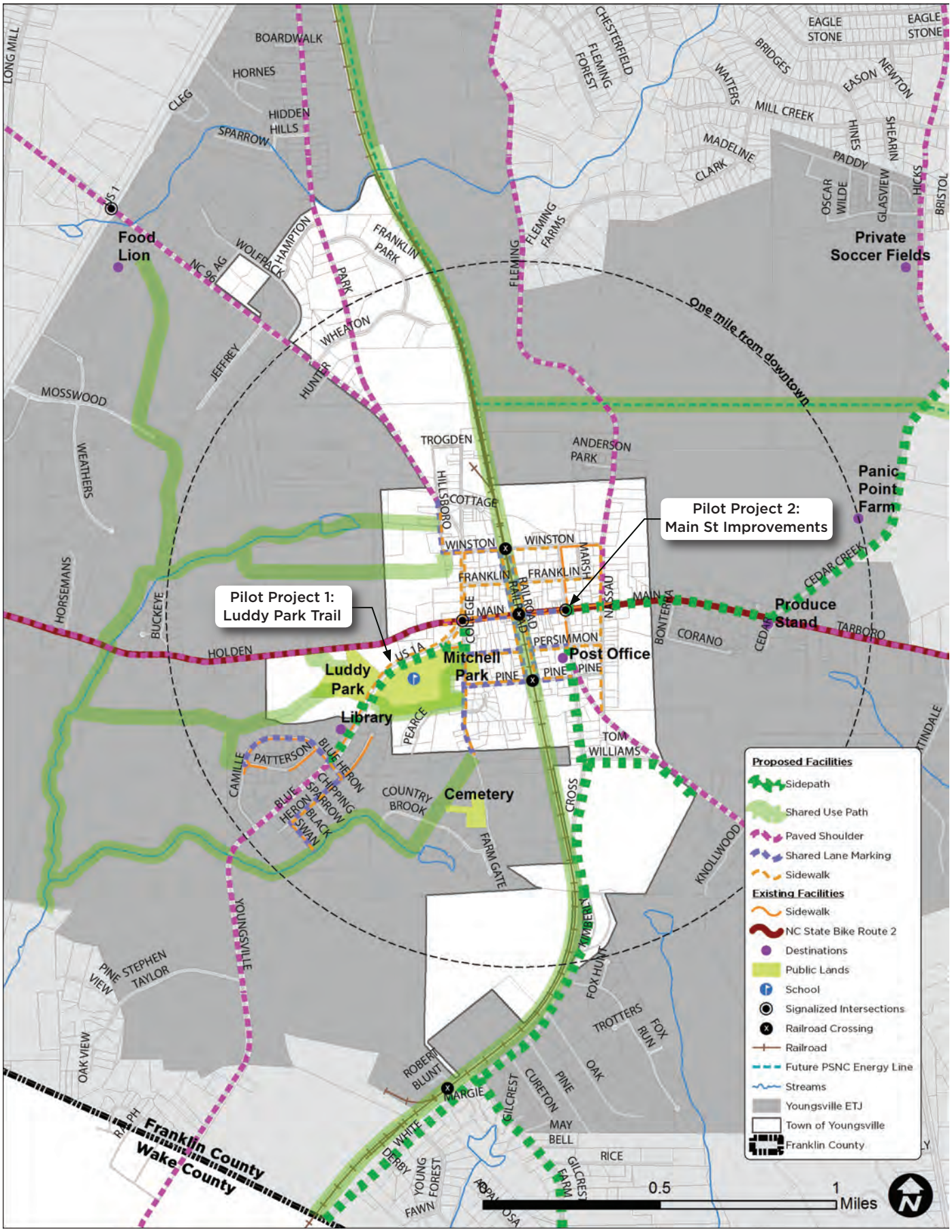
Some of these treatments have been proven to reduce crashes, as shown in the 2007 FHWA Crash Reduction Factors Study (http://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_tct-pepc/).

Curb Extensions

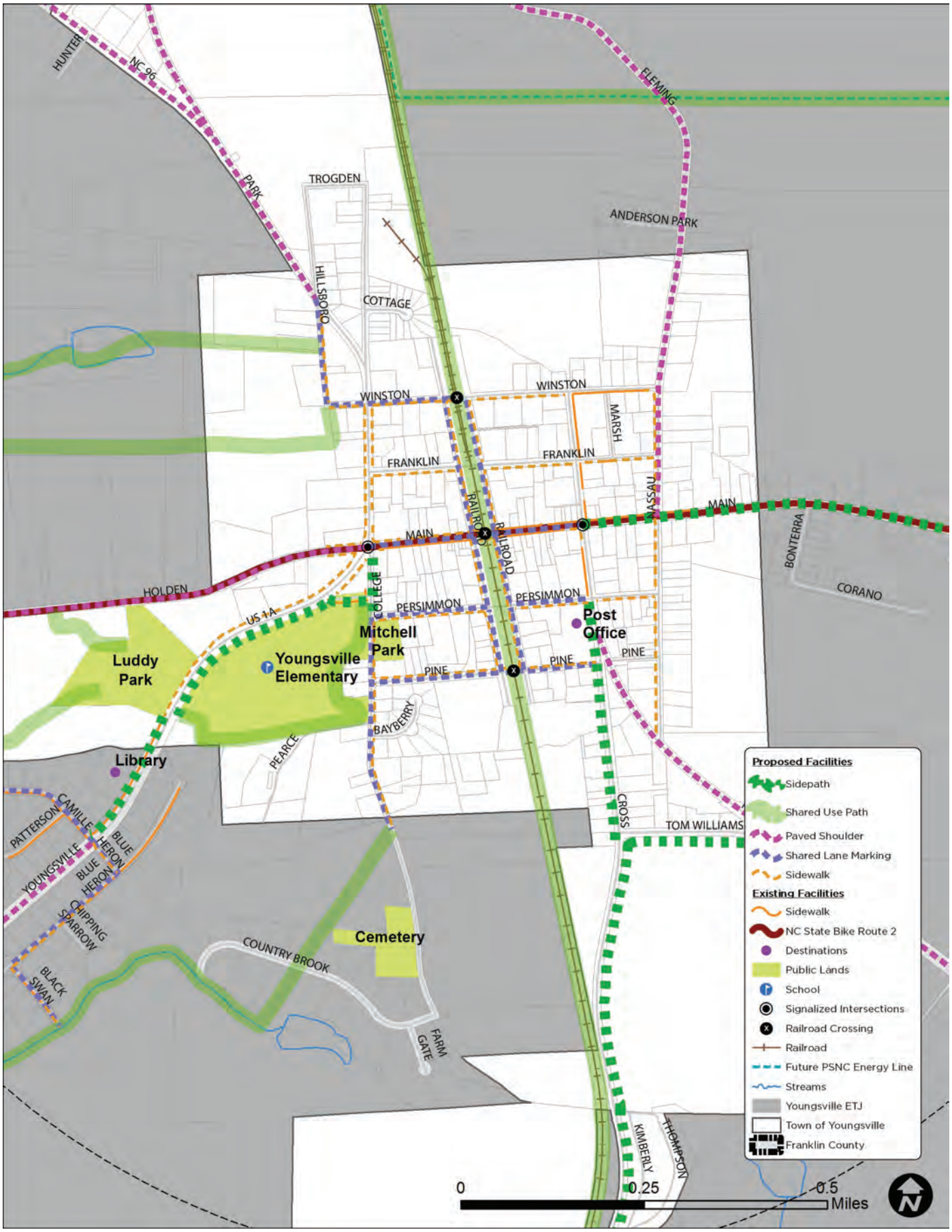
Curb extensions visually and physically narrow the roadway, creating safer and shorter crossings for pedestrians while increasing the available space for street furniture, benches, plantings, and street trees. Curb extensions also increase the overall visibility of pedestrians by aligning them with the parking lane and reducing the crossing distance.

Curb extension example from an NCDOT project in West Jefferson, NC.

Map 3.1 Overall Recommendations



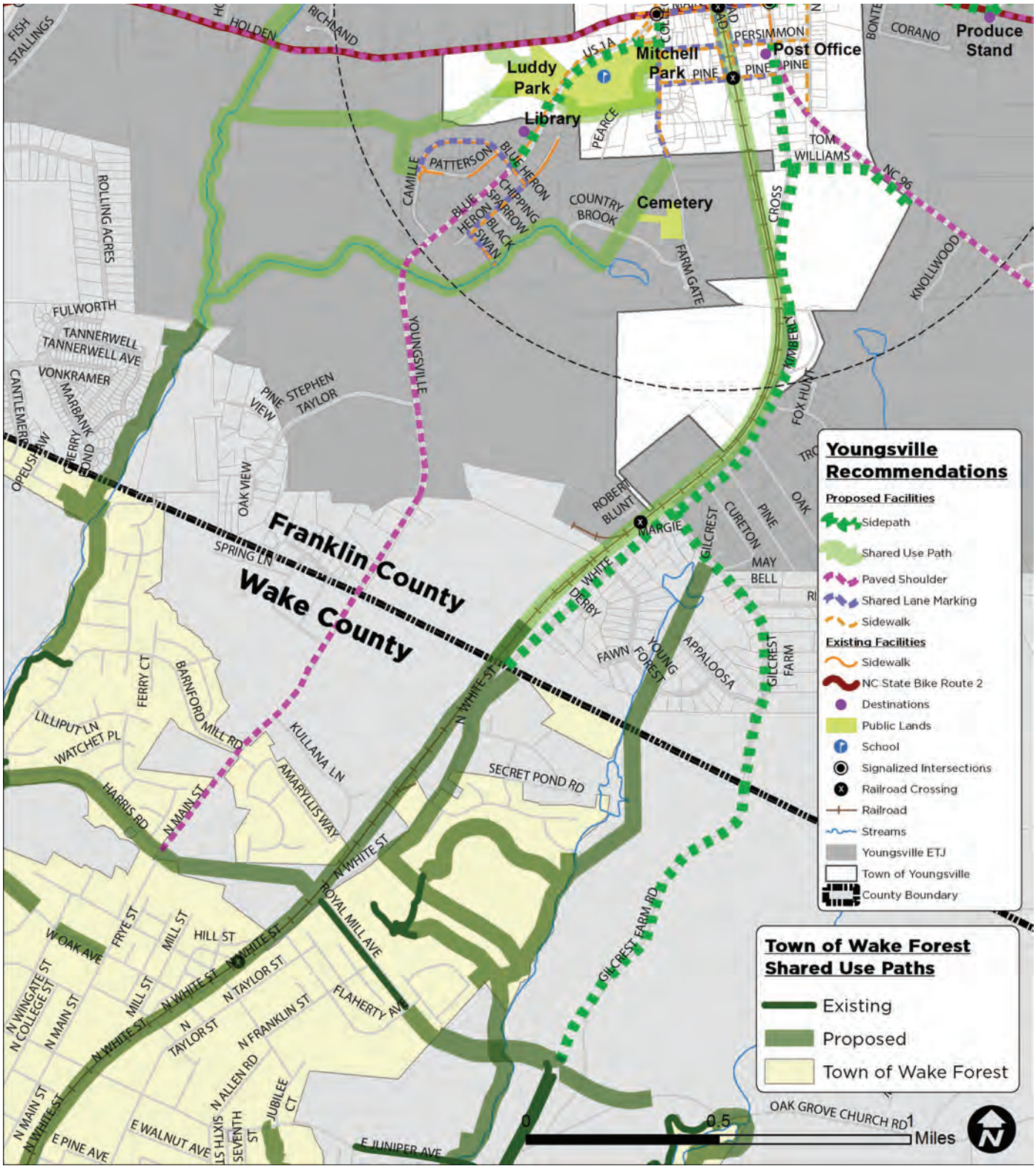
Map 3.2 Recommendations Zoom



Wake County Connectivity

Several bicycle and pedestrian connection possibilities exist between the Town of Youngsville and the Wake County greenway system. Map 3.3 below shows where the recommended bicycle and pedestrian network for Youngsville connects to proposed and existing greenways in Wake County.

Map 3.3 Wake County Connectivity



Pilot Project 1: Luddy Park Trail

This pilot project consists of a shared-use path along Youngsville Blvd (US 1A), from Main Street to Camille St. The project features a crosswalk that directly connects the town's largest park and elementary school, improving safety for people crossing to and from the park, and for those walking and bicycling along US 1A. The project was identified as a top priority by the Youngsville Bicycle and Pedestrian Plan Steering Committee, primarily because it improves access to key destinations, including Downtown Youngsville/Main Street, Mitchell Park, Youngsville Elementary School, Luddy Park, Faith Baptist Church, Youngsville Library, and nearby residential subdivisions.

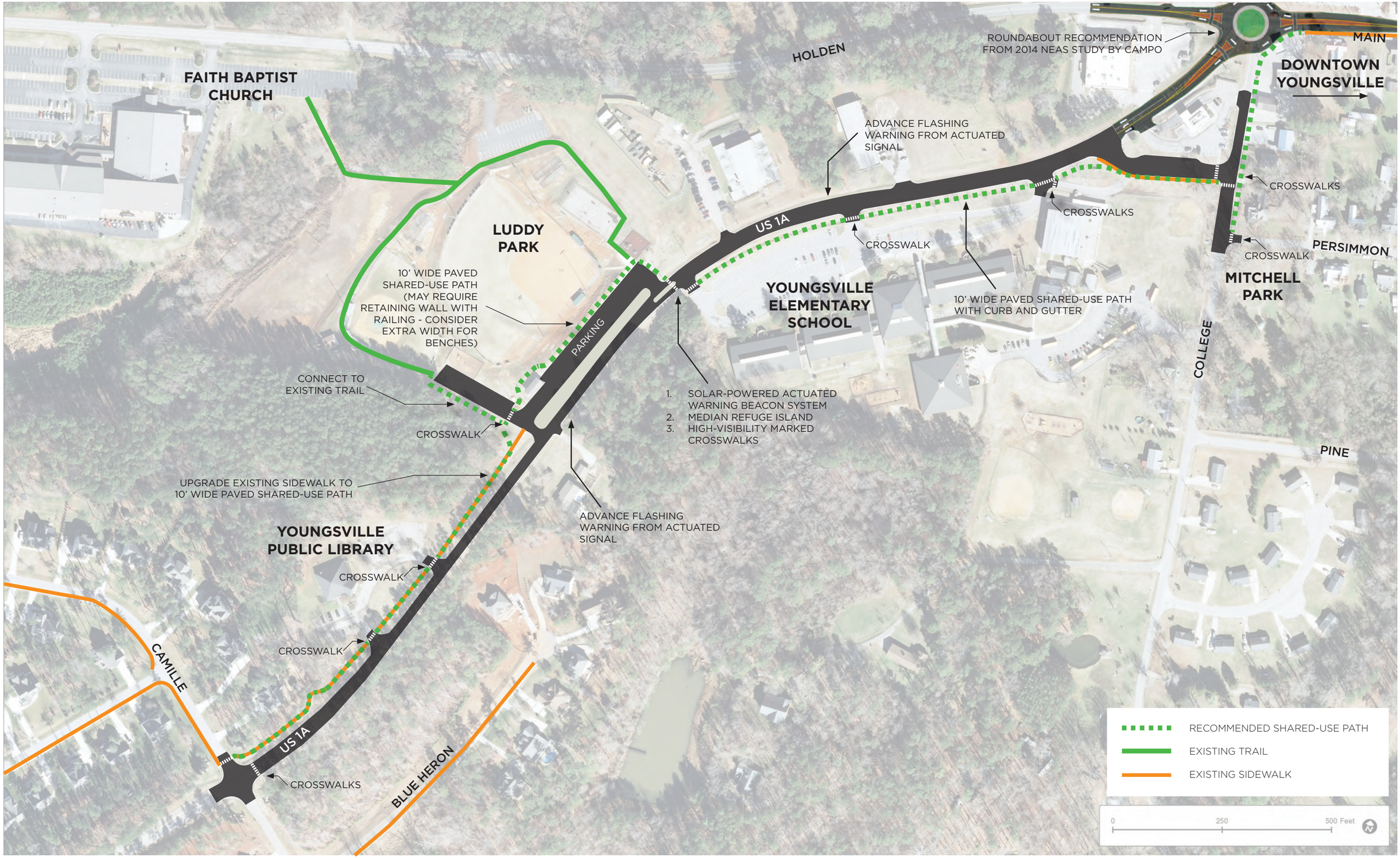
A long-term benefit of investing in this project is the potential for greater regional bicycle and pedestrian connectivity. This project could be seen as a first step in building trails and greenways that connect south towards the Wake Forest greenway system, and by extension, to the larger Triangle greenway network. Such a connection would eventually allow Youngsville to become the northern terminus of the regional trail network, with potential for positive economic returns from regional bicycle tourism, and from property value increases associated with the quality of life benefits of trails (see Chapter 1).

The map on the following page outlines the specific recommendations associated with this project.

Top: Existing crossing between Luddy Park and Youngsville Elementary.

Bottom: Proposed improvements that include a shared-use path, median refuge, high-visibility marked crosswalks, and a pedestrian-activated flashing beacon.

PILOT PROJECT #1 MAP: LUDDY PARK TRAIL



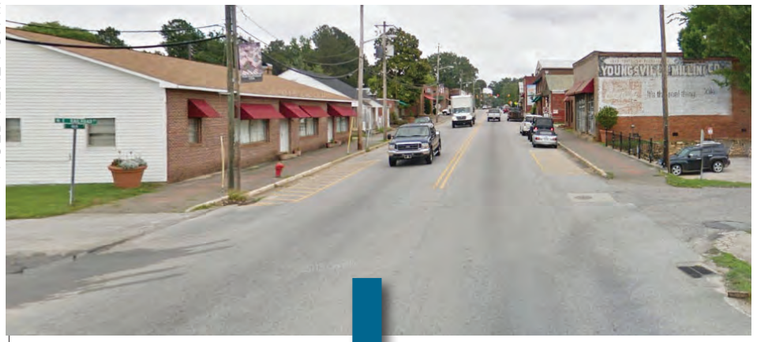
FOLD HERE FOR 11x17 FOLD-OUT

Pilot Project #2: Main Street Improvements

This project consists of a set of bicycle and pedestrian streetscape improvements to Main Street that originated in the 2014 Northeast Area Study (NEAS) by the Capital Area Metropolitan Planning Organization (CAMPO). The NEAS study recommends a roundabout at the western gateway to Main Street, new crosswalks, shared-lane bicycle markings, and street trees. This Bicycle and Pedestrian Plan expands upon those recommendations with more detail regarding potential locations for curb extensions, locations where new sidewalks and crosswalks are needed, and more specific potential locations for street trees (the NEAS study calls for street trees all along Main St on both sides, but in reality, there are fewer locations where street trees may be feasible).

The project was also identified as a top priority by the Youngsville Bicycle and Pedestrian Plan Steering Committee, primarily because it has the greatest potential for positive impact on Downtown Youngsville, and it improves pedestrian safety along and across Main Street. Main Street is also officially designated as part of the North Carolina Statewide Bicycle Route 2. This project could be completed in stages as funding allows, in key sections such as the roundabout, the improvements near the railroad, and improvements at Cross Street.

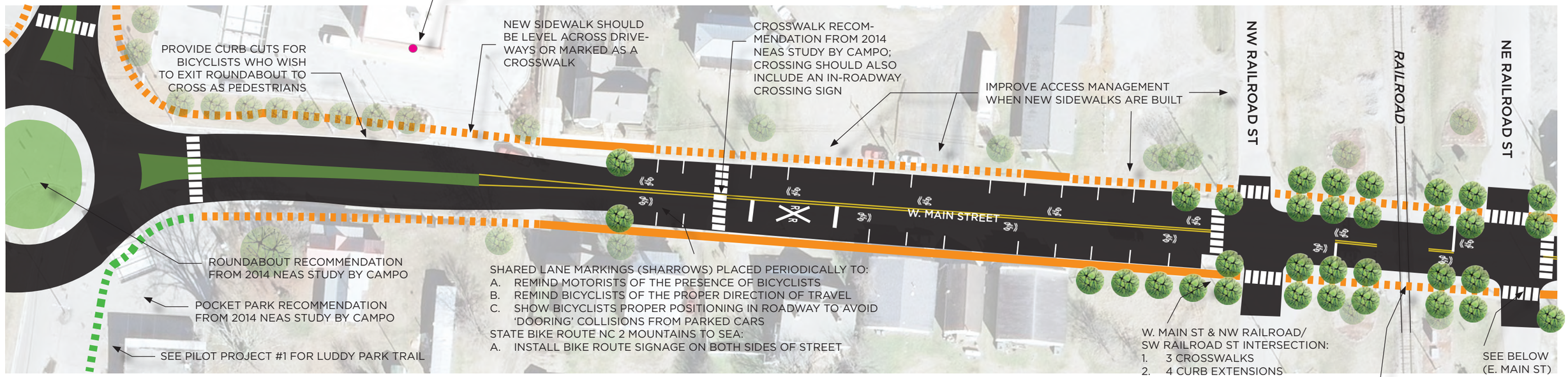
The map on the following page outlines the specific recommendations associated with this project.



Top: Existing conditions on Main (looking east at SE Railroad St). Bottom: Proposed improvements, including curb extensions, high visibility crosswalks, pedestrian signage, street trees, and landscaping.

PILOT PROJECT #2 MAP: MAIN STREET IMPROVEMENTS

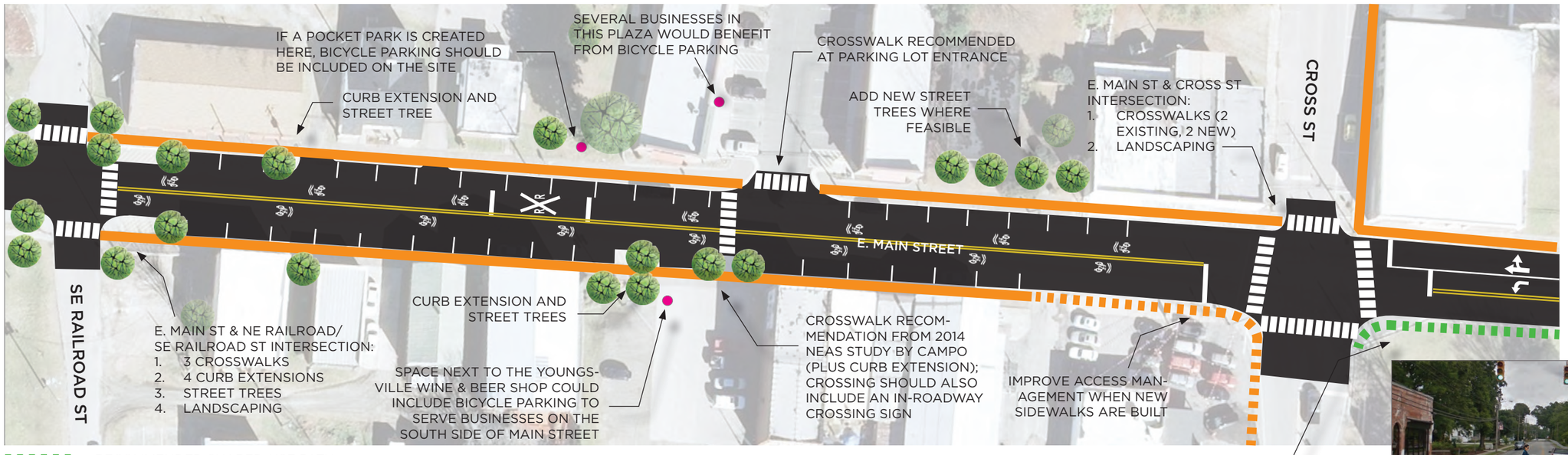
W. MAIN STREET



*PEDESTRIAN SCALE LIGHTING IS RECOMMENDED ALONG WEST AND EAST MAIN STREET BUT IS NOT SHOWN IN THE GRAPHICS ABOVE/BELOW - FURTHER STUDY IS NEEDED FOR PLACEMENT SPECIFICS. PLEASE SEE APPENDIX A FOR GUIDANCE ON PEDESTRIAN SCALE LIGHTING.

PEDESTRIAN-FRIENDLY RAILROAD CROSSINGS (EXAMPLE IMAGE BELOW FROM BELMONT, NC)

E. MAIN STREET



RECOMMENDED SHARED-USE PATH
RECOMMENDED SIDEWALK
EXISTING SIDEWALK
RECOMMENDED BICYCLE PARKING
RECOMMENDED STREET TREES (SHOWN WHERE FEASIBLE)
EXISTING STREET TREES

Full Project List

General Priority Ranking	Name & Detail	Start/End Point	Facility Type	Length (Feet)	Length (Miles)	Planning Level Cost Estimate
1	Luddy Park Trail - See pilot project #1 for more detail.	Main Street to Camille Circle	Shared Use Path, crossing infra-structure	3,410	0.65	$468,230
2	Main Street Improvements - See pilot project # 2 for more detail.	College Street to Cross Street	Streetscape Im-provements	1,563	0.3	$550,000
3	Town Core Sidewalk Network - the downtown core network of sidewalks should be developed per the specific locations provided by the Town's *Subdivision Ordinance. These are shown to the right of this table.	Downtown core (Phasing could begin with key north/south sidewalks completed first (such as College St, both Railroad Streets, Cross St, and/or Nassau St), followed by east/west sidewalk links)	Sidewalk	21,648	4.1	$1,082,400
4	West Youngsville Neighborhood Trail - As development occurs west of Luddy Park and to the west of Camille Circle, shared use paths should make a connection to Luddy Park, the Camille Circle neighborhood and to future development and network of shared use paths.	Luddy Park to Camille Circle and future resi-dential development	Shared Use Path	4,858	0.92	$485,760
5	S Cross Street/Tom Williams Road Sidepath - Because of the NC 96 and Cross Street intersection, this sidepath would ideally be located on the west side of S Cross St between Persimmon St and Tom Williams Rd. A sidepath along Tom Williams Rd would be ideally located along the south side utility corridor. The recommended sidepath along S Cross St from Tom Williams Rd to Thompson Circle should follow the east side of the road due to the railroad tracks to the west.	Persimmon Street to NC 96 and Thompson Circle	Sidepath	5,438	1.03	$543,840
6	Grocery/Shopping Center Trail - Two options stemming from Hillsboro St should be considered with development and/or working with local prop-erty owners in linking to the west. Additionally, the power line corridor (must work with utility owner) to connect to the Food Lion shopping center could make the final connection from Mosswood Blvd.	Hillsboro Street to Food Lion	Shared Use Path	13,094	2.48	$1,309,440
7	Youngsville Middle School Sidepath - Further analysis will be needed to determine which side of Main St and Cedar Creek Rd is most appropriate in connecting to the middle school.	Cross Street to Middle School along East Main Street and Cedar Creek Road	Sidepath	10,982	2.08	$1,098,240
8	NC Bike Route 2 - Until further development takes place (potentially ne-cessitating sidepath development), paved shoulder is recommended to accommodate through bicyclists traveling east/west on NC Bike Route 2.	US 1 to College Street and Cedar Creek Road to the ETJ border	Paved Shoulder	12,619	2.39	$478,000
9	Wake Forest Sidepath Link - This sidepath would provide a direct link to an existing sidepath along Traditions Garden Blvd in Wake County, linking into Wake Forest. The S. Cross St section would be ideally located on the east side due to the railroad tracks on the west side. To connect to the existing sidepath in Wake County, the completion of this project would require collaboration with Wake County and the Town of Wake Forest. The existing section of 5' sidewalk on Gilcrest Farm Rd could be widened to a 10'-12' sidepath.	Youngsville proposed sidepath along S. Cross St to existing sidepath along Tradi-tions Garden Blvd (Gilcrest Farm Rd) in Wake County.	Sidepath	12,355	2.34	$1,235,520
10	SW Neighborhood Trail - This sidepath recommendation follows a power line (must work with utility owner) and a Richland Creek tributary in link-ing to Black Swan Dr.	South College St to Black Swan Dr via power line and Richland Creek tributary	Shared Use Path	3,538	0.67	$353,760

Excerpt from the Town of Youngsville Subdivision Ordinance

A. Sidewalks are required by the Planning Board on one (1) or both sides of the street as follows:
West and East Winston - on the south side
West and East Franklin - on the south side
West and East Persimmon - on the south side
West and East Pine - on the north side
Northwest and Northeast Railroad - on the east side
Southwest and Southeast Railroad - on the west side
North Cross - on the east side
South Nassau - on the west side
Tom Williams Road - on the south side
Hillsboro - from US1-A/Hwy 96 to West Winston on the east side

B. Sidewalks are required by the Planning Board on one (1) or both sides of the street as follows:
West and East Main - on both sides
North and South College - on the east side
South Cross - on the west side
North Nassau - on the west side

Full Project List (Continued)

General Priority Ranking	Name & Detail	Start/End Point	Facility Type	Length (Feet)	Length (Miles)	Planning Level Cost Estimate
11	Richland Creek Trail - This recommendation includes a shared use path from Black Swan Dr following the Richland Creek tributary toward Richland Creek. This links to the recommended shared use path along Richland Creek that links to proposed shared use paths #4 and #6, detailed on the previous page. The recommended Richland Creek shared use path continues south into Wake Forest.	West Youngsville to southwest Youngsville trails	Shared Use Path	10,666	2.02	$1,066,560
12	Town Core Bike Route - Shared lane markings and bike route wayfinding signage are recommended along the low-traffic volume/speed neighborhood streets in the core of Youngsville - Hillsboro St, W Winston St, Main St (part of pilot project #2), Persimmon St, Pine St, and College St. These link bicyclists to other recommended facilities in the network, allowing bicyclists to comfortably travel to all parts of Youngsville as the network develops.	Youngsville downtown area	Shared Lane Markings	13,992	2.65	$66,435
13	Area Cycling Routes - Paved shoulder along these routes will provide safer accommodation for bicyclists and motorists alike. See page 4-15 for further information regarding resurfacing and paved shoulder improvements, along with a link to NCDOT's resurfacing schedule. It should also be noted that as Youngsville grows, sidepath development may become the most appropriate recommendation if a higher need to accommodate both pedestrian and bicycle transportation arises.	Several roadways radiating to/from Youngsville could more safely accommodate bicyclists and motorists (NC 96, Fleming Road, Youngsville Boulevard, Park Avenue)	Paved Shoulder	47,362	8.97	$1,794,000
14	Rail-With-Trail South - This recommendation could be implemented as part of the potential east coast high-speed rail line that could traverse through Youngsville, potentially linking Youngsville to Wake Forest and through to Raleigh.	Downtown to the Wake County border	Shared Use Path	11,722	2.22	$1,172,160
15	Rail-With-Trail North - This recommendation could be implemented as part of the potential east coast high-speed rail line that could traverse through Youngsville, potentially linking Youngsville further north toward Franklinton.	Downtown to the northern ETJ boundary	Shared Use Path	11,986	2.27	$1,198,560
16	PSNC Trail - This recommendation could be implemented along the utility easement for the future PSNC gas line through Youngsville.	Railroad corridor north of downtown east to Cedar Creek Road/ETJ boundary	Shared Use Path	6,706	1.27	$670,560

All facility recommendations along NCDOT-maintained roadways will require review and approval by NCDOT Highway Division 5 prior to implementation.

Planning Level Cost Estimates

These planning level cost estimates are based on the average per-mile cost of built projects:

Shared-Use Path/Sidepaths (10-12')	*$528,000/mile*
Sidewalk (5' minimum)	*$264,000/mile*
Shared Lane Markings/Sharrows/Bike Route	*$25,070/mile*
***Paved Shoulder*	*$200,000/mile*

***For paved shoulder improvements, narrowing roadway lane widths can lower project costs by lowering the amount of additional pavement space needed. This should be evaluated in project design on a case-by-case basis.*

Additional elements included in the cost estimates for Pilot Projects #1 (Main Street Improvements) and #2 (Luddy Park Trail) are as follows:

Rectangular Rapid Flashing Beacon	*$22,250/each*
Advanced Warning Flashing Beacon	*$10,010/each*
Median Refuge Island	*$13,520/each*
High-visibility Crosswalk	*$2,540/each*
Curb Extensions	*$13,000/each*
Street Trees	*$430/each*
Wayfinding Signage	*$500/each*
Sharrow Markings	*$350/each*
Bicycle Parking	*$660/each*

The source for the listed costs utilizes a combination of recently constructed bicycle and pedestrian projects in North Carolina and the 2013 report, 'Costs for Pedestrian and Bicyclist Infrastructure Improvements' by the UNC Highway Safety Research Center (HSRC), prepared for the Federal Highway Administration.

It is important to note that costs for bicycle and pedestrian infrastructure vary greatly from city to city and site to site. The cost information above should be used only for estimating purposes and not necessarily for determining actual bid prices for a specific infrastructure project.

Roadway Inventory

ROAD	FROM	TO	APPROXIMATE ROAD WIDTH (EDGE OF PAVEMENT)	EXISTING ROAD CONFIGURATION	EXISTING SIDEWALK (ONE/BOTH SIDES)	CURB/ GUTTER (Y/N)	SHOULDER (Y/N)	SPEED LIMIT
Youngsville Blvd	W. Main St	Luddy Park	34-37 Ft	3 lane	None	N	N	35 (25 school zone)
Main St	Youngsville Blvd	Cross St	40-45 Ft	2 lane	Both (gaps on north side west of RR tracks)	Y	N	25
Winston St, Franklin St, Persimmon St, Pine St, Railroad St (NW, NE, SW, SE), N Cross St, S College St, S Nassau St	College St	Cross St/Nassau St	18-20 ft	2 lane	mostly none (existing on Cross St and section of Winston St	N	N	25
Tom Williams Rd	S Cross St	Tom Williams Rd	19-20 ft	2 lane	N	N	N	25
Holden Rd	US 1	Main Street	24-25 ft	2 lane	N	N	0-2 ft	35-45
E. Main St	Cross St	Bonterra Dr	34-36 ft	3 lane	North side from Cross St to just east of Nassau St	Y from Cross St to Town limits	N	35
E. Main St	Bonterra Dr	Cedar Creek Rd	24-25 ft	2 lane	None	N	0-2 ft	35
Cedar Creek Rd	E. Main St	Cedar Creek Middle School	24-25 ft	2 lane	None	N	0-2 ft	45
Nassau St/Fleming Rd	Main St	Fleming Farm Rd	20-22 ft	2 lane	None	N	0-2 ft	35-45
96 NC	Main St	Town Limits (SE)	27 ft	2 lane	Brief section on west side near Main St	N	0-2 ft	35 (tansitions to 55)
S. Cross St	NC 96	Gilchrest Farm Rd	24-25 ft	2 lane	None	N	0-2 ft	45
College St	Main St	Franklin St	32-40 ft	3 lane transitioning to 2 lane	None	Y	N	25
College St	Franklin St	Winston St	25-30 ft	2 lane (transitioning from 3 lane)	Brief sections on both sides (very old section on west side)	Y on east side	0-1 ft	25
US 1A	Winston St	Ag Dr	24-25 ft	2 lane	None	N	0-2 ft	45
Park Ave	NC 96	US 1	24-25 ft	2 lane	None	N	0-1 ft	45

PROGRAM RECOMMENDATIONS

Below are key program recommendations that are essential and complementary to improvements in infrastructure. See Chapter 4: Implementation for more information on other program ideas related to plan implementation.

Media Campaign to Educate Motorists, Bicyclists, and Pedestrians

Watch for Me NC is a comprehensive campaign aimed at reducing the number of bicyclists and pedestrians hit and injured in crashes with vehicles. The campaign consists of educational messages on traffic laws and safety, and an enforcement effort by area police in several Triangle communities.

Watch for Me NC is an ongoing statewide grant program administered by the NCDOT Division of Bicycle and Pedestrian Transportation (NCDOT DBPT). Youngsville should contact the NCDOT DBPT to request materials and guidance. As a part of this program, the Town could:

- Distribute the educational materials made available by NCDOT at local festivals and other events, at local bike shops and other businesses, and in renters' information packets and property owners' guest information books.
- Work with police officers to hand out bicycle lights along with bicycle and pedestrian safety cards.
- Broadcast program promotions and educational videos on the local government access channel.
- Enforce motorist rates of yielding to pedestrians.

Watch for Me NC website: http://www.watchformenc.org/

One-Stop Website

Many current and potential bicyclists and pedestrians do not know where to find information on traffic laws, events, maps, tips, and recreation groups. The Town of Youngsville could develop a "one-stop" website that houses all bicycle- and pedestrian-related information and promotions. A website is not difficult to set up, but it will only be successful if the site is easy to use, easy to find, and updated frequently. The site should be reviewed and updated regularly with the most current information. Alternatively, a page could be developed as part of Youngsville's existing website.

The Bicycle and Pedestrian Advisory Committee (see Chapter 4: Implementation) can assist in keeping the site up to date. Other recommended programs in this chapter could be housed on the website, such as a hike and bike map, Watch for Me NC materials and links, and a calendar of upcoming events.

Sample bicycle and pedestrian information websites:

» Duck, NC: http://www.townofduck.com/ducktrail/

» Wake Forest, NC: http://www.wakeforestnc.gov/greenways.aspx

Town of Wake Forest website

Open Streets Events

Open Streets events are periodic street closures (usually on Sundays) that create a temporary park that is open to the public for walking, bicycling, dancing, hula hooping, roller skating, and other forms of human-powered activity. These programs are known by many names: Ciclovias, Open Streets, Sunday Parkways, Summer Streets, and Sunday Streets. They promote health by creating a safe and attractive space for physical activity and social interaction.

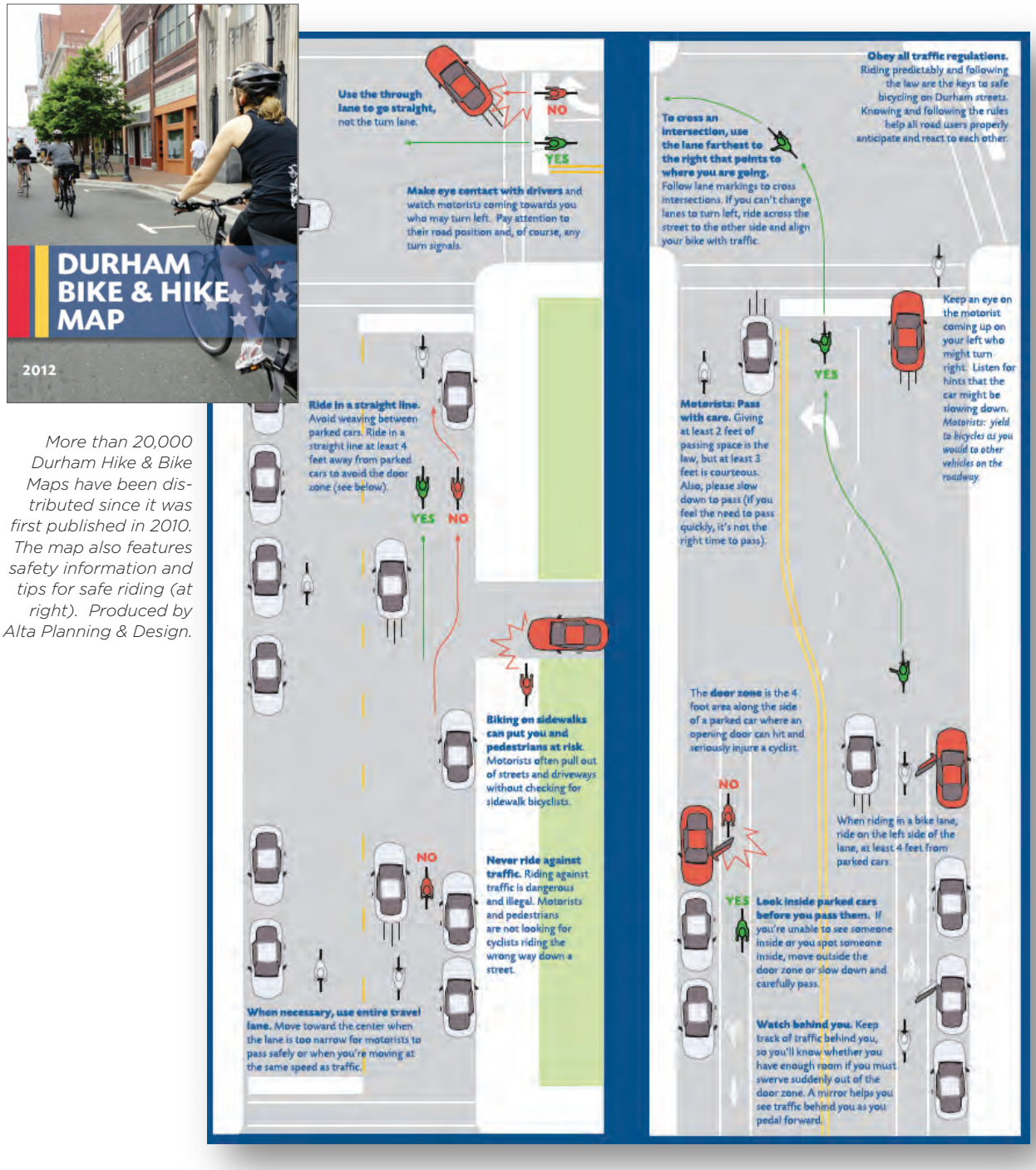
For this type of program, organizers should consider lessons learned and best practices from other communities. Some recommendations include:

- These events lend themselves to innovative partnerships and public/private funding. Health care providers whose mission includes facilitating physical activity are often major sponsors. Businesses may also support the event if it brings customers to their location. They often take place on a Sunday - partnerships with local churches in Youngsville could be pursued.
- Informing residents along the route about what it means for them is essential. They should be informed numerous times (3-6 times is not too much), including a reminder the day before the event. Expectations about vehicle access to and from residences should be managed clearly.
- Closing Main Street in Youngsville may be challenging due to through traffic needs - however, this could be a great location for an Open Streets event after Priority Project #2 is completed.
- For more local examples, refer to Durham's Bull City Summer Streets event. The Town of Boone, Marion, and the City of Salisbury have all held at least one ciclovia as well.
- Videos of Sunday Parkways events: http://www.streetfilms.org/tag/ciclovias/

Examples of Open Street events in Durham and Boone, NC

Hike & Bike Map

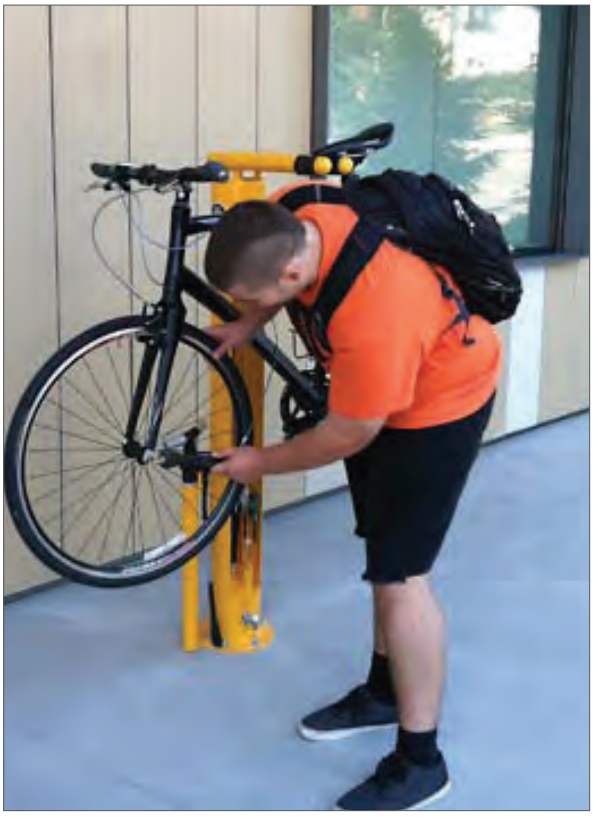
One of the most effective ways of encouraging people to ride a bicycle is through the use of maps and guides to show where you can walk and bike, and to guide people to enjoyable routes and destinations. A portion of the map should be devoted to bicycle and pedestrian safety education, such as informational graphics that demonstrate bicycle hand signals and how to share the road and the trail safely. The map should be made available online and printed as needed to be actively distributed to residents and visitors. A town map or local trail map could be created following completion of this plan's pilot projects, but safety education information could be produced at anytime (see example education info below from the Durham Hike & Bike Map: http://durhamnc.gov/1031/Durham-Bike-Hike-Map).



More than 20,000 Durham Hike & Bike Maps have been distributed since it was first published in 2010. The map also features safety information and tips for safe riding (at right). Produced by Alta Planning & Design.

Public Bicycle Maintenance Stand

Public maintenance stands have become a popular amenity in bicycle friendly communities because they provide bicyclists with access to tools on-the-go and encourage people to teach and learn bicycle maintenance in an informal setting. They can also help to reduce the number of abandoned or trashed bikes in a community; bikes are often abandoned by their owners when they have a minor mechanical issue that they do not have the tools or knowledge to fix. Public maintenance stands encourage people to learn bicycling skills from one another and send a message to residents and visitors that bicycling is supported in the community. These fixtures can be placed in a park or in another public place and require little upkeep or oversight, since the tools and stand are designed to be self-contained and theft-resistant. This type of amenity would be particularly useful along Main Street in Youngsville, as it is designated as North Carolina Statewide Bicycle Route 2.



Public bicycle maintenance and tool stand examples.

Wayfinding Signage Program

Wayfinding signage enhances resident and visitor orientation by directing pedestrians, bicyclists, and motorists to popular destinations around town. Youngsville could develop a customized wayfinding program that provides effective orientation and direction to key destinations. A wayfinding program can include directional signage, on-road markings, and kiosks with town maps. Chambers of commerce and health departments are examples of potential partners to develop such a program, based on the nexus with tourism, economic development, and active living. A cost-effective signage program can be implemented quickly and easily through the "Walk [Your City]" program (see below). Signs can be customized for bicycling. One of the first wayfinding signage projects could be implemented following completion of this plan's pilot projects. Visit http://walkyourcity.org/ for more information.

Below: Walk [Your City] is an online tool for making directional signage for walking and biking (all images below used with permission from walkyourcity.org).

Road signage has traditionally been expensive and car-centered, leaving walkers and bikers by the wayside. Walk [Your City] lets anyone from citizens to corporations quickly and affordably promote healthy lifestyles, public safety, and human-centered transit.

CHAPTER FOUR:
IMPLEMENTATION

Implementation Overview | Action Steps Table |
Key Action Step Descriptions | Key Partners in Implementation |
Performance Measures | Facility Development Methods

IMPLEMENTATION OVERVIEW

This chapter defines a structure for managing the implementation of the Town of Youngsville Bicycle and Pedestrian Plan. Implementing the recommendations within this plan will require leadership and dedication to pedestrian and bicycle facility development on the part of a variety of agencies. Equally critical, and perhaps more challenging, will be meeting the need for a recurring source of revenue. Even small amounts of local funding could be very useful and beneficial when matched with outside sources. Most importantly, the town need not accomplish the recommendations of this plan by acting alone; success will be realized through collaboration with regional and state agencies, the private sector, and non-profit organizations. Funding resources that may be available to Youngsville are presented in Appendix B of this plan.

Given the present day economic challenges faced by local governments (as well as their state, federal, and private sector partners), it is difficult to know what financial resources will be available at different time frames during the implementation of this plan. However, there are still important actions to take in advance of major investments, including key organizational steps, the initiation of education and safety programs, and the development of strategic, lower-cost sidewalk and on-road bicycle facilities. Following through on these priorities will allow the key stakeholders to prepare for the development of larger pedestrian and trail projects over time, while taking advantage of strategic opportunities as they arise.

The organizational framework on page 4-3 and Table 4-1 summarize the key players and steps involved in implementation.

Members of the Youngsville Bicycle and Pedestrian Plan Steering Committee could be good candidates for a standing Bicycle and Pedestrian Advisory Committee (BPAC) for the Town during plan implementation

ORGANIZATIONAL FRAMEWORK FOR IMPLEMENTATION

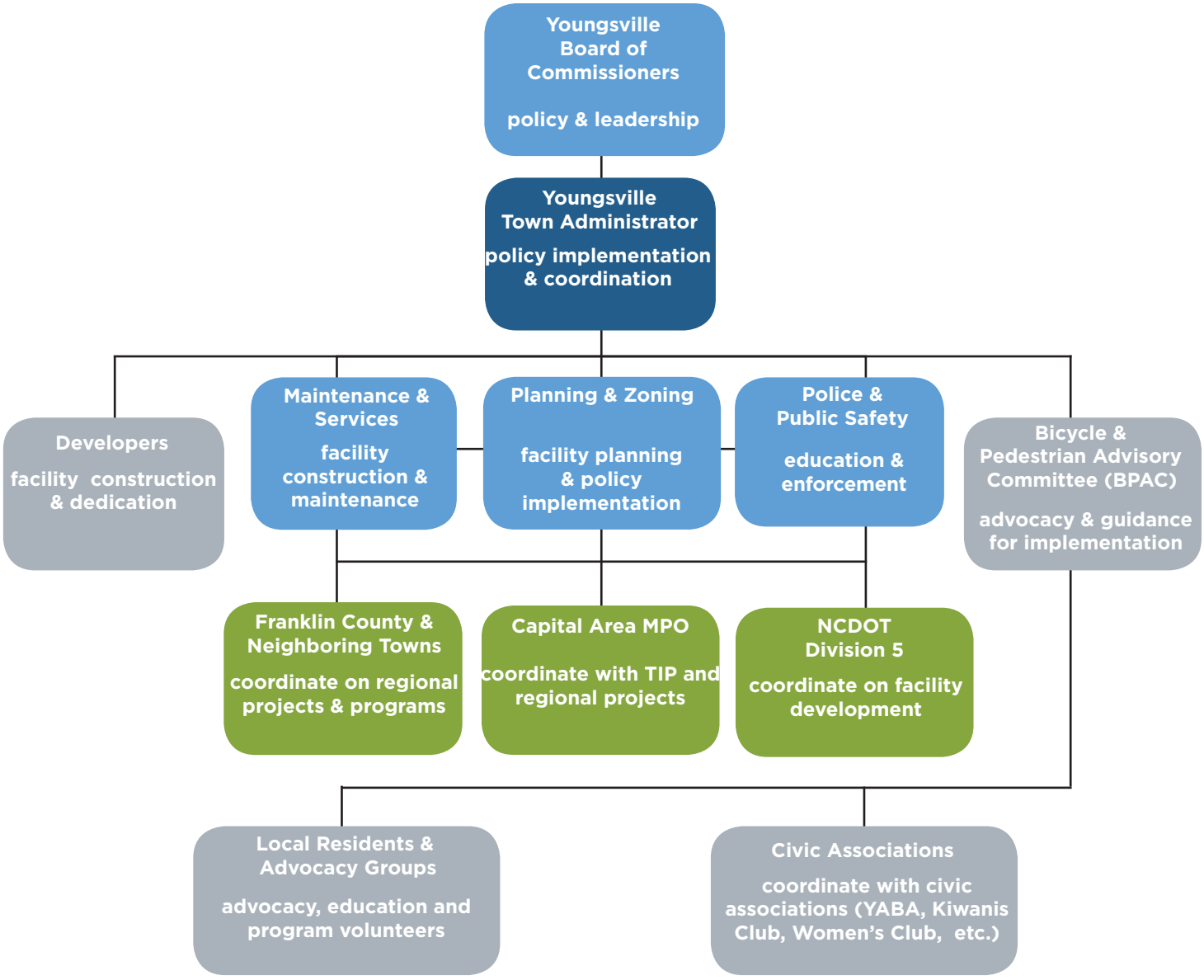


Table 4-1 Implementation Action Steps

TASK	LEAD AGENCY	SUPPORT	DETAILS	PHASE
Present Plan to Town Board	Project Consultants	Town Administrator, Project Steering Committee	Presentation to Town Board in Fall 2015.	Short-term (2015)
Approve this plan	NCDOT Bike/Ped Division	Project Consultants	Official letter of approval in Fall 2015.	Short-term (2015)
Adopt this plan (page 4-7 provides further detail)	Town Board	Town Administrator, Project Consultants	Through adoption, the Plan becomes an official planning document of the Town. Adoption shows that Youngsville has undergone a successful, supported planning process. After adoption, this plan should be incorporated into the 2015 update to the Franklin County CTP.	Short-term (2015)
Designate Staff (page 4-8 provides further detail)	Town Board	Town Administrator	Designate staff to oversee the implementation of this plan and the proper maintenance of the facilities that are developed. This role is referred to below as "Designated Town Staff".	Short-term (2015)
Form a Bicycle and Pedestrian Advisory Committee (BPAC) (page 4-8 provides further detail)	Town Board	Town Administrator, Project Steering Committee	Form and confirm the goals of the BPAC, which should focus on implementation of this plan.	Short-term (2015)
Ensure that Priority Projects are Incorporated in NCDOT's Prioritization Process	Designated Town Staff	Capital Area MPO, NCDOT Division 5	Communicate with MPO and NCDOT Division 5 staff about the importance of this plan's top projects. Frame the discussion around the key project criteria outlined on page B-8 and B-9 of this plan.	Short-term (2015)
Begin Annual Meeting With Key Project Partners	Designated Town Staff	NCDOT, BPAC, and local & regional stakeholders	Key project partners (see org. chart on page 4-3) should meet on an annual basis to evaluate the implementation of this Plan. Meetings could also include on-site tours of priority project corridors.	Short-term/ Ongoing (Beginning 2016)
Present this plan to other local and regional groups, to ensure planning efforts are integrated and supported regionally	Designated Town Staff	Capital MPO, NCDOT Planning Branch	Possible groups to receive a presentation: CAMPO, the Kerr-Tarr RPO, Franklin County planners and health department leaders, Town of Wake Forest, City of Raleigh, etc.	Short-term/ Ongoing (Beginning 2016)
Update 4' sidewalk requirement to 5'	Designated Town Staff	Town Board	5' sidewalk requirement adheres to the Americans with Disabilities Act (ADA).	Short-term (2016)
Allow public access for new sewer easements	Designated Town Staff	Town Board, Planning & Zoning, Franklin County	The acquisition of new sewer easements is a key step for long-term development of the trail system.	Short-term (2016)
Update development regulations to say that greenway corridors on adopted plans should be set aside in the development process. (page 4-7 provides further detail)	Designated Town Staff	Town Board, Planning & Zoning	Incorporating planned greenway trails into development regulations is another key step for long-term implementation.	Short-term (2016)

Table 4-1 Implementation Action Steps (Continued)

TASK	LEAD AGENCY	SUPPORT	DETAILS	PHASE
Communicate with PSNC the desire for a greenway along PSNC owned corridor	Designated Town Staff	Planning & Zoning, BPAC	Careful consideration needed near substations and overall protection of the utility. Seek approval of all designs.	Short-term/ Ongoing (2016 onward)
Policy & Law Orientation (page 4-11 provides further detail)	Youngsville Police	NCDOT Bike/Ped Divison, BPAC	Police staff should be familiar with state bicycle and pedestrian policies and laws, including best practices for reporting on accidents involving people walking or bicycling: http://www.ncdot.gov/bikeped/lawspolicies/policies/.	Short-term (2016)
Consider reducing speed limits when new bicycle facilities are added in some locations	Town Board	NCDOT, BPAC	Consider lowering the speed limits along key corridors once improvements have been made. Installing temporary speed feedback signs is another traffic calming strategy.	Short-term/ Ongoing (2016 onward)
Develop new policies & approaches for implementation (page 4-7 provides further detail)	Designated Town Staff	Town Board	Establish land right-of-way acquisition mechanisms, coordinate development plans, & implement driveway access management.	Short-term/ Ongoing (2016 onward)
Design Orientation	Designated Town Staff, NCDOT Division 5	NCDOT Bike/Ped Division	Become familiar with the guidelines in Appendix A of this Plan, as well as state and national standards for bicycle and pedestrian facility design.	Short-term/ Ongoing (2016 onward)
Apply for LAPP Funding	Designated Town Staff	Town Board, BPAC, Planning & Zoning, NCDOT Division 5,	Created by the Capital Area Metropolitan Planning Organization (CAMPO), LAPP funds are a function of the State Transportation Improvement Program (STIP). This is a potential funding source for pilot projects 1 & 2.	Short-term/ Ongoing (2016 onward)
Seek Multiple Funding Sources and Facility Development Options (page 4-10 provides further detail)	Designated Town Staff	Town Board, BPAC, Planning & Zoning, NCDOT Division 5, Capital Area MPO	Chapter 3 contains project cost estimates and Appendix B contains potential funding opportunities.	Short-term/ Ongoing (2016 onward)
Launch New Programs (page 4-10 provides further detail)	BPAC	Planning & Zoning, NCDOT Bike/Ped Division, Youngsville Police Department, Frankin County Health Department	These groups should coordinate to launch new programs, such as those described in Chapter 3, including a hike & bike map, one-stop website, bike rodeo, wayfinding program, and a bicycle maintenance stand.	Short-term/ Ongoing (2016 onward)
Maintain Bicycle & Pedestrian Facilities	Dedicated Town Staff, NCDOT Division 5	BPAC, General Public (for reporting maintenance needs), Planning & Zoning	Youngsville should maintain existing and future bicycle facilities, pavement markings, and sidewalks, working with NCDOT where necessary.	Short-term/ Ongoing (2016 onward)
Notify Planning & Zoning of upcoming roadway reconstruction, resurfacing, and restriping projects	Town Maintenance Director, NCDOT Division 5	Capital Area MPO, NCDOT Bike/Ped Division	Provide sufficient time for comments (in advance of the design phase); Incorporate bicycle pedestrian recommendations from this Plan into future updates to the CTP and into future project design plans.	Short-term/ Ongoing (2016 onward)

Table 4-1 Implementation Action Steps (Continued)

TASK	LEAD AGENCY	SUPPORT	DETAILS	PHASE
Develop a Long-Term Funding Strategy	Designated Staff	Town Board, Town Administrator, Capital Area MPO, NCDOT Division 5	To allow continued development of the overall system, capital funds for bicycle and pedestrian facility construction should be set aside every year. Powell Bill funds should be programmed for facility construction. Funding for an ongoing maintenance program should also be included in the Town's operating budget.	Short-term/ Ongoing (2016 onward)
Install bike racks throughout town	Public Utilities, BPAC	Planning & Zoning, local businesses	Install bike racks at parks, public buildings, schools, shopping centers, downtown destinations, and other important destinations.	Mid-term (2016-2018)
Install and maintain crosswalks	Designated Staff, NCDOT Division 5	BPAC, NCDOT Bike/Ped Division	Establish program for the regular review and maintenance of existing crosswalks. Install new crossing improvements where recommended in Chapter 3.	Mid-term (2016-2018)
Provide Enforcement and Education Training for Police Officers Through Free Online Resources	Police Department	NCDOT Bike/Ped Division	Resources are available from the National Highway Traffic Safety Administration, and from webinars by the Association of Pedestrian and Bicycle Professionals. Utilize available WatchForMeNC materials, and request that Youngsville is included when WatchForMeNC is integrated statewide.	Mid-term (2016-2018)
Complete Two Pilot Projects (page 4-11 provides further detail)	Dedicated Town Staff + NCDOT Division 5	Capital Area MPO, NCDOT Bike/Ped Division	Chapter 3 provides info on the priority projects. Aim to complete at least three of the priority projects by the end of 2017.	Mid-term (2016-2018)
Distribute Bicycle and Pedestrian Safety Information	BPAC	NCDOT Bike/Ped Division, Police Department	NCDOT has print material with safety tips for motorists, bicyclists and pedestrians available for download at www.ncdot.gov/bikeped/safetyeducation/materials/. Other methods of distribution could include web sites, social media, and 'on-the-ground' in trail kiosks.	Mid-term (2016-2018)
Communication & Outreach (page 4-9 provides further detail)	BPAC	Local newspapers, Town web site & social media mangers	The BPAC should establish a communication campaign to celebrate successes as facilities are developed and otherwise raise awareness of the overall bicycle and pedestrian network and its benefits. A key first task of this group is to establish a page on the town website dedicated to bike/ped education and project updates.	Mid-term (2016-2018)
Seek designation as a Bicycle-Friendly Community & Walk-Friendly Community (page 4-8 provides further detail)	Designated Town Staff	BPAC	The development and implementation of this plan is an essential first step toward becoming a designated Bicycle-Friendly and Walk-Friendly Community. With ongoing efforts and the short- term work program recommended here, the Town should be in a position to apply for and receive recognition by 2019.	Mid-term (2018-2020)
Complete Additional Priority Projects	Dedicated Town Staff + NCDOT Division 5	Capital Area MPO, NCDOT Bike/Ped Division	Chapter 3 provides info on the Priority Projects. Aim to complete at least six of the priority projects by the end of 2020.	Mid- to Long-term (2018-2020)
Plan Update	Town Board & BPAC	Planning & Zoning	This plan should be updated in 2020. If many projects and programs have been completed by then, a new set of priorities should be established. If many projects and programs have not been completed, a new implementation strategy should be established.	Long-Term (2020)

KEY ACTION STEPS DESCRIPTIONS

POLICY ACTION STEPS

Several policy steps are crucial to the success of future facility development. These steps will legitimize the recommendations found in this plan and enable the Town to carry out those recommendations.

Adopt This Plan

Before any other action takes place, the Town of Youngsville should adopt this plan. This should be considered the first step in implementation. Through adoption of this plan and its accompanying maps as the Town's official bicycle and pedestrian plan, Youngsville 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 Youngsville to dedicate or allocate funds, but rather indicates intent to implement this plan over time, starting with these action steps.

The Planning Board should review and recommend the plan to the Town Board, which in turn must consider and officially incorporate the recommended infrastructure improvements of this plan into its land-use plans. The following entities should adopt this plan:

» The Town of Youngsville
» Capital Area MPO

This plan and its recommended facilities should be approved by the NCDOT, and they should be included in the future planning of the NCDOT Planning Branch, the Division of Bicycle and Pedestrian Transportation (DBPT), and NCDOT Division 5. This plan's recommendations should also be integrated into an update to the Comprehensive Transportation Plan (CTP) for Franklin County. NCDOT should refer to this document when assessing the impact for future projects and plans. Likewise, NCDENR's Division of Parks and Recreation should refer to this plan in any projects for future state parks or trails near Youngsville.

Adopt a Complete Streets Policy

There is a growing national trend towards integrating bicycling, walking, and transit as a routine element in highway and transit projects. This movement has developed under the name of "Complete Streets," which is defined by the Complete the Streets Coalition as follows:

"Complete Streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street."

The Safe Routes to School National Partnership can assist the City's efforts in writing Complete Streets policy. Technical assistance can range from providing resources to assistance in creating marketing campaigns and Complete Streets language.

Appendix C outlines a draft Complete Streets resolution for consideration by the Town of Youngsville. By adopting a "Complete Streets" policy, the Town would be committing to developing new roadways and reconstructing existing roadways to accommodate all users.

Establish Land Right-of-Way Acquisition Mechanisms

It is recommended that local zoning and subdivision ordinances be amended to ensure that, as developments are planned and reviewed, the bicycle facilities and greenway corridors identified in this plan are protected. This would entail amending development regulations to have developers set aside land for trail infrastructure whenever a development proposal overlaps with the proposed routes, as adopted. This requirement should be inserted as a subsection of Section *7.2 Recreation Requirement* of the Subdivision Ordinance. Youngsville staff should

ensure that an effective review of all bicycle and pedestrian elements in proposed developments takes place.

Coordinate Development Plans

The Town of Youngsville should ensure that adopted bicycle, pedestrian, trail and multi-use path recommendations from this plan are included in future residential and commercial developments that connect with such proposed facilities.

Implement Driveway Access Management

Youngsville should consider adding access management language to the town ordinances for both future development and retrofits to existing development, especially high-volume corridors. The NCDOT's policy on 'Street and Driveway Access to North Carolina Highways' provides examples on how to reduce conflict points between motor vehicles and pedestrians and bicyclists. For more information: www.ncdot.org/doh/preconstruct/altern/value/manuals/pos.pdf

High numbers of driveways or conflict points are unsafe and hostile to bicyclists and pedestrians. Limiting 200 ft between curb cuts will significantly enhance bicycle and pedestrian travel.

PROGRAM ACTION STEPS

While policies provide support for facility development, the program recommendations, featured at the end of Chapter 3, will build community support for the creation of new facilities and help establish a stronger bicycling and walking culture. The action steps that follow will support these programming efforts.

Designate Staff

The Town should 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 planning staff and maintenance/services staff oversee the day-to-day implementation of this plan. In many municipalities, a full-time bicycle and pedestrian coordinator covers this task, but in smaller towns, such as Youngsville, it makes more sense to fold these responsibilities into current staff responsibilities.

Form a Bicycle and Pedestrian Advisory Committee (BPAC)

The Town of Youngsville should form a bicycle and pedestrian advisory committee (BPAC) out of the plan's steering committee to assist in the implementation of this plan. The BPAC should have representation from active pedestrians and commuting and recreational cyclists and should champion the recommendations of this plan. The formation of this group would be a significant step in becoming designated as a Bicycle Friendly and Walk Friendly Community (see section that follows). The committee would provide a communications link between the citizens of the community and local government. They should also continue to meet periodically, and be tasked with assisting Town staff in community outreach, marketing, and educational activities recommended by this plan.

As an alternative for a small town like Youngsville, a member or members of the Town Board of Commissioners or Planning Board could fulfill this role, working with Town staff on implementation of both the infrastructure and non-infrastructure elements of the plan.

Become Designated as a Walk Friendly and Bicycle Friendly Community

A goal for Youngsville should be to seek a "Bicycle Friendly Community" (BFC) designation from the League of American Bicyclists. The BFC campaign is an award program that recognizes municipalities that actively support bicycling activities and safety. A Bicycle Friendly Community provides safe accommodation for bicycling and encourages its residents to bicycle for transportation and recreation. Carrboro and Davidson are examples of small North

Carolina towns that have become designated as Bicycle Friendly Communities.

Similarly, the Walk Friendly Community (WFC) Campaign is an awards program that recognizes municipalities that actively support pedestrian activity and safety. A Walk Friendly Community provides safe accommodation for walking and encourages its residents to walk for transportation and recreation. The program is maintained by the UNC Highway Safety Research Center's Pedestrian and Bicycle Information Center, with support from a variety of national partners.

Becoming designated as a Bicycle- and Walk-Friendly Community signals to current residents, potential residents, and visitors that the town is a safe and welcoming place for individuals and families to live and recreate. The development and implementation of this plan is an essential first step toward becoming a Walk- and Bicycle-Friendly Community. With ongoing efforts and the short-term work program recommended here, the Town should be in a position to apply for and receive BFC status within a few years.

Implement NC Bike Route 2 Through Youngsville

As part of the state bike route system from western NC to the Outer Banks (NC 2 Mountains to Sea), this route passes east/west through downtown Youngsville; entering town from the west on Holden Road, passing through downtown on Main Street, then leaving town to the east on Tarboro Road.

Youngsville should use this designation as leverage to implement recommendations along Holden Road (paved shoulder), Main Street (streetscape improvements and marked shared lanes), E. Main Street (sidepath), and finally Tarboro Road (paved shoulder). This should also include signage updates. The Town should coordinate improvements with NCDOT Division 5 and NCDOT DBPT.

By improving this route through town for bicyclists, Youngsville has a chance to become a destination for through-bicyclists who might stop, start, or simply spend time and money in Youngsville. Along with infrastructure improvements, encouragement from the business community in welcoming bicyclists along NC Bike Route 2 would strengthen this effort. For more information on NC 2 and the state bike route system, see - http://ncbikeways.com/

Communication and Outreach

The BPAC should lead the effort to establish a communication campaign to celebrate successes as facilities are developed and otherwise raise awareness of the overall pedestrian and bicycle network and its benefits. A key first task of this group is to design and add a web page on the Town's current website.

Many current and potential pedestrians and bicyclists do not know where to turn to find out about traffic laws, events, maps, tips, and groups. Developing a "Walk and Bike Hub" web page provides information to a wide audience and encourages people to walk and bicycle. This could be as simple as providing links on the Town's website to helpful walking/biking pages in addition to local information. Walking an biking related events could also be broadcast through the Town Facebook page.

Such a web page is not usually difficult to set up, but it will only be successful if the site is both easy to use and updated frequently. All website content should be reviewed regularly for accuracy. Walking groups, the bicycling community, and volunteer organizations interested in safety and health can assist in keeping the site up to date.

Establish a Monitoring Program

From the beginning, and continuously through the life of a pedestrian or bicycle facility project, the BPAC and Town staff should brainstorm

specific benchmarks to track through a monitoring program and honor the completion of projects with public events and media coverage. Benchmarks should be revisited and revised periodically as the pedestrian and bicycle facility network evolves.

Begin Annual 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. The Town of Youngsville should work with CAMPO to organize this meeting and ensure key collaborative efforts are communicated. This meeting should include representatives from the Organizational Chart shown on page 4-3. 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 Town to incrementally complete each of the suggested physical improvements, policy changes and programs over a 5-10 year period. A brief progress benchmark memo should be a product of these meetings, and participants should reconfirm the plan's goals each year. The meetings could also occasionally feature special training sessions on pedestrian, on-road bicycle, and trail issues.

Seek Multiple Funding Sources and Facility Development Options

Multiple approaches should be taken to support bicycle and 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. Dedicated local funding sources will be important for the implementation of this plan. 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 and 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 B.

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 Town should also evaluate which of the proposed projects could be added to future TIP updates, and should coordinate closely with NCDOT Division 5 and the Capital Area MPO on priority projects.

Develop Bicycle and Pedestrian Facility Designs and Specifications for Proposed Projects

Town of Youngsville staff could prepare these in-house to save resources, using the design guidelines of this plan along with experience gained working toward implementation of the two priority projects. The public should have an opportunity to comment on the design of new facilities.

Launch New Programs

The program recommendations found in Chapter 3 provide a set of programmatic resources that will support the goals of the Youngsville Bicycle and Pedestrian Plan. The Town should reference the recommendations to develop new programs that promote walking and bicycling.

Through cooperation between the Town, the BPAC, and groups such as walking and bicycling clubs, strong education, encouragement, and enforcement campaigns could also occur

as new facilities are built. When an improvement has been made, the roadway environment has changed and proper interaction between motorists, bicyclists, 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 3 provides program ideas to choose from, some of which are included in the action steps table starting on page 4-4.

Provide Enforcement and Education Training for Police Officers

Law enforcement officers have many important responsibilities, yet pedestrians and bicyclists remain the most vulnerable forms of traffic. The Youngsville Police Department has been aware of this planning process, and 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 Youngsville's 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), or through fee-based webinars available through the Association of Pedestrian and Bicycle Professionals (APBP).

Another option is to apply to participate in future Watch for Me, NC campaigns offered by the NCDOT Bike/Ped Division. A key component of the campaign is to offer bicycle and pedestrian law enforcement training to local police officers.

INFRASTRUCTURE ACTION STEPS

While establishing the policies and programs described, Youngsville should move forward with the design and construction of priority projects. The Town should also work to identify funding for long-term, higher-cost projects.

Identify Funding

Achieving the vision defined within this plan will require, among other things, a stable and recurring source of funding. Communities across the country that have successfully engaged in pedestrian and bicycle programs have relied on multiple funding sources to achieve their goals. No single source of funding will meet the recommendations identified in this Plan. Instead, stakeholders will need to work cooperatively with municipality, state, and federal partners to generate funds sufficient to implement the program.

Donations from individuals or companies are another potential source of funding. The BPAC or assigned commissioner/board member should establish an "Adopt a Trail" or "Adopt a Sidewalk" program as a mechanism to collect these donations for the development of sidewalk, trail and sidepath recommendations discussed in Chapter 3. This can include project components such as wayfinding signage. In addition to a formalized program, a website should be set up as an easy way for individuals to donate smaller amounts.

Federal and state grants should be pursued along with local funds to pay for necessary right-of-way acquisition and project design, construction, and maintenance expenses. "Shovel-ready" designed projects should be prepared in the event that future federal stimulus funds become available. Additional recommended funding sources may be found in Appendix B.

Complete Short-Term Priority Projects

By quickly moving forward on priority projects, Youngsville will demonstrate its commitment to carrying out this plan and will better sustain momentum generated during the planning process. Refer to Chapter 3: Network Recommendations for priority projects.

KEY PARTNERS IN IMPLEMENTATION

ROLE OF THE YOUNGSVILLE BOARD OF COMMISSIONERS

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

Adoption of this plan is in line with public support. Youngsville's online comment form for the planning process yielded over 100 responses and showed strong support for improving bicycling and pedestrian conditions.

ROLE OF THE YOUNGSVILLE PLANNING BOARD

The Youngsville Planning Board serves as an advisory board to the Town Board 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- and bicycle-related policies in North Carolina. (see: www.ncdot.gov/bikeped/lawspolicies/policies/)

ROLE OF YOUNGSVILLE PLANNING & ZONING

Planning & Zoning staff will take primary responsibility for the contact with new development to implement the plan (with support from the Public Utilities Department and CAMPO). The staff should be prepared to:

- Communicate and coordinate with local developers on adopted recommendations for bicycle and pedestrian facilities, including paved multi-use trails.
- Become familiar with the standards set forth in Appendix A of this plan, as well as state and national standards for bicycle and pedestrian facility design.
- Secure encroachment agreements for work on NCDOT-owned and maintained roadways.
- Communicate and coordinate with Franklin County, Capital Area MPO, and neighboring municipalities on regional facilities; partner for joint-funding opportunities.
- 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 NCDOT Division 5 to ensure that when NCDOT-owned and maintained roadways in Youngsville are resurfaced or reconstructed, this plan's adopted recommendations for bicycle and 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.
- Become experts on bicycle and pedestrian-related policies in North Carolina. (see: www.ncdot.gov/bikeped/lawspolicies/policies/)

ROLE OF THE BICYCLE AND PEDESTRIAN ADVISORY COMMITTEE (OR ASSIGNED COMMISSIONER/BOARD MEMBER)

The Committee should be prepared to:

- Meet with staff from Planning & Zoning and the Public Utilities Department; evaluate

progress of the plan's implementation and offer input regarding pedestrian, bicycle, and trail-related issues.
» Assist Youngsville staff in applying for grants and organizing bicycle- and pedestrian-related events and educational activities.
» Build upon current levels of local support for pedestrian and bicycle issues and advocate for local project funding.

ROLE OF THE LOCAL NCDOT DIVISION 5

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

» Recognize this plan as not only an adopted plan of the Town of Youngsville, but also as an approved plan of the NCDOT.
» Become familiar with the bicycle and 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 facility design; construct and maintain recommended facilities using the highest standards allowed by the State (including the use of innovative treatments on a trial basis).
» Notify the Town of Youngsville staff of all upcoming roadway reconstruction or resurfacing/restriping projects in town, 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 YOUNGSVILLE POLICE DEPARTMENT

The Youngsville 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. The Police Department should be prepared to:

» Become experts on pedestrian-and bicycle related laws in North Carolina (see: www.ncdot.gov/bikeped/lawspolicies/laws/).
» Continue to enforce not only bicycle- and pedestrian-related laws, but also motorist laws that affect walking and bicycling, such as speeding, running red lights, aggressive driving, etc.
» Participate in bicycle- and pedestrian-related education programs.
» Review safety considerations as projects are implemented.

ROLE OF DEVELOPERS

Developers in Youngsville can play an important role in facility development whenever a project requires the enhancement of transportation facilities or the dedication and development of on-road bicycle facilities, 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 facility design.
» Be prepared to account for bicycle and pedestrian circulation and connectivity in future developments.

ROLE OF LOCAL & REGIONAL STAKEHOLDERS

Stakeholders for bicycle and pedestrian facility development and related programs, such as Franklin County, Capital Area MPO, and local organizations play important roles in the imple-

mentation of this plan. Local and regional stakeholders should be prepared to:

- Become familiar with the recommendations of this plan, and communicate & coordinate with the Town for implementation, specifically in relation to funding opportunities, such as grant writing and developing local matches for facility construction.
- Youngsville should apply for LAPP funds through CAMPO (see appendix page B-12 for more information) for pilot projects 1 & 2.
- CAMPO should work with Youngsville on populating the Strategic Transportation Improvement (STI) list with pedestrian and bicycle infrastructure projects.
- Frankiln County should coordinate with the Town on trail development.
- Business owners and organizations should look for opportunities to partner on specific projects, such as streetscape improvements, or comprehensive signage and wayfinding projects.

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 and bicycling issues in Youngsville.
- Assist Town staff and the BPAC by volunteering for bicycle- and pedestrian-related events and educational activities and/or participate in such activities.
- Assist Youngsville staff and the BPAC by speaking at Town Board meetings and advocating for local pedestrian and bicycle project and program funding.

ROLE OF VOLUNTEERS

Services from volunteers, student labor, and seniors, or donations of material and equipment may be provided in-kind, to offset construction and maintenance costs. Formalized maintenance agreements, such as adopt-a-trail/greenway or adopt-a-highway can be used to provide a regulated service agreement with volunteers.

Other efforts and projects can be coordinated as needed with senior class projects, scout projects, interested organizations, clubs or a neighborhood's community service to provide for many of the program ideas outlined in Chapter 3 of this plan. Advantages of utilizing volunteers include reduced or donated planning and construction costs, community pride and personal connections to the town's greenway, bicycle, and pedestrian networks.

PERFORMANCE MEASURES (EVALUATION AND MONITORING)

Youngsville 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. Performance measures could address the following aspects of pedestrian and bicycle transportation and recreation in Youngsville:

- *Safety.* Measures of pedestrian- and bicycle-related crashes and injuries.
- *Facilities.* Measures of how many pedestrian and bicycle facilities have been funded and constructed since the plan's adoption.
- *Maintenance.* Measures of existing sidewalk/crosswalk or bicycle facility deficiency or maintenance needs.
- *Counts.* Measures of pedestrian and/or bicycle traffic at specific locations.
- *Education, Encouragement and Enforcement.* Measures of the number of people who have participated in part of a pedestrian- or bicycle-related program since the plan's adoption.

FACILITY DEVELOPMENT METHODS

This section describes different construction methods for the proposed pedestrian and bicycle facilities outlined in Chapter 3. Note that many types of transportation facility construction and maintenance projects can be used to create new bicycle and pedestrian facilities. It is much more cost-effective to provide bicycle and 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 bicycle and pedestrian facilities into routine transportation and utility projects, Youngsville should keep track of NCDOT's projects and any other local transportation improvements. While doing this, town staff should be aware of the different procedures for state and local roads and interstates.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) STRATEGIC TRANSPORTATION INVESTMENTS (STI)

The NCDOT's State Transportation Improvement Program is based on the Strategic Transportation Investments Bill, signed into law in 2013. The Strategic Transportation Investments (STI) Initiative introduces the Strategic Mobility Formula, a new way to fund and prioritize transportation projects.

The new Strategic Transportation Investments Initiative is scheduled to be fully implemented by July 1, 2015. Projects scheduled for construction before then will proceed as scheduled under the current Equity Formula. Projects slated for construction after that time will be ranked and programmed according to the new formula. The new Strategic Mobility Formula assigns projects for all modes into one of three categories: 1) Statewide Mobility, 2) Regional Impact, and 3) Division Needs.

All independent bicycle and pedestrian projects are placed in the "Division Needs" category, and are currently ranked based on 50% data (safety, access, demand, connectivity, and cost effectiveness) and 50% local input. ***See Appendix B, page B-8 to B-10 for more information.***

LOCAL ROADWAY CONSTRUCTION OR RECONSTRUCTION

Pedestrians and bicyclists should be accommodated any time a new road is constructed or an existing road is reconstructed. In the longer-term, all new roads with moderate to heavy motor vehicle traffic should have sidewalks, bicycle facilities, and safe intersections. However, side paths can be an acceptable solution when a road has few driveways and high-speed, high-volume traffic.

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. The Department of Justice and the Federal Highway Administration recently released guidance on the Title II of the Americans with Disabilities Act requirement to provide curb ramps when streets, roads, or highways are altered through resurfacing. More information is available on the following website:
http://www.ada.gov/doj-fhwa-ta.htm.

RESIDENTIAL AND COMMERCIAL DEVELOPMENT

The construction of sidewalks, bicycle facilities, trails, and safe crosswalks should be required during development. Construction of facilities that corresponds with site construction is more cost-effective than retrofitting. In commercial development, emphasis should also be focused on safe pedestrian and bicyclist access into, within, and through large parking lots. This ensures the future growth of the pedestrian and bicycle networks and the development of safe communities.

REMOVING PARKING

Some neighborhood collector roadways are wide enough to add pedestrian and bicycle facilities, but they are used by residents for

on-street parking, especially in the evening. In locations like this, removing parking is likely to create considerable controversy and is not recommended unless there is no other solution or the parking is rarely used. In the rare case that removing parking is being considered, the parking should not be removed unless there is a great deal of public support for the facilities on that particular roadway and a full public involvement process with adjacent residents and businesses is undertaken prior to removing parking.

If it is not practical to add a bike lane, edgelines and shared lane markings may be considered. On roads where the outside lane and parking area combined are more than 17 feet wide, 10 foot wide travel lanes can be striped with an edgeline, leaving the rest of the space on either side for parking. The stripe would help slow motor vehicles and provide extra comfort for bicyclists, especially during the daytime when fewer cars would be parked along the curb. On roads with outside lane and parking areas that are narrower than 17 feet wide, shared lane markings can be provided every 250 feet on the right side of the motor vehicle travel lane to increase the visibility of the bike route.

REPAVING

Repaving projects provide a clean slate for revising pavement markings. When a road is repaved, the roadway should be restriped to create narrower lanes and provide space for bike lanes and shoulders, where feasible. In addition, if the spaces on the sides of non-curb and gutter streets have relatively level grades and few obstructions, the total pavement width can be widened to include paved shoulders.

NCDOT provides a resurfacing schedule for the next three years. Please see the following website - https://connect.ncdot.gov/resources/Asset-Management/Pages/HMIPDIV.aspx. Projects in Youngsville that could be coordinated with recommendations from this plan include:

- US 1A Yougnsville Blvd - from Wake County line to Main Street (FY2016)
- Main Street (NC 96) - from Youngsville Blvd to Cross Street (FY2018)

INSTALLING SHARED LANE MARKINGS

Youngsville should adopt the use of shared lane markings, or "sharrows," as one of its bicycle facility types. Shared lane markings have been incorporated into the Manual on Uniform Traffic Control Devices (MUTCD). They take the place of traditional bicycle lanes where travel lanes cannot be narrowed, where speeds do not exceed 35 mph, and/or where there is on-street parking. The intent of the shared lane marking is threefold:

- They draw attention to the fact that the roadway is accommodating bicycle use and traffic;
- They clearly define the direction of travel for both bicyclists and motorists; and
- With proper placement, they remind bicyclists to bike further from parked cars to prevent "dooring" collisions.

While shared-lane markings are not typically recommended or needed on local, residential streets, they are sometimes used along such streets when part of a signed route or bicycle boulevard. It should be noted that sharrows are not a replacement for bicycle lanes in their effectiveness or use.

RETROFIT ROADWAYS WITH NEW BICYCLE AND PEDESTRIAN FACILITIES

There may be critical locations in the pedestrian and bicycle network that have safety issues or are essential links to destinations. In these locations, it may be justifiable to add new pedestrian and bicycle facilities before scheduling a roadway to be repaved or reconstructed. In some other locations, it may be relatively easy to add sidewalk or to add extra pavement for

shoulders, but other segments may require removing trees, relocating landscaping or fences, or re-grading ditches. Retrofitting roadways with side paths creates similar challenges.

BRIDGE CONSTRUCTION OR REPLACEMENT

Provisions should always be made to include a walking and bicycling facility as a part of vehicular bridges. All new or replacement bridges should accommodate two-way travel for all users. Even though bridge construction and replacement does not occur regularly, it is important to consider these policies for long-term bicycle and 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. Facility design standards such as widths of facilities and heights of handrails are presented in Appendix A: Design Guidelines.

SIGNAGE AND WAYFINDING PROJECTS

A relatively low-cost, short-term action that Youngsville can pursue immediately is to develop and adopt a wayfinding signage style policy and procedure, to be applied throughout the entire community, to make it easier for people to find destinations. The Walk [Your City] program highlighted on page 3-20 is one such program that could be implemented as part of this effort.

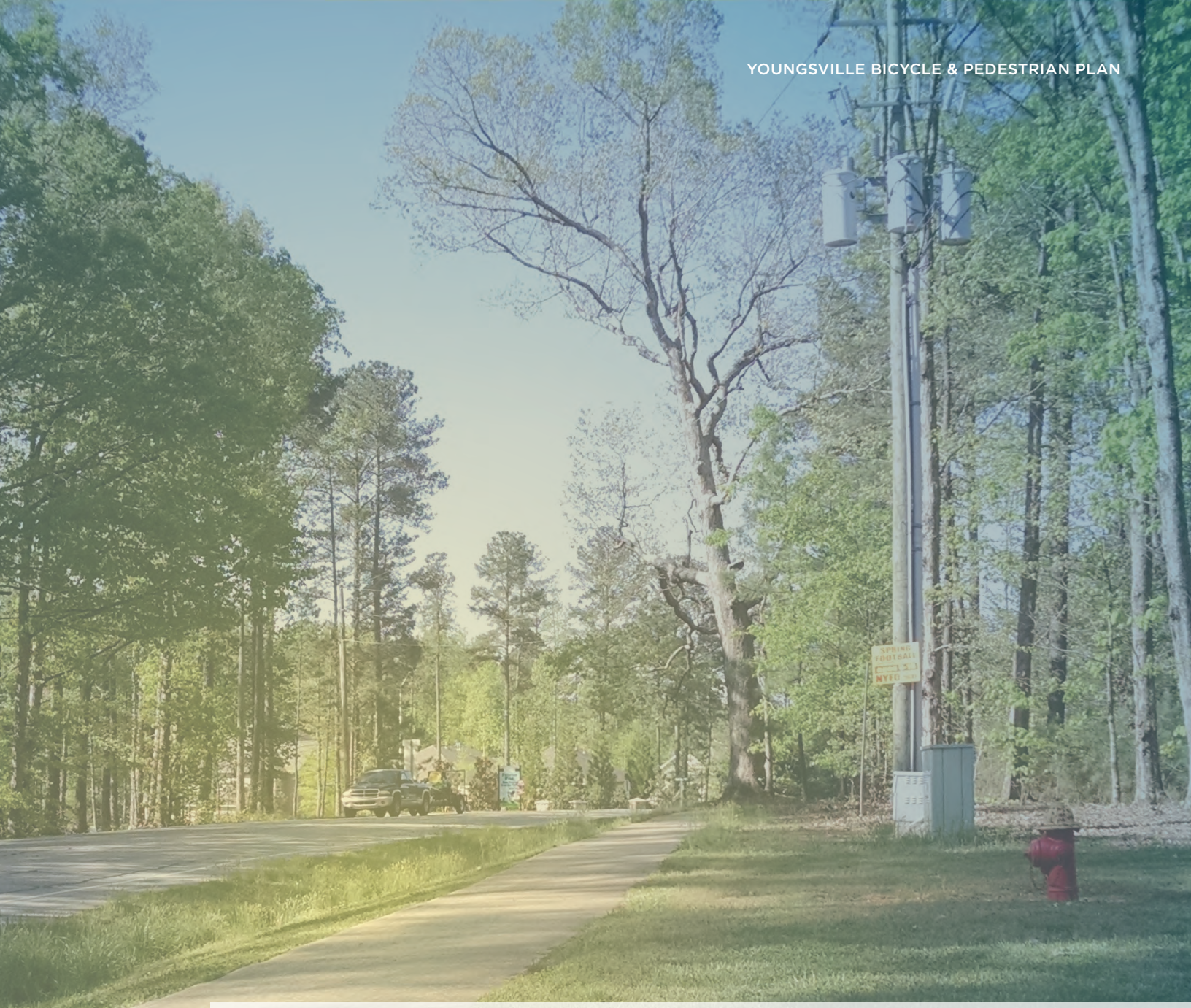
Bicycle route signs are another example of wayfinding signs, and should be installed along routes independently of other signage projects or as a part of a more comprehensive wayfinding improvement project. Posting signage that includes bicycle and walk travel times to major destinations can help to increase awareness of the ease and efficiency of bicycle and pedestrian travel. See Appendix A: Design Guidelines for more detailed guidance on signage and wayfinding improvements.

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/reference/signage_guide

TOWN EASEMENTS

Youngsville should explore opportunities to revise existing easements to accommodate public access greenway trail facilities. Adding policy language as a subsection to Section *6.5 Utility Easements* to allow for public access for trail users, as a matter of right, on all new sewer and utility easements would greatly enhance the development of the greenway network over time. 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 better utilizes the Town's resources.

Railroad line through the heart of Youngsville



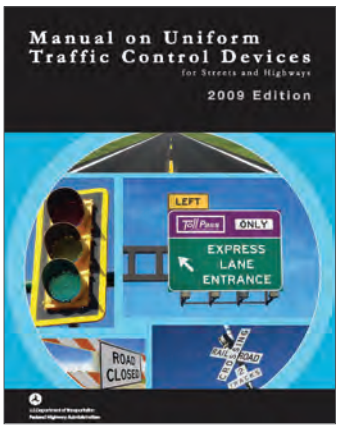
APPENDIX A:
DESIGN GUIDELINES

Overview | Design Needs of Pedestrians | Design Needs of Bicyclists | Shared Use Paths

OVERVIEW

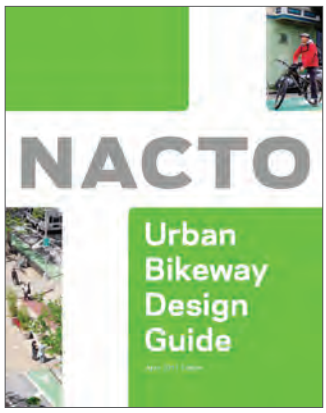
The sections that follow serve as an inventory of pedestrian and bicycle design treatments and provide guidelines for their development. These treatments and design guidelines are important because they represent the tools for creating a walk- and bicycle-friendly, safe, and accessible community. The guidelines are not, however, a substitute for a more thorough evaluation by a landscape architect or engineer upon implementation of facility improvements. Some improvements may also require cooperation with the NCDOT for specific design solutions. The following standards and guidelines are referred to in this guide.

» **The Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD)** is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.



» **American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities,** updated in June 2012 provides guidance on dimensions, use, and layout of specific bicycle facilities.

» **The National Association of City Transportation Officials' (NACTO) 2012 Urban Bikeway Design Guide** is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs. All of the NACTO Urban Bikeway Design Guide treatments are in use internationally and in many cities around the US. The FHWA endorsed the NACTO Guide in 2013.



» Meeting the requirements of the **Americans with Disabilities Act (ADA)** is an important part of any bicycle and pedestrian facility project. **The United States Access Board's proposed Public Rights-of-Way Accessibility Guidelines (PROWAG) and the 2010 ADA Standards for Accessible Design (2010 Standards)** contain standards and guidance for the construction of accessible facilities.

» **The North Carolina Department of Transportation Complete Streets Planning and Design Guidelines**, released in 2012, provides NCDOT and municipality staff with a guide to planning and designing streets that meet the needs of all users, including pedestrians, bicyclists, and motor vehicles. The guidelines include detailed information on the processes, street types, and recommendations for creating complete streets in North Carolina.

Should these standards be revised in the future and result in discrepancies with this appendix, the standards should prevail for all design decisions. A qualified engineer or landscape architect should be consulted for the most up to date and accurate cost estimates.

Main Street Sidewalk

DESIGN NEEDS OF PEDESTRIANS

Types of Pedestrians

Pedestrians have a variety of characteristics and the transportation network should accommodate a variety of needs, abilities, and possible impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception. Children have low eye height and walk at slower speeds than adults. They also perceive the environment differently at various stages of their cognitive development. Older adults walk more slowly and may require assistive devices for walking stability, sight, and hearing. Table A-1 to the right summarizes common pedestrian characteristics for various age groups.

The MUTCD recommends a normal walking speed of three and a half feet per second when calculating the pedestrian clearance interval at traffic signals. The walking speed can drop to three feet per second for areas with older populations and persons with mobility impairments. While the type and degree of mobility impairment varies greatly across the population, the transportation system should accommodate these users to the greatest reasonable extent.

Table A-1: Pedestrian Characteristics by Age

Age	Characteristics
0-4	Learning to walk Requires constant adult supervision Developing peripheral vision and depth perception
5-8	Increasing independence, but still requires supervision Poor depth perception
9-13	Susceptible to "dart out" intersection dash Poor judgment Sense of invulnerability
14-18	Improved awareness of traffic environment Poor judgment
19-40	Active, fully aware of traffic environment
41-65	Slowing of reflexes
65+	Difficulty crossing street Vision loss Difficulty hearing vehicles approaching from behind Could become disoriented or have limited cognitive abilities

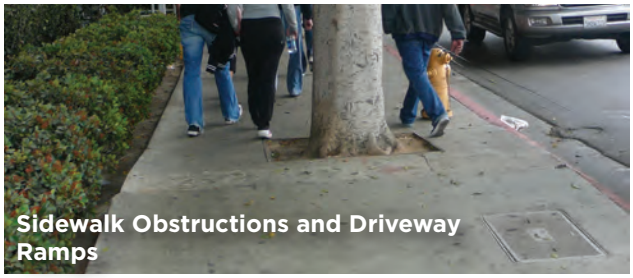
PEDESTRIAN FACILITIES
Sidewalks

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel that is separated from vehicle traffic. Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped planting strip area. Sidewalks are a common application in both urban and suburban environments.

Attributes of well-designed sidewalks include the following:

- **Accessibility:** A network of sidewalks should be accessible to all users.
- **Adequate width:** Two people should be able to walk side-by-side and pass a third comfortably. Different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should accommodate a high volume of walkers.
- **Safety:** Design features of the sidewalk should allow pedestrians to have a sense of security and predictability. Sidewalk users should not feel they are at risk due to the presence of adjacent traffic.
- **Continuity:** Walking routes should be obvious and should not require pedestrians to travel out of their way unnecessarily.
- **Landscaping:** Plantings and street trees should contribute to the overall psychological and visual comfort of sidewalk users, and be designed in a manner that contributes to the safety of people.
- **Drainage:** Sidewalks should be well graded to minimize standing water.
- **Social space:** There should be places for standing, visiting, and sitting. The sidewalk area should be a place where adults and children can safely participate in public life.
- **Quality of place:** Sidewalks should contribute to the character of neighborhoods and business districts.


Sidewalk Widths


Sidewalk Obstructions and Driveway Ramps


Pedestrian Amenities


Pedestrian-Scale Lighting

SIDEWALK WIDTHS

Description

The width and design of sidewalks will vary depending on street context, functional classification, and pedestrian demand. Below are preferred widths of each sidewalk zone according to general street type. Standardizing sidewalk guidelines for different areas of the city, dependent on the above listed factors, ensures a minimum level of quality for all sidewalks.

Guidance

It is important to provide adequate width along a sidewalk corridor. Two people should be able to walk side-by-side and pass a third comfortably. In areas of high demand, sidewalks should contain adequate width to accommodate the high volumes and different walking speeds of pedestrians. The Americans with Disabilities Act requires a 4 foot clear width in the pedestrian zone plus 5 foot passing areas every 200 feet.

Street Classification	Parking Lane/ Enhancement Zone	Furnishing/ Green Zone	Pedestrian Through Zone	Frontage Zone	Total Sidewalk Area
Local Streets	7 feet	4 - 8 feet	5 - 6 feet	N/A	9 - 12 feet
Commercial Areas	8 - 10 feet	6 - 8 feet	6 - 12 feet	2 - 8 feet	14- 28 feet
Arterials and Collectors	8 - 10 feet	6 - 8 feet	4 - 12 feet	2 - 4 feet	12 -24 feet

Areas that have significant accumulations of snow during the winter may prefer a wider furnishing zone for snow storage.

Six feet enables two pedestrians (including wheelchair users) to walk side-by-side, or to pass each other comfortably

Total sidewalk area excludes parking dimensions

Recommended dimensions shown here are based on the NCDOT Complete Streets Planning and Design Guidelines. Exact dimensions should be selected in response to local context and expected/desired pedestrian volumes.

Additional References

USDOJ. (2010). *ADA Standards for Accessible Design.*
United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG).*
NCDOT. (2012). *Complete Streets Planning and Design Guidelines.*

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped boulevard. Surfaces must be firm, stable, and slip resistant.

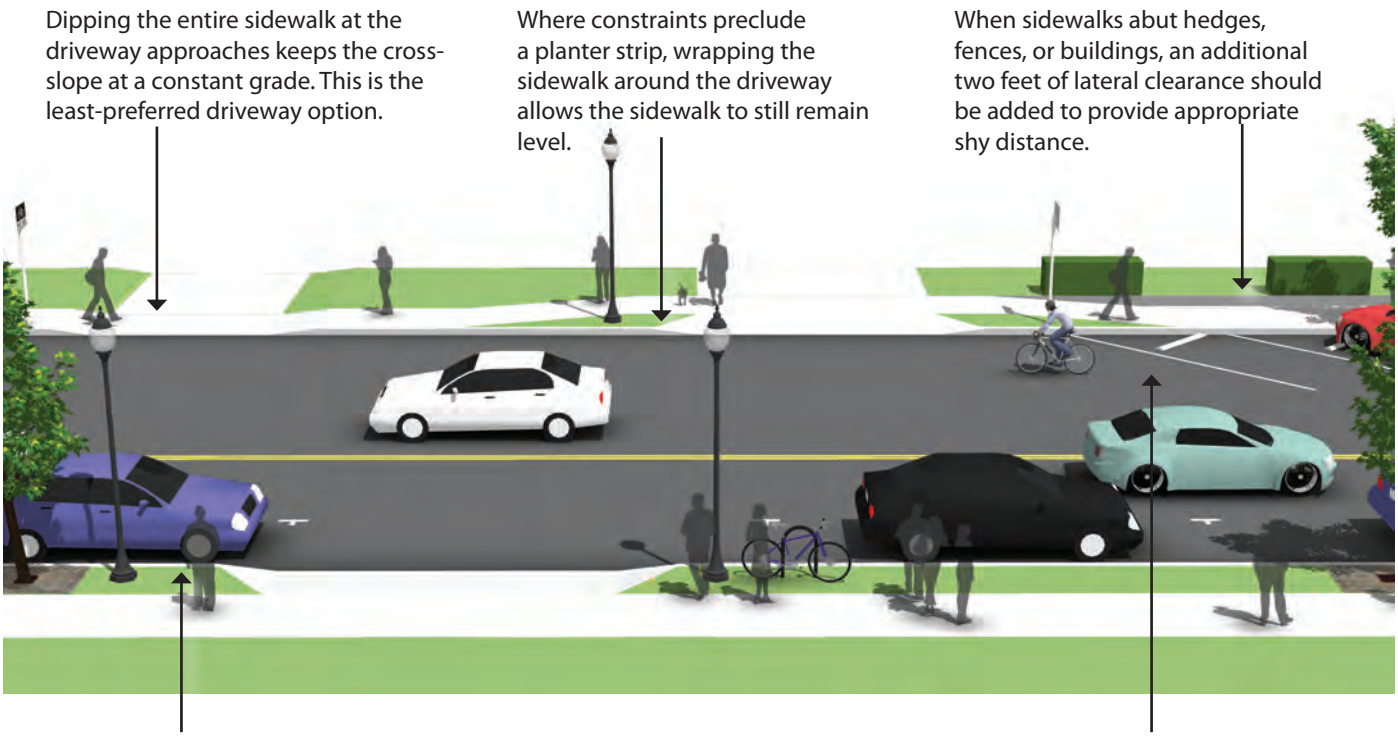
SIDEWALK OBSTRUCTIONS AND DRIVEWAY RAMPS

Description

Obstructions to pedestrian travel in the sidewalk corridor typically include driveway ramps, curb ramps, sign posts, utility and signal poles, mailboxes, fire hydrants and street furniture.

Guidance

- Reducing the number of accesses reduces the need for special provisions. This strategy should be pursued first.
- Obstructions should be placed between the sidewalk and the roadway to create a buffer for increased pedestrian comfort.



Driveways are a common sidewalk obstruction, especially for wheelchair users. When constraints only allow curb-tight sidewalks, dipping the entire sidewalk at the driveway approaches keeps the cross-slope at a constant grade. However, this may be uncomfortable for pedestrians and could create drainage problems behind the sidewalk.

Additional References

USDOJ. (2010). *ADA Standards for Accessible Design.*
United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG).*
AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Materials and Maintenance

Excessive cracks, gaps, pits, settling, and lifting of the sidewalk creates a pedestrian tripping hazard and reduces ADA accessibility; damaged sidewalks should be repaired.

PEDESTRIAN AMENITIES

Description

A variety of streetscape elements can define the pedestrian realm, offer protection from moving vehicles, and enhance the walking experience. Pedestrian amenities should be placed in the furnishing zone on a sidewalk corridor. Signs, meters, and tree wells should go between parking spaces. Key features are presented below.

Street Trees

In addition to their aesthetic and environmental value, street trees can slow traffic and improve safety for pedestrians. Trees add visual interest to streets and narrow the street's visual corridor, which may cause drivers to slow down. It is important that trees do not block light or the vision triangle.

Street Furniture

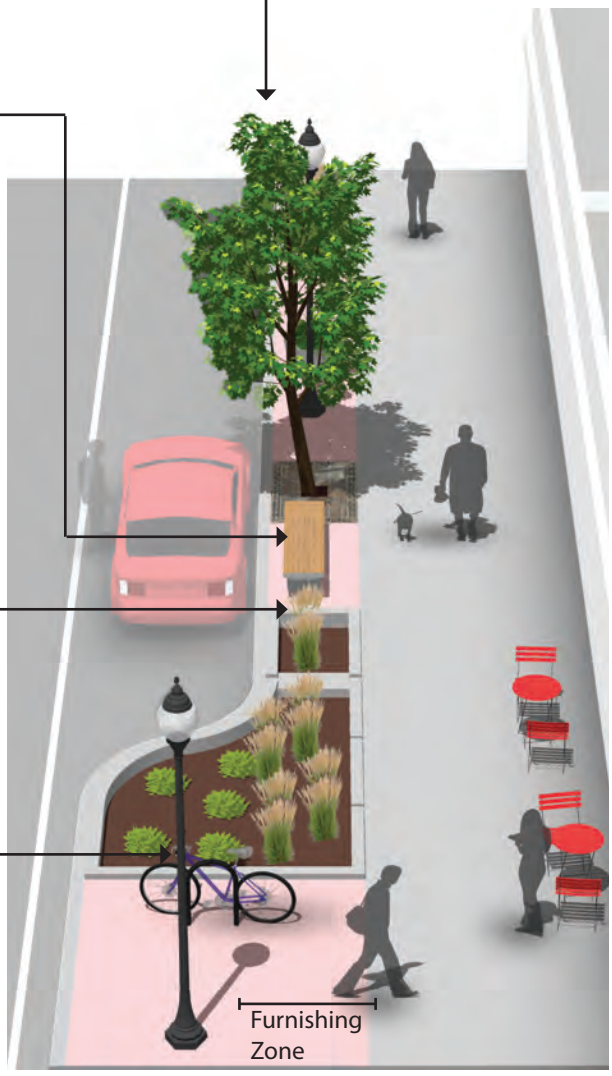
Providing benches at key rest areas and viewpoints encourages people of all ages to use the walkways by ensuring that they have a place to rest along the way. Benches should be 20" tall to accommodate elderly pedestrians comfortably. Benches can be simple (e.g., wood slats) or more ornate (e.g., stone, wrought iron, concrete). If alongside a parking zone, street furniture must be 3 feet from the curbface.

Green Features

Green stormwater strategies may include bioretention swales, rain gardens, tree box filters, and pervious pavements (pervious concrete, asphalt and pavers). Bioswales are natural landscape elements that manage water runoff from a paved surface. Plants in the swale trap pollutants and silt from entering a river system.

Lighting

Pedestrian scale lighting improves visibility for both pedestrians and motorists - particularly at intersections. Pedestrian scale lighting can provide a vertical buffer between the sidewalk and the street, defining pedestrian areas.



Additional References

United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG).*
NCDOT. (2012). *Complete Streets Planning and Design Guidelines.*

Materials and Maintenance

Establishing and caring for your young street trees is essential to their health. Green features may require routine maintenance, including sediment and trash removal, and clearing curb openings and overflow drains.

PEDESTRIAN SCALE LIGHTING

Description

Pedestrian scale lighting improves visibility for both pedestrians and motorists - particularly at intersections and in areas of high pedestrian activity.

Pedestrian scale lighting is characterized by short light poles (around 15 feet high), close spacing, low levels of illumination (except at crossings), and the use of LED lamps to produce good color rendition, long service life and high energy efficiency.

Guidance

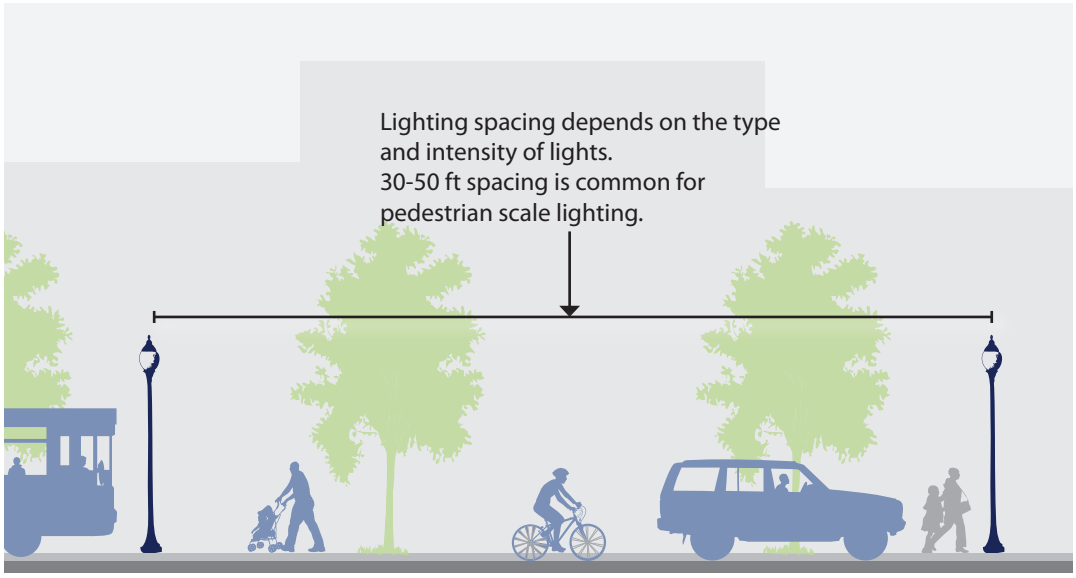
Locate lighting at the following locations:

- Pedestrian oriented areas
- Street crossings (intersection and mid block)
- Entrances and exits of bridges
- Areas near churches, schools, and community centers with nighttime pedestrian activity.

Placement details and dimensions:

- Spacing should be provided for minimum illumination levels while limiting excess light pollution
- Luminaries should direct light downward
- Ligting poles should be placed in the furniture zone of the sidewalk and not interfere with pedestrian travel.

Solar powered lights are available where utility collection is difficult.



Discussion

Both street and pedestrian lighting levels should be considered for the same street corridor, especially in areas with tree canopy. “Dark Sky” lighting should be considered within residential districts.

Additional References

Illuminating Engineering Society of North America. *American National Standard Practice for Roadway Lighting.* 2005.
AASHTO. *Guide for the Development of Bicycle Facilities.* 2012
FHWA. *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations.* 2005.

Materials and Maintenance

Low-cost light emitting diodes (LED) offer a wide range of light levels and can reduce long term utility costs.

Cross Street crossing at Main Street

PEDESTRIANS AT INTERSECTIONS

Attributes of pedestrian-friendly intersection design include:

- **Clear Space:** Corners should be clear of obstructions. They should also have enough room for curb ramps, for transit stops where appropriate, and for street conversations where pedestrians might congregate.
- **Visibility:** It is critical that pedestrians on the corner have a good view of vehicle travel lanes and that motorists in the travel lanes can easily see waiting pedestrians.
- **Legibility:** Symbols, markings, and signs used at corners should clearly indicate what actions the pedestrian should take.
- **Accessibility:** All corner features, such as curb ramps, landings, call buttons, signs, symbols, markings, and textures, should meet accessibility standards and follow universal design principles.
- **Separation from Traffic:** Corner design and construction should be effective in discouraging turning vehicles from driving over the pedestrian area. Crossing distances should be minimized.
- **Lighting:** Adequate lighting is an important aspect of visibility, legibility, and accessibility.

These attributes will vary with context but should be considered in all design processes. For example, suburban and rural intersections may have limited or no signing. However, legibility regarding appropriate pedestrian movements should still be taken into account during design.


Marked/Raised Crosswalks


Median Refuge Islands


Minimizing Curb Radii


Curb Extensions


ADA Compliant Curb Ramps

MARKED CROSSWALKS

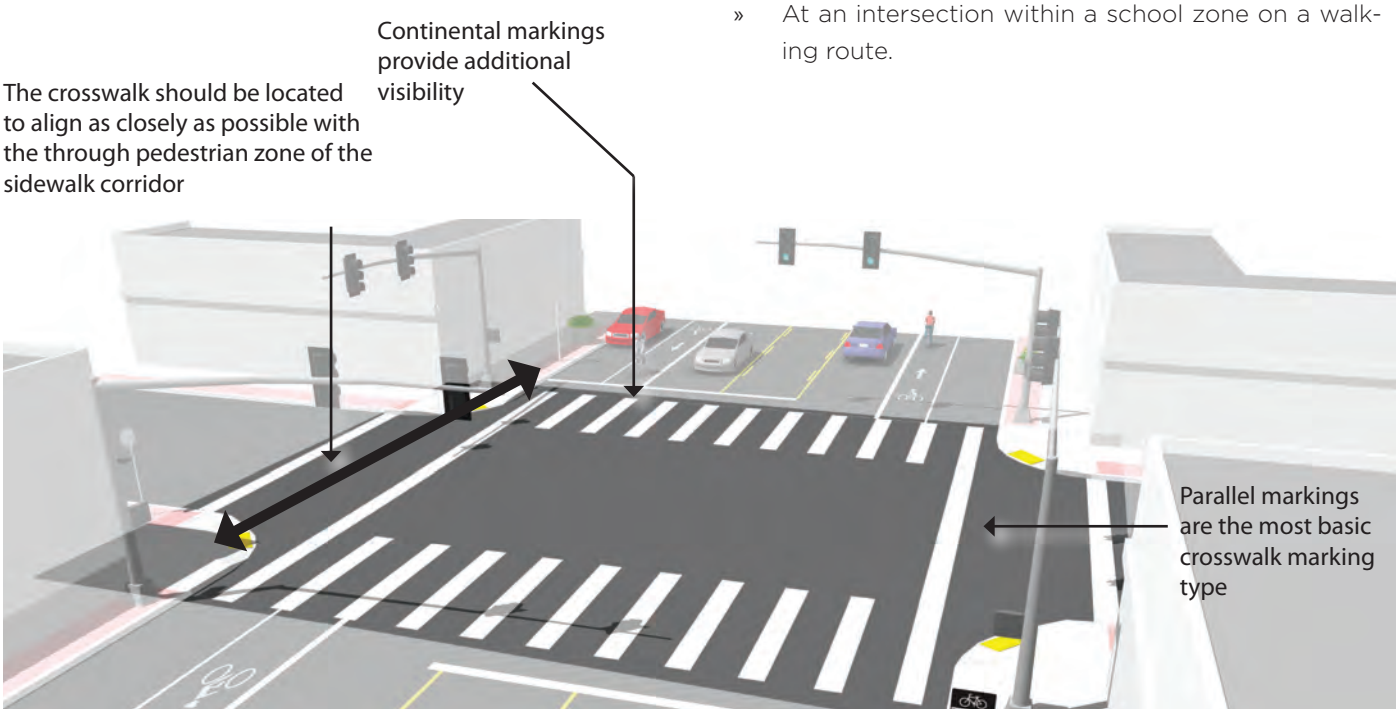
Description

A marked crosswalk signals to motorists that they must stop for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily make crossings safer especially on multi-lane roadways.

At mid-block locations, crosswalks can be marked where there is a demand for crossing and there are no nearby marked crosswalks.

Guidance

- At signalized intersections, all crosswalks should be marked. At unsignalized intersections, crosswalks may be marked under the following conditions:
- At a complex intersection, to orient pedestrians in finding their way across.
- At an offset intersection, to show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At an intersection within a school zone on a walking route.



Continental crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including: school crossings, across arterial streets for pedestrian-only signals, at mid-block crosswalks, and at intersections where there is expected high pedestrian use and the crossing is not controlled by signals or stop signs.

Additional References

FHWA. (2009). *Manual on Uniform Traffic Control Devices.* (3B.18)
AASHTO. (2004). *Guide for the Planning, Design, and Operation of Pedestrian Facilities.*
FHWA. (2005). *Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations.*

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. Thermoplastic markings offer increased durability compared to conventional paint.

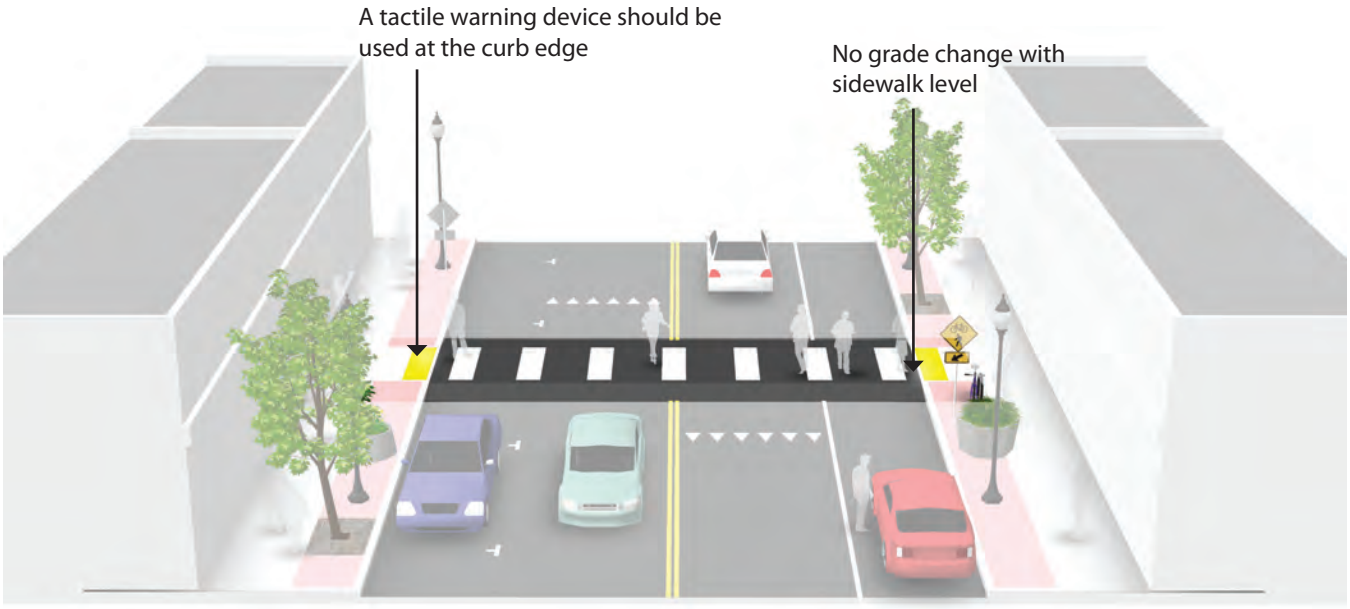
RAISED CROSSWALKS

Description

A raised crosswalk or intersection can eliminate grade changes from the pedestrian path and give pedestrians greater prominence as they cross the street. Raised crosswalks should be used only in very limited cases where a special emphasis on pedestrians is desired, and application should be reviewed on case-by-case basis.

Guidance

- Use detectable warnings at the curb edges to alert vision-impaired pedestrians that they are entering the roadway.
- Approaches to the raised crosswalk may be designed to be similar to speed humps.
- Raised crosswalks can also be used as a traffic calming treatment.



Like a speed hump, raised crosswalks have a traffic slowing effect which may be unsuitable on emergency response routes.

Additional References

FHWA. (2009). *Manual on Uniform Traffic Control Devices.* (3B.18)
AASHTO. (2004). *Guide for the Planning, Design, and Operation of Pedestrian Facilities.*
USDOJ. (2010). *ADA Standards for Accessible Design.*
NCDOT. (2012). *Complete Streets Planning and Design Guidelines.*

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.

MEDIAN REFUGE ISLANDS

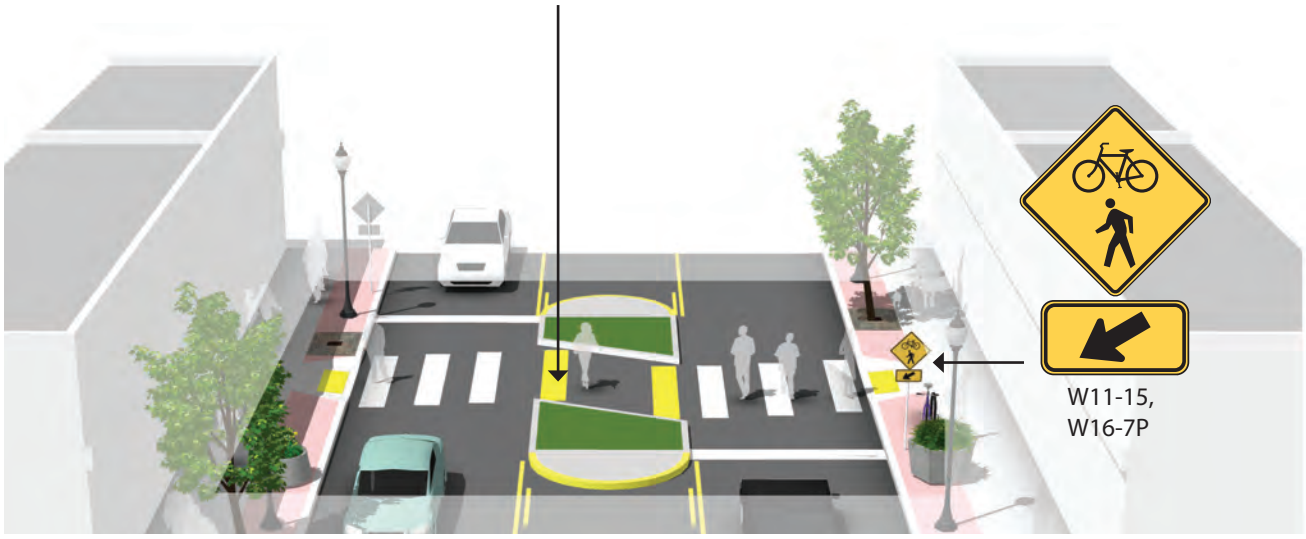
Description

Median refuge islands are located at the mid-point of a marked crossing and help improve pedestrian safety by allowing pedestrians to cross one direction of traffic at a time. Refuge islands minimize pedestrian exposure by shortening crossing distance and increasing the number of available gaps for crossing.

Guidance

- Can be applied on any roadway with a left turn center lane or median that is at least 6' wide.
- Appropriate at signalized or unsignalized crosswalks
- The refuge island must be accessible, preferably with an at-grade passage through the island rather than ramps and landings.
- The island should be at least 6' wide between travel lanes (to accommodate bikes with trailers and wheelchair users) and at least 20' long.
- On streets with speeds higher than 25 mph there should also be double centerline marking, reflectors, and "KEEP RIGHT" signage.

Cut through median islands are preferred over curb ramps, to better accommodate bicyclists.



If a refuge island is landscaped, the landscaping should not compromise the visibility of pedestrians crossing in the crosswalk. Shrubs and ground plantings should be no higher than 1 ft 6 in. On multi-lane roadways, consider configuration with active warning beacons for improved yielding compliance.

Additional References

FHWA. (2009). *Manual on Uniform Traffic Control Devices.*
AASHTO. (2004). *Guide for the Planning, Design, and Operation of Pedestrian Facilities.*
NACTO. (2012). *Urban Bikeway Design Guide.*
NCDOT. (2012). *Complete Streets Planning and Design Guidelines.*

Materials and Maintenance

Refuge islands may collect road debris and may require somewhat frequent maintenance. Refuge islands should be visible to snow plow crews and should be kept free of snow berms that block access.

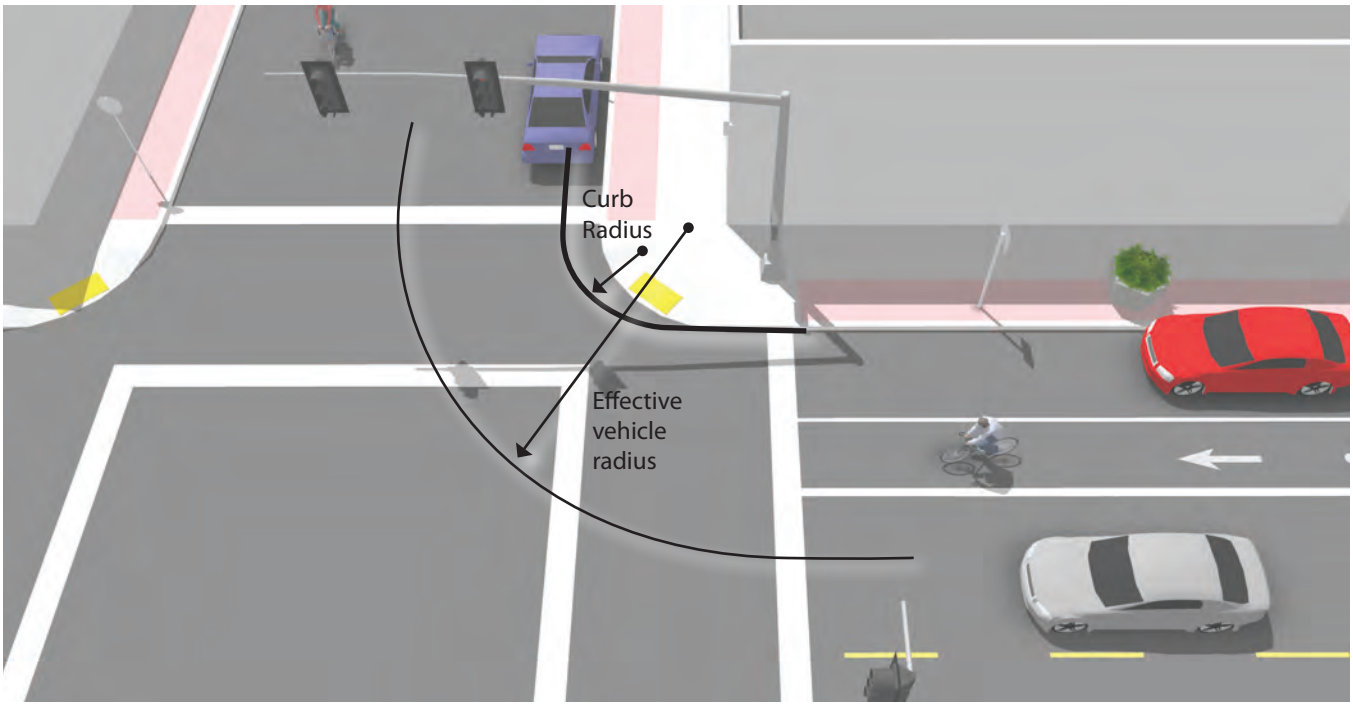
MINIMIZING CURB RADII

Description

The size of a curb's radius can have a significant impact on pedestrian comfort and safety. A smaller curb radius provides more pedestrian area at the corner, allows more flexibility in the placement of curb ramps, results in a shorter crossing distance and requires vehicles to slow more on the intersection approach. During the design phase, the chosen radius should be the smallest possible for the circumstances.

Guidance

The radius may be as small as 3 ft where there are no turning movements, or 5 ft where there are turning movements, adequate street width, and a larger effective curb radius created by parking or bike lanes.



Several factors govern the choice of curb radius in any given location. These include the desired pedestrian area of the corner, traffic turning movements, street classifications, design vehicle turning radius, intersection geometry, and whether there is parking or a bike lane (or both) between the travel lane and the curb.

Additional References

AASHTO. (2004). *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* AASHTO. (2004). *A Policy on Geometric Design of Highways and Streets.*
NCDOT. (2012). *Complete Streets Planning and Design Guidelines.*

Materials and Maintenance

Improperly designed curb radii at corners may be subject to damage by large trucks.

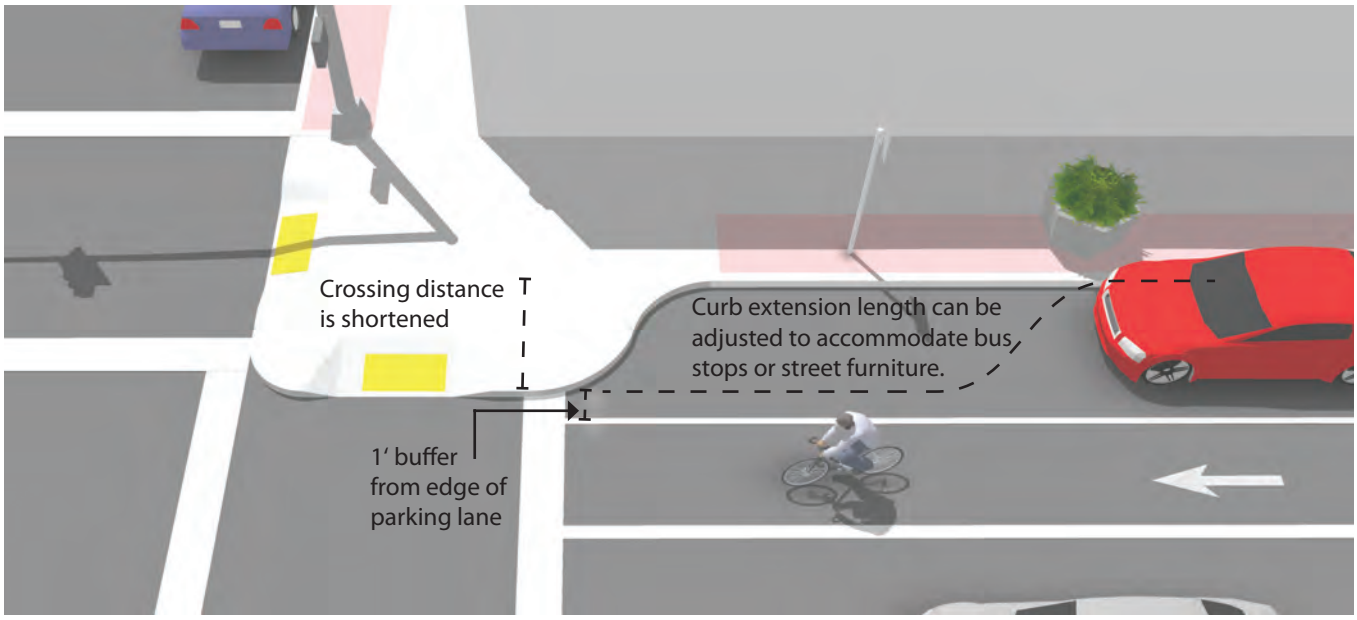
CURB EXTENSIONS

Description

Curb extensions minimize pedestrian exposure during crossing by shortening crossing distance and giving pedestrians a better chance to see and be seen before committing to crossing. They are appropriate for any crosswalk where it is desirable to shorten the crossing distance and there is a parking lane adjacent to the curb.

Guidance

- In most cases, the curb extensions should be designed to transition between the extended curb and the running curb in the shortest practicable distance.
- For purposes of efficient street sweeping, the minimum radius for the reverse curves of the transition is 10 ft and the two radii should be balanced to be nearly equal.
- Curb extensions should terminate one foot short of the parking lane to maximize bicyclist safety.



If there is no parking lane, adding curb extensions may be a problem for bicycle travel and truck or bus turning movements.

Additional References

AASHTO. (2004). *Guide for the Planning, Design, and Operation of Pedestrian Facilities*. AASHTO. (2004). *A Policy on Geometric Design of Highways and Streets.* NCDOT. (2012). *Complete Streets Planning and Design Guidelines.*

Materials and Maintenance

Planted curb extensions may be designed as a bioswale, a vegetated system for stormwater management.

ADA COMPLIANT CURB RAMPS

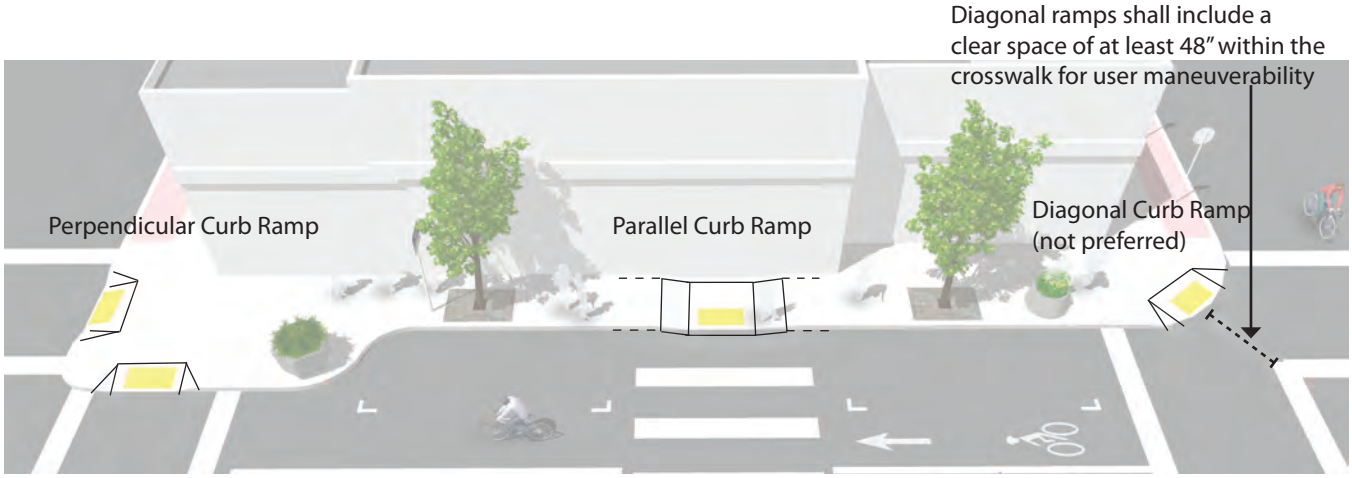
Description

Curb ramps are the design elements that allow all users to make the transition from the street to the sidewalk. There are a number of factors to be considered in the design and placement of curb ramps at corners. Properly designed curb ramps ensure that the sidewalk is accessible from the roadway. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access.

Although diagonal curb ramps might save money, they create potential safety and mobility problems for pedestrians,including reduced maneuverability and increased interaction with turning vehicles, particularly in areas with high traffic volumes. Diagonal curb ramp configurations are the least preferred of all options.

Guidance

- The landing at the top of a ramp shall be at least 4 feet long and at least the same width as the ramp itself.
- The ramp shall slope no more than 1:50 (2.0%) in any direction.
- If the ramp runs directly into a crosswalk, the landing at the bottom will be in the roadway.
- If the ramp lands on a dropped landing within the sidewalk or corner area where someone in a wheelchair may have to change direction, the landing must be a minimum of 5'-0" long and at least as wide as the ramp, although a width of 5'-0" is preferred.



Crosswalk spacing not to scale. For illustration purposes only.

The edge of an ADA compliant curb ramp will be marked with a tactile warning device (also known as truncated domes) to alert people with visual impairments to changes in the pedestrian environment. Contrast between the raised tactile device and the surrounding infrastructure is important so that the change is readily evident. These devices are most effective when adjacent to smooth pavement so the difference is easily detected. The devices must provide color contrast so partially sighted people can see them.

Additional References

United States Access Board. (2002). *Accessibility Guidelines for Buildings and Facilities.*
United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG).*
USDOJ. (2010). *ADA Standards for Accessible Design.*

Materials and Maintenance

It is critical that the interface between a curb ramp and the street be maintained adequately. Asphalt street sections can develop potholes at the foot of the ramp, which can catch the front wheels of a wheelchair.

SIGNALIZATION

Crossing beacons and signals facilitate crossings of roadways for pedestrians and bicyclists. Beacons make crossing intersections safer by clarifying when to enter an intersection and by alerting motorists to the presence of pedestrians and bicyclists.

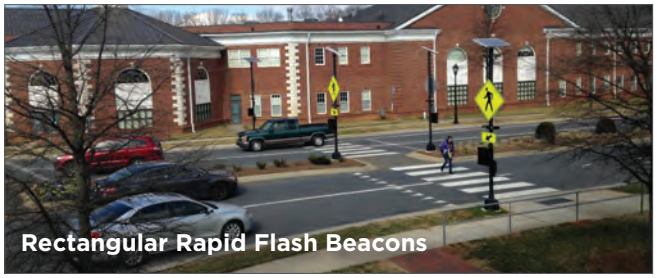
Flashing amber warning beacons can be utilized at unsignalized intersection crossings. Push buttons, signage, and pavement markings may be used to highlight these facilities for pedestrians, bicyclists and motorists.

Determining which type of signal or beacon to use for a particular intersection depends on a variety of factors. These include speed limits, traffic volumes, and the anticipated levels of pedestrian and bicycle crossing traffic.

An intersection with crossing beacons may reduce stress and delays for crossing users, and discourage illegal and unsafe crossing maneuvers.

Pedestrians at Signalized Crossings


Pedestrian Hybrid Beacon


Rectangular Rapid Flash Beacons

PEDESTRIANS AT SIGNALIZED CROSSINGS

Description

Pedestrian Signal Head

» All traffic signals should be equipped with pedestrian signal indications except where pedestrian crossing is prohibited by signage.

» Countdown signals should be used at all signalized intersections to indicate whether a pedestrian has time to cross the street before the signal phase ends.

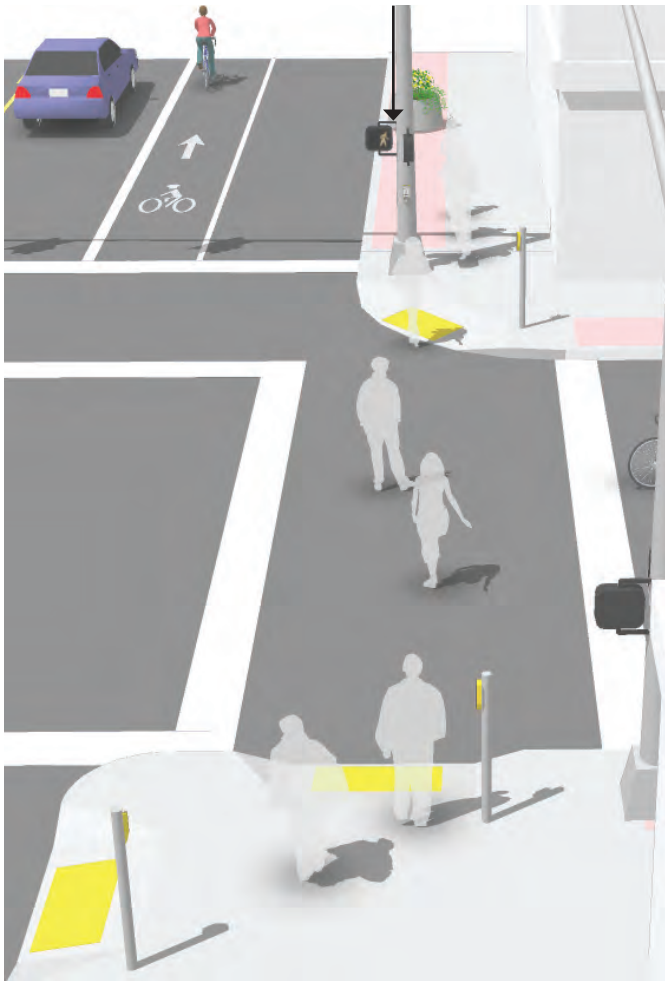
Signal Timing

» Providing adequate pedestrian crossing time is a critical element of the walking environment at signalized intersections. The MUTCD recommends traffic signal timing to assume a pedestrian walking speed of 3.5' per second, meaning that the length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street.

» At crossings where older pedestrians or pedestrians with disabilities are expected, crossing speeds as low as 3' per second may be assumed.

» In busy pedestrian areas such as downtowns, the pedestrian signal indication should be built into each signal phase, eliminating the requirement for a pedestrian to actuate the signal by pushing a button.

Audible pedestrian traffic signals provide crossing assistance to pedestrians with vision impairment at signalized intersections



Consider the use of a Leading Pedestrian Indication (LPI) to provide additional traffic protected crossing time to pedestrians

When push buttons are used, they should be located so that someone in a wheelchair can reach the button from a level area of the sidewalk without deviating significantly from the natural line of travel into the crosswalk, and marked (for example, with arrows) so that it is clear which signal is affected. In areas with very heavy pedestrian traffic, consider an all-pedestrian signal phase to give pedestrians free passage in the intersection when all motor vehicle traffic movements are stopped.

Additional References

United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG).*
AASHTO. (2004). *Guide for the Planning, Design, and Operation of Pedestrian Facilities.*
NCDOT. (2012). *Complete Streets Planning and Design Guidelines.*

Materials and Maintenance

It is important to repair or replace traffic control equipment before it fails. Consider semi-annual inspections of controller and signal equipment, intersection hardware, and loop detectors.

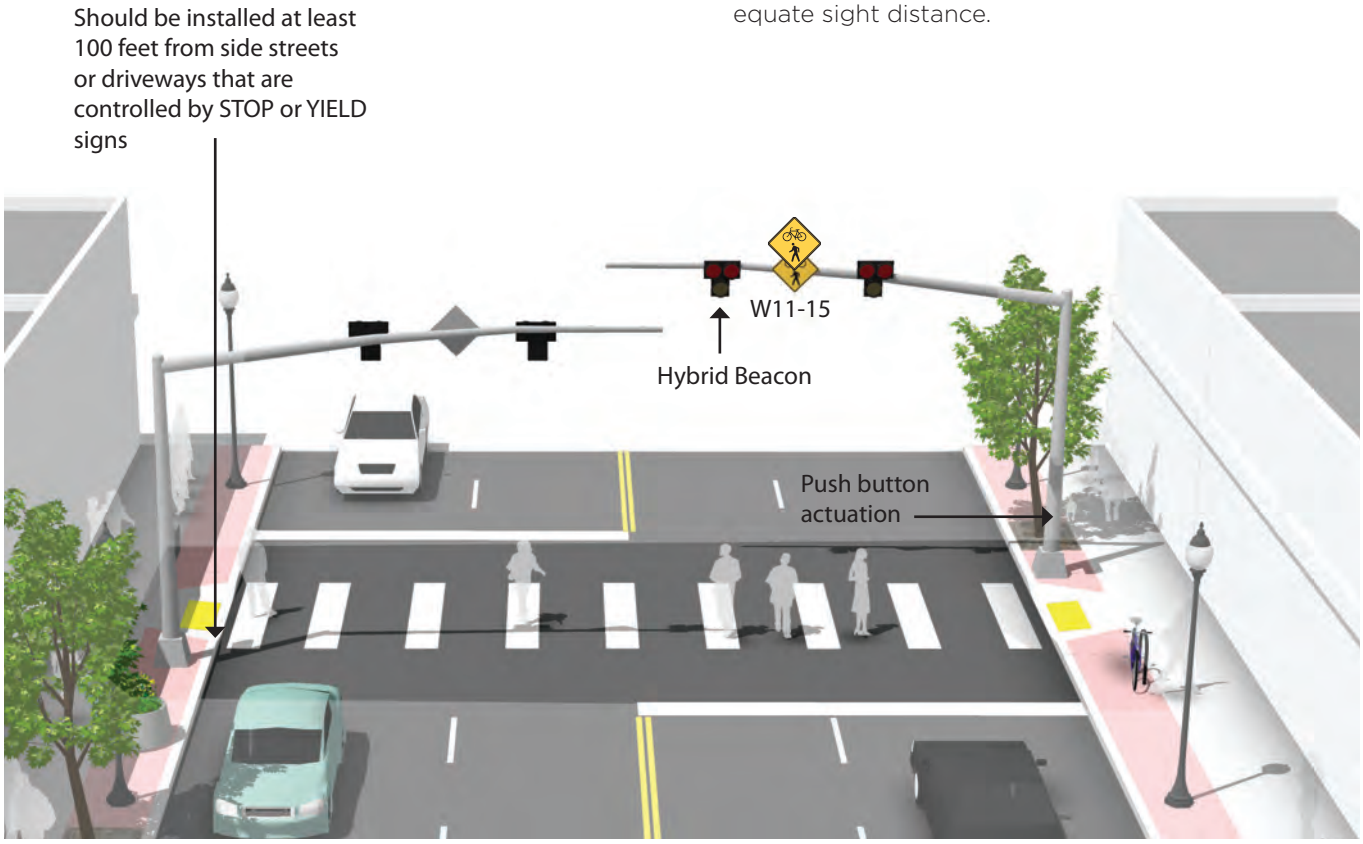
PEDESTRIAN HYBRID BEACON

Description

Hybrid beacons are used to improve non-motorized crossings of major streets. A hybrid beacon consists of a signal-head with two red lenses over a single yellow lens on the major street, and a pedestrian signal head for the crosswalk.

Guidance

- Hybrid beacons may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable pedestrian crossings.
- If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.



Hybrid beacon signals are normally activated by push buttons, but may also be triggered by infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety.

Additional References

FHWA. (2009). *Manual on Uniform Traffic Control Devices.*
NACTO. (2012). *Urban Bikeway Design Guide.*
NCDOT. (2012). *Complete Streets Planning and Design Guidelines.*

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

RECTANGULAR RAPID FLASH BEACONS

Description

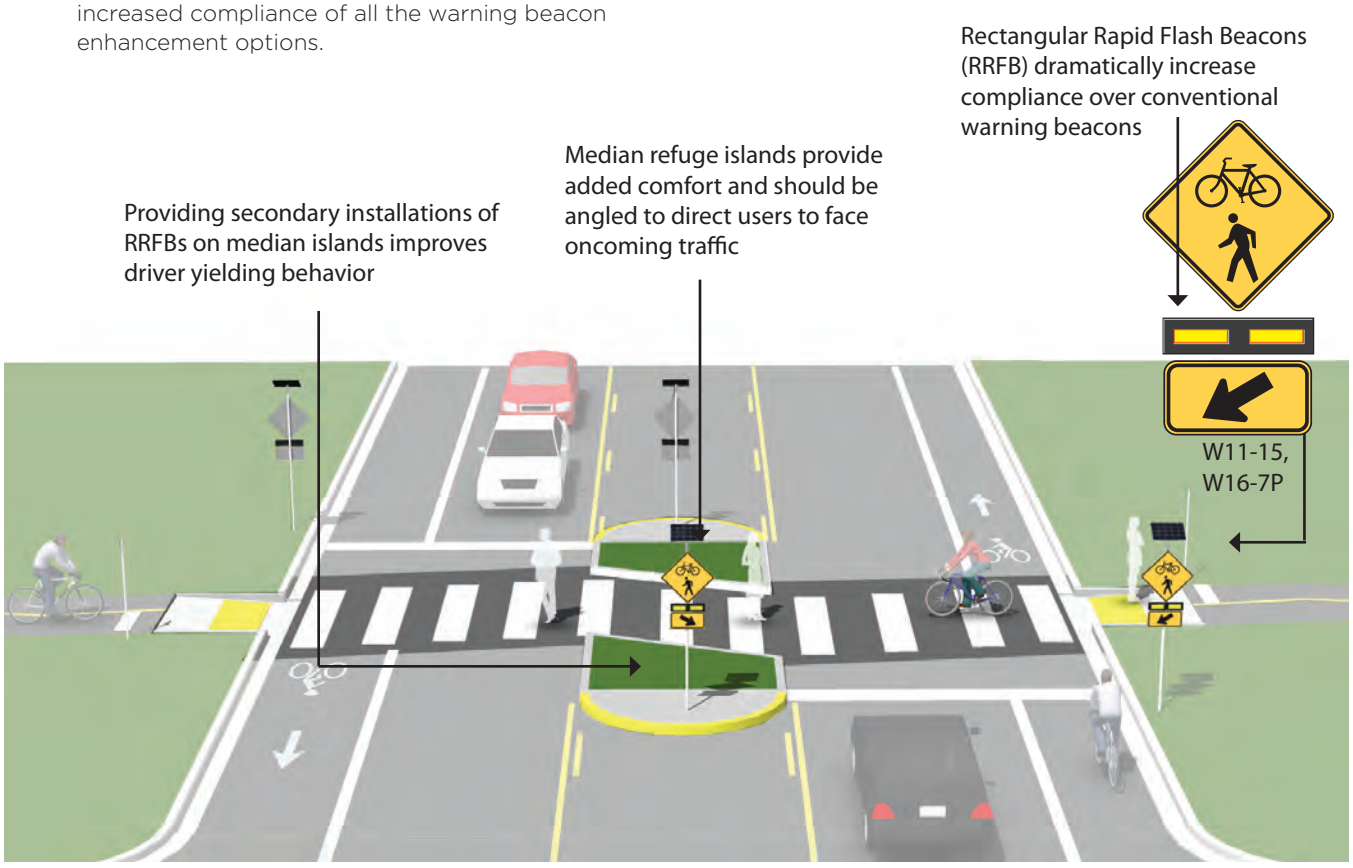
Enhanced marked crossings are unsignalized crossings with additional treatments designed to increase motor vehicle yielding compliance on multi-lane or high volume roadways.

- These enhancements include trail user or sensor actuated warning beacons, Rectangular Rapid Flash Beacons (RRFB) shown below, or in-roadway warning lights.
- Rectangular rapid flash beacons show the most increased compliance of all the warning beacon enhancement options.

Guidance

Guidance for marked/unsignalized crossings applies.

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.
- Warning beacons shall initiate operation based on user actuation and shall cease operation at a predetermined time after the user actuation or, with passive detection, after the user clears the crosswalk.



Discussion

An FHWA report presented study results showing of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88%. Additional studies of long term installations show little to no decrease in yielding behavior over time. Additional studies in Oregon reported compliance rates as high as 99% when actuated.

Additional References

FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
FHWA. *MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11).* 2008.
FHWA. *Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks.* 2010.
Alhajri, F., Carlso, K., Foster, N., Georde, D. *A Study on Driver's Compliance to Rectangular Rapid Flashing Beacons.* 2013.

Materials and Maintenance

Locate markings out of wheel tread when possible to minimize wear and maintenance costs. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

Utility lines near Tom Williams Road

DESIGN NEEDS OF BICYCLISTS

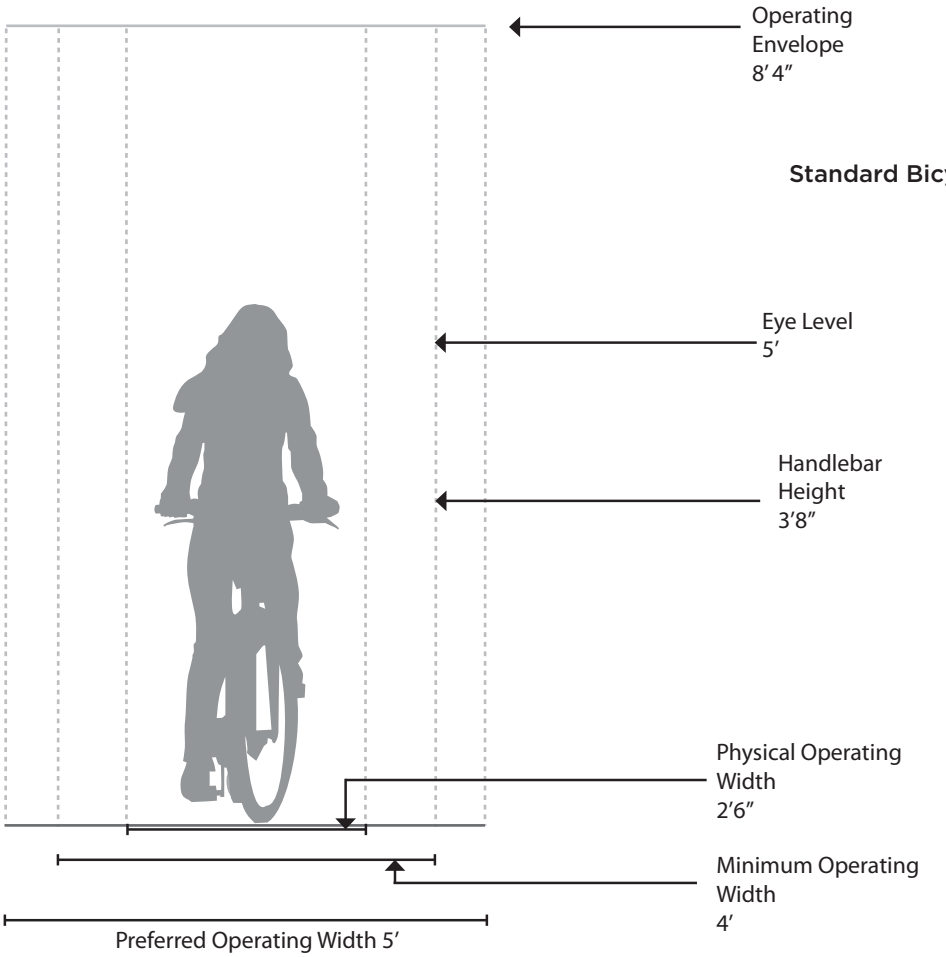
The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide quality facilities and minimize user risk.

Bicycle as a Design Vehicle

Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions.

The figure below illustrates the operating space and physical dimensions of a typical adult bicyclist, which are the basis for typical facility design. Bicyclists require clear space to operate within a facility. This is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, although four feet may be minimally acceptable.

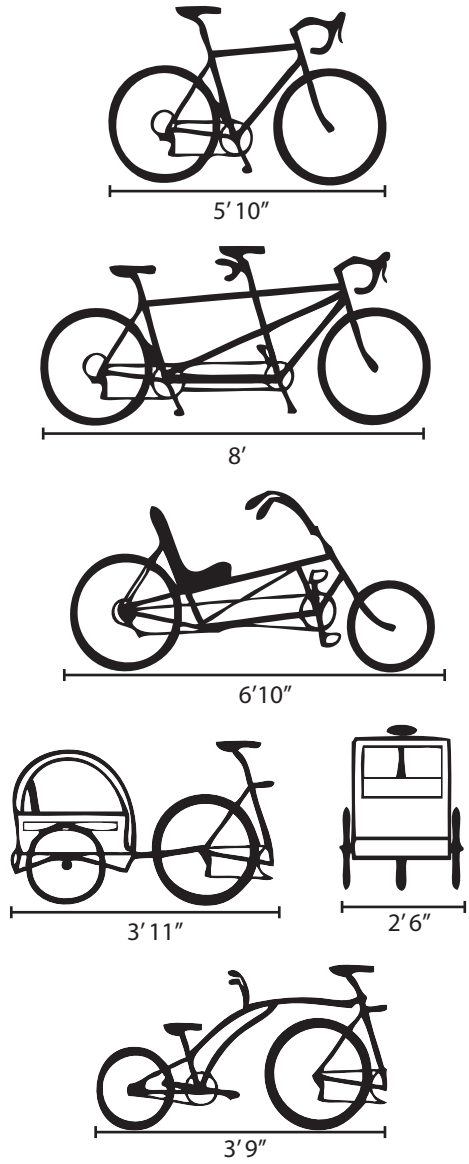
In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories. The figure and table below summarize the typical dimensions for bicycle types.



Source: AASHTO Guide for the Development of Bicycle Facilities, 4th Edition. 2012.

Design Speed Expectations

The expected speed that different types of bicyclists can maintain under various conditions also influences the design of facilities such as shared use paved trails. The table to the right provides typical bicyclist speeds for a variety of conditions.



Bicycle as Design Vehicle - Typical Dimensions

Source: *AASHTO Guide for the Development of Bicycle Facilities,* 3rd Edition *AASHTO does not provide typical dimensions for tricycles.

Bicycle as Design Vehicle - Typical Dimensions

Bicycle Type	Feature	Typical Dimensions
Upright Adult Bicyclist	Physical width	2 ft 6 in
	Operating width (Minimum)	4 ft
	Operating width (Preferred)	5 ft
	Physical length	5 ft 10 in
	Physical height of handlebars	3 ft 8 in
	Operating height	8 ft 4 in
	Eye height	5 ft
	Vertical clearance to obstructions (tunnel height, lighting, etc)	10 ft
	Approximate center of gravity	2 ft 9 in - 3 ft 4 in
Recumbent Bicyclist	Physical length	6 ft 10 in
	Eye height	3 ft 10 in
Tandem Bicyclist	Physical length	8 ft
Bicyclist with child trailer	Physical length	9 ft 9 in
	Physical width	2 ft 6 in

Bicycle as Design Vehicle - Design Speed Expectations

Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	Paved level surfacing	8-15 mph
	Downhill	20-30+ mph
	Uphill	5 -12 mph
Recumbent	Paved level surfacing	11-18 mph

**Tandem bicycles and bicyclists with trailers have typical speeds equal to or less than upright adult bicyclists.*

BICYCLE FACILITIES

Shared Roadway

On shared roadways, bicyclists and motor vehicles use the same roadway space. Sharing may include side-by-side operation, or single lane in-line operation depending on the configuration.


Marked Shared Roadway

These facilities are typically used on roads with low speeds and traffic volumes, however they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Shared roadways employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage and traffic calming devices to reduce vehicle speeds or volumes.

Separated Bikeways

Designated exclusively for bicycle travel, separated bikeways are segregated from vehicle travel lanes by striping, and can include pavement stencils and other treatments. Separated bikeways are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation.


Bicycle Lanes

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.
- Reducing the incidence of wrong way riding.
- Reminding motorists that bicyclists have a right to the road.


Buffered Bike Lanes


Paved Shoulder

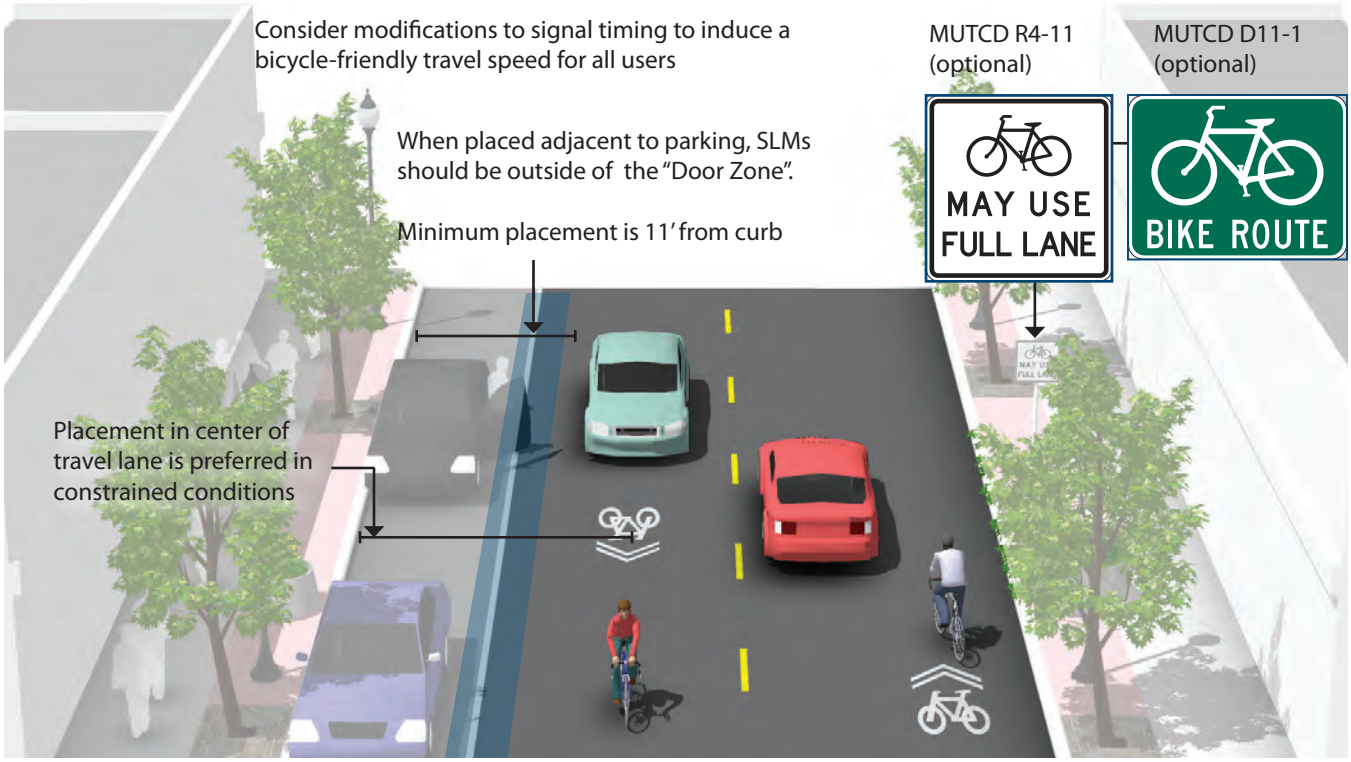
MARKED SHARED ROADWAY

Description

A marked shared roadway is a general purpose travel lane marked with shared lane markings (SLM) used to encourage bicycle travel and proper positioning within the lane. In constrained conditions, the SLMs are placed in the middle of the lane to discourage unsafe passing by motor vehicles. On a wide outside lane, the SLMs can be used to promote bicycle travel to the right of motor vehicles.
In all conditions, SLMs should be placed outside of the door zone of parked cars.

Guidance

- May be used on streets with a speed limit of 35 mph or under. Lower than 30 mph speed limit preferred.
- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel.
- Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.



Regular Lane Adjacent to Parking **Wide Lane without Parking**

Discussion

If collector or arterial, this should not be a substitute for dedicated bicycle facilities if space is available. Bike Lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. SLMs shall not be used on shoulders, in designated bike lanes, or to designate bicycle detection at signalized intersections. (MUTCD 9C.07)

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Placing SLMs between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.

BICYCLE LANE

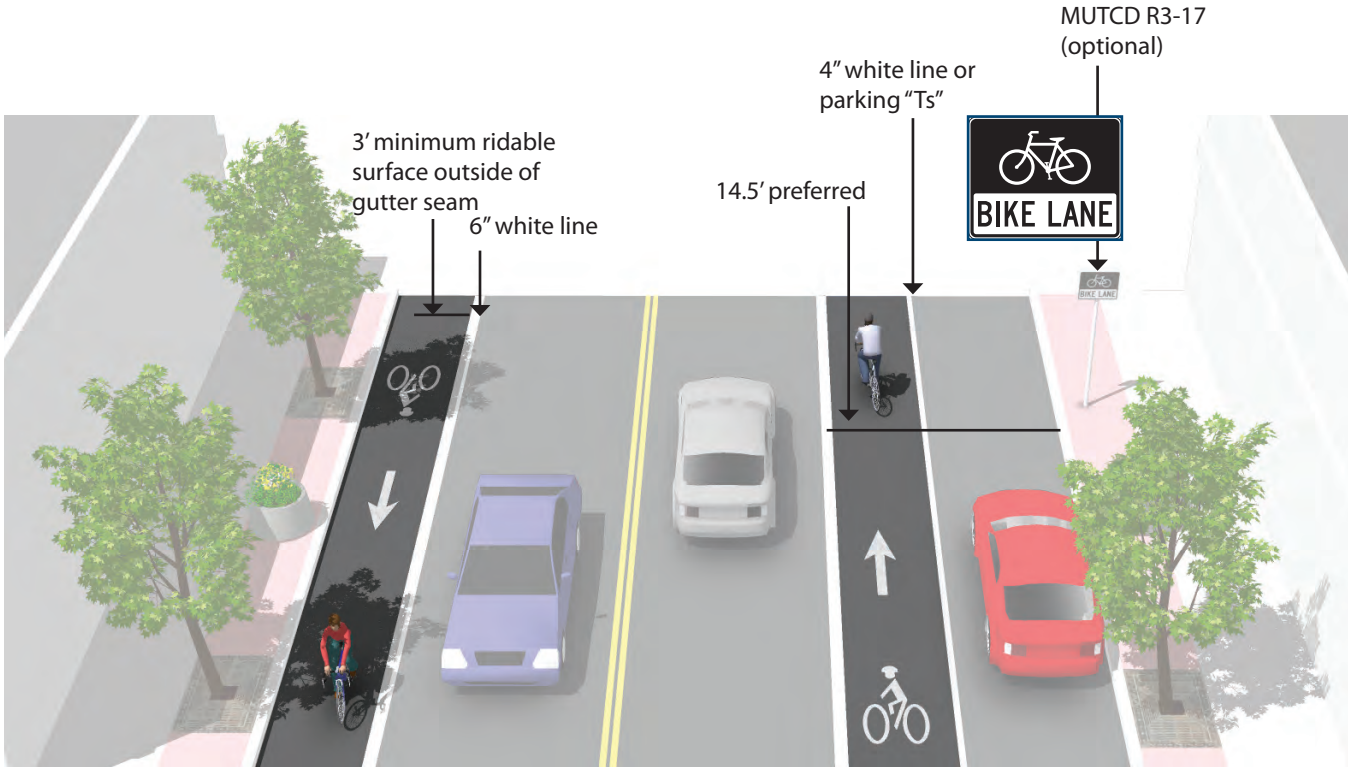
Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.

Guidance

- 4 foot minimum when no curb and gutter is present.
- 5 foot minimum when adjacent to curb and gutter or 3 feet more than the gutter pan width if the gutter pan is wider than 2 feet.
- 14.5 foot preferred from curb face to edge of bike lane. (12 foot minimum).
- 7 foot maximum width for use adjacent to arterials with high travel speeds. Greater widths may encourage motor vehicle use of bike lane.



Discussion

Wider bicycle lanes are desirable in certain situations such as on higher speed arterials (45 mph+) where use of a wider bicycle lane would increase separation between passing vehicles and bicyclists. Appropriate signing and stenciling is important with wide bicycle lanes to ensure motorists do not mistake the lane for a vehicle lane or parking lane. Consider buffered bike lanes when further separation is desired.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

BUFFERED BIKE LANE

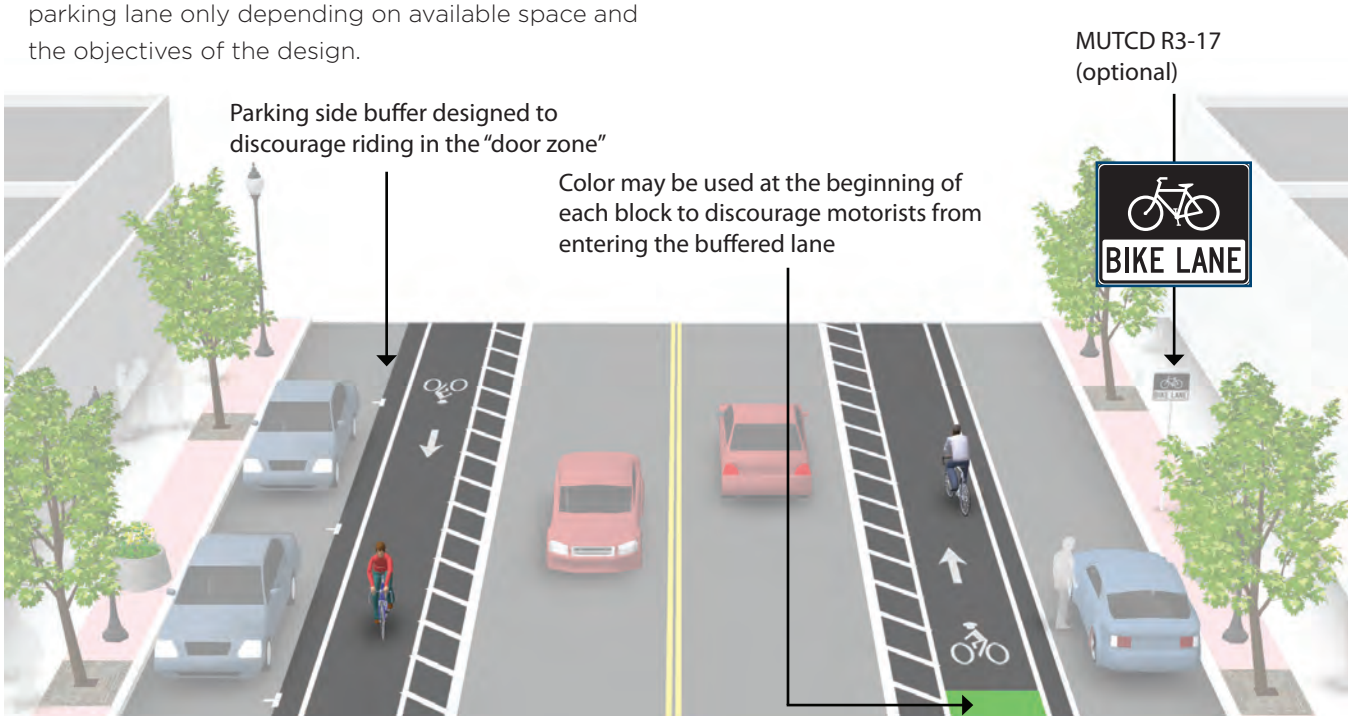
Description

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes follow general guidance for buffered preferential vehicle lanes as per MUTCD guidelines (section 3D-01).

Buffered bike lanes are designed to increase the space between the bike lane and the travel lane and/or parked cars. This treatment is appropriate for bike lanes on roadways with high motor vehicle traffic volumes and speed, adjacent to parking lanes, or a high volume of truck or oversized vehicle traffic. Buffered bike lanes can buffer the travel lane only, or parking lane only depending on available space and the objectives of the design.

Guidance

- The minimum bicycle travel area is 5 feet wide.
- Buffers should be at least 2 feet wide. If 3 feet or wider, mark with diagonal or chevron hatching. For clarity at driveways or minor street crossings, consider a dotted line for the inside buffer boundary where cars are expected to cross.



Discussion

Frequency of right turns by motor vehicles at major intersections should determine whether continuous or truncated buffer striping should be used approaching the intersection. Commonly configured as a buffer between the bicycle lane and motor vehicle travel lane, a parking side buffer may also be provided to help bicyclists avoid the 'door zone' of parked cars.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices. (3D-01).* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

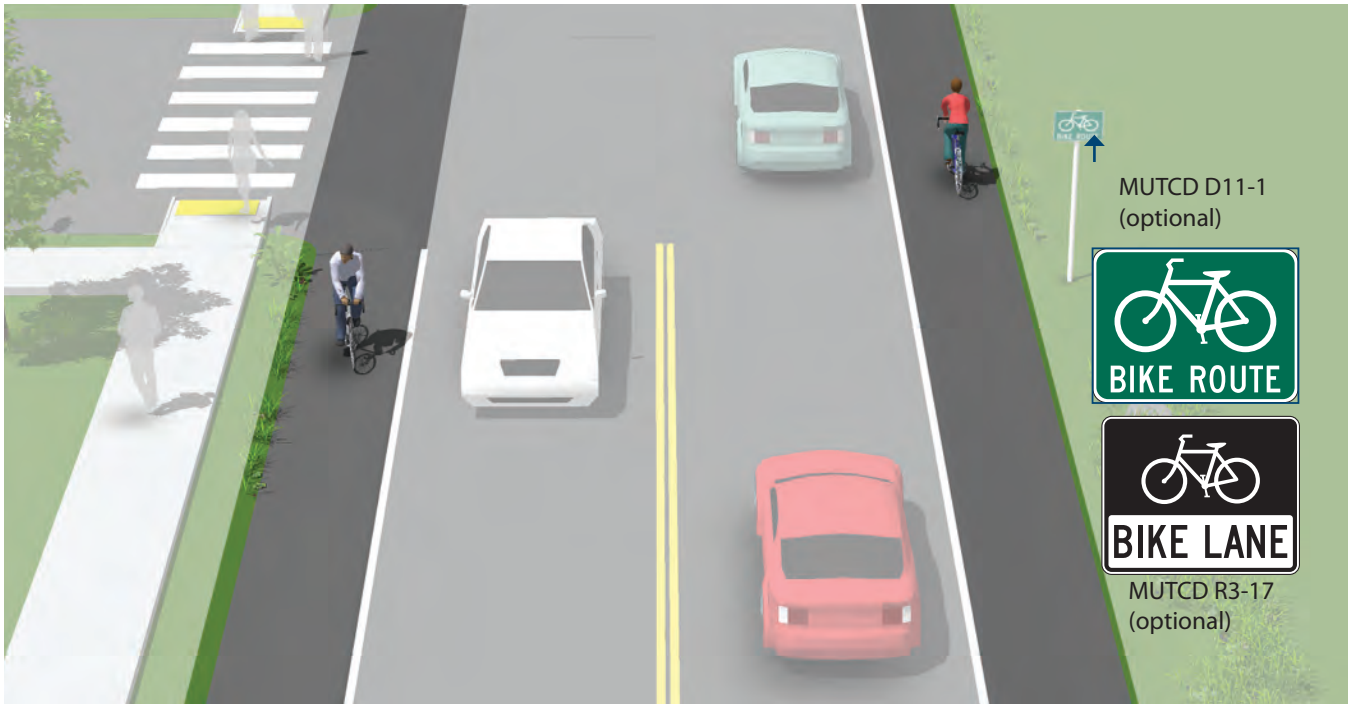
SHOULDER BIKEWAYS (PAVED SHOULDER)

Description

Typically found in less-dense areas, shoulder bikeways are paved roadways with striped shoulders (4'+) wide enough for bicycle travel. Shoulder bikeways often, but not always, include signage alerting motorists to expect bicycle travel along the roadway. Shoulder bikeways should be considered a temporary treatment, with full bike lanes planned for construction when the roadway is widened or completed with curb and gutter. This type of treatment is not typical in urban areas and should only be used where constraints exist.

Guidance

- If 4 feet or more is available for bicycle travel, the full bike lane treatment of signs, legends, and an 8" bike lane line would be provided.
- If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.
- Rumble strips are not recommended on shoulders used by bicyclists unless there is a minimum 4 foot clear path. 12 foot gaps every 40-60 feet should be provided to allow access as needed.



Discussion

A wide outside lane may be sufficient accommodation for bicyclists on streets with insufficient width for bike lanes but which do have space available to provide a wider (14'-16') outside travel lane. Consider configuring as a marked shared roadway in these locations. Where feasible, roadway widening should be performed with pavement resurfacing jobs.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Shoulder bikeways should be cleared of snow through routine snow removal operations.

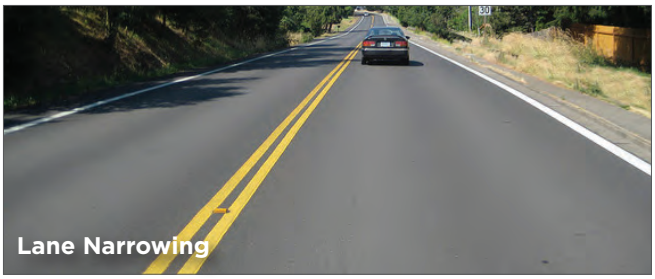
Cedar Creek Road

RETROFITTING EXISTING STREETS TO ADD BIKEWAYS

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths. As a result, much of the guidance provided in this section focuses on effectively reallocating existing street width through striping modifications to accommodate dedicated bike lanes.

Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.


Roadway Widening


Lane Narrowing


Lane Reconfiguration

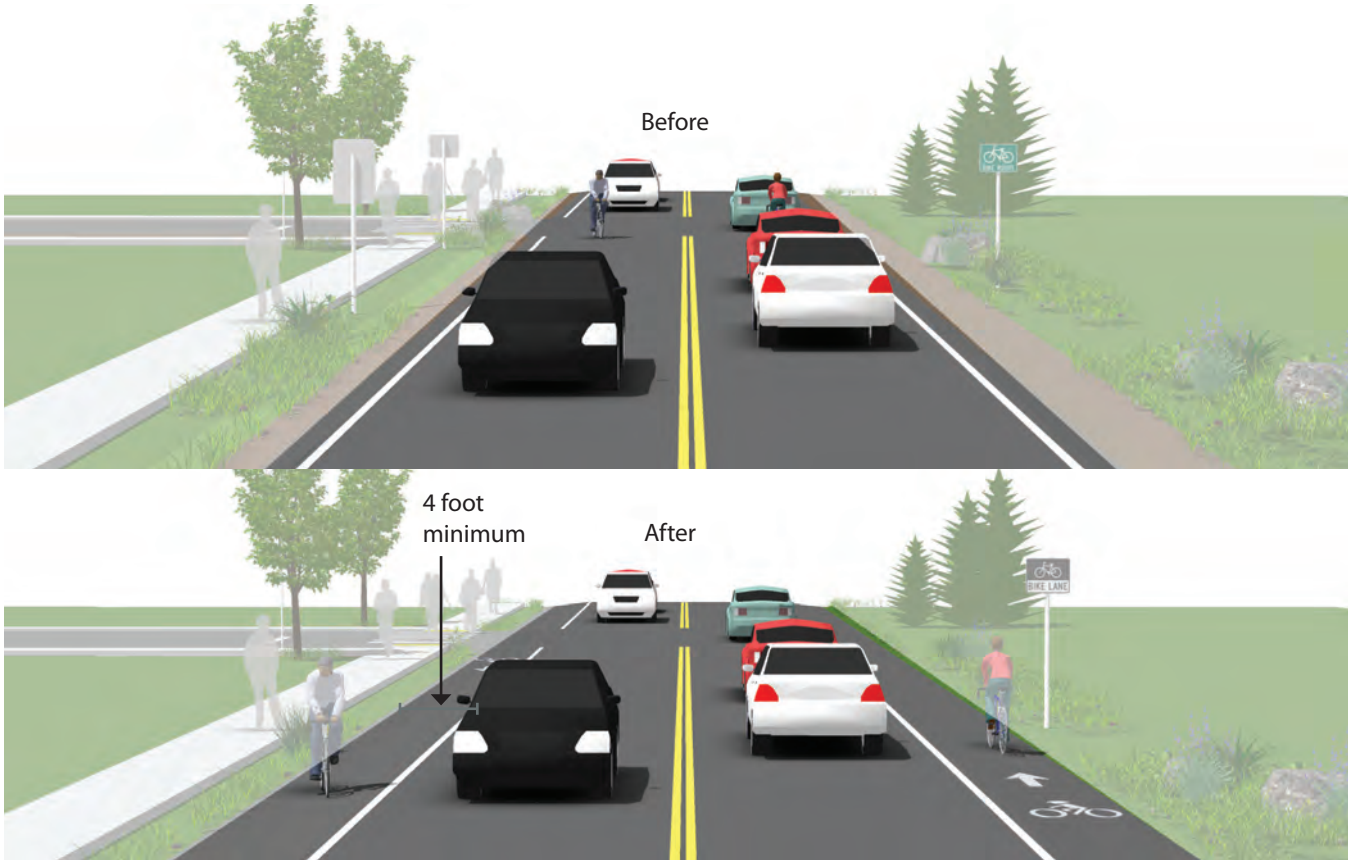
ROADWAY WIDENING

Description

Bike lanes can be accommodated on streets with excess right-of-way through shoulder widening. Although roadway widening incurs higher expenses compared with re-striping projects, bike lanes can be added to streets currently lacking curbs, gutters and sidewalks without the high costs of major infrastructure reconstruction.

Guidance

- Guidance on bicycle lanes applies to this treatment.
- 4 foot minimum width when no curb and gutter is present.
- 6 foot width preferred.



Discussion

Roadway widening is most appropriate on roads lacking curbs, gutters and sidewalks. If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.

Materials and Maintenance

The extended bicycle area should not contain any rough joints where bicyclists ride. Saw or grind a clean cut at the edge of the travel lane, or feather with a fine mix in a non-ridable area of the roadway.

LANE NARROWING

Description

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.

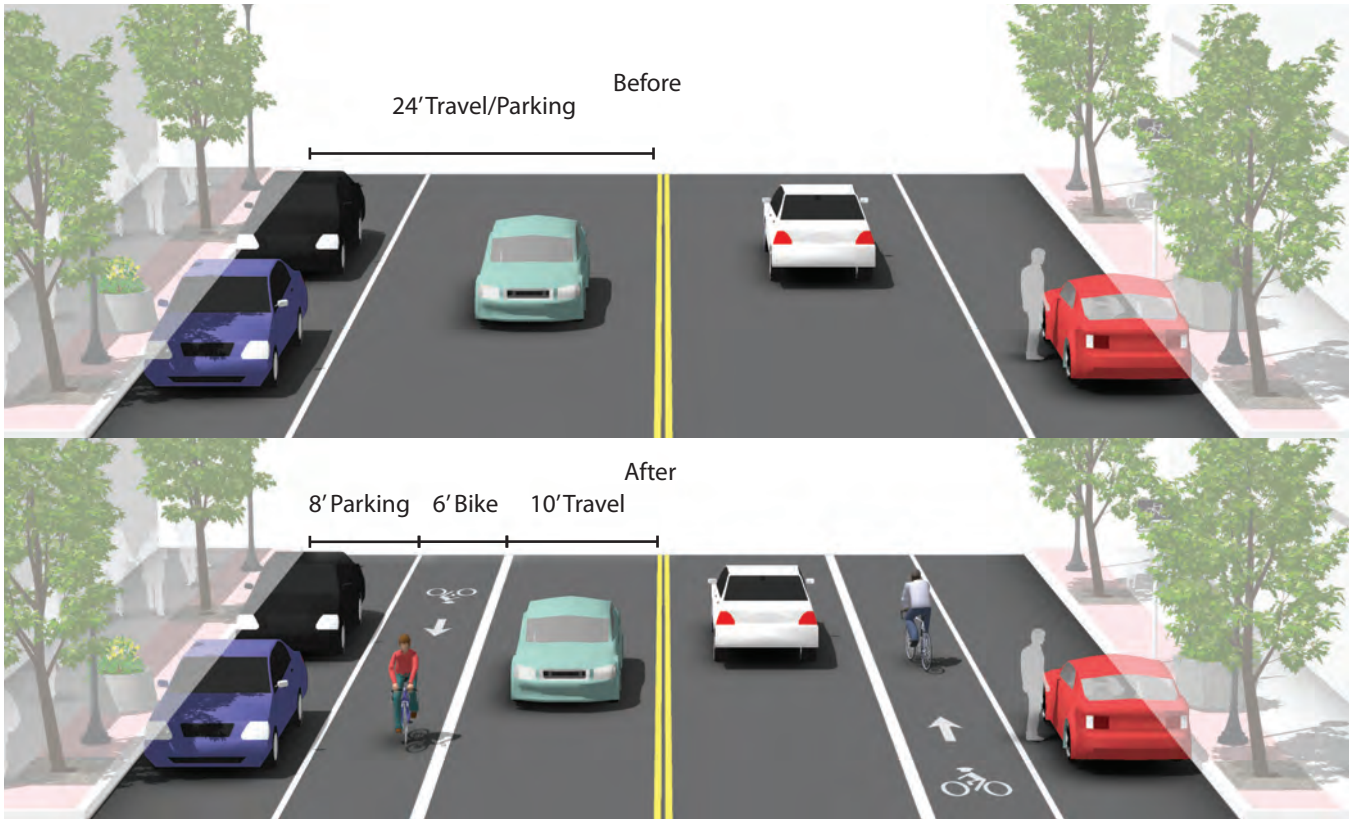
Guidance

Vehicle lane width:

- Before: 10-15 feet
- After: 10-11 feet

Bicycle lane width:

- Guidance on Bicycle Lanes applies to this treatment.



Discussion

Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes can also be narrowed in some situations to free up pavement space for bike lanes. AASHTO supports reduced width lanes in A Policy on Geometric Design of Highways and Streets: "On interrupted-flow operation conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages."

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

LANE RECONFIGURATION

Description

The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects.

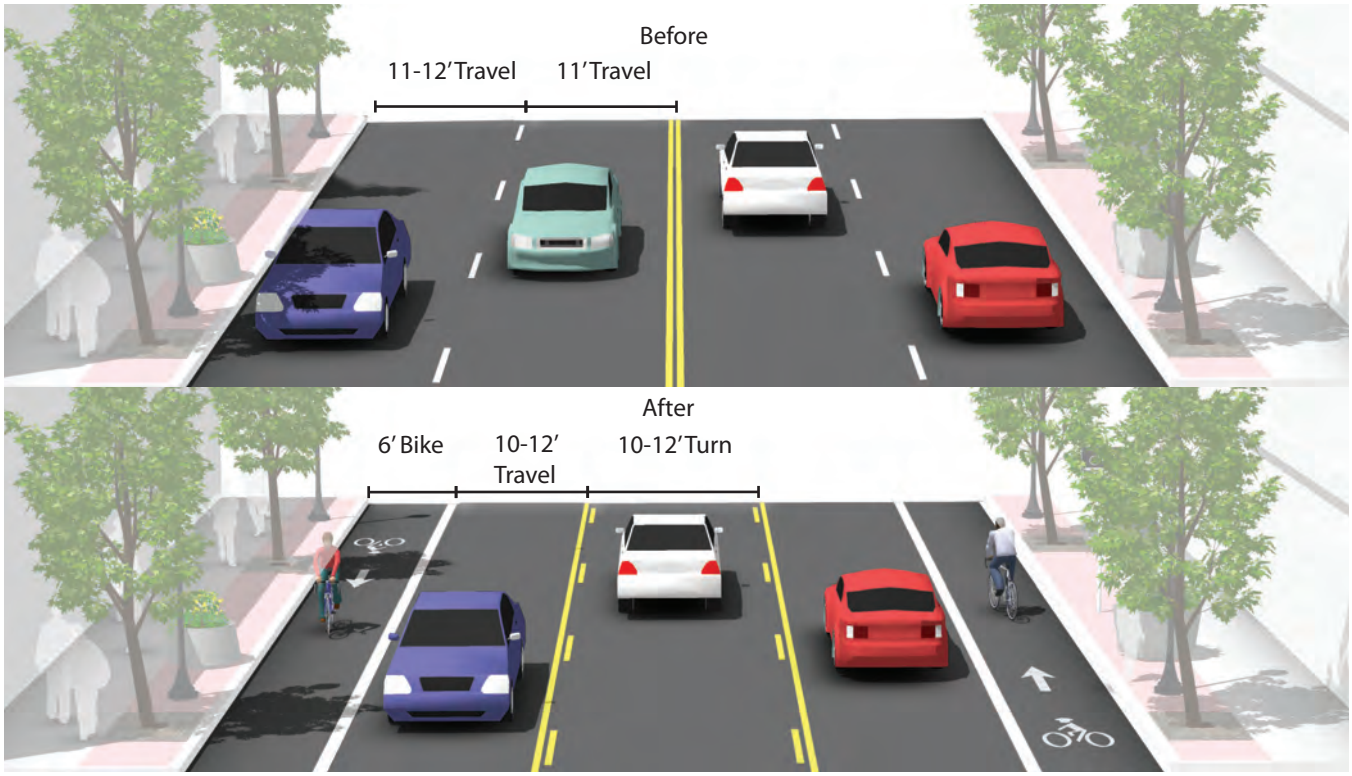
Guidance

Vehicle lane width:

- Width depends on project. No narrowing may be needed if a lane is removed.

Bicycle lane width:

- Guidance on Bicycle Lanes applies to this treatment.



Discussion

Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.

FHWA. *Evaluation of Lane Reduction "Road Diet" Measures on Crashes.* Publication Number: FHWA-HRT-10-053. 2010.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

INTERSECTIONS

Intersections are junctions at which different modes of transportation meet and facilities overlap. An intersection facilitates the interchange between bicyclists, motorists, pedestrians and other modes in order to advance traffic flow in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflict between bicyclists (and other vulnerable road users) and vehicles by heightening the level of visibility, denoting clear right-of-way and facilitating eye contact and awareness with other modes. Intersection treatments can improve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

The configuration of a safe intersection for bicyclists may include elements such as color, signage, medians, signal detection and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, and the adjacent street function and land use.

Bike Lanes at Right Turn Only Lanes

Combined Bike Lane/Turn Lane


Intersection Crossing Markings

BIKE LANES AT RIGHT TURN ONLY LANES

Description

The appropriate treatment at right-turn lanes is to place the bike lane between the right-turn lane and the right-most through lane or, where right-of-way is insufficient, to use a shared bike lane/turn lane.

The design (right) illustrates a bike lane pocket, with signage indicating that motorists should yield to bicyclists through the conflict area.

Guidance

At auxiliary right turn only lanes (add lane):

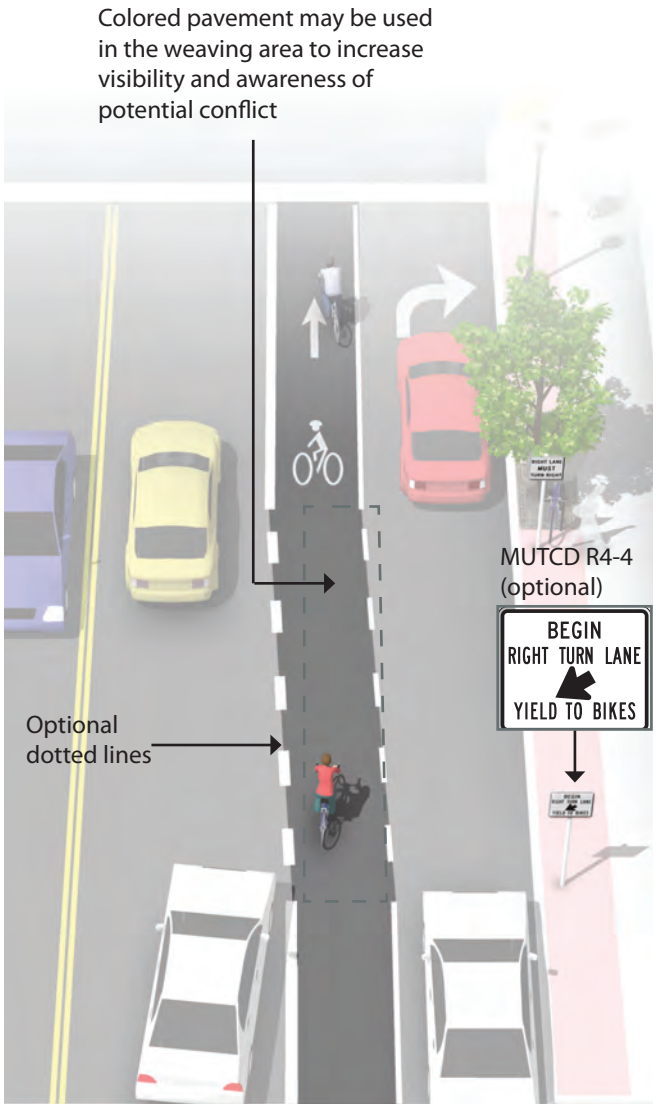
- » Continue existing bike lane width; standard width of 5 to 6 feet or 4 feet in constrained locations.
- » Use signage to indicate that motorists should yield to bicyclists through the conflict area.
- » Consider using colored conflict areas to promote visibility of the mixing zone.

Where a through lane becomes a right turn only lane:

- » Do not define a dotted line merging path for bicyclists.
- » Drop the bicycle lane in advance of the merge area.
- » Use shared lane markings to indicate shared use of the lane in the merging zone.

Discussion

For other potential approaches to providing accommodations for bicyclists at intersections with turn lanes, please see Combined Bike Lane/Turn Lane on the following page.



Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices. (3D-01).* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

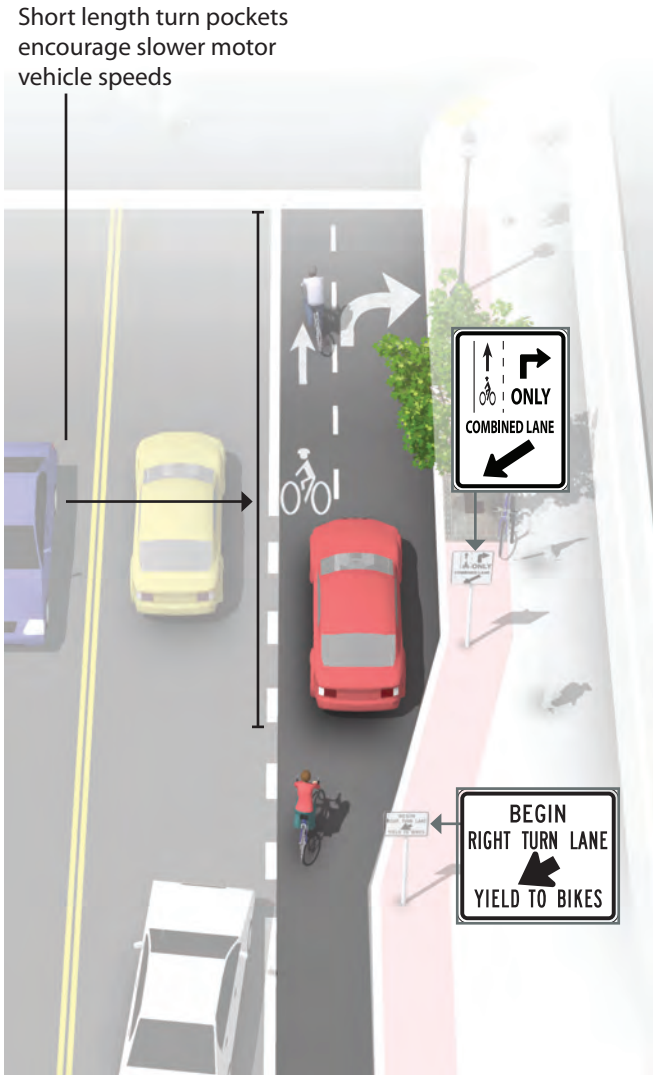
Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.

COMBINED BIKE LANE/TURN LANE

Description

The combined bicycle/right turn lane places a standard-width bike lane on the left side of a dedicated right turn lane. A dotted line delineates the space for bicyclists and motorists within the shared lane. This treatment includes signage advising motorists and bicyclists of proper positioning within the lane.

This treatment is recommended at intersections lacking sufficient space to accommodate both a standard through bike lane and right turn lane.



Guidance

- Maximum shared turn lane width is 13 feet; narrower is preferable.
- Bike Lane pocket should have a minimum width of 4 feet with 5 feet preferred.
- A dotted 4 inch line and bicycle lane marking should be used to clarify bicyclist positioning within the combined lane, without excluding cars from the suggested bicycle area.
- A "Right Turn Only" sign with an "Except Bicycles" plaque may be needed to make it legal for through bicyclists to use a right turn lane.

Discussion

Case studies cited by the Pedestrian and Bicycle Information Center indicate that this treatment works best on streets with lower posted speeds (30 MPH or less) and with lower traffic volumes (10,000 ADT or less). May not be appropriate for high-speed arterials or intersections with long right turn lanes. May not be appropriate for intersections with large percentages of right-turning heavy vehicles.

Additional References

NACTO. *Urban Bikeway Design Guide.* 2012.

This treatment is currently slated for inclusion in the next edition of the AASHTO Guide for the Development of Bicycle Facilities.

Materials and Maintenance

Locate markings out of tire tread to minimize wear. Because the effectiveness of markings depends on their visibility, maintaining markings should be a high priority.

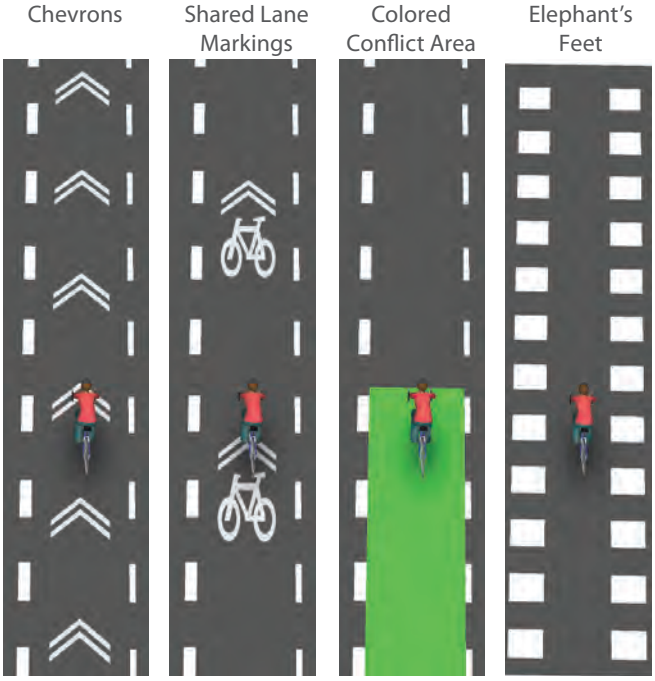
INTERSECTION CROSSING MARKINGS

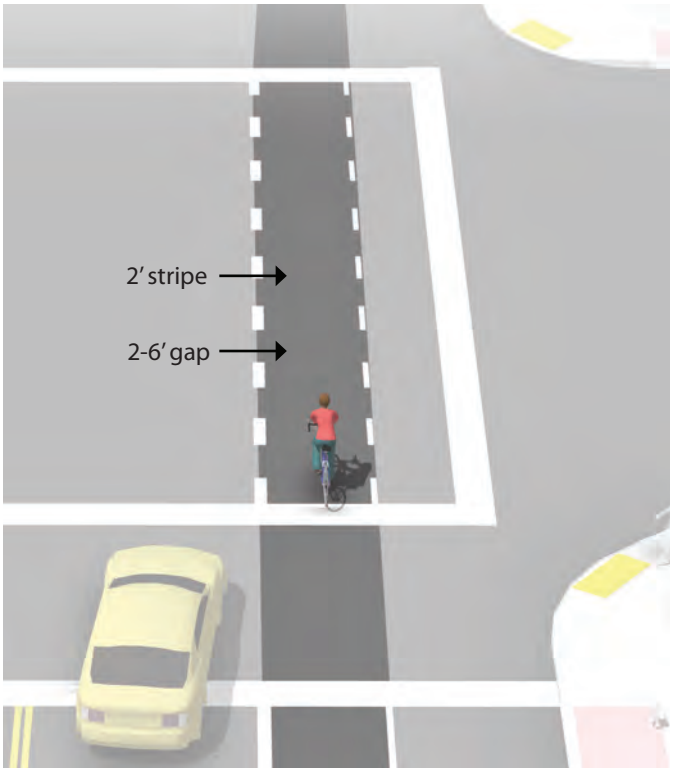
Description

Bicycle pavement markings through intersections indicate the intended path of bicyclists through an intersection or across a driveway or ramp. They guide bicyclists on a safe and direct path through the intersection and provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane.

Guidance

- » See MUTCD Section 3B.08: "dotted line extensions"
- » Crossing striping shall be at least six inches wide when adjacent to motor vehicle travel lanes. Dotted lines should be two-foot lines spaced two to six feet apart.
- » Chevrons, shared lane markings, or colored bike lanes may be used to increase visibility within conflict areas or across entire intersections. Elephant's Feet markings are common in Canada, and in use in Chicago, IL.





Discussion

Additional markings such as chevrons, shared lane markings, or colored bike lanes in conflict areas are strategies currently in use in the United States and Canada. Cities considering the implementation of markings through intersections should standardize future designs to avoid confusion.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices. (3D-01).* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority.

BICYCLE SUPPORT FACILITIES AND MAINTENANCE

Support facilities such as bicycle parking and repair stations can significantly enhance the bicyclist experience across Youngsville. Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. Along with increased use and connectivity, bicycle repair stations will complement not only infrastructure improvements, but a cultural shift that will allow faculty, staff, students, and visitors to engage simple bicycle maintenance and functionality.

Wayfinding

The ability to navigate through Youngsville is informed by landmarks, natural features and other visual cues. Signs throughout Town should indicate to bicyclists:

- Direction of travel
- Location of destinations
- Travel time/distance to those destinations

These signs will increase users' comfort and accessibility to the bicycle systems. Signage can serve both wayfinding and safety purposes including:

- Helping to familiarize users with the network
- Helping users identify the best routes to destinations
- Helping to address misconceptions about time and distance
- Helping overcome a "barrier to entry" for people who are not frequent bicyclists (e.g., "interested but concerned" bicyclists)

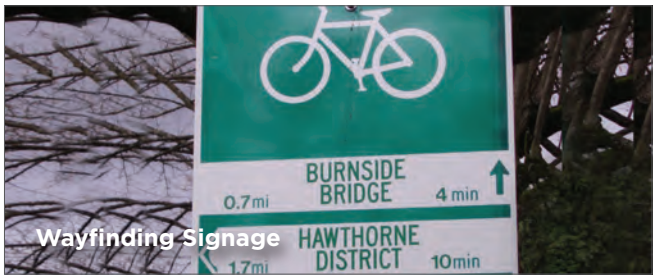
A community-wide wayfinding signage plan would identify:

- Sign locations
- Sign type – what information should be included and design features
- Destinations to be highlighted on each sign – key destinations for bicyclists
- Approximate distance and travel time to each destination


Bicycle Parking


Sweeping


Bicycle Repair Station



Wayfinding Signage

Wayfinding signs also visually cue motorists that they are driving along a bicycle/pedestrian route and should use caution. Signs are typically placed at key locations leading to and along routes, including the intersection of multiple routes. Too many road signs tend to clutter the right-of-way, and it is recommended that these signs be posted at a level most visible to bicyclists and pedestrians rather than per vehicle signage standards.

BICYCLE PARKING

Description

Short-term bicycle parking is meant to accommodate visitors, customers, and others expected to depart within two hours. It should have an approved standard rack, appropriate location and placement, and weather protection. Racks should:

- Support the bicycle in at least two places, preventing it from falling over.
- Allow locking of the frame and one or both wheels with a U-lock.
- Is securely anchored to ground.
- Resists cutting, rusting and bending or deformation.

Guidance

- 2' minimum from the curb face to avoid 'dooring.'
- Close to destinations; 50' maximum distance from main building entrance.
- Minimum clear distance of 6' should be provided between the bicycle rack and the property line.
- Locate racks in areas that cyclists are most likely to travel.

SWEEPING

Description

Bicyclists often avoid shoulders and bike lanes filled with gravel, broken glass and other debris; they will ride in the roadway to avoid these hazards, potentially causing conflicts with motorists. Debris from the roadway should not be swept onto sidewalks (pedestrians need a clean walking surface), nor should debris be swept from the sidewalk onto the roadway. A regularly scheduled inspection and maintenance program helps ensure that roadway debris is regularly picked up or swept.

Guidance

- Establish a seasonal sweeping schedule that prioritizes roadways with major bicycle routes.
- Sweep walkways and bikeways whenever there is an accumulation of debris on the facility.
- In curbed sections, sweepers should pick up debris; on open shoulders, debris can be swept onto gravel shoulders.
- Pave gravel driveway approaches to minimize loose gravel on paved roadway shoulders.
- Perform additional sweeping in the Spring to remove debris from the Winter.
- Perform additional sweeping in the Fall in areas where leaves accumulate.

BICYCLE REPAIR STATION

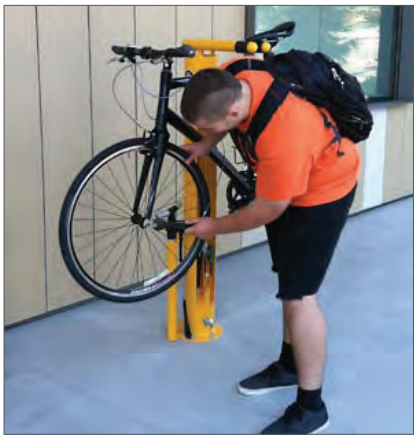
Description

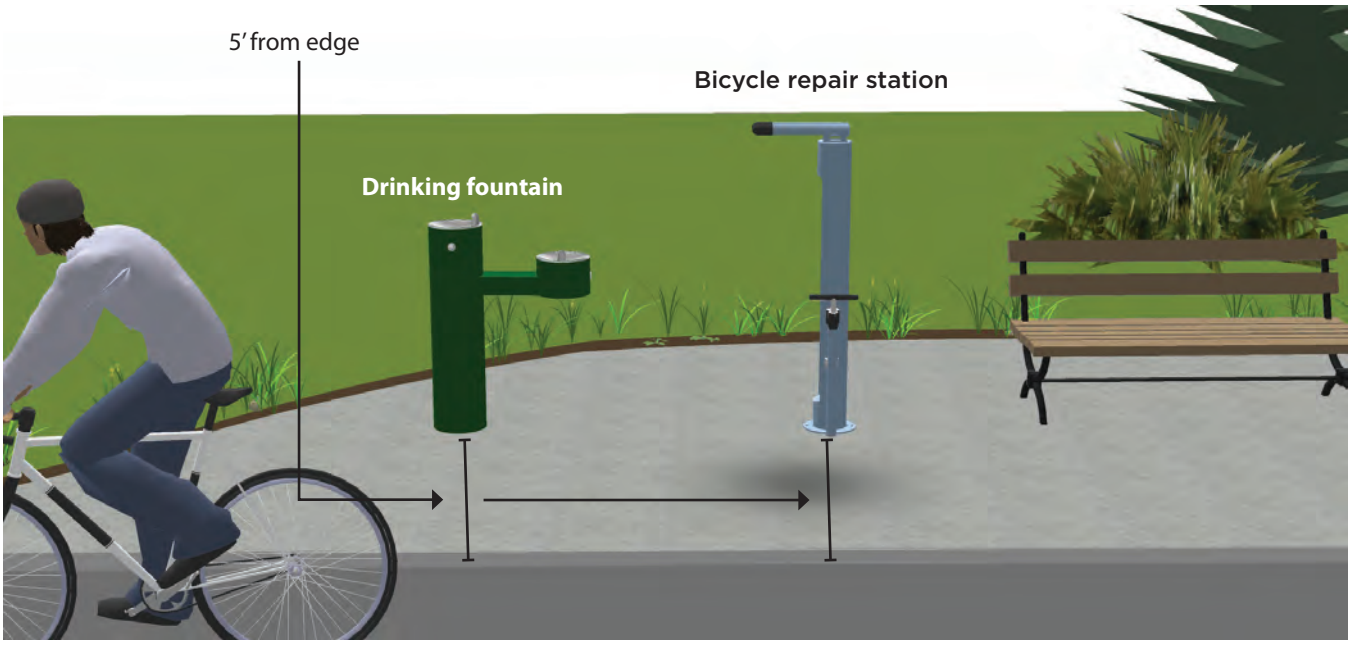
Bicycle repair stations are small kiosks designed to offer a complete set of tools necessary for routine bicycle maintenance. Bicycle repair stations have become a popular amenity in bicycle friendly places because they provide bicyclists with access to tools on-the-go and encourage people to teach and learn bicycle maintenance in an informal setting. They can also help to reduce the number of abandoned or trashed bikes in a community; bikes are often abandoned by their owners when they have a minor mechanical issue that they do not have the tools or knowledge to fix. Bicycle repair stations encourage people to learn bicycling skills from one another and send a message to residents and visitors that bicycling is supported in the community. These fixtures can be placed in a park or in another public place and require little upkeep or oversight, since the tools and stand are designed to be self-contained and theft-resistant.

Guidance

- Bicycle repair station tools are secured by high security cables, but will still be an attractive target for theft. Proper placement of kiosks in areas of high activity is one key strategy to reduce potential vandalism.
- Consider grouping repair stations together with other amenities such as bicycle parking, seating, and drinking fountains.

Public bicycle maintenance and tool stand examples.





WAYFINDING SIGNAGE

Description

A bicycle wayfinding system consists of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. There are three general types of wayfinding signs:

Guidance

Confirmation Signs

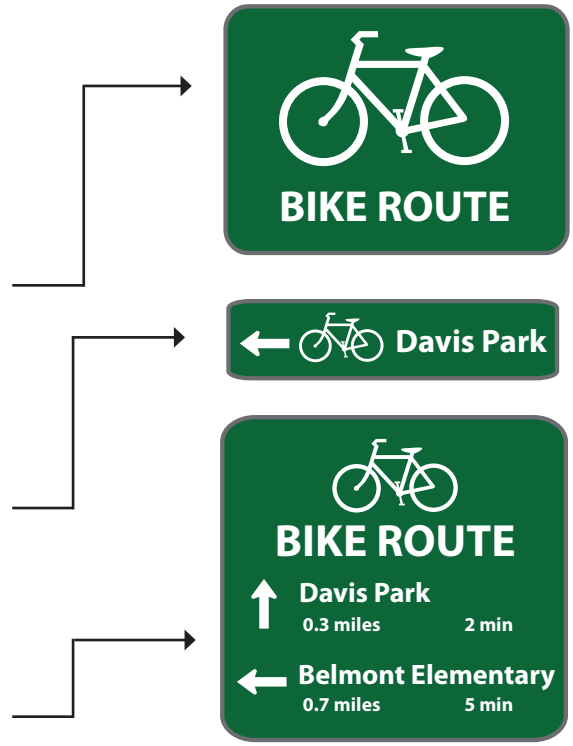
Indicate to bicyclists that they are on a designated bikeway. Make motorists aware of the bicycle route. This signage can include destinations and distance/time, but does not include arrows.

Turn Signs

Indicate where a bikeway turns from one street onto another street. This signage can be used with pavement markings, and does include destinations and arrows.

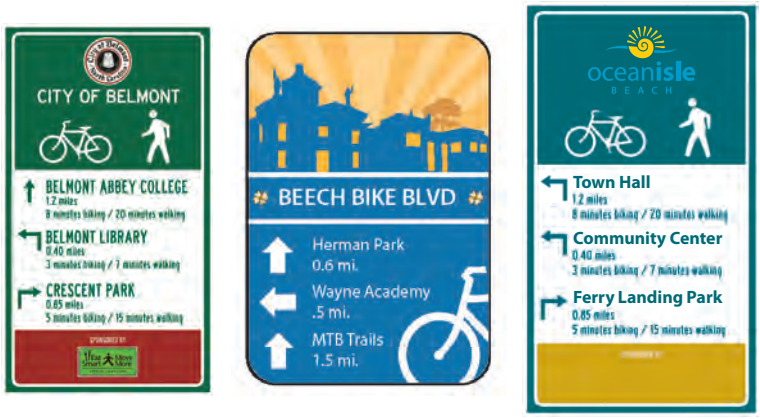
Decision Signs

Mark the junction of two or more bikeways and informs bicyclists of the designated bike route to access key destinations. Destinations and arrows, distances and travel times are optional but recommended.



Alternative Designs

A customized alternative design may be used to include travel times, local town logos, and sponsorship branding. See examples to the right.



Discussion

There is no standard color for bicycle wayfinding signage. Section 1A.12 of the MUTCD establishes the general meaning for signage colors. Green is the color used for directional guidance and is the most common color of bicycle wayfinding signage in the US, including those in the MUTCD.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices. (3D-01).* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

Maintenance needs for wayfinding signs are similar to other signs and will need periodic replacement due to wear.

WAYFINDING: SIGN PLACEMENT

Description

Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes.

Guidance

Confirmation Signs

» Every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along on-street bicycle facilities, unless another type of sign is used (e.g., within 150 ft of a turn or decision sign).

» Should be placed soon after turns to confirm destination(s). Pavement markings can also confirm that a bicyclist is on a preferred route.

Decision Signs

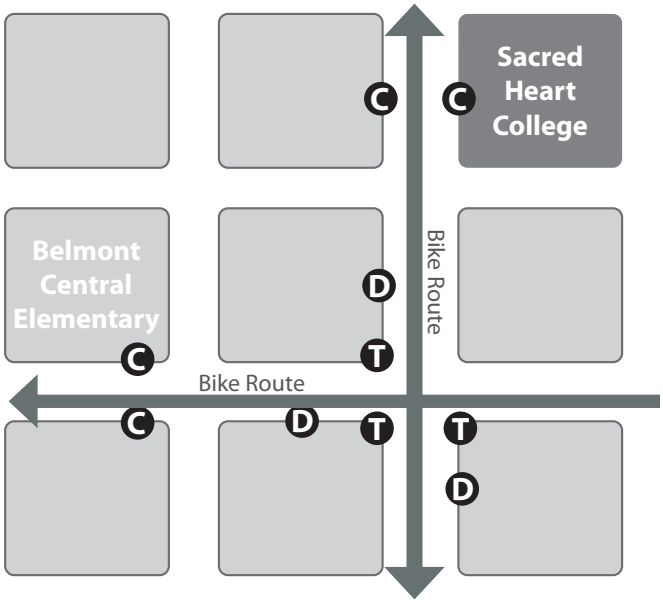
» Near-side of intersections in advance of a junction with another bicycle route.

» Along a route to indicate a nearby destination.

Turn Signs

» Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through).

» Pavement markings can also indicate the need to turn to the bicyclist.



Discussion

It can be useful to classify a list of destinations for inclusion on the signs based on their relative importance to users throughout the area. A particular destination's ranking in the hierarchy can be used to determine the physical distance from which the locations are signed. For example, primary destinations (such as the downtown area) may be included on signage up to five miles away. Secondary destinations (such as a transit station) may be included on signage up to two miles away. Tertiary destinations (such as a park) may be included on signage up to one mile away.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices. (3D-01).* 2009.
NACTO. *Urban Bikeway Design Guide.* 2012.

Materials and Maintenance

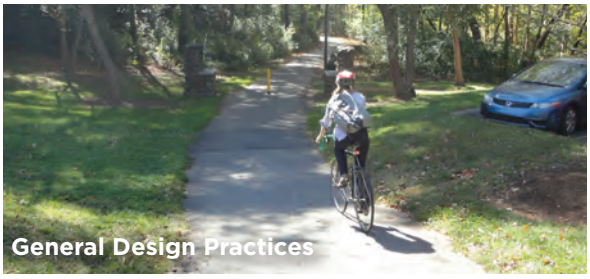
Maintenance needs for bicycle wayfinding signs are similar to other signs and will need periodic replacement due to wear.

Tributary leading to Richland Creek

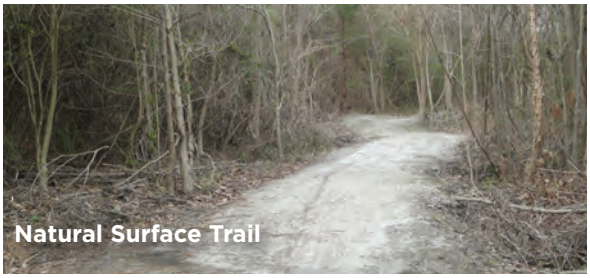
SHARED USE PATHS (GREENWAYS)

A shared use path (also known as a greenway) allows for two-way, off-street bicycle use and also may be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users. These facilities are frequently found in parks, along rivers, beaches, and in greenbelts or utility corridors where there are few conflicts with motorized vehicles. Trail facilities can also include amenities such as lighting, signage, and fencing (where appropriate). Key features of shared use paved trails include:

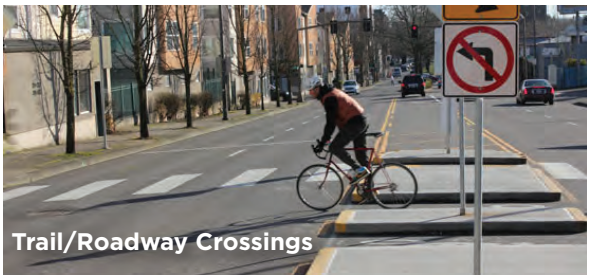
- Frequent access points from the local road network.
- Directional signs to direct users to and from the trail.
- A limited number of at-grade crossings with streets or driveways.
- Terminating the trail where it is easily accessible to and from the street system.
- Separate treads for pedestrians and bicyclists when heavy use is expected.


General Design Practices


Trails Along Roadways


Natural Surface Trail


Boardwalks

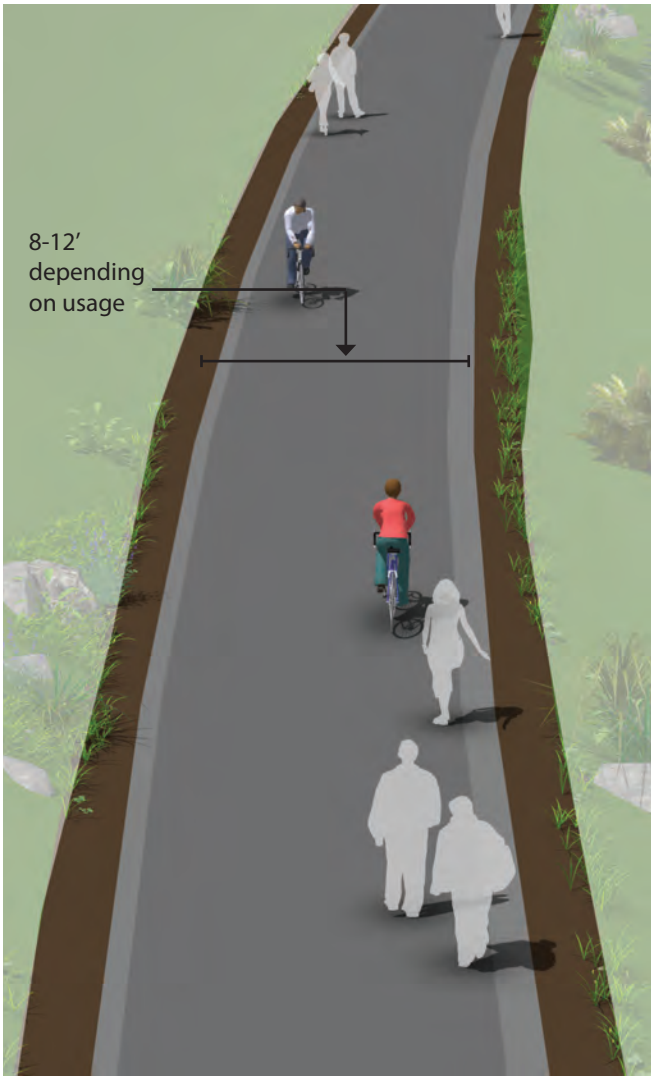

Trail/Roadway Crossings


Bridges

SHARED USE PATHS

Description

Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle trails should generally provide directional travel opportunities not provided by existing roadways.



Guidance

Width

- 8 feet is the minimum allowed for a two-way bicycle trail and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5' minimum) can be provided for pedestrian use.

Lateral Clearance

- A 2 foot or greater shoulder on both sides of the trail should be provided. An additional foot of lateral clearance (total of 3') is required by the MUTCD for the installation of signage or other furnishings.
- If bollards are used at intersections and access points, they should be colored brightly and/or supplemented with reflective materials to be visible at night.

Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Discussion

Terminate the trail where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Manual on Uniform Traffic Control Devices.* 2009.
Flink, C. *Greenways: A Guide To Planning Design And Development.* 1993.

Materials and Maintenance

Asphalt is the most common surface for bicycle trails. The use of concrete for trails has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of trail users.

SHARED USE PATHS ALONG ROADWAYS (SIDEPATHS)

Description

Shared use paths along roadways, also called Sidepaths, are a type of trail that run adjacent to a street.

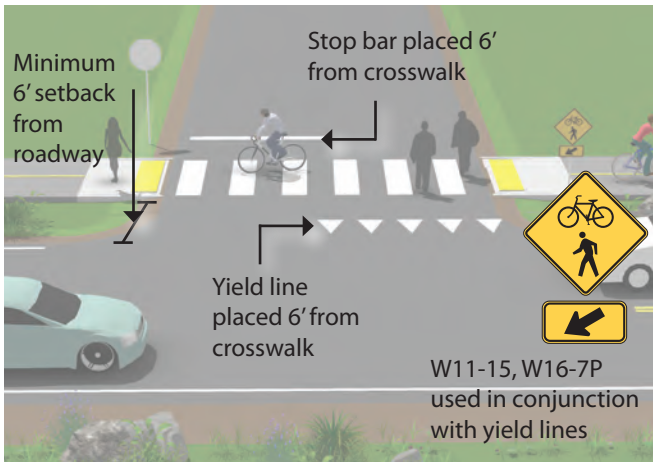
- Because of operational concerns it is generally preferable to place trails within independent rights-of-way away from roadways. However, there are situations where existing roads provide the only corridors available.
- Along roadways, these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding where bicyclists enter or leave the trail.
- The AASHTO Guide for the Development of Bicycle Facilities cautions practitioners of the use of two-way sidepaths on urban or suburban streets with many driveways and street crossings.

In general, there are two approaches to crossings: adjacent crossings and setback crossings, illustrated below.

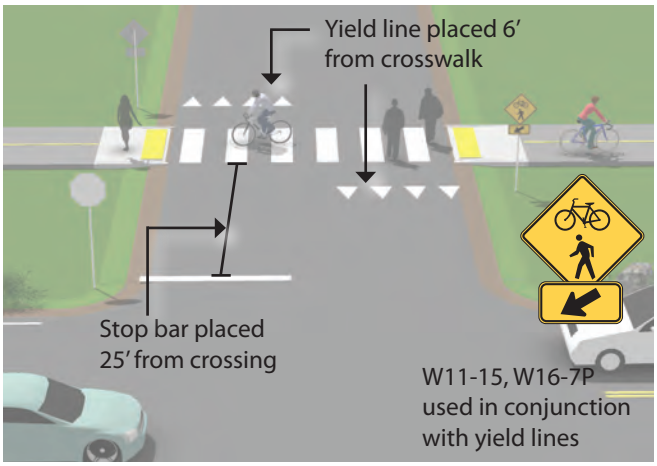
Guidance

- Guidance for sidepaths should follow that for general design practises of shared use trails.
- A high number of driveway crossings and intersections create potential conflicts with turning traffic. Consider alternatives to sidepaths on streets with a high frequency of intersections or heavily used driveways.
- Where a sidepath terminates special consideration should be given to transitions so as not to encourage unsafe wrong-way riding by bicyclists.
- Crossing design should emphasize visibility of users and clarity of expected yielding behavior. Crossings may be STOP or YIELD controlled depending on sight lines and bicycle motor vehicle volumes and speeds.

Adjacent Crossing - A separation of 6 feet emphasizes the conspicuity of riders at the approach to the crossing.



Setback Crossing - A set back of 25 feet separates the trail crossing from merging/turning movements that may be competing for a driver's attention.



Discussion

The provision of a shared use paved trail adjacent to a road is not a substitute for the provision of on-road accommodation such as paved shoulders or bike lanes, but may be considered in some locations in addition to on-road bicycle facilities. To reduce potential conflicts in some situations, it may be better to place one-way sidepaths on both sides of the street.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
NACTO. *Urban Bikeway Design Guide.* See entry on Raised Cycle Tracks. 2012.

Materials and Maintenance

Asphalt is the most common surface for bicycle trails. The use of concrete for trails has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of trail users.

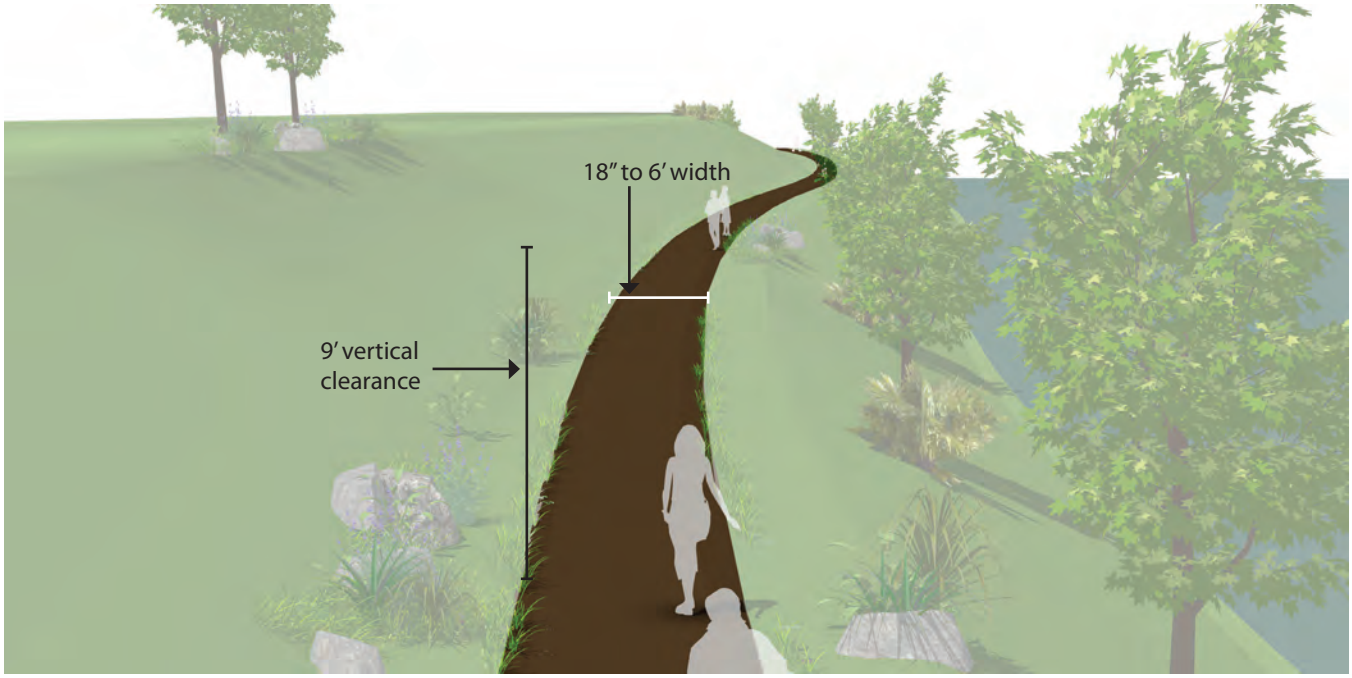
NATURAL SURFACE TRAIL

Description

Sometimes referred to as footpaths, hiking trails or single track trails, the soft surface shared use 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 or where a more primitive experience is desired.

Guidance

- Trails can vary in width from 18 inches to 6 feet or greater; vertical clearance should be maintained at nine-feet above grade.
- Mountain bike trails are typically 18-24 inches wide and have compacted bare earth or leaf litter surfacing.
- Base 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.
- Provide positive drainage for trail tread without extensive removal of existing vegetation; maximum slope is five percent (typical).



Discussion

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

Additional References

IMBA. *Managing Mountain Biking.* 2007.
IMBA. *Trail Solutions.* 2004.
Flink, C. *Greenways: A Guide To Planning Design And Development.* 1993.

Materials and Maintenance

Consider implications for accessibility when weighing options for surface treatments.

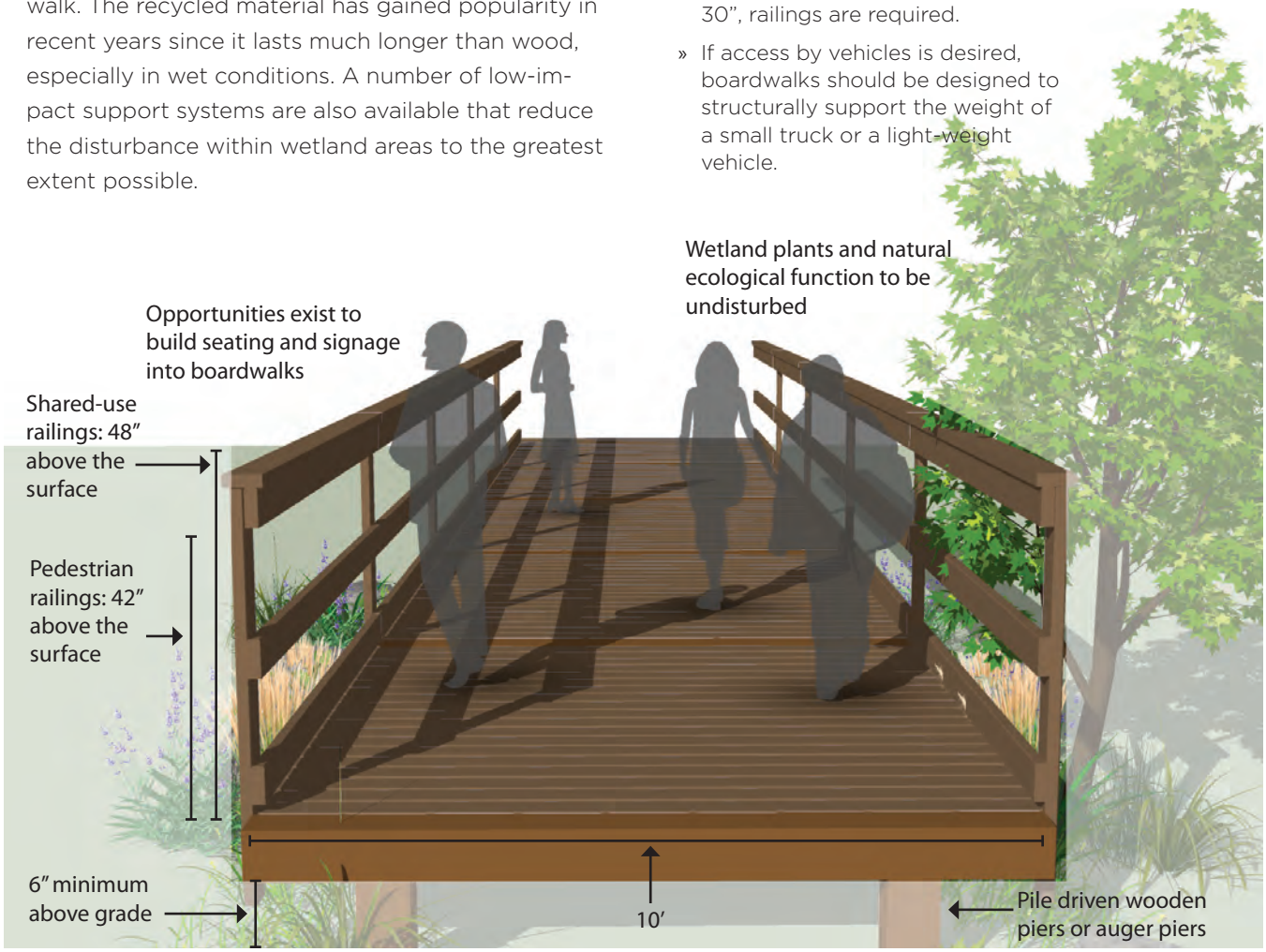
BOARDWALKS

Description

Boardwalks are typically required when crossing wetlands or other poorly drained areas. They are usually 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.

Guidance

- Boardwalk width should be a minimum of 10 feet when no rail is used. A 12 foot width is preferred in areas with average anticipated use and whenever rails are used.
- When the height of a boardwalk exceeds 30", railings are required.
- If access by vehicles is desired, boardwalks should be designed to structurally support the weight of a small truck or a light-weight vehicle.



Discussion

In general, building in wetlands is subject to regulations and should be avoided.

The foundation normally consists of wooden posts or auger piers (screw anchors). Screw anchors provide greater support and last much longer.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
FHWA. *Wetland Trail Design and Construction.* 2007.

Materials and Maintenance

Decking should be either non-toxic treated wood or recycled plastic. Cable rails are attractive and more visually transparent but may require maintenance to tighten the cables if the trail has snow storage requirements.

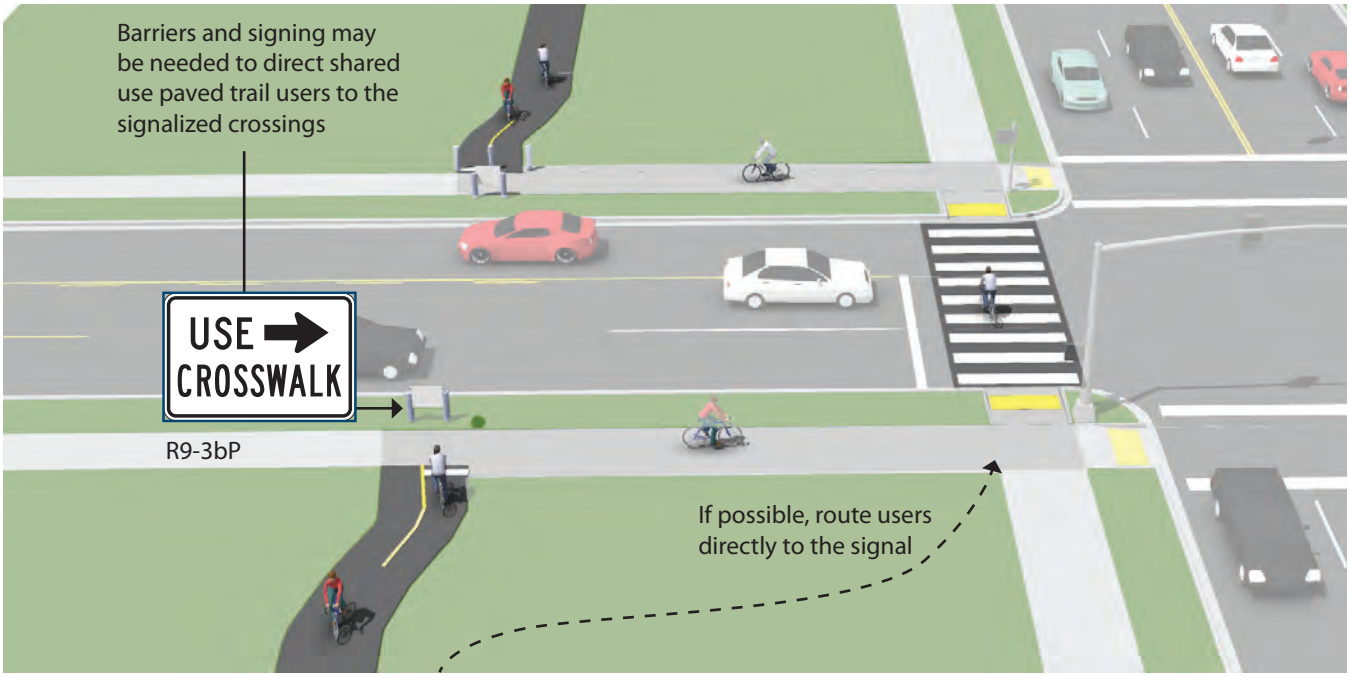
TRAIL/ROADWAY CROSSINGS: ROUTE USERS TO SIGNALIZED CROSSINGS

Description

Trail crossings within approximately 400 feet of an existing signalized intersection with pedestrian crosswalks are typically diverted to the signalized intersection to avoid traffic operation problems when located so close to an existing signal. For this restriction to be effective, barriers and signing may be needed to direct trail users to the signalized crossing. If no pedestrian crossing exists at the signal, modifications should be made.

Guidance

» Trail crossings should not be provided within approximately 400 feet of an existing signalized intersection. If possible, route trail directly to the signal.



Discussion

In the US, the minimum distance a marked crossing can be from an existing signalized intersection varies from approximately 250 to 660 feet. Engineering judgement and the context of the location should be taken into account when choosing the appropriate allowable setback. Pedestrians are particularly sensitive to out of direction travel and jaywalking may become prevalent if the distance is too great.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities.* 2012.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities.* 2004.

Materials and Maintenance

If a sidewalk is used for crossing access, it should be kept clear of snow and debris and the surface should be level for wheeled users.

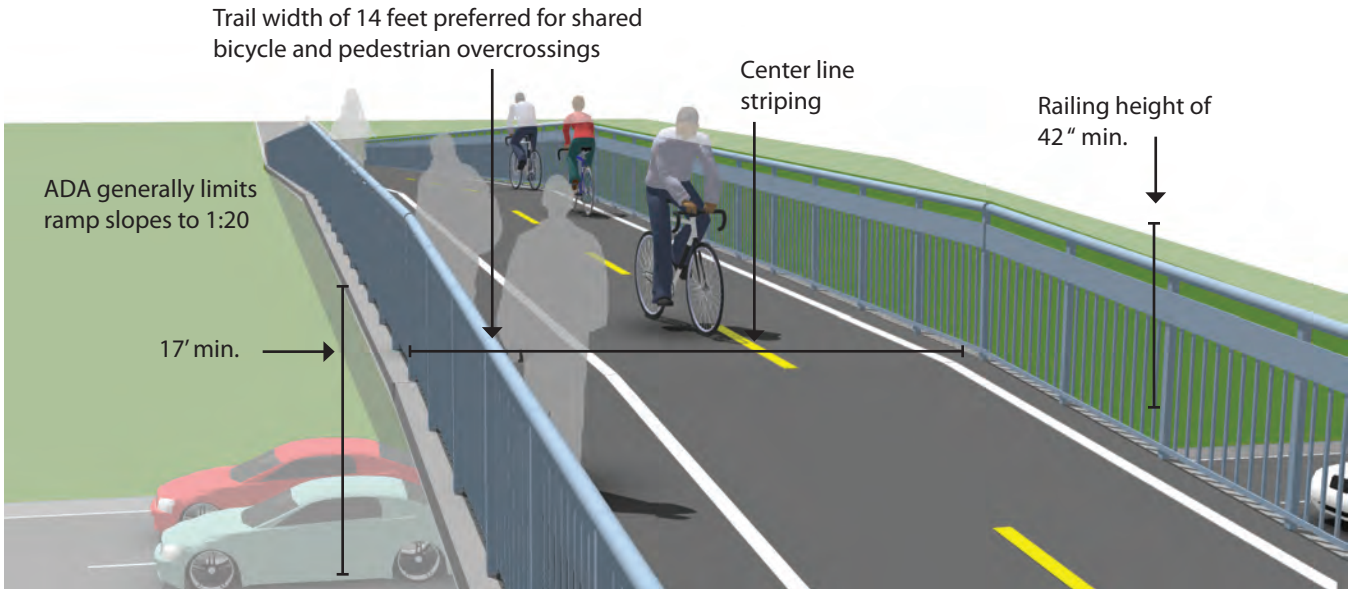
TRAIL/ROADWAY CROSSINGS: OVERCROSSINGS

Description

Bicycle/pedestrian overcrossings provide critical non-motorized system links by joining areas separated by barriers such as deep canyons, waterways or major transportation corridors. In most cases, these structures are built in response to user demand for safe crossings where they previously did not exist. There are no minimum roadway characteristics for considering grade separation. Depending on the type of facility or the desired user group grade separation may be considered in many types of projects. Overcrossings require a minimum of 17 feet of vertical clearance to the roadway below versus a minimum elevation differential of around 12 feet for an undercrossing. This results in potentially greater elevation differences and much longer ramps for bicycles and pedestrians to negotiate.

Guidance

- 8 foot minimum width, 14 feet preferred. If overcrossing has any scenic vistas additional width should be provided to allow for stopping. A separate 5 foot pedestrian area may be provided for facilities with high bicycle and pedestrian use.
- 10 foot headroom on overcrossing; clearance below will vary depending on feature being crossed.
- Roadway: 17 feet
  Freeway: 18.5 feet
  Heavy Rail Line: 23 feet
- The overcrossing should have a centerline stripe even if the rest of the trail does not have one.



Discussion

Overcrossings for bicycles and pedestrians typically fall under the Americans with Disabilities Act (ADA), which strictly limits ramp slopes to 5% (1:20) with landings at 400 foot intervals, or 8.33% (1:12) with landings every 30 feet. Overcrossings pose potential concerns about visual impact and functional appeal, as well as space requirements necessary to meet ADA guidelines for slope.

Additional References

AASHTO. *Guide for the Development of Bicycle Facilities*. 2012.
AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities*. 2004.

Materials and Maintenance

Potential issues with vandalism.
Overcrossings can be more difficult to clear of snow than undercrossings.

BRIDGES

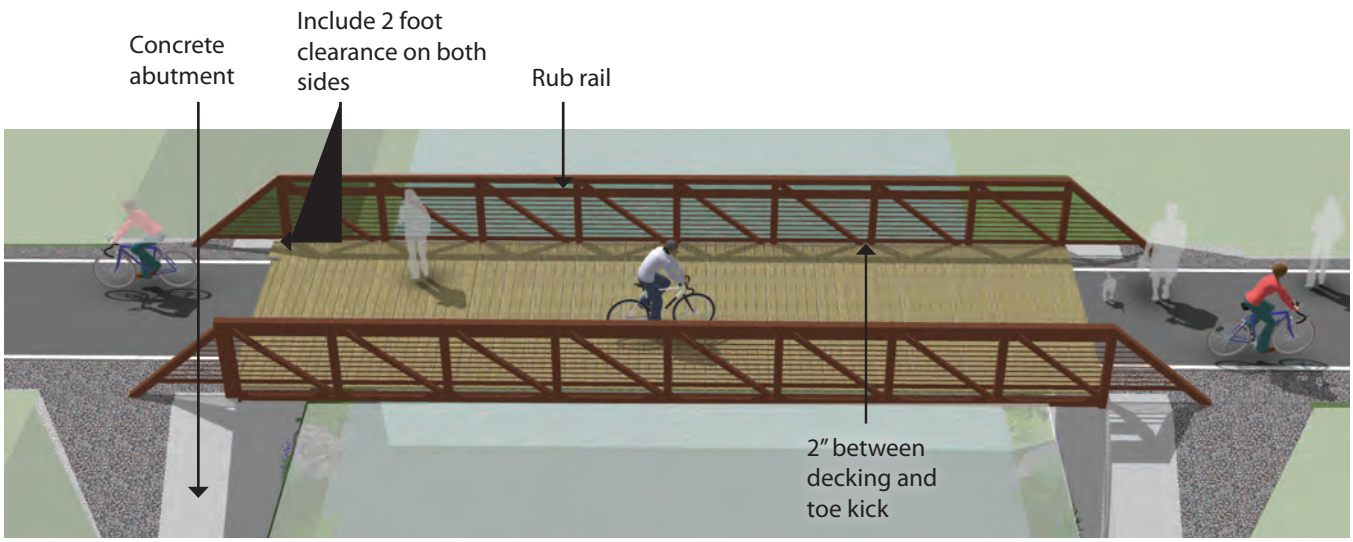
Description

Greenway trail bridges are most often used to provide user access over natural features such as streams and rivers, where a culvert is not an option or the span length exceeds 20 feet. The type and size of bridges can vary widely depending on the greenway trail and specific site requirements. Bridges often used for greenway trails include suspension bridges and prefabricated clear span bridges. When determining a bridge design for greenway trails, it is important to consider emergency and maintenance vehicle access.

Greenway trails that are poorly designed through water features can impact wetlands and streams, and become conduits for delivering sediments, nutrients, and pathogens to the watershed. Greenway trails that cross streams can exhibit bank and streambed erosion if not properly constructed.

Guidance

- The clear span width of the bridge should include 2 feet of clearance on both ends of the bridge approach for the shoulder.
- Bridge deck grade should be flush with adjacent greenway trail tread elevation to provide a smooth transition.
- Railing heights on bridges should include a 42 inch minimum guard rail, and 48 inches where hazardous conditions exist.
- A minimum overhead clearance of 10 feet is desirable for emergency vehicle access. Maximum opening between railing posts is 4 inches.
- A greenway trail bridge should support 10 tons for 10 foot wide greenway trails, and 20 tons for wider than 10 feet for emergency vehicle access.
- Bridges along greenway trails that allow equestrian use should be designed for mounted unit loadings.
- When crossing small headwater streams, align the crossing as far upstream as possible in the narrowest section of stream channel to minimize impact.
- Greenway trail drainage features should be constructed to manage stormwater before the greenway trail crosses the watercourse.
- All abutment and foundation design should be completed and sealed by a professional structural engineer licensed in the State of North Carolina.
- All greenway trail bridges will require local building permits, stormwater and land disturbance permits, floodplain development permits, and FEMA approval. Length and height of the bridge cords are governed by the width of the floodway and impacts to the base flood elevation of streams.



APPENDIX B:
FUNDING SOURCES

Overview | Federal - MAP-21 | Federal - Other | State | Local | Private | Trail Partnership Case Studies

OVERVIEW

When considering possible funding sources for bicycle and pedestrian projects, it is important to remember that not all construction activities or programs will be accomplished with a single funding source. It will be necessary to consider several sources of funding that together will support full project completion. Funding sources can be used for a variety of activities, including: programs, planning, design, implementation, and maintenance. This appendix outlines the most likely sources of funding from the federal, state, and local government levels as well as from the private and non-profit sectors. Note that this reflects the funding available at the time of writing. Funding amounts, cycles, and the programs themselves may change over time.

FEDERAL FUNDING SOURCES

Federal funding is typically directed through state agencies to local governments either in the form of grants or direct appropriations. Federal funding typically requires a local match of five percent to 50 percent, but there are sometimes exceptions. The following is a list of possible Federal funding sources that could be used to support construction of pedestrian and bicycle improvements.

MOVING AHEAD FOR PROGRESS IN THE TWENTY-FIRST CENTURY (MAP-21)

The largest source of federal funding for pedestrian and bicycle projects is the USDOT's Federal-Aid Highway Program, which Congress has reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The latest act, Moving Ahead for Progress in the Twenty-First Century (MAP- 21) was enacted in July 2012, and is set to expire in December 4, 2015.

At the time of this writing (October 2015), the most likely scenario is a short-term extension towards the end of 2015, with a similar structure to MAP-21, but with higher local matches required for projects. Therefore, it is not possible to guarantee the continued availability of any listed MAP-21 programs, or to predict their future funding levels or policy guidance. Nevertheless, many of these programs have been included in some form since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, and thus may continue to provide capital for active transportation projects and programs.

In North Carolina, federal monies are administered through the North Carolina Department of Transportation (NCDOT) and Metropolitan Planning Organizations (MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system. For more information, visit: http://www.fhwa.dot.gov/map21/summaryinfo.cfm

Transportation Alternatives

Transportation Alternatives (TA) is a funding source under MAP-21 that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SRTS), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did.

Average annual funds available through TA over the life of MAP-21 equal $814 million nationally, which is based on a two percent

set-aside of total MAP- 21 allocations. Note that state DOT's may elect to transfer up to 50 percent of TA funds to other highway programs, so the amount listed on the website represents the maximum potential funding. Remaining TA funds (those monies not re-directed to other highway programs) are disbursed through a separate competitive grant program administered by NCDOT. Local governments, school districts, tribal governments, and public lands agencies are permitted to compete for these funds.

Each state governor is given the opportunity to "opt out" of the Recreational Trails Program. However, as of the writing of this plan, only Florida and Kansas have "opted out" of the RTP. For all other states, dedicated funds for recreational trails continue to be provided as a subset of TA. MAP-21 provides $85 million nationally for the RTP. As part of MAP-21, this program expires December 4, 2015. For the complete list of eligible activities, visit: http://www.fhwa.dot.gov/environment/transportation_enhancements/ legislation/map21.cfm For funding levels, visit: http://www.fhwa.dot.gov/MAP21/funding.cfm Funding Resources B-5

Surface Transportation Program

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of pedestrian improvements are eligible, including trails, sidewalks, crosswalks, pedestrian signals, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. 50 percent of each state's STP funds are allocated by population to the MPOs; the remaining 50 percent may be spent in any area of the state. As part of MAP-21, this program expires December 4, 2015. For more information: http://www.fhwa.dot.gov/map21/stp.cfm

Highway Safety Improvement Program

MAP-21 doubles the amount of funding available through the Highway Safety Improvement Program (HSIP) relative to SAFETEA-LU. HSIP provides $2.4 billion nationally for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. MAP-21 preserves the Railway-Highway Crossings Program within HSIP but discontinues the High-Risk Rural roads set-aside unless safety statistics demonstrate that fatalities are increasing on these roads. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds. As part of MAP-21, this program expires December 4, 2015. For more information: http://www.fhwa.dot.gov/map21/hsip.cfm

Congestion Mitigation/Air Quality Program

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. States with no non-attainment areas may use their CMAQ funds for any CMAQ or STP eligible project. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible. Communities located in attainment areas who do not receive CMAQ funding apportionments may apply for CMAQ funding to implement projects that will reduce travel by automobile. As part of MAP-21, this program expires December 4, 2015. For more information: http://www.fhwa.dot.gov/map21/cmaq.cfm

Federal Transit Administration Enhanced Mobility of Seniors and Individuals with Disabilities

This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility when the transportation service provided is unavailable, insufficient, or inappropriate to meeting these needs. As part of MAP-21, this program expires December 4, 2015. For more information: http://www.fta.dot.gov/documents/MAP-21_Fact_Sheet_-_Enhanced_Mobility_of_Seniors_and_Individuals_with_Disabilities.pdf

Safe Routes to School (SRTS) Program

SRTS enables and encourages children to walk and bike to school. The program helps make walking and bicycling to school a safe and more appealing method of transportation for children. SRTS facilitates 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 North Carolina Safe Routes to School Program is supported by federal funds through SAFETEA-LU and MAP-21 legislation. Please note that all SRTS projects "shall be treated as projects on a Federal-aid system under chapter 1 of title 23, United States Code." Although no local match is required and all SRTS projects are 100% federally funded under the SAFETEA-LU, agencies are encouraged to leverage other funding sources that may be available to them, including grant awards, local, state, or other federal funding. SRTS funds can be used for proposed projects that are within 2 miles of a school public or private, K-8, in a municipality or in the county jurisdiction. In response to the Strategic Transportation Investments law of June 2013, proposed SRTS projects will be considered as part of the Bicycle and Pedestrian project input with Strategic Prioritization Office for funding consideration. Most of the types of eligible SRTS projects include sidewalks or a shared-use path. However, intersection improvements (i.e. signalization, marking/upgrading crosswalks, etc.), on street bicycle facilities (bike lanes, wide paved shoulders, etc.) or off-street shared-use paths are also eligible for SRTS funds. As part of MAP-21, this program expires December 4, 2015. For a more inclusive list, please visit the FHWA SRTS program at: http://www.fhwa.dot.gov/environment/safe_routes_to_school/overview/
Or contact DBPT/NCDOT at 919.707.2604.

OTHER FEDERAL FUNDING SOURCES

Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities (PSC) is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to "improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide."

The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure ("Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health"). The Partnership is not a formal agency with a regular annual grant program. Nevertheless, it is an important effort that has already led to some new grant opportunities (including both TIGER I and TIGER II grants). North Carolina jurisdictions should track Partnership commu-

nications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals are more likely to score well than initiatives that are narrowly limited in scope to pedestrian improvement efforts. PSC 2015 Priorities include: using PSC agency resources to advance Ladders of Opportunity for every American and every community; helping communities adapt to a changing climate, while mitigating future disaster losses; and supporting implementation of community-based development priorities. For more information:

http://www.sustainablecommunities.gov/

http://www2.epa.gov/smart-growth/hud-dot-epa-partnership-sustainable-communities

Resource for Rural Communities: http://www.sustainablecommunities.gov/sites/sustainablecommunities.gov/files/docs/federal_resources_rural.pdf

Federal Land and Water Conservation Fund

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

Rivers, Trails, and Conservation Assistance Program

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation funds available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in North Carolina locales indirectly through technical assistance, particularly for community organizations, but is not a capital funding source. Annual application deadline is August 1st. For more information: http://www.nps.gov/ncrc/programs/rtca/ or contact the Southeast Region RTCA Program Manager Deirdre "Dee" Hewitt at (404) 507- 5691

National Scenic Byways Discretionary Grant Program

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

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

Federal Lands Transportation Program (FLTP)

The FLTP funds projects that improve access within federal lands (including national forests, national parks, national wildlife refuges, national recreation areas, and other Federal public lands) on federally owned and maintained transportation facilities. $300 million per fiscal year has been allocated to the program for 2013 and 2014. As part of MAP-21, this program expires December 4, 2015. For more information: http://www.fhwa.dot.gov/map21/factsheets/fltp.cfm

Energy Efficiency and Conservation Block Grants

The Department of Energy's Energy Efficiency and Conservation Block Grants (EECBG) may be used to reduce energy consumptions and fossil fuel emissions and for improvements in energy efficiency. Section 7 of the funding announcement states that these grants provide opportunities for the development and implementation of transportation programs to conserve energy used in transportation including development of infrastructure such as bike lanes and pathways and pedestrian walkways. Although the current grant period has passed, more opportunities may arise in the future. For more information: http://www1.eere.energy.gov/wip/eecbg.html

TIGER Discretionary Grants

The U.S. Department of Transportation's (DOT) Transportation Investment Generating Economic Recovery (TIGER) discretionary grants are intended to fund capital investments in surface transportation infrastructure. The grant program focuses on "capital projects that generate economic development and improve access to reliable, safe, and affordable transportation for disconnected both urban and rural, while emphasizing improved connection to employment, education, services and other opportunities, workforce development, or community revitalization." Infrastructure improvement projects such as recreational trails and greenways with an emphasis on multi-modal transit qualify for this grant. Pre-Application deadlines are typically in May, with final application deadlines in June. For more information: http://www.dot.gov/tiger

Economic Development Administration

Under Economic Development Administration's (EDA) Public Works and Economic Adjustment Assistance programs, grant applications are accepted for construction, non-construction, technical assistance, and revolving loan fund projects. "Grants and cooperative agreements made under these programs are designed to leverage existing regional assets and support the implementation of economic development strategies that advance new ideas and creative approaches to advance economic prosperity in distressed communities." Application deadlines are typically in March and June.
For more information: http://www.eda.gov/funding-opportunities/files/2015-EDAP-FFO-Fact-Sheet.pdf

Historic Preservation Fund Grants

The State, Tribal, and Local Plans & Grants (STLPG) division manages several grant programs to assist with a variety of historic preservation and community projects focused on heritage preservation. For more information on the different grant programs visit: http://www.nps.gov/preservation-grants/

Environmental Contamination Cleanup Funding Sources

EPA's Brownfields Program provides direct funding for brownfields assessment, cleanup, revolving loans, and environmental job training. EPA's Brownfields Program collaborates with other EPA programs, other federal partners, and state agencies to identify and leverage more resources for brownfields activities. Technical assistance relating to brownfields financing is an additional service provided.
For more information: http://epa.gov/brownfields/grant_info/index.htm

National Fish and Wildlife Foundation: Five Star & Urban Waters Restoration Grant Program

The Five Star & Urban Waters Restoration Grant Program seeks to develop community capacity to sustain local natural resources for future generations by providing modest financial assistance to diverse local partnerships for wetland, riparian, forest and coastal habitat restoration, urban wildlife conservation, stormwater management as well as outreach, education and stewardship. Projects should focus on water quality, watersheds and the habitats they support. NFWF may use a mix of public and private funding sources to support any grant made through this program. Request for proposals application are typically due in late January/early February. For more information: http://www.nfwf.org/fivestar/Pages/home.aspx#.VS_eq_nF-Bw

Environmental Solutions for Communities Grant Program

The National Fish and Wildlife Foundation (NFWF) and Wells Fargo seek to promote sustainable communities through Environmental Solutions for Communities by supporting highly-visible projects that link economic development and community well-being to the stewardship and health of the environment. Priority for grants to projects that successfully address one or more of the following:

- Support innovative, cost-effective programs that enhance stewardship on private agricultural lands to enhance water quality and quantity and/or improve wildlife habitat for species of concern, while maintaining or increasing agricultural productivity.
- Support community-based conservation projects that protect and restore local habitats and natural areas, enhance water quality, promote urban forestry, educate and train community leaders on sustainable practices, promote related job creation and training, and engage diverse partners and volunteers.
- Support visible and accessible demonstration projects that showcase innovative, cost-effective and environmentally-friendly approaches to improve environmental conditions within urban communities by 'greening' traditional infrastructure and public projects such as storm water management and flood control, public park enhancements, and renovations to public facilities.
- Support projects that increase the resiliency of the Nation's coastal communities and ecosystems by restoring coastal habitats, living resources, and water quality to enhance livelihoods and quality of life in these communities.
- In North Carolina, strong preference will be given to projects located in the regions of Charlotte, Raleigh, or Winston Salem.

For more information: http://www.nfwf.org/environmentalsolutions/Pages/2015rfp.aspx#.VS-8SPnF-Bw

STATE FUNDING SOURCES

There are multiple sources for state funding of bicycle and pedestrian transportation projects. However, beginning July 1, 2015, state transportation funds cannot be used to match federally-funded transportation projects, according to a law passed by the North Carolina Legislature.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) STRATEGIC TRANSPORTATION INVESTMENTS (STI)

The NCDOT's State Transportation Improvement Program is based on the Strategic Transportation Investments Bill, signed into law in 2013. The Strategic Transportation Investments (STI) Initiative introduces the Strategic Mobility Formula, a new way to fund and prioritize transportation projects.

The new Strategic Transportation Investments Initiative is scheduled to be fully implemented by July 1, 2015. Projects scheduled for construction before then will proceed as scheduled under the current Equity Formula. Projects slated for construction after that time will be ranked and programed according to the new formula. The new Strategic mobility formula assigns projects for all modes into one of three categories: 1) Statewide Mobility, 2) Regional Impact, and 3) Division Needs.

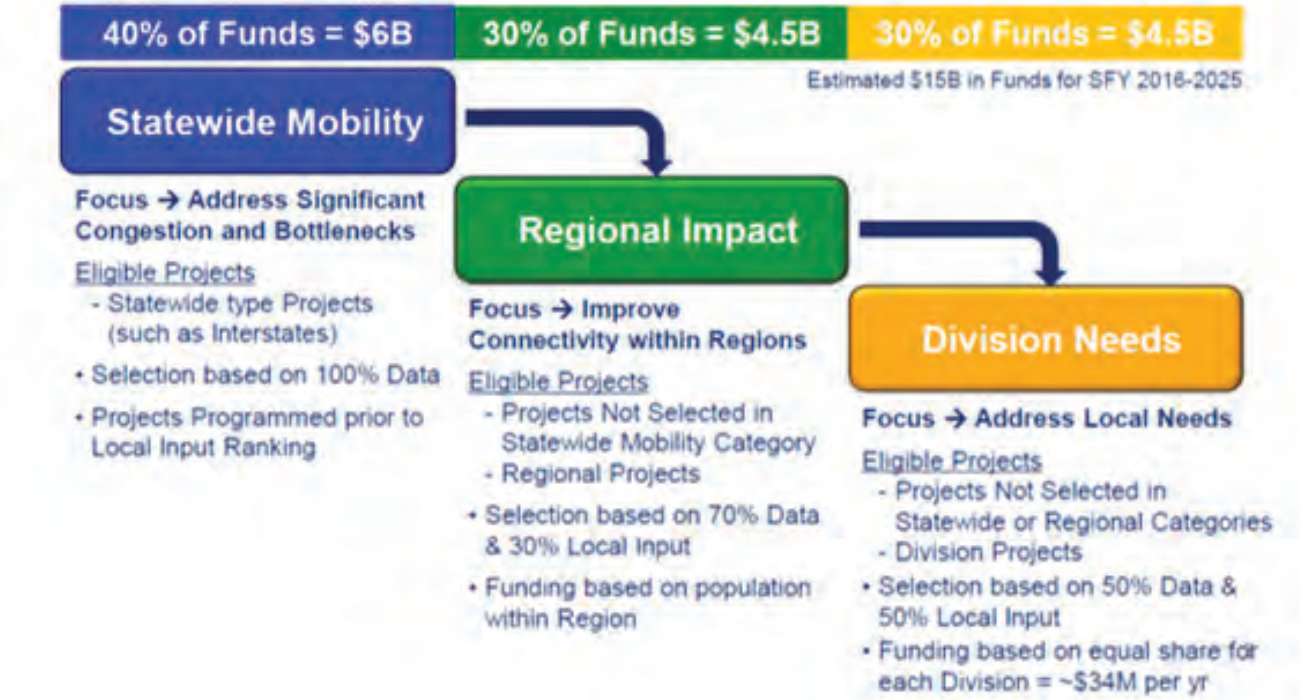
All independent bicycle and pedestrian projects are placed in the "Division Needs" category, and are currently ranked based on 50% data (safety, access, demand, connectivity, and cost effectiveness) and 50% local input, with a breakdown as follows:

Safety 15%

- Definition: Projects or improvements where bicycle or pedestrian accommodations are non-existent or inadequate for safety of users
- How it's measured: Crash history, posted speed limits, and estimated safety benefit
- Calculation:
  - Bicycle/pedestrian crashes along the corridor within last five years: 40% weight
  - Posted speed limits, with higher points for higher limits: 40% weight
  - Project safety benefit, measured by each specific improvement: 20% weight

How the STI Works

(Source: NCDOT Bicycle and Pedestrian Prioritization, June 2015)



Access 10%

» Definition: Destinations that draw or generate high volumes of bikes/pedestrians
» How it's measured: Type of and distance to destination

Demand 10%

» Definition: Projects serving large resident or employee user groups
» How its measured: # of households and employees per square mile within 1 ½ mile bicycle or ½ mile pedestrian facility + factor for unoccupied housing units (second homes)

Connectivity 10%

» Definition: Measure impact of project on reliability and quality of network
» How it's measured: Creates score per each SIT based on degree of bike/ped separation from roadway and connectivity to similar or better project type

Cost Effectiveness 5%

» Definition: Ratio of calculated user benefit divided by NCDOT project cost
» How it's measured: Safety + Demand + Access + Connectivity)/Estimated Project Cost to NCDOT

Local Input 50%

» Definition: Input from MPO/RPOs and NCDOT Divisions, which comes in the form points assigned to projects.
» How it is measured: Base points + points for population size. A given project is more likely to get funded if it is assigned base points from both the MPO/RPO and the Division, making the need for communicating the importance of projects to these groups critical. Further, projects that have a local match will score higher.

Additional bicycle and pedestrian project requirements:

» Federal funding typically requires a 20% non-federal match
» State law prohibits state match for bicycle and pedestrian projects (except for Powell Bill)
» Limited number of project submittals per MPO/RPO/Division
» Minimum project cost requirement is $100,000
» Bike/Ped projects typically include: bicycle lanes, multi-use path/greenway, paved shoulders, sidewalks, pedestrian signals, SRTS infrastructure projects, and other streetscape/multi-site improvements (such as median refuge, signage, etc.)

These rankings largely determine which projects will be included in NCDOT's State Transportation Improvement Program (STIP). The STIP is a federally mandated transportation planning document that details transportation planning improvements prioritized by the stakeholders for inclusion in NCDOT's Work Program over the next 10 years. "More than 900 non-highway construction projects were prioritized for years 2015-2020, totaling an estimated $9 billion. NCDOT will only have an estimated $1.5 billion to spend during this time period." The STIP is updated every 2 years. The STIP contains funding information for various transportation divisions of NCDOT, including, highways, rail, bicycle and pedestrian, public transportation and aviation.

For more information on STIP: www.ncdot.gov/strategictransportationinvestments/

To access the STIP: https://connect.ncdot.gov/projects/planning/Pages/State-Transportation-Improvement-Program.aspx

For more about the STI process: http://www.ncdot.gov/download/performance/performance_TheProcess.pdf

INCIDENTAL PROJECTS

Bicycle and Pedestrian accommodations such as; bike lanes, wide paved shoulders, sidewalks, intersection improvements, bicycle and pedes-

trian safe bridge design, etc. are frequently included as "incidental" features of larger highway/roadway projects. This is increasingly common with the adoption of NCDOT's "Complete Streets" Policy.

In addition, bicycle safe drainage grates and handicapped accessible sidewalk ramps are now a standard feature of all NCDOT highway construction. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds, and usually with a local match. On-road bicycle accommodations, if warranted, typically do not require a local match.

"Incidental Projects" are often constructed as part of a larger transportation project, when they are justified by local plans that show these improvements as part of a larger, multi-modal transportation system. Having a local bicycle or pedestrian plan is important, because it allows NCDOT to identify where bike and pedestrian improvements are needed, and can be included as part of highway or street improvement project. It also helps local government identify what their priorities are and how they might be able to pay for these projects. Under "Complete Streets" local governments may be responsible for a portion of the costs for bicycle and pedestrian projects. For more information: http://www.ncdot.gov/bikeped/funding/process/

DUKE ENERGY WATER RESOURCES FUND

Duke Energy is investing $10 million in a fund for projects that benefit waterways in the Carolinas. The fund supports science-based, research-supported projects and programs that provide direct benefit to at least one of the following focus areas:

- Improve water quality, quantity and conservation;
- Enhance fish and wildlife habitats;
- Expand public use and access to waterways; and
- Increase citizens' awareness about their roles in protecting these resources.

Youngsville could consider this resource for its proposed creekside greenways. For more information: http://www.duke-energy.com/community/foundation/water-resources-fund.asp

CLEAN WATER MANAGEMENT TRUST FUND

The Clean Water Management Trust Fund is available to any state agency, local government, or non-profit whose primary purpose is the conservation, preservation, and restoration of North Carolina's environmental and natural resources. Grant assistance is provided to conservation projects that:

- enhance or restore degraded waters;
- protect unpolluted waters, and/or
- contribute toward a network of riparian buffers and greenways for environmental, educational, and recreational benefits;
- provide buffers around military bases to protect the military mission;
- acquire land that represents the ecological diversity of North Carolina; and
- acquire land that contributes to the development of a balanced State program of historic properties.

The application deadline is typically in February. For more information: http://www.cwmtf.net/#appmain.htm

SPOT SAFETY PROGRAM

The Spot Safety Program is a state funded public safety investment and improvement program that provides highly effective low cost safety improvements for intersections, and sections of North Carolina's 79,000 miles

of state maintained roads in all 100 counties of North Carolina. The Spot Safety Program is used to develop smaller improvement projects to address safety, potential safety, and operational issues. The program is funded with state funds and currently receives approximately $9 million per state fiscal year. Other monetary sources (such as Small Construction or Contingency funds) can assist in funding Spot Safety projects, however, the maximum allowable contribution of Spot Safety funds per project is $250,000.

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

A Safety Oversight Committee (SOC) reviews and recommends Spot Safety projects to the Board of Transportation (BOT) for approval and funding. Criteria used by the SOC to select projects for recommendation to the BOT include, but are not limited to, the frequency of correctable crashes, severity of crashes, delay, congestion, number of signal warrants met, effect on pedestrians and schools, division and region priorities, and public interest. For more information: https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx

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. Beginning July 1, 2015 under the Strategic Transportation Investments initiative, Powell Bill funds may no longer be used to provide a match for federal transportation funds such as Transportation Alternatives. Certified Statement, street listing, add/delete sheet and certified map from all municipalities are due between July 1st and July 21st of each year. Additional documentation is due shortly after. More information: https://connect.ncdot.gov/municipalities/State-Street-Aid/Pages/default.aspx

LOCALLY ADMINISTERED PROJECTS PROGRAM (LAPP)

Created by the Capital Area Metropolitan Planning Organization (CAMPO), LAPP funds are a function of the State Transportation Improvement Program (STIP) and a certain percentage of LAPP funds will be will be programmed for bicycle/pedestrian projects. The goals of the LAPP program are as follows:

- Develop a holistic approach to identifying and prioritizing small but highly effective transportation projects.
- Utilize available funding sources in a more efficient manner.
- Avoid future Federal rescissions to the maximum extent possible.
- Establish an annual modal investment mix to guide locally administered investments.
- Create an appropriate tracking system to monitor project status and better ensure obligation and expenditure of programmed funds.
- Establish a training program for LAPP participants.

To be eligible for LAPP funding, a project must meet nine criteria under the following categories:

- Federal-aid eligible projects
- Locally administered

- Metropolitan transportation plan compliant
- LAPP-eligible project phase
- Shovel ready
- Highly efficient solution to current transportation problem
- Does not supplant local funds
- Locally funded with minimum match committed
- TIP friendly

For more information: http://www.campo-nc.us/

HIGHWAY HAZARD ELIMINATION PROGRAM

The Hazard Elimination Program is used to develop larger improvement projects to address safety and potential safety issues. The program is funded with 90 percent federal funds and 10 percent state funds. The cost of Hazard Elimination Program projects typically ranges between $400,000 and $1 million. A Safety Oversight Committee (SOC) reviews and recommends Hazard Elimination projects to the Board of Transportation (BOT) for approval and funding. These projects are prioritized for funding according to a safety benefit to cost (B/C) ratio, with the safety benefit being based on crash reduction. Once approved and funded by the BOT, these projects become part of the department's State Transportation Improvement Program (STIP). For more information: https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx

GOVERNOR'S HIGHWAY SAFETY PROGRAM

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

EAT SMART, MOVE MORE NORTH CAROLINA COMMUNITY GRANTS

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

THE NORTH CAROLINA DIVISION OF PARKS AND RECREATION – RECREATIONAL TRAILS AND ADOPT-A-TRAIL GRANTS

The North Carolina Division of Parks and Recreation and the State Trails Program offer funds to help citizens, organizations and agencies plan, develop and manage all types of trails ranging from greenways and trails for hiking, biking, and horseback riding to river trails and off-highway vehicle trails. "The Adopt-a-Trail Grant Program (AAT) awards $108,000 annually to government agencies, nonprofit organizations and private trail groups for trail projects. The Recreational Trails Program (RTP) is a $1.3 million grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. Grant applicants must be able to contribute 20% of the project cost or in-kind contributions. Both grant applications are typically due in January or February. For more information: http://www.ncparks.gov/About/trails_grants.php

NC 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 percent of the total cost of the project, and may contribute more than 50 percent. 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. Grant applications are typically due in February. For more information: http://www.ncparks.gov/About/grants/partf_main.php

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 pedestrian and bicycle projects in 'entitlement communities': Infrastructure and Community Revitalization. More information: http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs

CLEAN WATER MANAGEMENT TRUST FUND (CWMTF)

This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection, eligible for application by a state agency, local government, or non-profit. At the end of each year, a minimum of $30 million is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies, and conservation non-profits to help finance projects that specifically address water pollution problems. Funds may be used for planning and land acquisition to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits. Deadlines are typically in February. For more information: http://www.cwmtf.net/#appmain.htm

SAFE ROUTES TO SCHOOL (SRTS)

SRTS is managed by NCDOT, but is federally funded; See Federal Funding Sources above for more information.

URBAN AND COMMUNITY FORESTRY GRANT

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

applicant and municipalities seeking Tree City USA status are given priority for funding. Grant applications are due by March 31 at 5:00 pm and recipients are notified by mid-July each year.

For more about Tree City USA status, including application instructions, visit: http://ncforestservice.gov/Urban/urban_grant_overview.htm

LOCAL GOVERNMENT FUNDING SOURCES

Municipalities often plan for the funding of pedestrian and bicycle facilities or improvements through development of Capital Improvement Projects (CIP) or occasionally, through their annual Operating Budgets. In Raleigh, for example, the greenways system has been developed over many years through a dedicated source of annual funding that has ranged from $100,000 to $500,000, administered through the Recreation and Parks Department. CIPs should include all types of capital improvements (water, sewer, buildings, streets, etc.) versus programs for single purposes. This allows municipal decision-makers to balance all capital needs. Typical capital funding mechanisms include the capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. Each category is described below. A variety of possible funding options available to North Carolina jurisdictions for implementing pedestrian and bicycle projects are also described below. However, many will require specific local action as a means of establishing a program, if not already in place.

CAPITAL RESERVE FUND

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

CAPITAL PROJECT ORDINANCES

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

LOCAL IMPROVEMENT DISTRICT (LID)

Local Improvement Districts (LIDs) are most often used by cities to construct localized projects such as streets, sidewalks, or bikeways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as traffic trip generation.

MUNICIPAL SERVICE DISTRICT

Municipalities have statutory authority to establish municipal service districts, to levy a property tax in the district additional to the townwide property tax, and to use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts, and can include projects such as street, sidewalk, or bikeway improvements within the downtown taxing district.

TAX INCREMENT FINANCING

Project Development Financing bonds, also known as Tax Increment Financing (TIF) is a relatively new tool in North Carolina, allowing localities to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., sidewalk improvements) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to finance the debt created by the original public improvement project. Streets,

streetscapes, and sidewalk improvements are specifically authorized for TIF funding in North Carolina. Tax Increment Financing typically occurs within designated development financing districts that meet certain economic criteria that are approved by a local governing body. TIF funds are generally spent inside the boundaries of the TIF district, but they can also be spent outside the district if necessary to encourage development within it. Although larger cities use this type of financing more often, Woodfin, NC is an example of another small town that has used this type of financing.

OTHER LOCAL FUNDING OPTIONS

- Bonds/Loans
- Taxes
- Impact fees
- Exactions
- Installment purchase financing
- In-lieu-of fees
- Partnerships

PRIVATE AND NON-PROFIT FUNDING SOURCES

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

NOVOZYMES NORTH AMERICA

Novozymes North America is a company leading in several industries: biofuels, detergent, food, feed and bioagriculture. Out of its Franklinton, NC location, the company operates the largest multi-purpose enzyme manufacturing facility in the USA. Each year, Novozymes invests nearly 14 percent of its global revenue in research and development.

UNION BANK

Union Bank is a community bank serving the north central North Carolina region with a location in Youngsville. Union Bank strives to make the communities it serves better by providing strong financial and customer service. With its strong commitment to the communities it serves, Union Bank is involved in a variety of different local projects.

WAKE ELECTRIC MEMBERSHIP CORP

Wake Electric is an electric utility company that provides reliable, safe and affordable energy and related services to approximately 39,000 consumers in parts of several counties in north central North Carolina, including Franklin County. Wake Electric operates as a not--profit cooperative business and aims to consistently meet the needs of its consumers through an emphasis on great services and quality of life.

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 was successful in 2013 in asking the North Carolina General Assembly to continue to support conservation efforts in the state. The state budget bill includes about $50 million in funds for key conservation efforts in North Carolina. Land for Tomorrow works to 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, and historic downtowns and neighborhoods will be there to enhance the quality of life for generations to come. For more information: http://www.land4tomorrow.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 ensure 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

Projects considered for funding typically are innovative and aim to create meaningful, transformative change. Project examples include: service demonstrations; gathering and monitoring of health-related statistics; public education; training and fellowship programs; policy analysis; health services research; technical assistance; communications activities; and evaluations. For more specific information about what types of projects are funded and how to apply, visit http://www.rwjf.org/en/how-we-work/grants/what-we-fund.html

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 non-profit organizations and institutions throughout the state. Based in Raleigh, the foundation also manages a number of community affiliates throughout North Carolina, that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. The foundation also manages various scholarship programs statewide. For more information: http://nccommunityfoundation.org/

WALMART STATE GIVING PROGRAM

The Walmart Foundation financially supports projects that create opportunities for better living. Grants are awarded for projects that support and promote education, workforce development/economic opportunity, health and wellness, and environmental sustainability. Both programmatic and infrastructure projects are eligible for funding. State Giving Program provides grants to 501(c)(3) organizations, ranging from $25,000 to $250,000. The program grant application deadline is May 1st. Online resource: http://foundation.walmart.com/apply-for-grants/state-giving

RITE AID FOUNDATION GRANTS

The Rite Aid Foundation is a foundation that supports projects that promote health and wellness in the communities that Rite Aid serves. Award amounts vary and grants are awarded on a one year basis to communities in which Rite Aid operates. The Rite Aid Foundation focuses on three core areas for charitable giving: children's health and well-being; special community health and wellness needs; and Ride Aid's own community of associates during times of special need. Online resource: https://www.riteaid.com/about-us/rite-aid-foundation

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. The Foundation focuses its grant making on five focus areas: Community Economic Development; Environment; Public Education; Social Justice and Equity; and Strengthening Democracy. Deadline to apply is typically in August. For more information: www.zsr.org

BANK OF AMERICA CHARITABLE FOUNDATION, INC.

The Bank of America Charitable Foundation is one of the largest in the nation. There are numerous different initiatives and grant pro-

grams, yet the ones most relevant to increased recreational opportunities and trails are the Revitalizing Neighborhoods and Environment Programs. Starting in 2013, a new 10-year, $50 billion goal to be a catalyst for climate change was launched. This initiative aims to spark the "innovation economy and advance a transition to a low-carbon future." 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 several investment priorities: Education; Environment; Economic and Workforce Development; and Community Impact and Cultural Enrichment. Related to this project, the Foundation would support programs that support conservation, training, and research around environmental and energy efficiency initiatives. For more information: http://www.duke-energy.com/community/foundation.asp

AMERICAN GREENWAYS EASTMAN KODAK AWARDS

The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants ($250 to $2,000) to stimulate the planning, design, and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying 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: http://www.rlch.org/funding/kodak-american-greenways-grants

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 $588,000 to 192 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.

For more information: http://www.americanhiking.org/national-trails-fund/

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. Grants are typically about $35,000 each. Since its inception in 1989, The Conservation Alliance has contributed $4,775,059 to environmental groups across the

nation, saving over 34 million acres of wild lands.

The Conservation Alliance Funding Criteria:

- The Project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation.
- The Alliance does not look 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 (within four years).

For more information: http://www.conservationalliance.com/grants

NATIONAL FISH AND WILDLIFE FOUNDATION (NFWF)

The National Fish and Wildlife Foundation (NFWF) is a private, non-profit, 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 provides grants through more than 70 diverse conservation grant programs. A few of the most relevant programs for bicycle and pedestrian projects include Acres for America, Conservation Partners Program, and Environmental Solutions for Communities. 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.
For more information: http://www.nfwf.org/whatwedo/grants/Pages/home.aspx

THE TRUST FOR PUBLIC LAND

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the TPL is the only national non-profit working exclusively to protect land for human enjoyment and well-being. TPL helps acquire land and transfer it to public agencies, land trusts, or other groups that have intentions to conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities.
For more information: http://www.tpl.org

BLUE CROSS BLUE SHIELD 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. Healthy Places grant concentrates on increased physical activity and active play through support of improved build environment such as sidewalks, and safe places to bike. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the non-profit, provide an audit. For more information: 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. Rapid Response Grants enable state and local bicycle and pedestrian advocacy organizations to develop, transform, and provide innovative strategies in their communities. Since 2011, Rapid Response grant recipients have

won $100 million in public funding for biking and walking. The Advocacy Advance Partnership with the League of American Bicyclists also provides necessary technical assistance, coaching, and training to supplement the grants. For more information, visit www.peoplepoweredmovement.org

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.

CORPORATE DONATIONS

Corporate donations are often received in the form of liquid investments (i.e. cash, stock, bonds) and in the form of land. Municipalities typically create funds to facilitate and simplify a transaction from a corporation's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented.

PRIVATE INDIVIDUAL DONATIONS

Private individual donations can come in the form of liquid investments (i.e. cash, stock, bonds) or land. Municipalities typically create funds to facilitate and simplify a transaction from an individual's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented.

FUNDRAISING/CAMPAIGN DRIVES

Organizations and individuals can participate in a fundraiser or a campaign drive. It is essential to market the purpose of a fundraiser to rally support and financial backing. Often times fundraising satisfies the need for public awareness, public education, and financial support.

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.

INNOVATIVE FUNDING OPTIONS

Crowdsourcing "is the process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional employees or suppliers."
For some success stories and ideas for innovative fundraising techniques: http://www.americantrails.org/resources/funding/TipsFund.html

TRAIL PARTNERSHIP CASE STUDIES IN THE CAROLINAS

WILMINGTON/NEW HANOVER COUNTY & BLUE CROSS BLUE SHIELD (BCBS)

BCBSNC and their GO NC! program donated funds to complete the final phase of the 15-mile Gary Shell CrossCity Trail from Wade Park to the drawbridge at Wrightsville Beach. In addition to completing the trail, other enhancements include mile markers along the 15-mile trail and five bicycle fix-it stations along the trail. This partnership came about during development of the WMPO's Wilmington/New Hanover County Comprehensive Greenway Plan in 2012. Project

contact: Amy Beatty, Superintendent, City of Wilmington Recreation & Downtown Services, 302 Willard Street , Wilmington, NC 28401; Phone: 910. 341.7855.

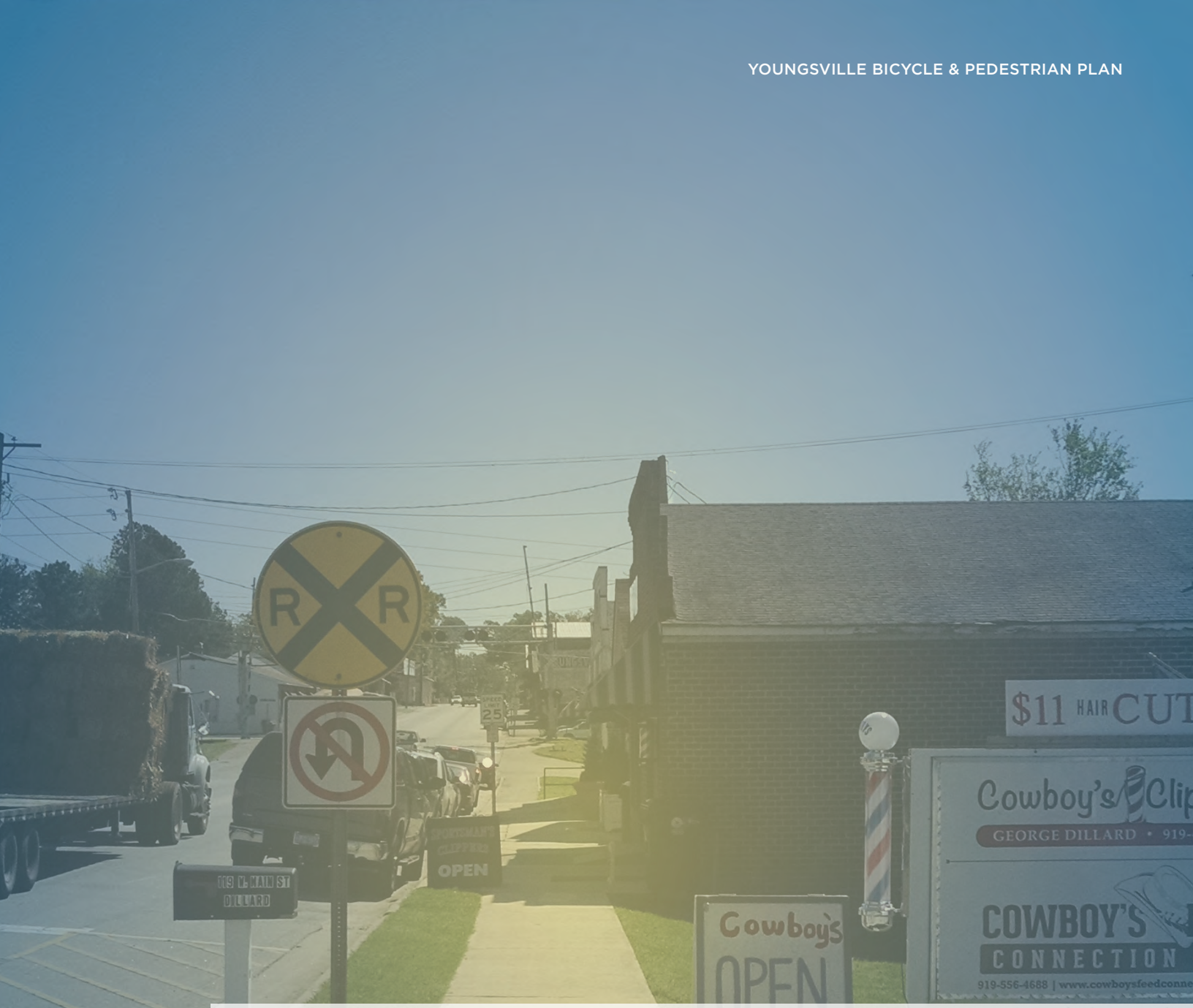
SPARTANBURG, SC & THE MARY BLACK FOUNDATION

The Mary Black Foundation Rail Trail was a collaboration between the Mary Black Foundation, Palmetto Conservation Foundation, City of Spartanburg, Partners for Active Living, SPATS, and local citizens. It extends from downtown Spartanburg at Henry Street, between Union and Pine Streets, and continues 2 miles to Country Club Road. Since its inception there has been buzz about redeveloping the Rail Trail corridor. The commuter and recreational trail brings together all walks of life, and connects neighborhoods, businesses, restaurants, a school, a bike shop, the YMCA, a grocery store, and a skate park. As the Hub City Connector segment of the Palmetto Trail through Spartanburg County, the Rail Trail is an outdoor transportation spine for Spartanburg from which other projects are expected to spin off. One great example is the first phase of B-cycle bicycle-sharing program located at the Henry Street trailhead. Project contact: Lisa Bollinger, Spartanburg Area Transportation Study, 366 North Church Street, Suite 700, Spartanburg, SC 29303; Phone: 864-596-3570.

SWAMP RABBIT TRAIL AND GREENVILLE HEALTH SYSTEM, GREENVILLE, SC

The Greenville Health System Swamp Rabbit Trail is a shared-use-path that runs along the Reedy River through Greenville County, connecting parks, schools, and local businesses. The GHS Swamp Rabbit has become very popular among residents and visitors for recreational and transportation purposes. The Greenville Heath System has become a private sponsor because of the health benefits offered by the trail as well as the branding opportunity achieved by having its name and logo on the trail's signs. The GHS Swamp Rabbit Trail continues to increase in size and popularity, with communities in neighboring counties making plans to extend the trail into their towns. Project contact: Ty Houck, Director of Greenways, Natural and Historic Resources, Greenville County Parks, Recreation and Tourism. 4806 Old Spartanburg Road, Taylors, SC 29687. Phone: 864-676-2180 ext. 141.

Swamp Rabbit Trail, Greenville, SC



APPENDIX C: COMPLETE STREETS

Draft Complete Streets Resolution

DRAFT COMPLETE STREETS RESOLUTION

A Resolution of the Town of Youngsville Expressing Support for the Complete Streets Concept and Requesting that a Complete Streets Ordinance be drafted as a component of the Code of General Ordinances.

WHEREAS, the "Complete Streets" concept promotes streets that are safe and convenient for all users including pedestrians, bicyclists, and transit riders;

WHEREAS, the North Carolina Board of Transportation adopted a "Complete Streets Policy" for the state;

WHEREAS, streets constitute a large portion of the public space and should be corridors for all modes of transportation including pedestrians, bicyclists, and transit riders;

WHEREAS, Streets that support and invite multiple uses that include safe, active and ample space for pedestrians, bicycles, and transit are more conducive to the efficient movement of people than streets designed primarily to move automobiles and trucks;

WHEREAS, the Town of Youngsville work to advance Youngsville as a bicycle and pedestrian friendly community and encourages bicycling and walking among its citizens and visitors;

WHEREAS, trends in public health, energy and transportation costs, and air quality necessitate a more comprehensive approach to mobility within communities to offer a greater variety of mobility choices that are not strictly automobile based;

WHEREAS, there are practical limits to roadway expansion as a response to traffic congestion;

WHEREAS, promoting pedestrian, bicycle and transit travel as an alternative to automobiles promotes healthy living, is less costly to the commuter, may delay the need to widen some streets, and reduces negative environmental impacts;

WHEREAS, the development of a more complete transportation network or "Complete Streets" can improve pedestrian safety, facilitate improvements in public health, increase the transportation network's capacity, and reduce climate change effects;

WHEREAS, the Federal Highway Administration has confirmed that designing streets with pedestrians in mind significantly reduces pedestrian risk. About one-third of Americans do not drive, including low-wealth Americans who cannot afford cars, school-age children, and an increasing number of older adults. Whether they walk or bicycle directly to their destinations, or to public transportation, these individuals require safe access to get to work, school, shops and medical visits, and to take part in social, civic and volunteer activities.

WHEREAS, obesity threatens the healthy future of one-third of all American children. For the first time in American history, our children's life expectancy may be shorter than their parents;

WHEREAS, forty percent of American adults age fifty and older reported inadequate sidewalks in their neighborhoods. Nearly fifty percent reported they cannot cross main roads close to their home safely. Half of those who reported such problems said they would walk, bicycle, or take the bus more according to a 2008 American Association of Retired Persons (AARP) study;

WHEREAS, transportation expenses can be reduced if local infrastructure encourages active transportation, which helps families replace car trips with bicycling, walking, or taking public

transit. When roads are re-designed and maintained to attract pedestrians, the local economy improves and diversifies from increased buyers, which creates job growth and increased investment in the area, including surrounding property values;

WHEREAS, studies have found that providing more travel options, including public transportation, bicycling and walking facilities, is an important element in reducing congestion. When roads are better designed for bicycling, walking, and taking transit, more people do so;

WHEREAS, the construction of "Complete Streets" can be an essential component in reducing automobile trips since nearly fifty percent of all trips in metropolitan areas are three miles or less and twenty-eight percent are one mile or less – distances easily covered by foot or bicycle. Sixty-five percent of trips under one mile are now made by automobile, in part because of incomplete streets that make it dangerous or unpleasant to walk, bicycle, or take transit;

WHEREAS, other jurisdictions and agencies nationwide have adopted "Complete Streets" legislation, including the United States Department of Transportation, numerous state transportation agencies including North Carolina, regions including the Capitol Area (Austin) Metropolitan Planning Organization (MPO) and the San Antonio-Bexar County MPO, and cities such as North Little Rock, Miami, Chicago, San Diego, and Seattle;

WHEREAS, the "Complete Streets" concept is supported by the Institute of Traffic Engineers, American Planning Association and the National Association of Local Boards of Health many other transportation, planning and public health professionals; and

NOW, THEREFORE, BE IT RESOLVED by the Youngsville Town Board that the Board requests that staff partner with community organizations and assess current street standards and land use and transportation plans, policies and programs with regard to the "Complete Streets" concept; identify relevant elements within the town's existing plans, regulations and operational standards that support the implementation of "Complete Streets" within the town; and identify the gaps and opportunities to supplement and fund said plans, regulations and standards in order to achieve the implementation of "Complete Streets" throughout the town and provide council with guidance towards the creation of a complete streets ordinance.

ADOPTED BY THE TOWN BOARD ON _____, 2015

_____

Town Clerk

Approved as to form:

_____

Town Attorney

Bicycle Parking at Youngsville Elementary School