



Town of Leland **PEDESTRIAN PLAN**



December 2016

Prepared for the Town of Leland & 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.

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Steve Spruill	Leland Public Works Director
Lt. Josh Spence	Leland Police Department
Suraiya Rashid	Wilmington Area MPO
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Arlene Holms	Citizen
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Prepared for the Town of Leland, North Carolina

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This project was made possible with a matching grant from the North Carolina Department of Transportation (NCDOT) Division of Bicycle and Pedestrian Transportation (DBPT) and the Town of Leland.

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EXECUTIVE SUMMARY

The Leland Pedestrian Plan was made possible by joint funding from the Town of Leland and the North Carolina Department of Transportation (NCDOT). In 2015, Leland was awarded a matching grant through the NCDOT Bicycle and Pedestrian Planning Grant Initiative. The purpose of this grant program is to encourage North Carolina communities, like Leland, to develop comprehensive pedestrian plans and bicycle plans.

INTRODUCTION

Through this plan, the Town of Leland aims to:

- » Improve pedestrian safety;
- » Provide safe and convenient access to and within Leland;
- » Stimulate economic development;
- » Create opportunities for active and healthy lifestyles; and
- » Enhance overall quality of life.

The planning process started in mid 2015 with the initial Steering Committee meeting, and concluded with plan adoption in December 2016. Key tasks of the Steering Committee included guiding the overall vision of the plan, identifying existing opportunities and constraints for walking in Leland, leveraging resources for an expanded public outreach effort, and providing feedback on plan recommendations.

Extensive research highlights the multitude of economic, health, mobility, environment, safety, and quality of life benefits of having a pedestrian-friendly community.



EXISTING CONDITIONS

The Town of Leland, an area of approximately 19 square miles, borders the Brunswick River and Cape Fear River in Brunswick County. The median age of Leland (40.7 years) is less than that of Brunswick County (49.2 years). In addition, the median household income is significantly higher in Leland compared to the county - \$61,823 compared to \$46,955 respectively. Leland has a lower percentage of households that do not own vehicles, as well as a lower percentage of residents who report walking to work compared to both Brunswick County and the State of North Carolina.

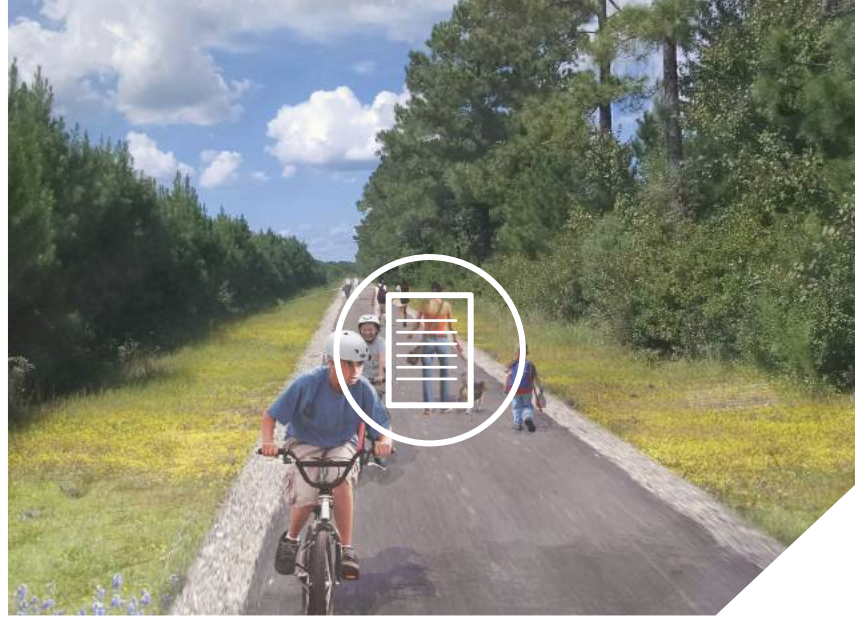
Current walking conditions in Leland are variable. Sidewalks can be found in some areas throughout Leland, but gaps exist in the sidewalk network. There are many local destinations that are within a mile from the downtown core, including schools, parks, and shopping centers.



RECOMMENDATIONS

This chapter details the infrastructure improvements that are recommended to create a safe, accessible, and connected pedestrian network in the Town of Leland. A diverse mix of facilities are recommended to create this comprehensive network, including sidewalks, crossing improvements, signage, and multi-use paths.

Recommendations were developed based on information from several sources: input from Town staff and Steering Committee, public input obtained through public comment forms and in-person workshops, previous plans and studies, review of existing pedestrian facilities, noted pedestrian destinations, and a detailed field analysis.



Fieldwork examined the potential and need for pedestrian facilities along and across key roadway corridors to make connections between popular destinations in Leland destinations.

Project ranking began with making a list of all of the network recommendations proposed in this plan. The criteria below were then used to rank each segment.

- » Pedestrian accident reported at location
- » Project would serve area with low car ownership rates
- » Worn path present
- » Potential for downtown access
- » Potential for park/trail access
- » Potential for school access
- » Potential for bus stop access
- » Project would connect to a shopping center
- » Curb and gutter present
- » Sufficient ROW present
- » Micro-gap

IMPLEMENTATION

This chapter defines a structure for managing the implementation of the actions, policies, and projects recommended in this plan. Implementation will require leadership and dedication to pedestrian facility development on the part of a variety of agencies. The town cannot 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.

Despite the present day economic challenges 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 projects. 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.



A photograph showing a person's hands writing on a large map or plan spread out on a table. A large green number '1' is overlaid on the left side of the image.

1 INTRODUCTION

Chapter Contents:

Project Funding

Vision & Goals

Planning Process

*The Value of Planning for
a Walkable Community*

PROJECT BACKGROUND

The Town of Leland (hereafter referred to as Leland) undertook the planning process in summer 2015 for the town's first pedestrian plan. Leland recognizes the importance of pedestrian options throughout the region and envisions a place connected by multiple modes of transportation that starts with a functioning pedestrian network. Leland has steadily built upon a series of plans and ordinances that support this vision and call for development to include provisions for and connections to the pedestrian network.

Recognizing the value that an improved pedestrian network will contribute to quality of life in Leland, the Town undertook this plan to better position it for future funding opportunities for pedestrian facilities. The Pedestrian Plan will be used to identify and prioritize pedestrian and greenway projects in Leland for both internal funding and funding from outside agencies or grants. The Master Plan, Collector Street Plan, and Long Range Transportation Plan have already been adopted by the Town and this pedestrian plan will complement and accompany these existing plans. The plan will also be used to support funding proposals to the Town, State, and Federal government for creation of pedestrian facilities.

The plan will also allow the Town to ensure that new developments will be compatible with existing systems and have a variety of transportation options. The plan will also help guide future dedication of Right of Ways to include pedestrian facilities prior to the dedication. The Planning Department, Park, Recreation, and Environment Department, Wilmington Metropolitan Planning Organization, Planning Board, and Town Council will utilize this plan as guidance on all future projects. Also, the plan will be added to the list of plans on the Town's Statement of Consistency in order to show that new development proposals are kept consistent with adopted plans and Town goals.



PROJECT FUNDING

The Leland Pedestrian Plan was made possible by joint funding from the Town of Leland and the North Carolina Department of Transportation (NCDOT). In 2015, Leland was awarded a matching grant through the NCDOT Bicycle and Pedestrian Planning Grant Initiative. The purpose of this grant program is to encourage North Carolina communities, like Leland, to develop comprehensive pedestrian plans and bicycle plans. To date, the initiative has funded planning efforts in more than 173 municipalities across the state. The program is administered through NCDOT's Division of Bicycle and Pedestrian Transportation.

VISION & GOALS

As growth and development continue in Leland, 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 Leland aims to:

- » Improve pedestrian safety;
- » Provide safe and convenient access to and within Leland;
- » Stimulate economic development;
- » Create opportunities for active and healthy lifestyles; and
- » Enhance overall quality of life.

The following Vision Statement outlines the overall vision for the outcomes of this plan:

VISION STATEMENT

*“Leland is a community that **invites** people of **all ages and abilities** to walk for **enjoyment, exercise,** and daily **transportation** by providing a **safe, convenient and attractive** pedestrian environment.”*



The steering committee gathered around maps of Leland to discuss project recommendations at December 2015 Steering Committee meeting (top photo).

A resident speaks with Robert Waring, Planning Manager for the Town of Leland, during an outreach event (bottom photo).





PLANNING PROCESS

The planning process started in mid 2015 with the initial Steering Committee meeting, and concluded with plan adoption in December 2016. The plan's Steering Committee, appointed by the Town Board, included a combination of local residents, town staff, and regional representatives from different points of view and interests related to pedestrian issues in Leland. Key tasks of the Steering Committee included guiding the overall vision of the plan, identifying existing opportunities and constraints for walking in Leland, leveraging resources for an expanded public outreach effort, and providing feedback on plan recommendations.

In addition to Steering Committee input, the planning process included several other important methods of public outreach and involvement. The project website, input map, public comment form, public workshops, and press releases were all used to inform and gather input from the public throughout plan development. Key steps in the planning process are highlighted in the flow chart to the right.

Key Steps in the Planning Process:



The steering committee gathered around a base map of Leland to discuss existing conditions during the kickoff meeting (top photo).

A presentation was given to Town Council to highlight the draft pedestrian plan recommendations (bottom photo).





THE VALUE OF PLANNING FOR A WALKABLE COMMUNITY

When considering the amount of dedication, time, and valuable resources that it takes to create a pedestrian-friendly community, it is also important to assess the immense value of investing in Leland's walkability.

This plan is important for enhancing the pedestrian environment in the Town of Leland for the following reasons:

- Prioritizes where and how to invest in pedestrian projects
- Guides community investment and programs toward issues of particular importance to the community
- Helps get projects into state STIP
- Improves eligibility for other funding
- In the long term, it adds up to a connected pedestrian network (the plan is the only way to ensure that each increment of new development will contribute to an overall comprehensive network)

Extensive research has highlighted the multitude of economic, health, mobility, environment, safety, and quality of life benefits of having a pedestrian-friendly community.

The following sections discuss the many benefits of planning for and creating a walkable Leland. Resources for these benefits are listed at the end of this chapter.

KEY BENEFITS OF PEDESTRIAN FRIENDLY COMMUNITIES





Safety

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 in North Carolina is inadequate infrastructure (75%). A lack of pedestrian facilities, such as sidewalks, trails, and safe crossings, lead to unsafe walking conditions for pedestrians.

- » Each year on average (2007-2011), 162 pedestrians and 19 bicyclists are killed in collisions with motor vehicles on North Carolina roads, with many more seriously injured.
- » North Carolina is ranked as one of the least safe states for walking (41st) and bicycling (44th).
- » 13% of all traffic fatalities in North Carolina are bicyclists and pedestrians.
- » During the five-year period from 2007 to 2011, a total of 12,286 pedestrian-motor vehicle crashes and 4,700 bicycle-motor vehicle crashes were reported to North Carolina authorities. During the same five-year period, 8 pedestrian crashes were recorded within the Leland town limits, 2 of which were fatal. Both fatal crashes occurred at night and the roadways were not lighted. In addition, no traffic controls were present at the location of the fatal crashes.

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 these safety issues were addressed.



SAFETY

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% |

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

- » www.ncdot.gov/bikeped/planning/walkbikenc/
- » www.pedbikeinfo.org/data/factsheet_crash.cfm



Health

Health Trends and Challenges

North Carolina's transportation system is one of the most important elements of our public environment, and it currently poses barriers to healthy living through active transportation. In 2012, NCDOT's Board of Transportation revised its mission statement to include "health and well-being" and passed a "Healthy Transportation Policy," which declares the importance of a transportation system that supports positive health outcomes. Below are some key findings and challenges related to health and transportation in North Carolina.

- » 65% of adults in North Carolina are either overweight or obese. The state is also ranked 5th worst in the nation for childhood obesity.
- » 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. However, every dollar invested in pedestrian and bicycle trails can result in a savings of nearly \$3 in direct medical expenses.
- » Of North Carolinians surveyed, 60% would increase their level of physical activity if they had better access to sidewalks and trails.^v
- » A Charlotte study found that residents who stopped driving to work, and started walking to the light rail station and taking light rail to work, weighed an average of 6.5 pounds less than those who continued to drive to work.
- » According to the 2015 Brunswick County Community Health Assessment, the number of injuries as well as obesity is getting worse in the county. The current rate of cardiovascular disease in the county is 219.8 per 100,000 people, which is well above the Healthy NC 2020 goal of 161.5. Obesity is a major risk factor for cardiovascular disease.

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.

Active Transportation: Pathway to Health



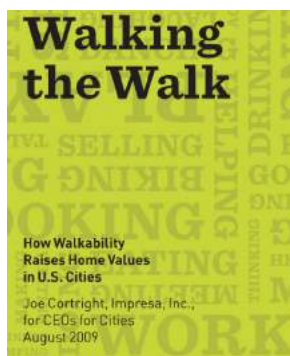


Economics

Economic Trends in North Carolina

Facilities for pedestrians and bicyclists generate economic returns through improved health, safety, and environmental conditions, raise property values, and attract visitors. Below are some key economic trends related to walking and bicycling in North Carolina:

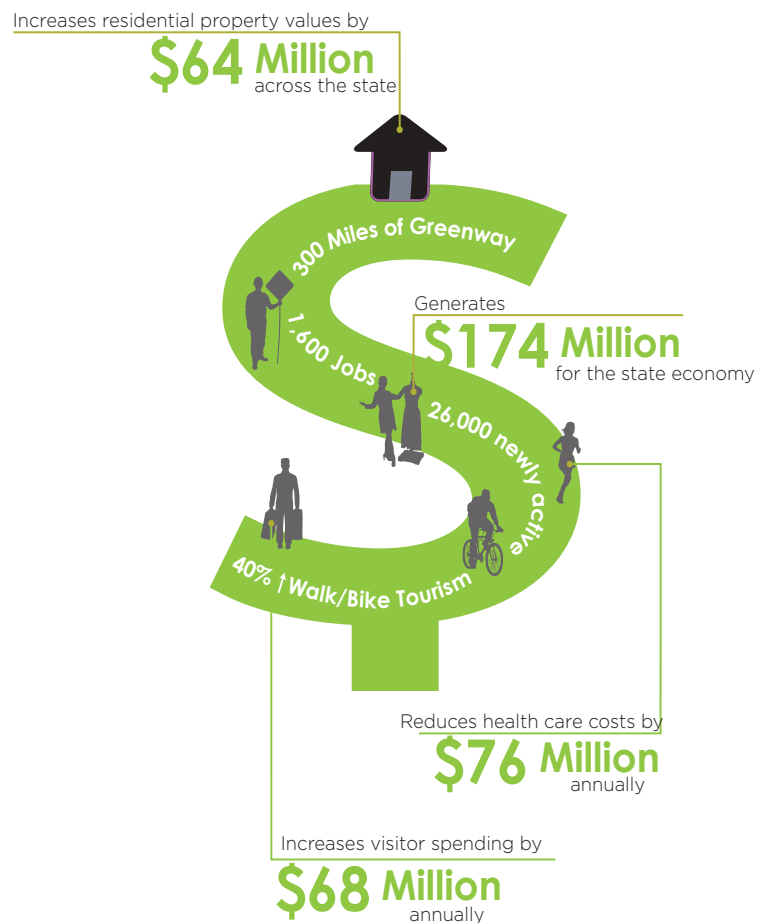
- » North Carolina is the 6th most visited state in the United States; visitors spent as much as \$18 billion a year, many of whom partake in activities related to walking or biking.
- » In North Carolina's Outer Banks alone, bicycling is estimated to have an annual economic impact of \$60 million and 1,407 jobs supported from the 40,800 visitors for whom bicycling was an important reason for choosing to vacation in the area.
- » Because walking saves on transportation costs, it puts more discretionary spending cash in pockets of consumers. 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 investments.
- » 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 (6.7% of occupied housing units in North Carolina do not have a vehicle compared to 0.6% of occupied housing units in Leland).
- » The report, "Walking the Walk: How Walkability Raises Housing Values in U.S. Cities", analyzed data 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.
- » Walkability will result in gains to Leland businesses, savings to residents, and increases the value of local business and residential real estate, resulting in a healthier local economy.



Download the full report at:
www.ceosforcities.org



ECONOMICS



An economic impact study, performed as part of the WalkBikeNC Plan, showed significant positive return on investment from the addition of 300 miles of greenways.



Mobility

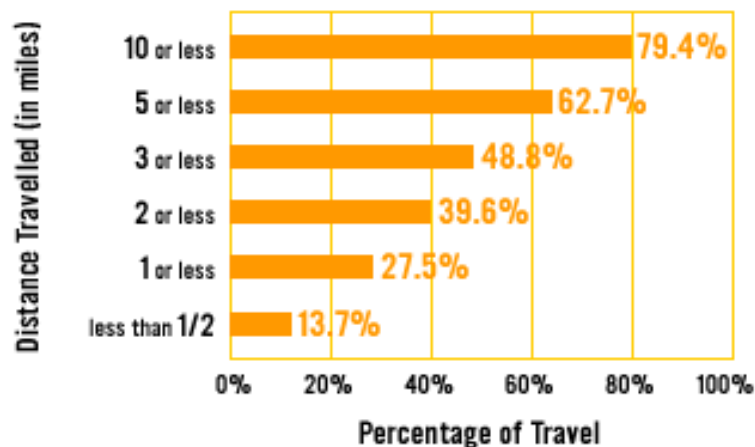
Opportunity to Increase Walking Rates

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. 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 in North Carolina currently fall below the national average, with just 1.8% walking to work, compared to 2.9% walking nationwide. This places North Carolina 42nd for walking commute rates in nationwide state rankings. In Leland, 0% of commuters report walking to work.

In many communities, the walking commute rate is used as an indicator of overall walking (the rates shown here are for commuting only). An estimated 40% of all trips (commute and non-commute) taken by Americans each and every day are less than two miles, equivalent to a walking trip of 30-40 minutes or a 10-minute bike ride; however, just 13% of all trips are made by walking or bicycling nationwide. 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. Germany, Denmark, and the Netherlands are wealthy countries with high rates of automobile ownership, just like the United States. Yet, these countries had low rates of walking and biking similar to the United States decades ago. The difference is that an emphasis has been placed on providing quality walking and bicycling environments which has alleviated the reliance on motor vehicles for short trips.

Daily Trip Distances



Most driving trips are for a distance of five miles or less. Chart from the BicycleandPedestrianInformationCenterwebsite, www.pedbikeinfo.org



Stewardship

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 Leland residents and visitors enjoy.

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. 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.

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 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.
- » 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.
- » 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.
- » Investments in walking infrastructure protect and boost the value of existing development, reducing the abandonment of existing built places and limiting the need to extend development excessively into greenfield areas.

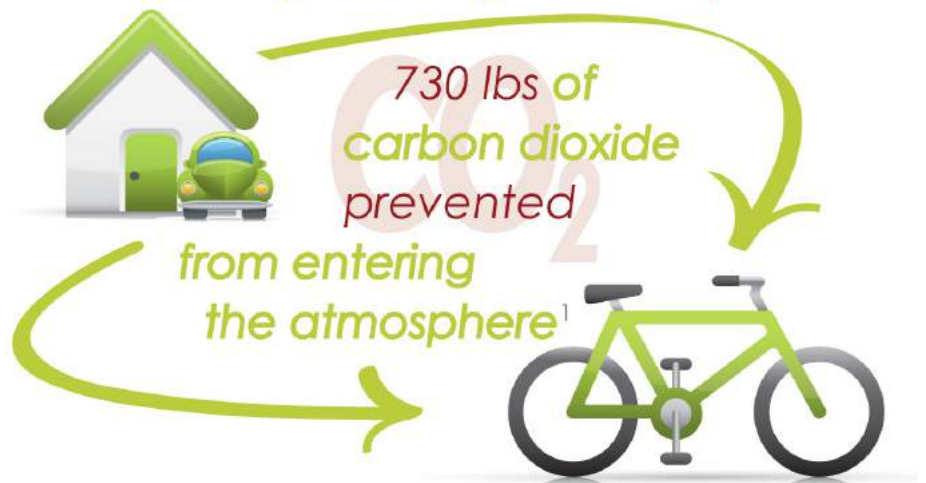
The following web addresses link to more comprehensive research on active transportation and stewardship.

- » www.ncdot.gov/bikeped/planning/walkbikenc/
- » www.pedbikeinfo.org/data/factsheet_environmental.cfm



STEWARDSHIP

*Replace 2 miles of driving
with walking or biking x 365 days =*





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2 EXISTING CONDITIONS

Chapter Contents:

Local Context

Current Conditions

Opportunities &
Challenges

Related Plans &
Initiatives

Public Input

LOCAL CONTEXT

The Town of Leland, a mainland coastal community, borders the Brunswick River and Cape Fear River in Brunswick County. Immediately adjacent to Leland are the towns of Navassa and Belville. US 74/76 and US 17 traverse the town, allowing travel to and from Wilmington, the largest city in the region. Pedestrian connectivity is limited in Leland due to its highly suburban context, podded development, and low population density over a large municipal area.

Due to development spreading from Wilmington to adjacent areas, Leland has experienced rapid growth in the last decade. The most intense growth has been commercial and residential development along both sides of US 17. Undeveloped land south of US 17 has been slated for future residential development. The local economy is strong compared to the rest of Brunswick County. Leland has been successful in attracting high-tech industries to the town, providing employment opportunities for residents and those in neighboring areas. In January 2015, three Park and Ride lots opened and became available to Leland commuters ; each lot has a bus stop along Wave Transit's Brunswick Connector route. These Park and Ride lots are part of Wilmington MPO's efforts to offer alternative modes of transportation for commuters.

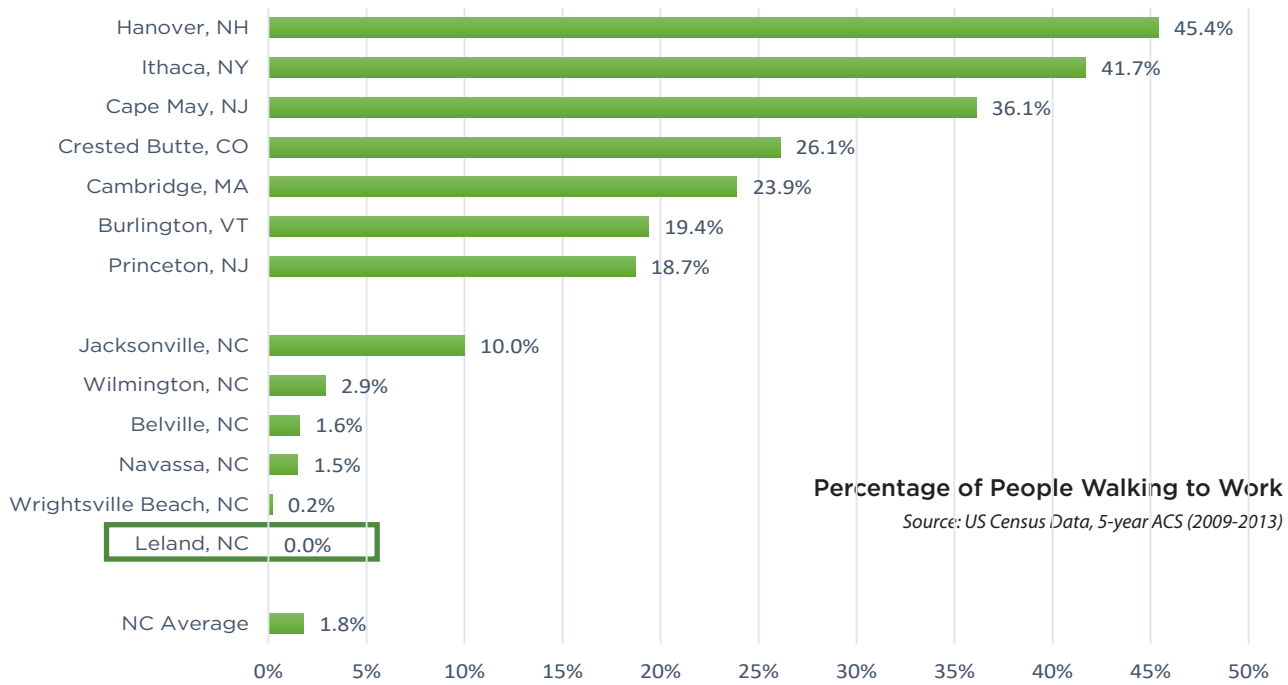
Table 2-1 provides a comparison of demographic data for Leland, Brunswick County, and the State of North Carolina. The median age of Leland (40.7 years) is less than that of Brunswick County (49.2 years). In addition, the median household income is significantly higher in Leland compared to the county - \$61,823 compared to \$46,955 respectively. Household income is highly variable in Leland, with some census tracts having a much higher percentage of lower income households. Overall, Leland has a lower percentage of households that do not own vehicles, as well as a lower percentage of residents who report walking to work compared to both Brunswick County and the State of North Carolina. Refer to Map 2.5 and 2.6 (page 2-10 to 2-11) for demographic data by census tract.

TABLE 2.1: DEMOGRAPHIC COMPARISON

	Leland	Brunswick County	North Carolina
Population	15,316	112,907	9,750,405
Median Age	40.7	49.2	37.8
Median Household Income	\$61,823*	\$46,955	\$46,693
% Households with no vehicles	0.60%*	2.30%	2.50%
% Walk to work	0%	1%	1.8%
% Bike to work	0%	0.1%	0.2%

** Median household income and percentage of households with no vehicle is variable by census tract. Refer to Map 2.5 and Map 2.6 for data by census tract.*

Source: U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates



Walking Rates

The chart above provides walk-to-work rates for model communities across the country, in North Carolina, and in peer communities for Leland. These numbers show that, with some effort to improve infrastructure, policies, and programs, high rates of walking to work are possible in communities of all sizes.

Leland should strive to reach the walk-to-work rates of Wilmington, NC, which has a 2.9% walk-to-work percentage. As walking to work becomes more feasible, Leland should work toward even higher rates to rival Jacksonville, NC at 10%.

EXISTING STANDARDS AND POLICIES

A detailed review of existing Town policies and standards was not conducted. Policy updates were recently made and thus it was not necessary to provide recommendations to these updates.

On August 25, 2016, the Town Council unanimously voted to approve the updated Leland Master Plan for adoption. The Master Plan was last updated in 2009 and is a document used to guide future development and land use regulations. This guiding document provides the vision and recommendations on how to accommodate growth in the next five years, especially since Leland is projected to experience both employment and population growth. A main aim of this document is to provide guidance on how Leland can continue to develop while simultaneously creating walkable neighborhoods. A concrete action from this updated Master Plan is to coordinate land use and transportation with state and WMPO for capital projects. NCDOT Complete Streets policy should be consulted when developing compact urban areas. The plan recommends a multimodal transportation network with bicycle and pedestrian facilities. The Master Plan references this pedestrian plan for pedestrian recommendations.





Currently, the Town's planning staff is working to implement the Town's adopted Master Plan in the form of a Unified Development Ordinance, also known as the FlexCode, that will consolidate the zoning and subdivision regulations. Development of neighborhoods categorized as Compact Urban areas will be outlined in the FlexCode. This document will provide guidelines for pedestrian accommodations for new housing construction and for public works. While the new FlexCode has a greater emphasis on creating walkable neighborhoods, it does not require new developments to construct sidewalks or greenways. Conflicts between motor vehicles and pedestrians are discussed, but no guidance is provided on the construction of new pedestrian infrastructure to coincide with new housing development.

CURRENT CONDITIONS

Current walking conditions in Leland are variable. Sidewalks can be found in some areas throughout Leland, but gaps exist in the sidewalk network. For example, there is a lack of safe pedestrian facilities around the Downtown core and near North Brunswick High School. The Downtown core is generally considered to be the segments of Village Road NE and Old Fayetteville Road that connect to Leland Town Hall. There are many local destinations that are within a mile from the downtown core, including schools, parks, and shopping centers. The parks throughout Leland, Cape Fear, and Sturgeon Creek are major destinations for recreation. US 17 and US 74/76 are major thoroughfares that traverse Leland.

Ownership of Public Road Right-of-Ways

The ownership of the public right-of-way is important for determining the types of facilities that can be constructed in or along a roadway. 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 pedestrian facility recommendations, and how improvements are scheduled, funded, and constructed. Map 2.2 on page 2-6 shows ownership of streets and roads in Leland. State-owned roads include Village Road, Lanvale Road, and River Road.

NCDOT Reported Pedestrian Crashes

Map 2.3 on page 2-7 shows pedestrian crashes in Leland that were reported to NCDOT from 2007 to 2012. During this time period, 10 crashes were recorded within the Town of Leland and 7 were recorded outside the town limits.



Inventory of Select Intersections

Map 2.4 on page 2-8 displays the locations of select intersections in Leland that were further examined for existing conditions and existing pedestrian accommodations (if any were present). Aside from sidewalks, intersections are crucial points of pedestrian connectivity. Major intersections within the town limits were identified and then inventoried in Table 2.2. All locations with possible intersection recommendations were included in this inventory. Understanding existing conditions at these major intersections is important in understanding where improvements need to be made and locations that act as barriers to pedestrian travel.

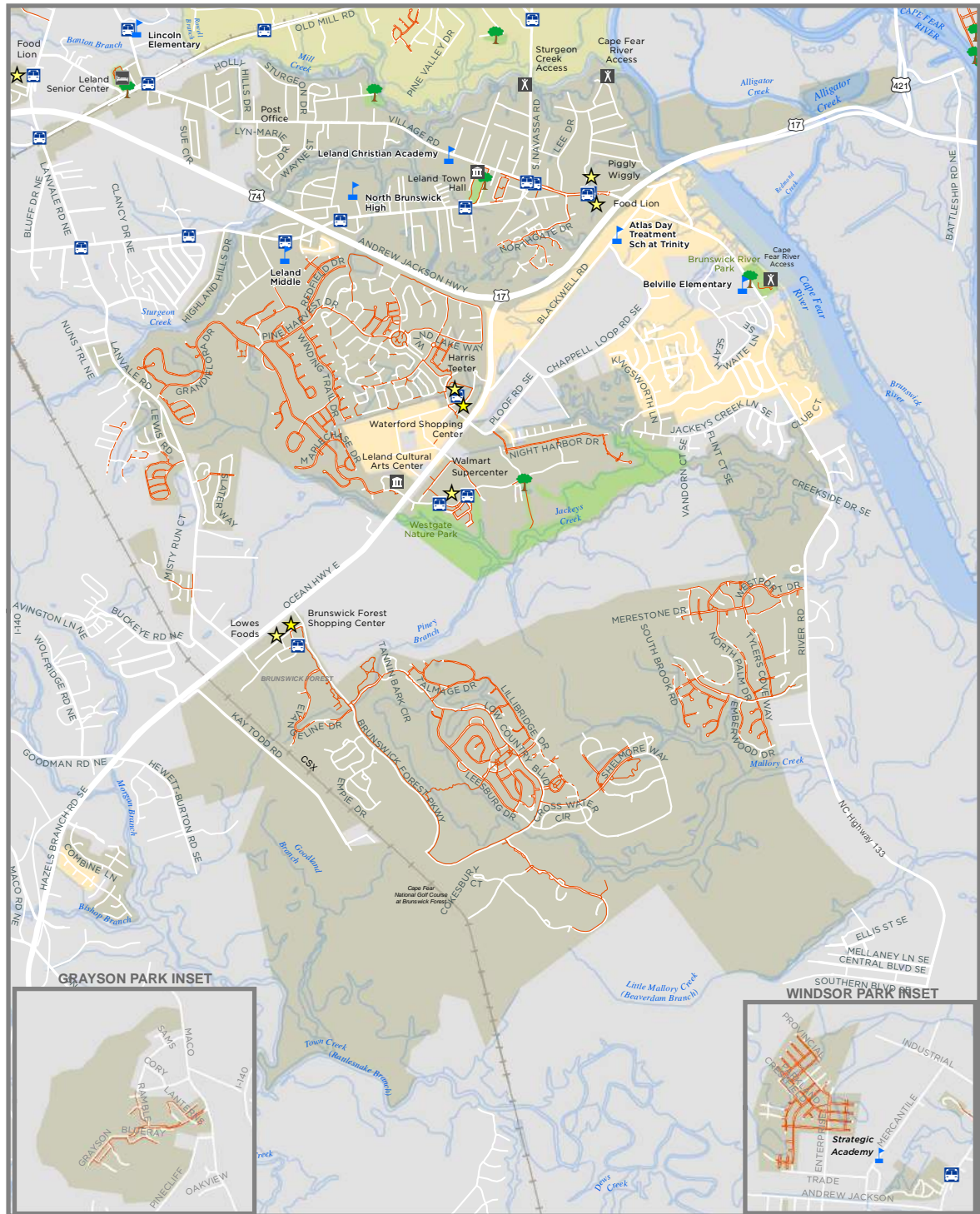
Table 2.2 shows the variation in pedestrian accommodations at 15 select intersections in Leland. Of these 15 intersections, only 2 intersections have existing crosswalks. Intersections that connect to shopping centers (which act as generators of pedestrian activity) generally do not have crosswalks. Curb ramps are present at 4 intersections but 2 of the 4 intersections do not have curb ramps on all sides. The intersection that serves North Brunswick High School currently lacks adequate crossing facilities and does not have sidewalks on any sides of the intersection.



Village Road and Old Fayetteville Road intersection, which was recently improved with pedestrian amenities, including pedestrian countdown timers, marked crosswalks, and curb ramps



MAP 2.1 - EXISTING SIDEWALKS AND MAJOR DESTINATIONS



Town of Leland
Comprehensive
Pedestrian Plan
2015

Base map



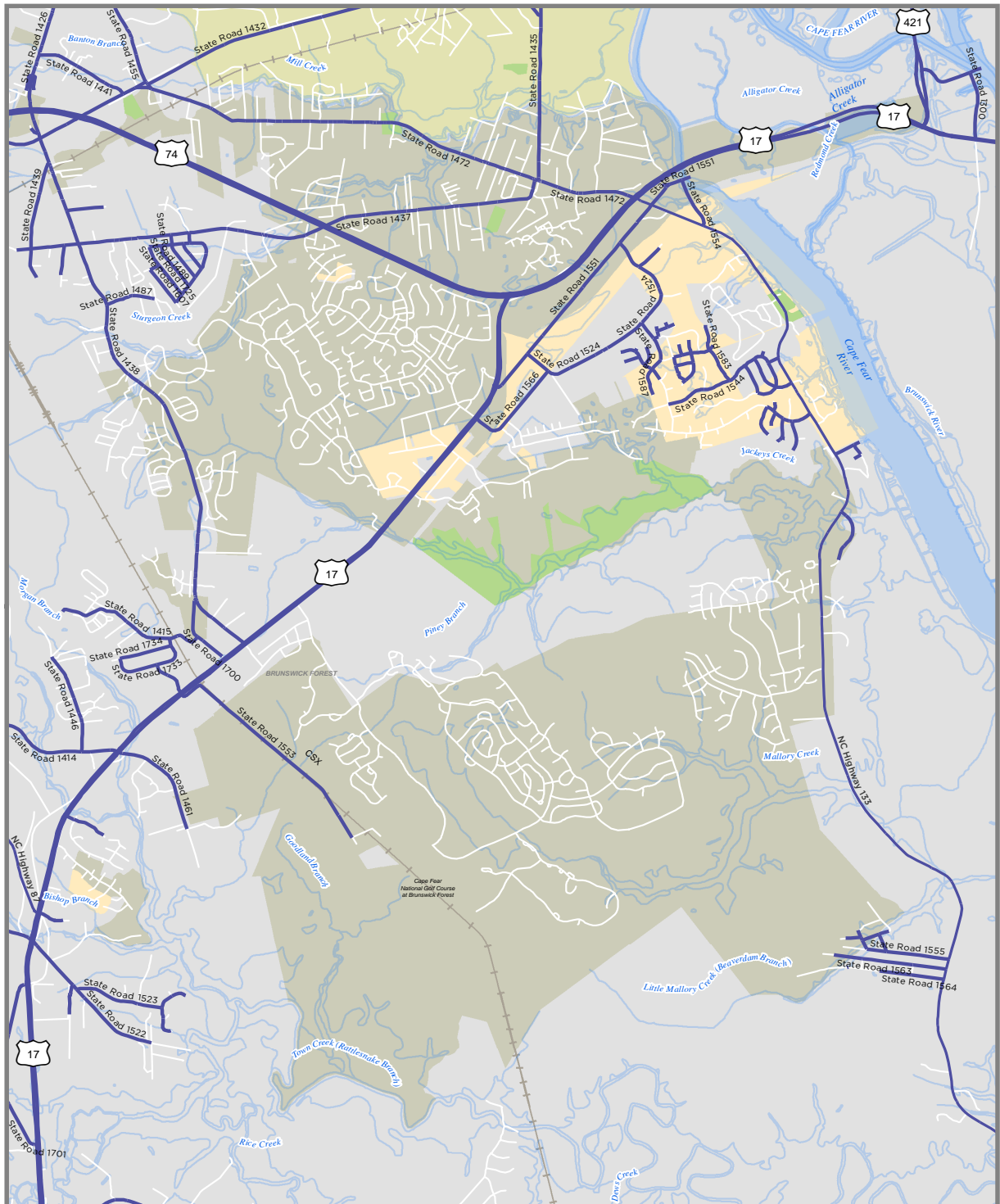
LEGEND

- | | | |
|------------------|-----------------------|--------------------|
| Town of Leland | School | WAVE Bus Stop |
| Town of Belville | Civic Institution | Existing sidewalks |
| Town of Navassa | Senior Center | |
| Waterbodies | Creek or River Access | |
| Parks | Shopping | |





MAP 2.2 - NCDOT OWNED ROADS



Town of Leland
Comprehensive
Pedestrian Plan
2015



LEGEND

- | | | | |
|--|------------------|--|------------------------|
| | Town of Leland | | NCDOT Roads |
| | Town of Navassa | | U.S. Highway |
| | Town of Belville | | State Maintained Roads |
| | Waterbodies | | |
| | Parks | | |

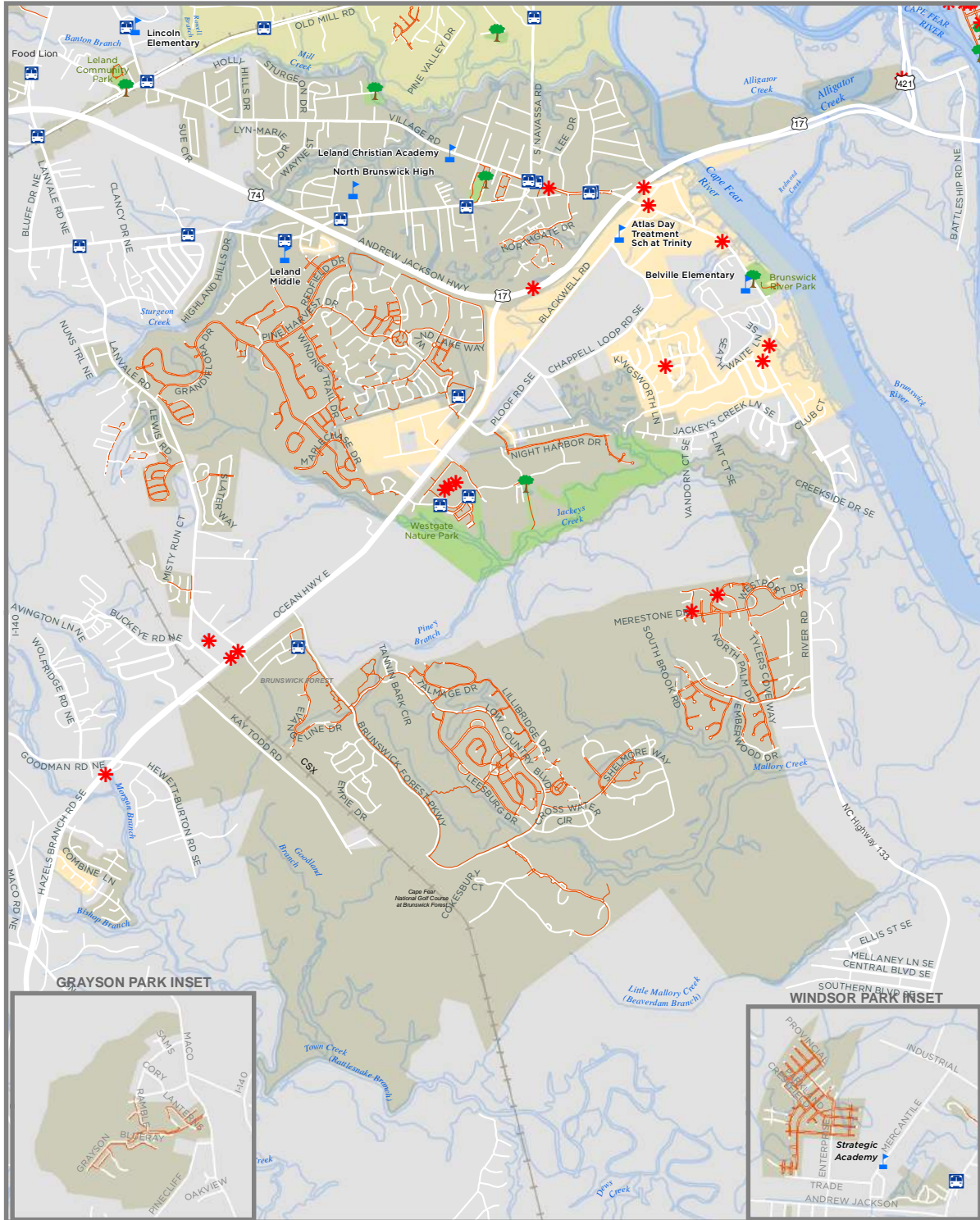


Data obtained from Town of Leland

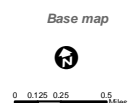


MAP 2.3: PEDESTRIAN CRASHES

(As reported to NCDOT, 2007-2012)



**Town of Leland
Comprehensive
Pedestrian Plan
2015**



LEGEND

- Town of Leland
- Town of Belville
- Town of Navassa
- Waterbodies
- Parks
- * Pedestrian Crash
- School
- WAVE Bus Stop
- Existing sidewalks

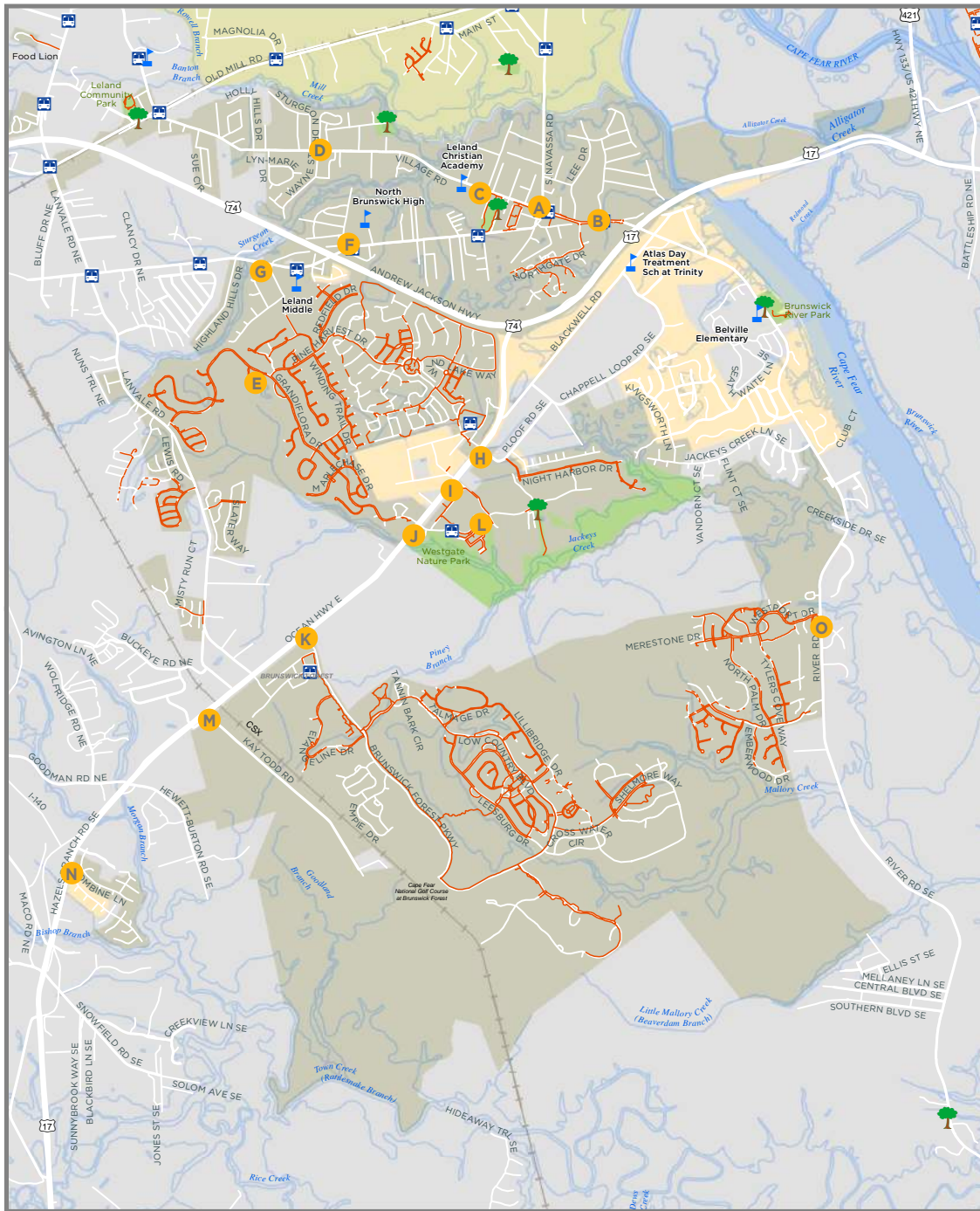




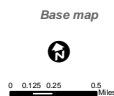
MAP 2.4: INVENTORY OF PRIORITY INTERSECTIONS

(Letters correspond to Table 2.2)

Intersections were identified based on fieldwork analysis, connectivity to destinations, and public input



**Town of Leland
Comprehensive
Pedestrian Plan
2015**



LEGEND

- Town of Leland
- Town of Navassa
- Town of Belville
- Waterbodies
- Parks
- School
- WAVE Bus Stop
- Existing sidewalks





TABLE 2.2: INTERSECTION INVENTORY

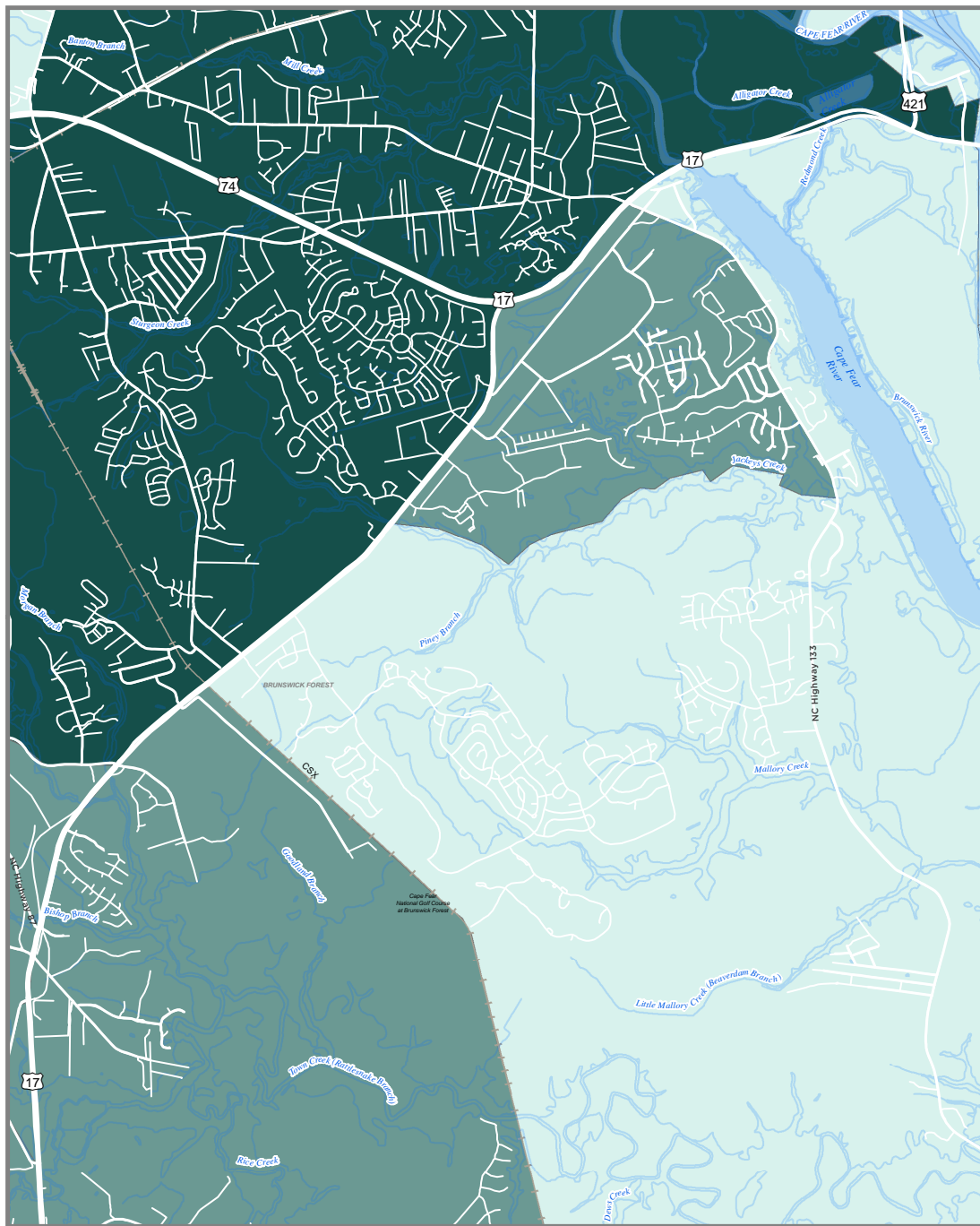
(Map IDs correspond to Map 2.4)

Map ID	Road 1	Road 2	Destinations Served	Stop Light (SL) or Stop Sign (SS)	Curb Ramp (Y/N)	Crosswalks (Y/N)	Median Island: Width and Type	Estimated Traffic Volume	Speed Limit	Other notes
A	Village Rd	Old Fayetteville Rd	Restaurants, Retail, Gas Station, Pharmacy	SL	Y	Y	Concrete Median Island approx. 2 feet	High	35	Recent NCDOT Improvement
B	Village Rd	Fairview Rd	Shopping Center with Piggly Wiggly, Gas Station, Restaurant, Retail	SL	Y	Y	Concrete Median Island approx. 2 feet	High	35	Recent NCDOT Improvement
C	Village Rd	Forest Hills Drive	Church, Residential Area	SS	N	N	None	Medium	35	
D	Village Rd	Appleton Way	Residential Area	SS	N	N	None	Medium	45	No sidewalks
E	Grandiflora Dr	Pine Harvest Drive	Residential Area	SS	Y (one side)	N	None	Low	30	
F	Old Fayetteville Rd	Basin Street	North Brunswick High School	SS	N	N	None	Medium	35	No sidewalks
G	Old Fayetteville Rd	Pickett Rd	Residential Area	SS	N	N	None	Medium	35	
H	US 17	Plooff Rd	Retail, Gas Station, Pharmacy	SL	N	N	Concrete Median approx. 2 feet, then Grass Median	High	45	No sidewalks
I	US 17	Ocean Gate Plaza	Shopping Plaza with Walmart, Retail, Banks, Restaurants, Gas Station	SL	N	N	Concrete Median approx. 2 feet on Both Sides	High	45	No sidewalks
J	US 17	West Gate Drive	Retail, Small Businesses, Lodging, Restaurants	SL	N	N	Concrete Median approx. 2 feet, then Grass Median	High	45	No sidewalks
K	US 17	Brunswick Forest Parkway	Shopping Center with Lowe's Foods, Retail, Restaurants	SL	N	N	Concrete and Grass Median, approx. 2 feet	High	55	
L	Ocean Gate Plaza	West Gate Drive	Residential Area, Shopping Center	SS	Y (two sides)	N	None	Medium	35	
M	US 17	Kay Todd Road	Residential Area	SS	N	N	Grass Median approx. 4 feet	High	55	
N	Hazels Branch Rd	Stoney Creek Lane	Small Businesses, Residential Area	SS	N	N	Grass Median approx. 4 feet	High	55	
O	Westport Drive	River Rd	Residential Area	SS	N	N	None	Medium	45	No sidewalks



MAP 2.5: HOUSEHOLDS THAT DO NOT OWN VEHICLES

Source: U.S. Census Bureau, American Community Survey (ACS) 2009-2013 5-year estimates



Town of Leland
Comprehensive
Pedestrian Plan
2015



LEGEND

Percent of No Vehicle Households by Census Tract

- 0 - 1.5%
- 1.6% - 4.1%
- 4.2% - 6.4%





MAP 2.6: MEDIAN HOUSEHOLD INCOME

Median household income and vehicle ownership (Map 2.5) is variable by census tract, indicating that demographic differences exist within Leland.

Source: U.S. Census Bureau, American Community Survey (ACS) 2009-2013 5-year estimates



Town of Leland
Comprehensive
Pedestrian Plan
2015



LEGEND

Median Household Income by Census Tract

- \$0 - \$34,999
- \$35,000 - \$44,999
- \$45,000 - \$59,999
- \$60,000+





OPPORTUNITIES

An analysis of existing conditions reveals several opportunities and constraints for pedestrian network development in Leland. Opportunities include:

- » **Ongoing New Residential Development:** New subdivisions provide opportunities to construct planned pedestrian facilities as development occurs. Several existing residential development projects, such as Brunswick Forest and Waterford, were built with extensive sidewalk and multi-use path networks.
- » **Parks & Trails:** Park property can be found throughout the Town of Leland. The Town recently constructed several trails, such as the trails in Westgate Nature Park and at Town Hall. There are several existing dirt roads that could be converted to new pedestrian trails.
- » **Sidewalk Condition:** The existing sidewalk infrastructure has been well maintained and remains in good condition. Most of the sidewalks are accessible and clear of any obstructions or tripping hazards.
- » **Downtown Leland:** Recent investments in the Downtown core have continued to enhance economic activity in the heart of Leland. New town infrastructure in this area includes the newly built Town Hall and greenway.
- » **River Access:** Leland is located near several rivers, which provides residents access to recreational opportunities.
- » **Park and Ride:** Three Park & Ride lots located at Brunswick Forest in front of Lowe's Food, at Food Lion on Mt. Misery Road near US 74/76 and at Leland Town Hall offer alternative modes of transportation for commuters. Parking spaces are reserved for people who carpool, vanpool, or use public transportation.
- » **Utility Access:** A partnership with Duke Power Company could result in pedestrian trails along power easements, such as the vital connection between Westgate Park and Brunswick Nature Park. This five mile connection would serve many neighborhoods in the Town of Leland, as well as the Town of Bellville and Brunswick County.



Waterford, a large residential development, was built with sidewalks on both sides of the street.



Westgate Nature Park has a popular trail network.



The new Leland Town Hall opened in 2015.



There are several Town-owned properties that provide river access.



CHALLENGES

The following list is an overview of the potential challenges facing the existing pedestrian network in Leland. These observations are based on input from the general public, field review, and available data.

Challenges include:

- » **Geographical Constraints:** The Town of Leland’s municipal boundary is a circuitous and irregular polygon with many “islands” and “peninsulas” around other towns’ jurisdictions or county areas, which creates a barrier for pedestrian connectivity. The neighborhoods of Grayson Park and Windsor Park are separated from the rest of Leland. This irregularly shaped boundary creates a challenge for connecting pedestrian facilities in direct routes across areas outside of Leland’s jurisdiction. NCDOT sidewalk policy may make it difficult to ensure continuous sidewalks since DOT requires municipal maintenance agreements for sidewalks along state roads.
- » **US 17 Superstreet:** This high-volume, high-speed multi-lane divided roadway does not incorporate safe and efficient pedestrian crossings. Several pedestrian trip generators are located on each side of US 17, such as Walmart and Harris-Teeter; pedestrians are crossing the road frequently and need safe crossing facilities.
- » **Major Arterials:** US17 and US74 run through Leland and, due to lack of safe pedestrian crossings, create a barrier to pedestrian travel. Major destinations are located along these arterials; yet walking to these destinations is currently not physically possible.
- » **Regional Connectivity:** Pedestrians desire lines across municipal boundaries due to the circuitous dividing line between local towns and county jurisdictions. However, the average citizen doesn’t know where the town of Leland ends and the town of Belville begins. As pedestrians, residents only care about accessing destinations. To create safe pedestrian travel to several key destinations, the adjacent communities of Belville and Navassa will need to be included in the process.
- » **Presence of Wetlands:** Several areas along the Brunswick and Cape Fear Rivers are wetlands. It may be difficult to develop infrastructure within these areas.



Leland Community Park in Northwest Leland is difficult to access for residents who live in other parts of Leland.



Although there are not sidewalks, school children can often be seen walking along the Old Fayetteville Street bridge over US 74.



Old Fayetteville Road has a 45 mph posted speed limit.



Wetlands in Sturgeon Creek Park will make it challenging to provide trail connections.

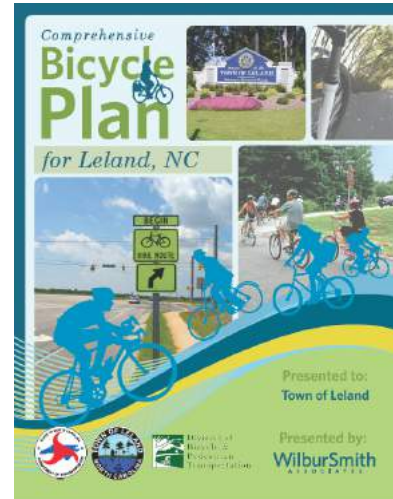


RELATED PLANS & INITIATIVES

The following local and regional plans are relevant to bicycle and pedestrian planning in Leland. Links to more information and online versions of these plans are provided below.

2008 Leland Bicycle Plan

The Leland Bicycle Plan serves as a planning tool to assist in the development and expansion of bicycle facilities and programs. Infrastructure project recommendations of this plan are categorized as short term, medium term, and long term priorities. In terms of policy and program recommendations, the plan suggests that the town update its development ordinances, coordinate with NCDOT regarding on-going projects, provide education programs to increase bicycle safety, and develop a maintenance plan.



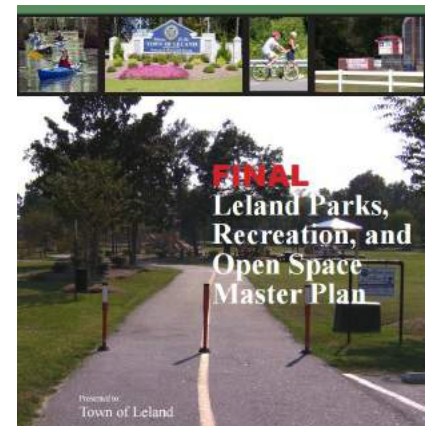
2009 Leland Master Plan (updated in 2016)

The 2009 Master Plan outlines strategies for land use and development. Although it was updated in August 2016, much of the 2009 Master Plan is still relevant and referenced in the updated plan. One of the recommendations focuses on requiring sidewalks throughout the town, especially in areas that lack sidewalks. Further recommendations include completing a pedestrian master plan, updating the development ordinances for a friendlier pedestrian environment, and funding pedestrian facilities. High priority roads for funding are portions of the Village Road Phase I project and streets within a half mile of schools.

2009 Leland Parks, Recreation, and Open Space Plan

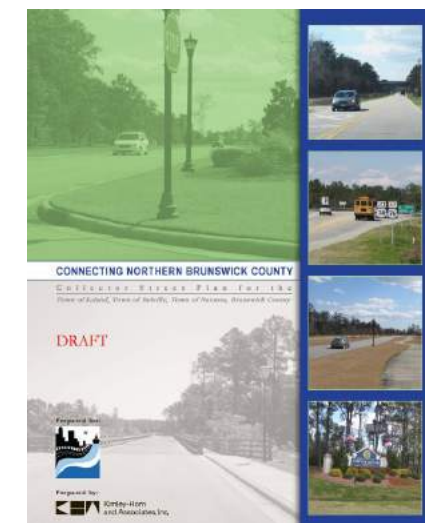
The goal of the Parks, Recreation, and Open Space Plan is to “define the town’s role in providing parks and recreation facilities over the next ten to twenty years.” The plan identifies four focus areas and as well as locations within each focus area that pose opportunities to develop parks and recreational facilities. They are:

- » Northern Leland: Sturgeon Creek system, Cape Fear River Paddle Trail, and the Town Hall Park area
- » South of the Downtown area: north of US 17 interchange with US Highway 74/76, west of US 74/76 between US 17 and Old Fayetteville Road
- » Brunswick Forest, Westport, and Mallory Creek: Brunswick Forest development trail network and connections to commercial development along US 17
- » Southern part of the town and preservation lands as defined by the Brunswick County Future Land Use Plan: Town Creek Nature Park



2013 Connecting Northern Brunswick County Collector Streets Plan

This plan aims to promote connectivity throughout the county by recommending a street collector network. Recommended improvements were classified for either collector streets or bicycle and pedestrian improvements. Bicycle and pedestrian improvements primarily focused on improving connectivity on US 17 as well as constructing a bicycle and pedestrian connection along US 17 to Brunswick Nature Park.





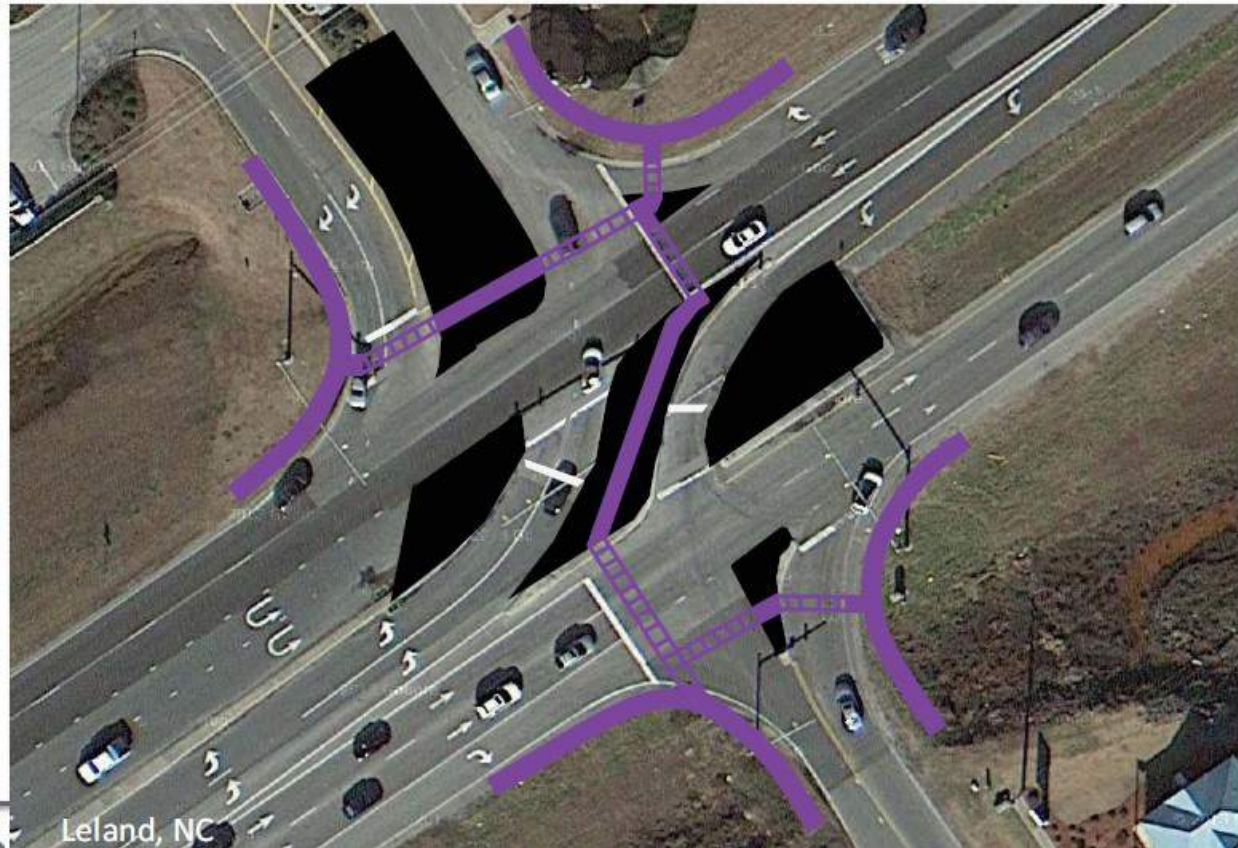
2014 NCDOT Pedestrian and Bicycle Accommodations on Superstreets Report

The report focuses on challenges that pedestrians and bicyclists face at superstreet intersections, like those on US 17, and recommendations for crossing alternatives at these intersections. A superstreet is a type of intersection that prohibits through and left turns on side streets to reduce turning conflicts. Superstreet designs are favored throughout North Carolina due to the benefits it brings to motor vehicles, including decreased delay and reduced motor vehicle collision rates.

Crossing alternatives for pedestrians and bicyclists were analyzed through microsimulation based on average stopped delay per route, average number of stops per route, and average travel time per route. For a typical signalized superstreet, the report recommends a combination of a diagonal cross with the midblock cross because it would allow pedestrians several options for crossing. Pedestrian signals are recommended for all crossings.



There is existing pedestrian demand for a crossing of US 17, near the Walmart Shopping Center.



The NCDOT report used a modified model of US 17 in Leland to derive base model characteristics to perform software simulation modeling to predict the interaction of pedestrians and bicyclists with motor vehicles. The diagonal cross (demonstrated in the image above), in combination with a midblock cross, was selected as the preferred pedestrian crossing geometry. The diagonal crossing component is not possible due to the placement of utility and signal elements in the diagonal median of the intersections in Leland. The exact design of the crossing should take into account a careful reading of the report's detailed methodology and recommendations, in conjunction with an examination of ground conditions at the proposed crossing location.

Source: 2014 NCDOT Pedestrian and Bicycle Accommodations on Superstreets Report.



PUBLIC INPUT

Public input for this plan was collected through the project website, public comment form, input map, and public workshops. In an effort to reach residents and receive valuable feedback on existing conditions, the project team:

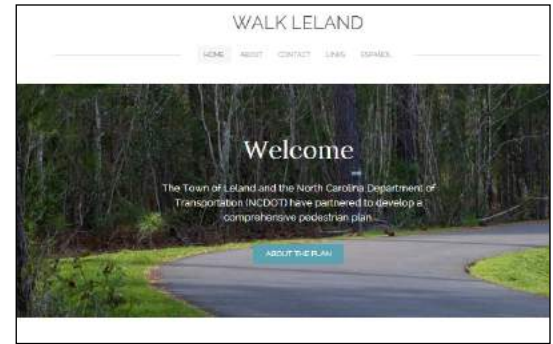
- » Attended the 2015 Leland Founders' Day Festival on Saturday, September 12th to promote the project and receive comments on existing conditions.
- » Shared project information and accepted comments during the monthly Manna Ministries food distribution event at Closer Walk Church.
- » Delivered project information cards to every student in Leland through the Brunswick County School System.
- » Greeted residents outside of the Piggly Wiggly to promote the plan and receive input.

Over 130 user surveys were completed throughout the planning process. Residents, visitors, and property owners feel that current walking conditions are fair (41%) to poor (58%) and that improving conditions is very important (75%). While respondents stated that they mainly walk to exercise, 90% of respondents indicated that lack of sidewalks in Leland discourages walking. The majority of respondents (85%) stated that the main purpose of the pedestrian plan should be to create safe conditions for walking in Leland. These issues were reflected in the public comments about the need to improve conditions for walking on Village Road, near the Village Road shopping center, near schools, and the Walmart Supercenter on W. Gate Drive.

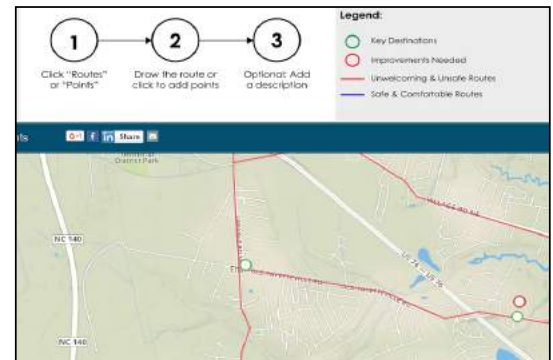
Comments were also provided through an online input map where respondents were able to identify key destinations, improvements needed, unsafe walking routes, and comfortable routes. Major arterials and collectors were identified as unsafe routes, including US-17, Old Fayetteville Road, and Village Road.



A logo was developed for the Town to brand their bicycle and pedestrian program outreach efforts.



Project updates were posted to the project website (above). The website also provided citizens with the opportunity to comment through a user survey and an online map (below).



Founders' Day provided a great opportunity to receive input on walking conditions in Leland.



The project team hosted a public open house on February 18th, 2016 to allow the public to review draft recommendations and provide comments.

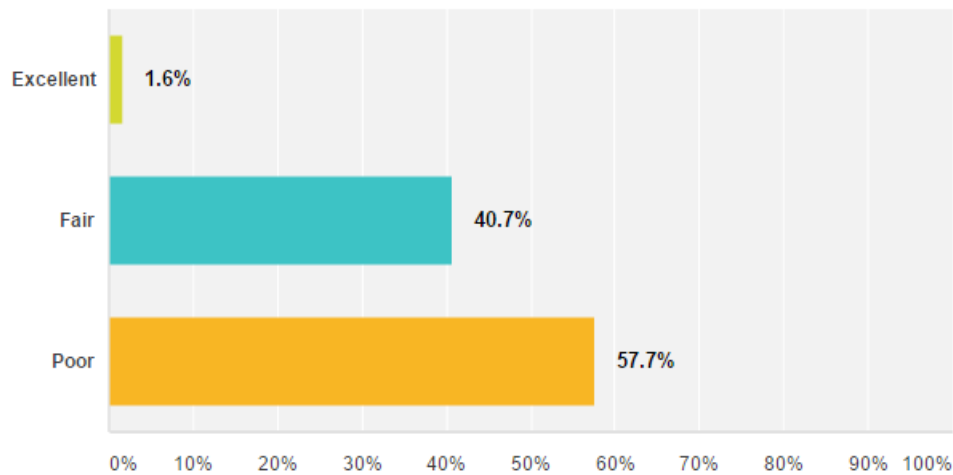


Public Comment Form Results

The charts below summarize public input collected during this planning process in Spring/Summer 2015. Comments were collected through an online survey that garnered 130 responses.

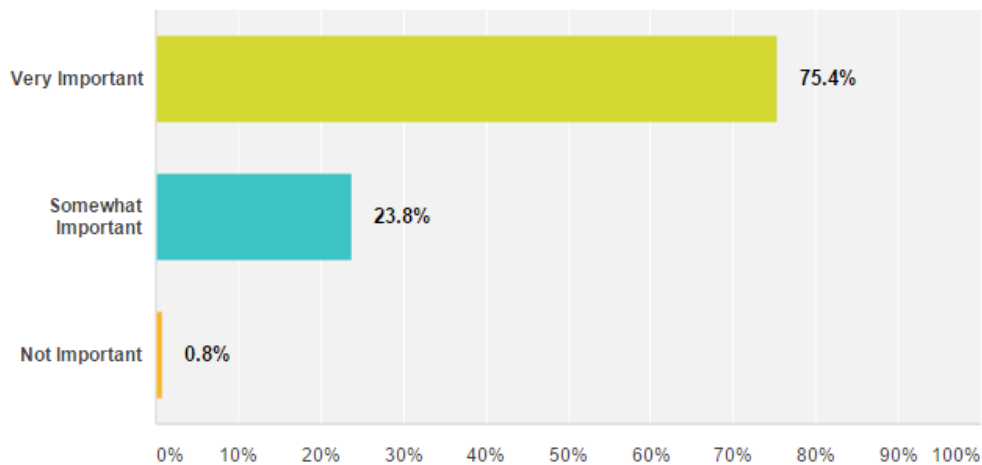
How do you rate walking conditions in Leland?

Answered: 123 Skipped: 2



How important to you is improving walking conditions in Leland?

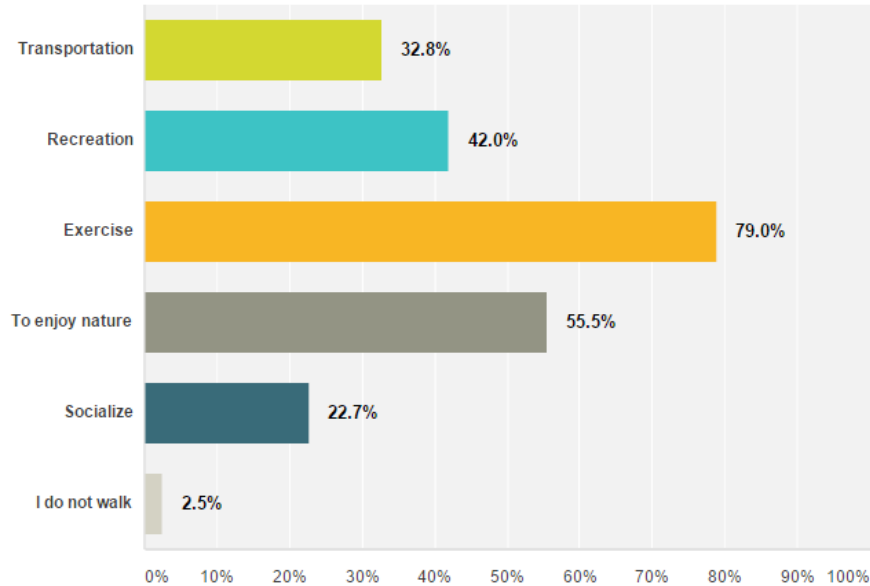
Answered: 122 Skipped: 3





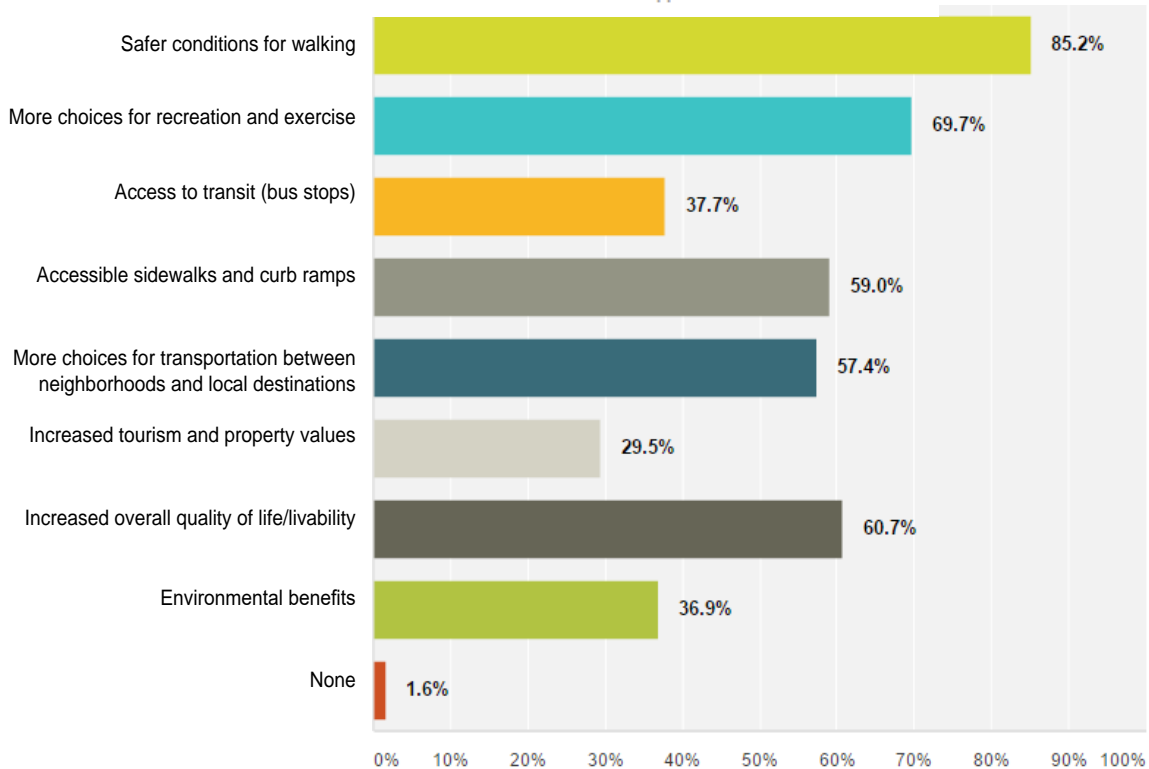
When walking in Leland, what is (or would be) the primary purpose of your trip? (check all that apply)

Answered: 119 Skipped: 6



What should be the most important goals and outcomes of the Walk Leland plan? (check all the apply)

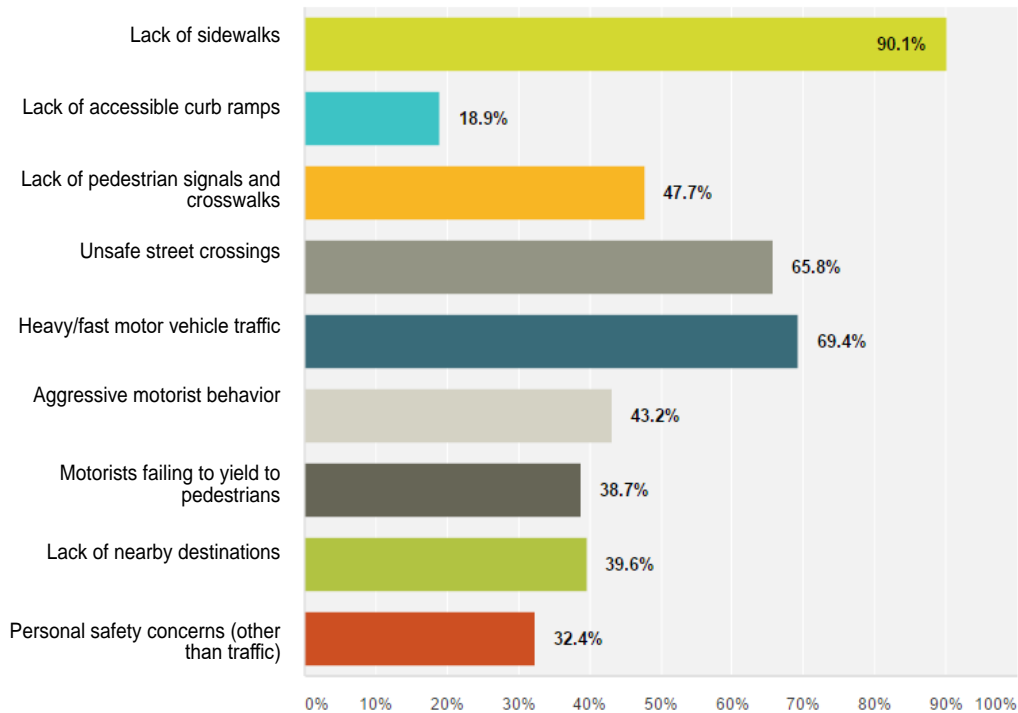
Answered: 122 Skipped: 3





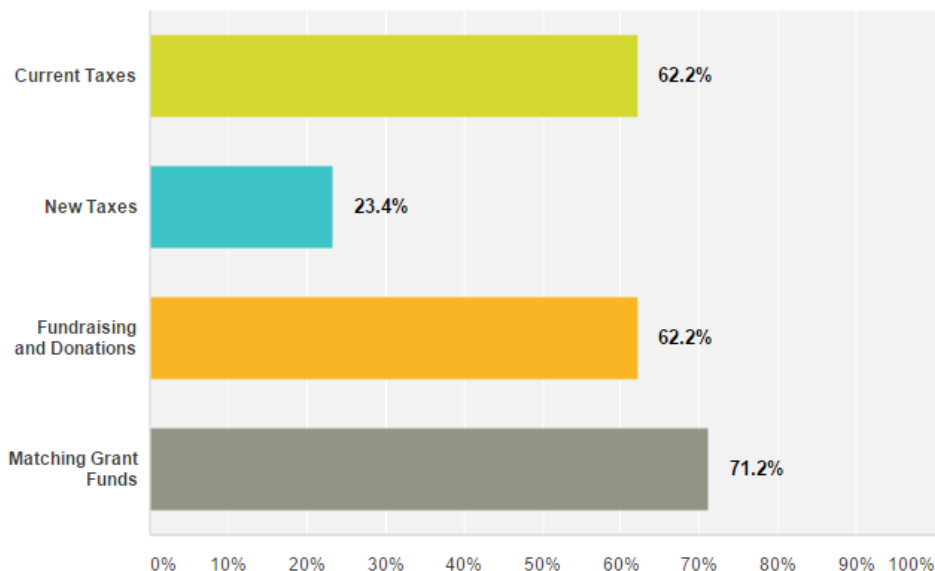
What do you think are the factors that most DISCOURAGE walking in Leland? Please select up to five factors.

Answered: 111 Skipped: 14



How should pedestrian facilities be funded within Leland (Select all that apply)

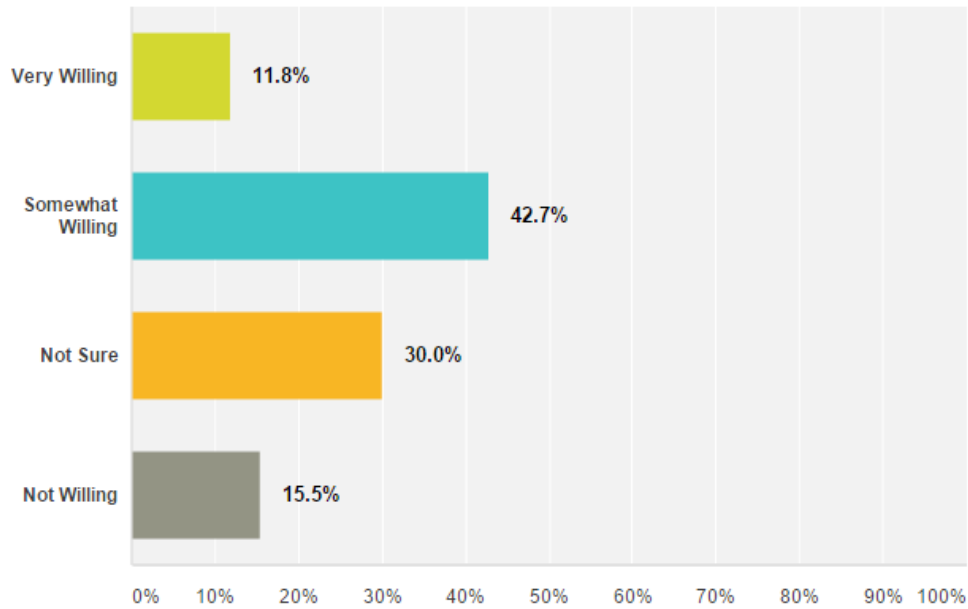
Answered: 111 Skipped: 14





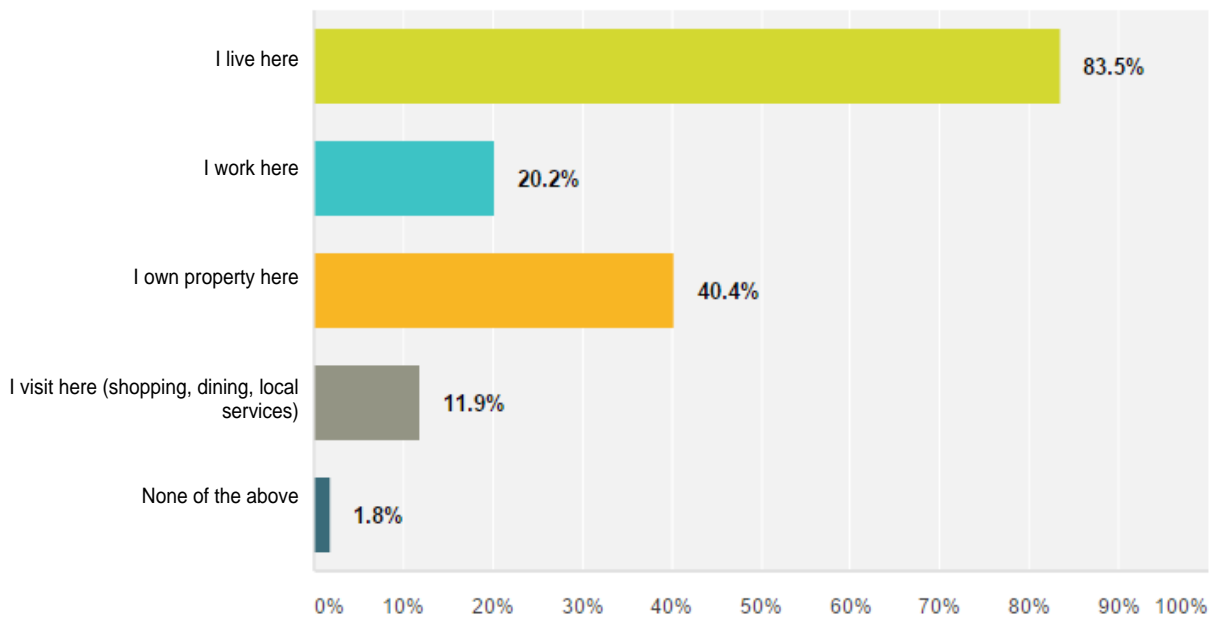
How willing would you be to pay some increase in taxes to fund pedestrian facilities in Leland?

Answered: 110 Skipped: 15



What is your relationship to Leland?

Answered: 109 Skipped: 16





Leland



3 RECOMMENDATIONS



Meadow Park

Chapter Contents:

Overview

Methodology for
Network Development

Recommended
Pedestrian
Network

Town of Leland
Sectors

Project
Ranking

Regional Connectivity

Planning Level
Cost Estimates

Project
Cutsheets

Program
Recommendations

OVERVIEW

This chapter details the infrastructure improvements that are recommended to create a safe, accessible, and connected pedestrian network in the Town of Leland. A diverse mix of facilities are recommended to create this comprehensive network, including sidewalks, crossing improvements, signage, and multi-use paths. Conceptually, the network recommendations and the destinations they connect can be seen as a network of ‘hubs and spokes’. Schools, neighborhoods, parks, river access points, and other places people walk to and from are the ‘hubs’, whereas the pedestrian facilities are the ‘spokes’ that connect them (see below).



METHODOLOGY FOR NETWORK DEVELOPMENT

Recommendations were developed based on information from several sources: input from Town staff and Steering Committee, public input obtained through public comment forms and in-person workshops, previous plans and studies, review of existing pedestrian facilities, noted pedestrian destinations, and a detailed field analysis. Fieldwork examined the potential and need for pedestrian facilities along and across key roadway corridors to make connections between popular destinations in Leland destinations.

All facility recommendations along NCDOT-maintained roadways should receive review and approval by NCDOT Highway Division 3 prior to implementation.

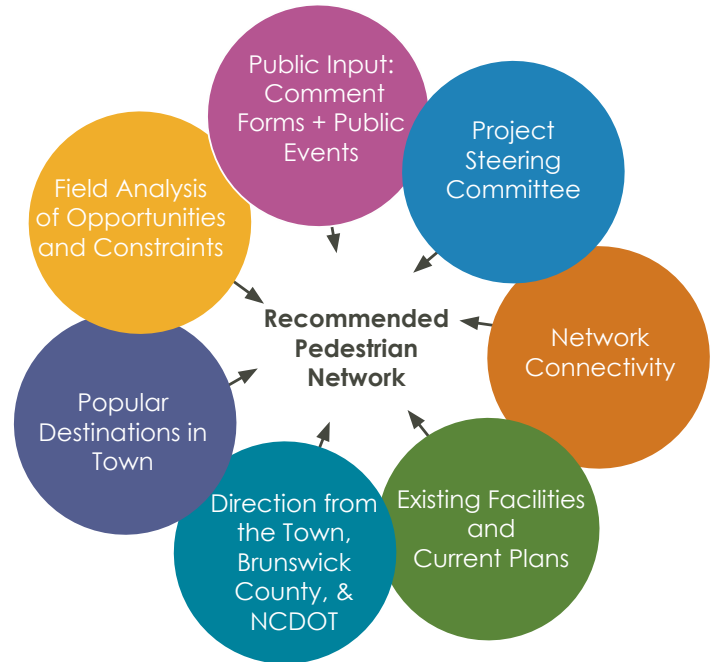


RECOMMENDED PEDESTRIAN NETWORK

Sidewalk

The sidewalks recommended for Leland are shown by the dashed orange lines on the recommendation maps in this chapter (with existing sidewalk shown in solid orange lines). These recommendations were chosen to fill in gaps in the existing sidewalk network and to better connect destinations and neighborhoods. General characteristics include:

- » Sidewalks in Leland should be at least 5’ wide, and, where possible, should include a landscaped buffer between the sidewalk and roadway.
- » Areas of higher pedestrian volume should be wider (Leland downtown commercial area), and sidewalks serving as part of the multi-use path system should be at least 10’ in width.



Multi-Use Path

A multi-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. Multi-use paths may be paved or unpaved and are the preferred facility for novice and average bicyclists. Multi-use paths are located within the roadway corridor right-of-way, adjacent to the roadway, but are often separated from the road by a landscaped buffer.

Proposed multi-use paths for Leland are shown as a dashed green line on the recommendation maps in this chapter. General characteristics include:

- » Multi-use paths in Leland should be 8’-12’ in width. Generally, paths should be at least 10’ unless specific constraints require some sections to be reduced to 8’, which should only occur when safe given the usage level.
- » Surface types vary according to use, but paved asphalt is standard for multi-use paths accommodating bicyclists and other wheeled users.
- » The key difference between a multi-use path shown to the right (along Low Country Blvd.) and a typical sidewalk (along Village Rd) is the extra width allowing for safer shared use by bicyclists, pedestrians, and other users.



Typical 5'-wide sidewalk along Village Rd.



Multi-use path along Low Country Blvd.

Pedestrian-Friendly Crossings

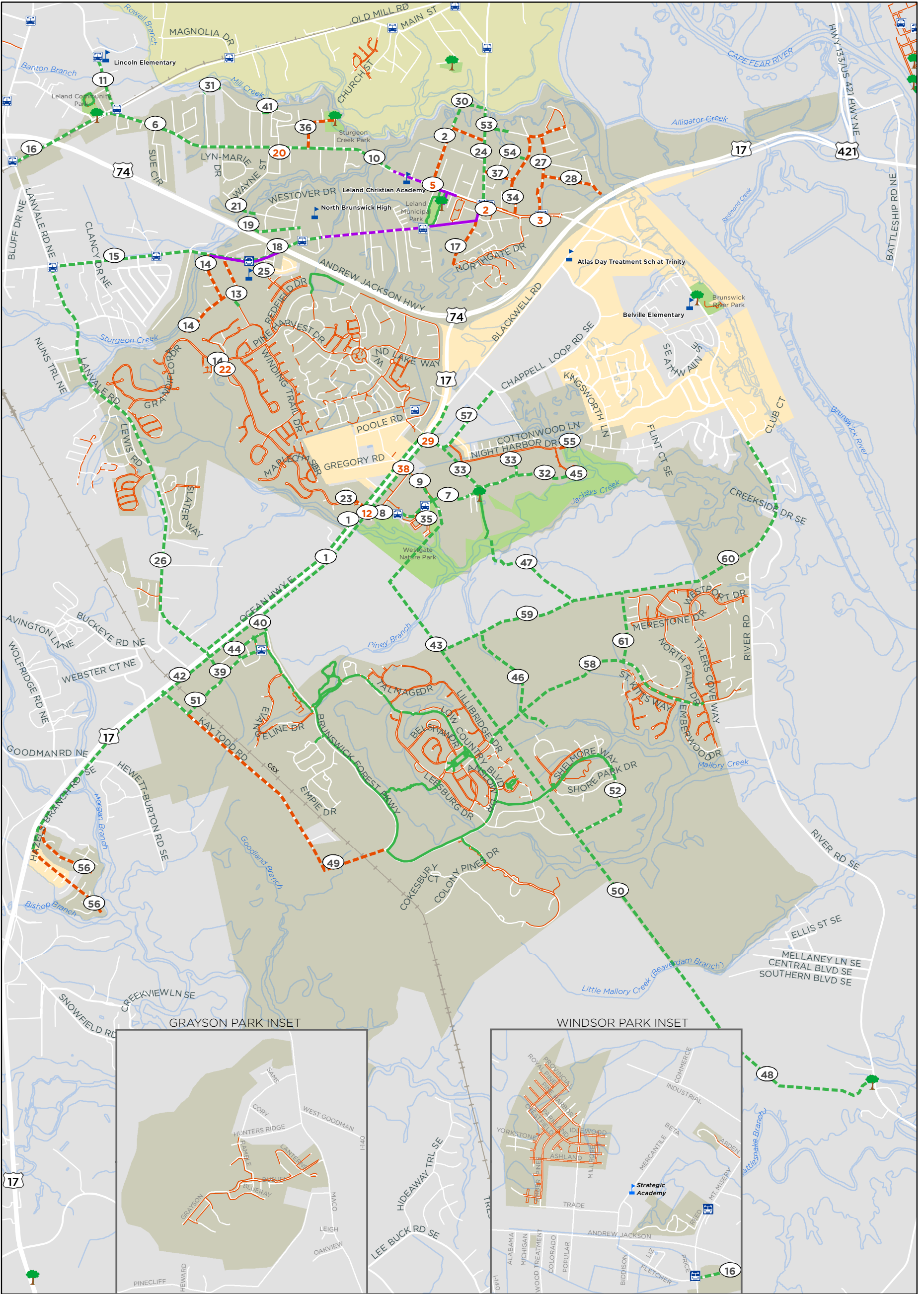
Consultant fieldwork, committee input, and previous planning efforts helped to identify important pedestrian crossing points that are in need of minor to significant improvements (see recommendations maps and tables that follow in this chapter). General characteristics include:

- » Crossings that link to sidewalks on each side of the road should possess curb cuts with ramps and marked crosswalks (which helps to satisfy the standards set forth by the American Disability Act of 1991).
- » Busy intersections could be improved with high-visibility crosswalks and crosswalk signage (see Appendix A for more design details).



Pedestrian crossing with crosswalk, curb ramp, and signage (at Town Hall Dr).

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>).



LEGEND

Town of Leland
Comprehensive
Pedestrian Plan
2015

Project Prioritization



0 0.325 0.65 Miles

- Prioritized Projects**
- Existing sidewalk
 - - - Multi-use path
 - - - Sidewalk

- x Intersection project number
- x Facility project number

- Existing sidewalk
- Existing multi-use path

- Programmed Facilities**
- - - Multi-use path
 - Sidewalk

- School
- WAVE Bus Stop

- Town of Leland
- Town of Navassa
- Town of Belville
- Parks

Coordination with NCDOT, Brunswick County and/or neighboring towns will be needed for recommendations outside of Town of Leland jurisdiction.





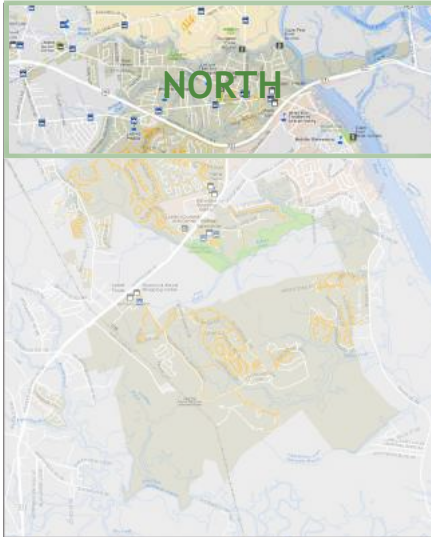
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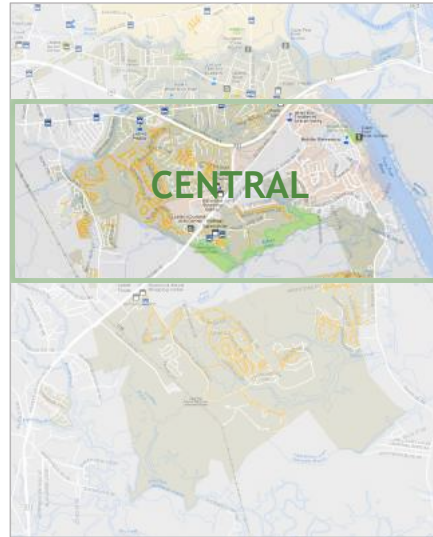
TOWN OF LELAND 'SECTORS'

Leland's town limits cover a large area of approximately 20 square miles. For the purposes of this plan, it is roughly divided into three sections or 'sectors' by natural and physical barriers - North, Central, and South, as highlighted below. Maps for each sector are displayed on pages 3-8 through 3-10 and provide a detailed review of each sector's recommendations.

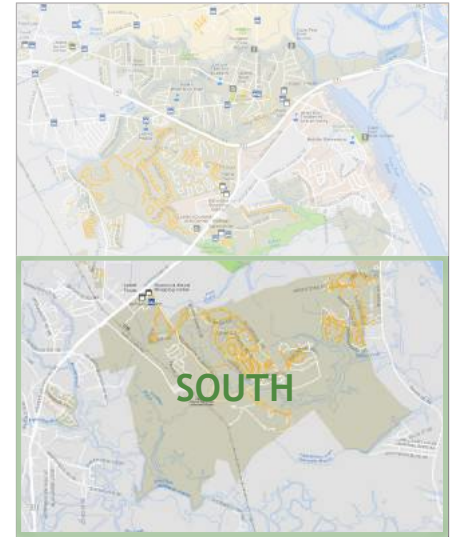
The 'North' sector is roughly bounded by US 74 to the south and Sturgeon Creek/Navassa town limits to the north.



The 'Central' sector is roughly bounded by US 74 to the north and Jackeys Creek to the south (US 17 further divides this sector).



The 'South' sector is roughly bounded by Jackeys Creek to the north and the Leland town limits to the south.



PROJECT RANKING

Project ranking began with making a list of all of the proposed network recommendations. Recommended improvements were broken down into segments at logical points, such as at major crossings and at connections to existing facilities. The criteria below were then used to rank each segment. Each criteria was given a maximum score and a project would either receive full points for meeting that criteria or no points if that criteria was not met. Projects with higher scores signify higher ranking projects and thus these projects are a higher priority for the Town. See Table 3-1 and corresponding maps on the following pages for a complete project list.

To rank projects, these criteria were selected for Leland based on existing local and regional plans, public input, existing conditions, and available data. The ranking shown in Table 3.1 is for information purposes only and does not restrict the Town or its partners to implementing a project in any particular order.

- » Pedestrian accident reported at location
- » Project would serve area with low car ownership rates
- » Worn path present
- » Potential for downtown access
- » Potential for park/trail access
- » Potential for school access
- » Potential for bus stop access
- » Project would connect to a shopping center
- » Curb and gutter present
- » Sufficient ROW present
- » Micro-gap



TABLE 3.1 OVERALL PROJECT LIST
(Criteria and ranking for information purposes only)

Total Score	Project Number (Map Key)	Street Name	To	From	Facility Type	Town Sector
29	1	US 17	Blackwell Rd	Lanvale Rd intersection	Sidepath (both sides)	Central
28	2	Old Fayetteville at Village Rd			Intersection Improvements	North
28	3	Village Rd at Shopping Center Entrance			Intersection Improvements	North
26	4	Forest Hills Dr and Loop Rd	Village Road	Navassa Road	Sidewalk	North
26	5	Town Hall pedestrian crossing			Intersection Improvements	North
24	6	Village Rd	Wayne Street	Leland Community Park	Sidepath Extension	North
24	7	West Gate Dr (Ocean Gate to Nature Park)	Ocean Gate Plaza	Westgate Nature Park	Sidepath	Central
24	8	West Gate Dr (US 17 to Ocean Gate)	US 17	Ocean Gate Plaza	Sidepath	Central
24	9	Ocean Gate Plaza	US 17	West Gate Dr	Sidepath	Central
23	10	Village Rd (Wayne to Woodland Dr)	Church (Woodland Dr)	Wayne Street	Sidepath	North
23	11	Lincoln Road	Leland Community Park	Lincoln Elementary	Sidepath	North
23	12	US 17 (at West Gate Dr)	West Gate Dr	Grandiflora Dr	Intersection Improvements	Central
22	13	Trail Pines Ct, Timber Ln, and Middle School Access	Trail Pines Ct & Timber Ln	Middle School	Sidepath	Central
22	14	Pickett Rd to Middle School	Grandiflora Dr, Timber Ln, Ricefield Br. St & Pickett Rd	Middle School	Sidewalk	Central
22	15	Old Fayetteville Rd	Pickett Rd	Lanvale Road	Sidepath	Central
21	16	Village Rd (Lanvale to Leland Community Park)	Leland Community Park	Lanvale Rd intersection	Sidepath	North
21	17	WB and S Rd sidewalk	Old Fayetteville Rd	End of street where it meets connector	Sidewalk	North
19	18	Old Fayetteville Road (Middle School to High School)	Middle School	High School	Sidepath	North
19	19	High School to Sturgeon Creek	Sturgeon Creek	Basin St NE (Brunswick HS)	Sidepath Connector	North
17	20	Village Rd at Appleton Way			Intersection Improvements	North
17	21	Royal Street to Wayne Street link	Old Fayetteville Rd	Village Rd	Sidepath, Sidewalk, Bridge	North
17	22	Grandiflora Dr at Pine Harvest	Grandiflora Dr & Pine Harvest Dr crosswalk improvements	Pine Harvest Dr	Intersection Improvements	Central
17	23	Grandiflora Dr at US 17	US 17	Existing Grandiflora Dr sidewalks	Sidewalk	Central
17	24	Navassa Rd	Leland/Navassa Town limits at Sturgeon Creek	Old Fayetteville Rd/Village Rd	Sidepath	North
16	25	Glendale Dr & Lindenwood Dr to Middle School link	Glendale Dr & Lindenwood Dr	Middle School	Sidewalk Connector	Central
16	26	Lanvale Rd sidepath	US 17	Old Fayetteville Rd	Sidepath	Central
16	27	Fairview Dr sidewalk	Live Oak Dr	Village Rd	Sidewalk	North
15	28	Dixie Dr and Riverview Dr sidewalk	Fairview Rd	Proposed sidepath on north side of US 17	Sidewalk	North
14	29	US 17 (at Ploof Rd)	Ploof Rd	Olde Waterford Way	Intersection Improvements	Central
14	30	Navassa Rd, Loop Rd, Forest Hills Dr	Navassa Rd	Forest Hills Drive	Sidepath	North
13	31	Holly Hills Dr and Sturgeon Dr	Village Road	Sturgeon Rd/Mill Creek proposed connector	Sidewalk, Sidepath	North
13	32	West Gate Dr (West Gate Park to eastern end)	Westgate Nature Park	Eastern terminus of West Gate Dr	Sidepath	Central



TABLE 3.1 OVERALL PROJECT LIST (continued)
(Criteria and ranking for information purposes only)



Total Score	Project Number (Map Key)	Street Name	To	From	Facility Type	Town Sector
13	33	Ploof Rd Ext and Angels Way	Night Harbor Dr/Ploof Rd	West Gate Dr	Sidepath	Central
13	34	Baldwin Dr sidewalk	Lee Drive	Village Rd	Sidewalk	North
12	35	Westgate Park (on Hickory Hill Dr)	Hickory Hill Dr	Westgate Nature Park shared use path terminus	Sidepath	Central
11	36	Graham Dr & Appleton Way	Village Rd and Appleton Way	Sturgeon Creek Park	Sidewalks	North
11	37	Baldwin Dr/Lee Dr/Live Oak Dr	Village Road	Proposed sidewalk on Live Oak Dr near Cape Fear River access	Sidewalk Connector	North
11	38	US 17 Pedestrian Crossing	Ocean Gate Plaza	Waterford Business Center/Gregory Rd	Intersection Improvements	Central
11	39	Brunswick Village (at US 17)	US 17 (via Provision Pkwy)	Brunswick Village Blvd	Sidepath	South
11	40	Brunswick Forest (US 17 to E Cutlar)	US 17	Existing Brunswick Forest Pkwy sidepath (@ E Cutlar Crossing)	Sidepath	South
10	41	Sturgeon Dr	Village Road	Mill Creek Loop	Sidewalk Connector	North
10	42	US 17 (South from Lanvale to Stoney Creek)	Lanvale Rd (on east side)	Combine Ln and Stoney Creek Ln neighborhoods	Sidepath	South
10	43	Power Line Trail	US 17	Wire Road	Sidepath	South
8	44	Brunswick Village (S Baxter Dr, E Cutlar Crossing, Dickinson Dr)	Brunswick Village Blvd	E Cutlar Crossing	Sidepath	South
6	45	Westgate Park (at Coral Stone Ct)	Westgate Nature Park shared use path phase 2	Coral Stone Ct	Sidepath	Central
6	46	Sidepath from Westport Trail	Westport Trail	Mallory Creek	Sidepath	South
6	47	Jackey's Creek to Westport Trail	Westport trail	Jackey's Creek/Westgate Nature Park trail	Sidewalk Connector	South
6	48	Power Line Trail (to Nature Park)	Wire Road	Brunswick Nature Park (ending sidepath at River Road)	Sidepath	South
6	49	Kay Todd Road sidewalk extension and connector	Brunswick Village Proposed Sidepath	Brunswick Forest Parkway	Sidewalk Connector	South
6	50	Power Line Trail extension	Proposed Power Line Trail	Southern Blvd	Sidepath	South
5	51	Brunswick Village	Provision Pkwy	US 17 (via Kay Todd and new road connecting across RR tracks)	Sidepath	South
5	52	Shelmore Way Loop (with Wire Road)	Existing Shelmore Way	Low Country Blvd (via Wire Road) & Shemore Way	Sidepath	South
5	53	Live Oak Drive extension	Navassa Rd	Live Oak Drive	Sidepath	North
5	54	Lake Drive to Lee Drive	Lake Drive	Lee Drive	Sidepath	North
4	55	N Olde Towne Wynd and Jackeys Creek Ln	Night Harbor Dr	N Olde Wynd and Jackeys Creek Ln	Sidewalk Connector	Central
3	56	Combine Ln & Stoney Creek Ln	Proposed US 17 sidepath	Neighborhood end	Sidewalk	South
2	57	Ploof Rd	US 17	Chappell Loop Rd	Sidepath	Central
2	58	Mallory Creek to Rice Gate Way	Mallory Creek Drive	Rice Gate Way	Sidewalk Connector	South
2	59	Westport Trail (from Power Line Trail)	Power line trail	NW corner of Westport existing development	Sidepath	South
2	60	Westport Trail (to River Rd)	NW corner of Westport existing development	River Rd/NC Highway 133 where it meets Belville Town Limits	Sidepath	South
2	61	Westport to Mallory Creek	Mallory Creek Drive sidepath	Proposed trail at NW corner of Westport neighborhood	Sidepath	South



MAP 3.2 - North Sector Priorities

Town of Leland
Comprehensive
Pedestrian Plan
2015

Project Prioritization - North

Prioritized Projects

- Multi-use path
- Sidewalk

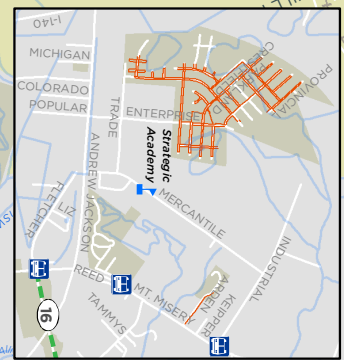
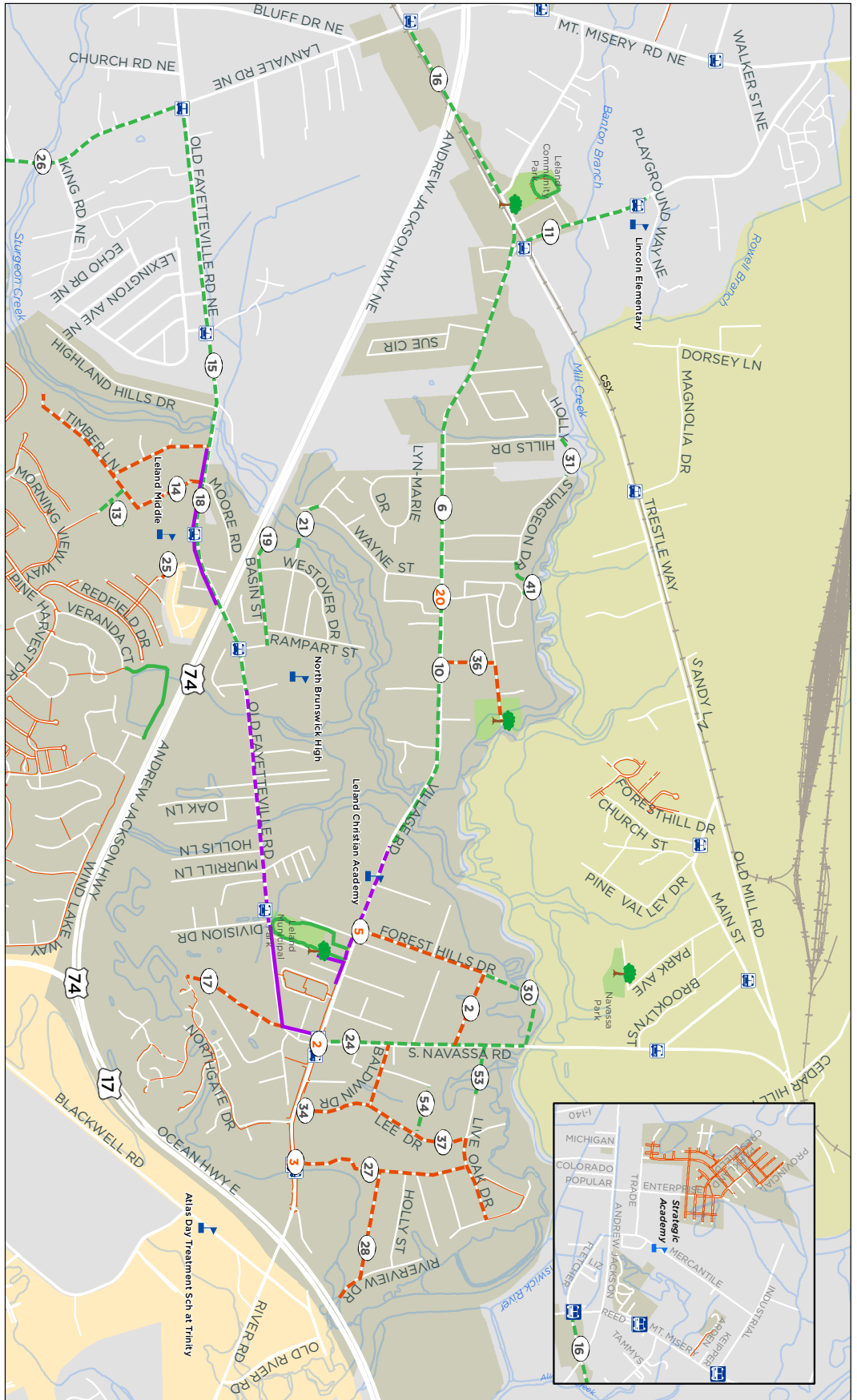
Programmed Facilities

- Existing sidewalk
- Existing multi-use path
- Sidewalk
- Multi-use path

Coordination with NCDOT, Brunswick County and/or neighboring towns will be needed for recommendations outside of Town of Leland jurisdiction.

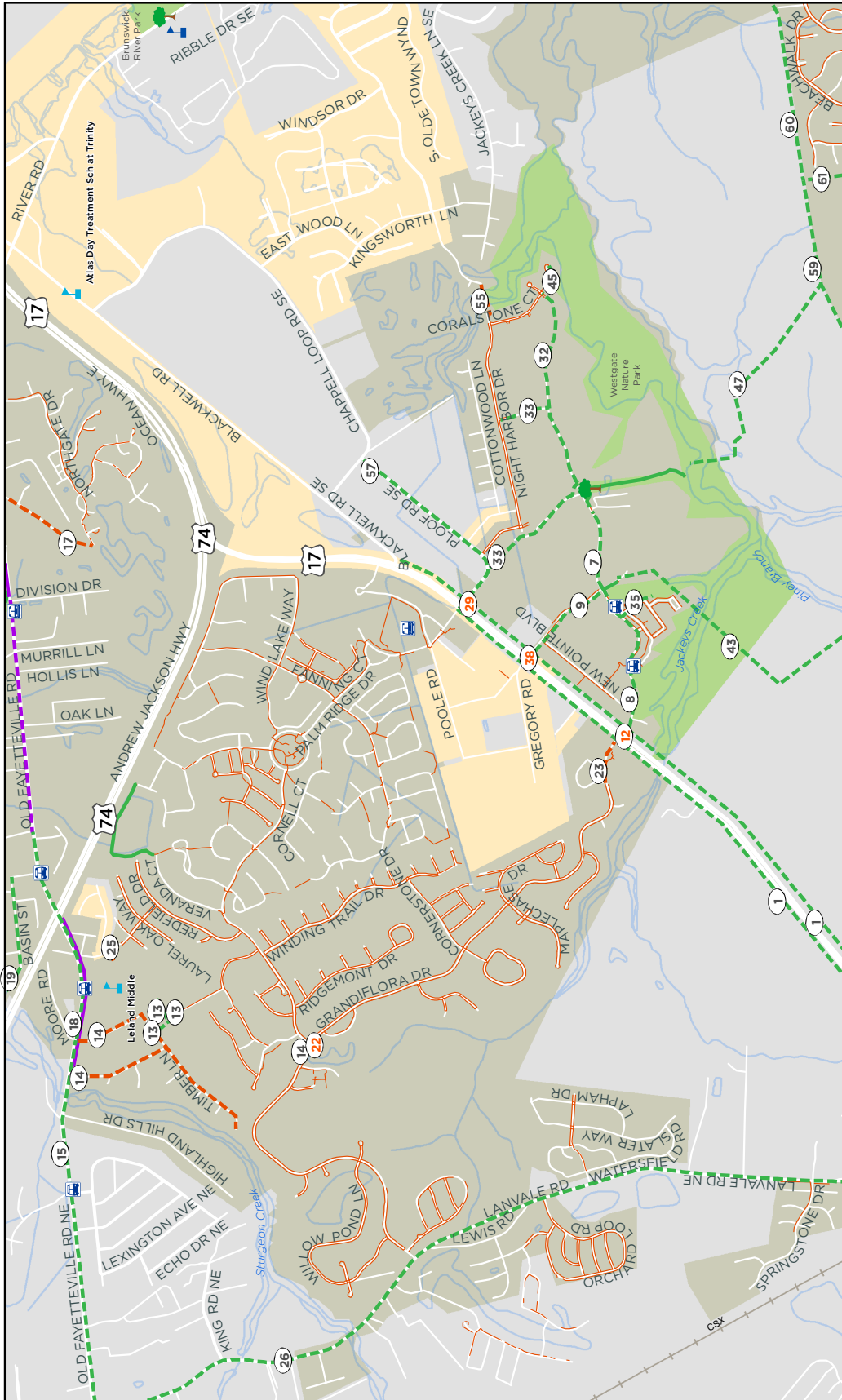
LEGEND

- School
- WAVE Bus Stop
- Town of Leland
- Town of Navassa
- Town of Belville
- Parks





MAP 3.3 - Central Sector Priorities



Town of Leland
Comprehensive
Pedestrian Plan
2015

Project Prioritization - Central

Prioritized Projects

- Existing sidewalk
- - - Multi-use path
- - - Sidewalk
- x Intersection project number
- x Facility project number

LEGEND

- School
- WAVE Bus Stop
- Town of Leland
- Town of Navassa
- Town of Belville
- Parks

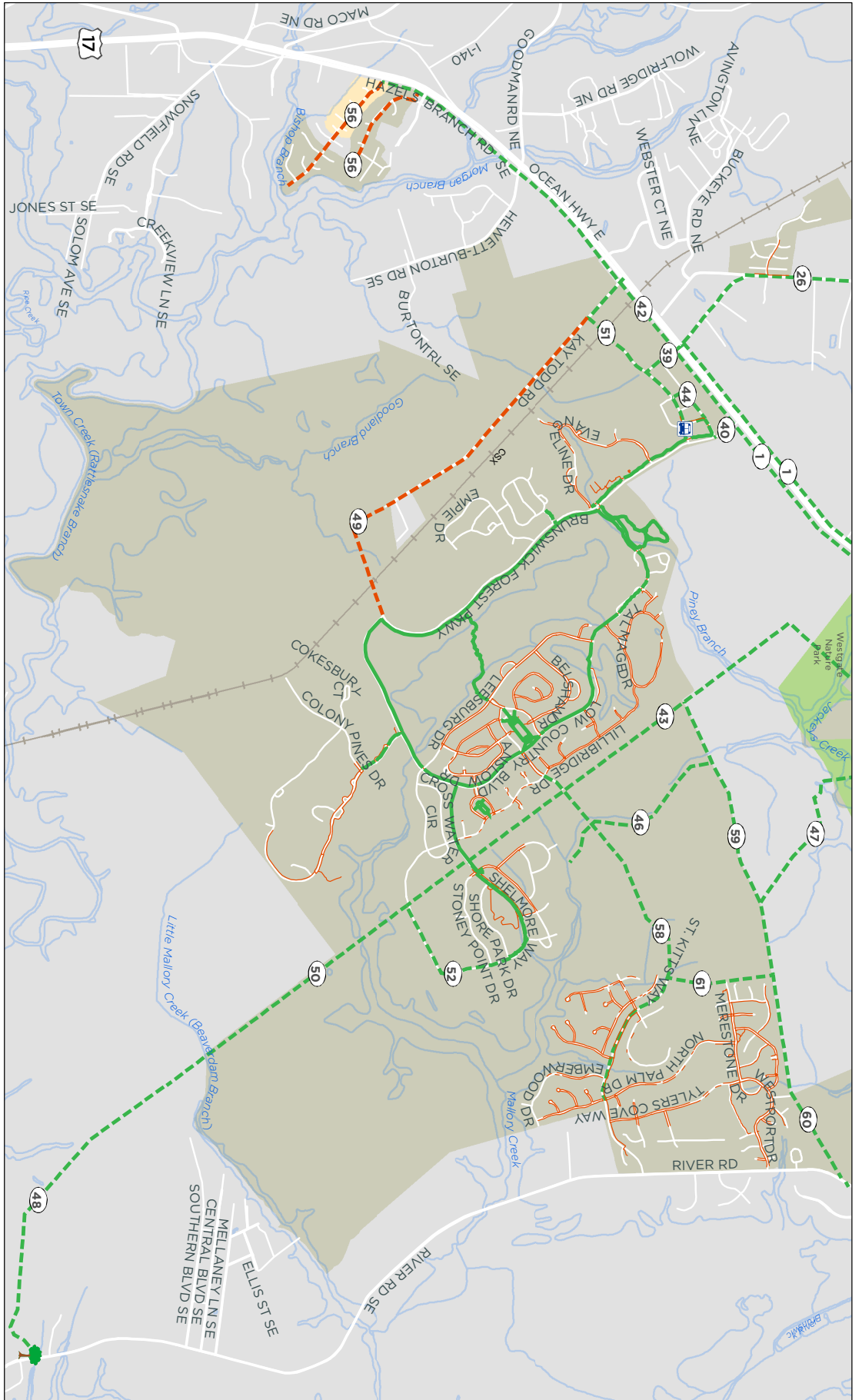
Programmed Facilities

- - - Multi-use path
- - - Sidewalk

Coordination with NCDOT, Brunswick County and/or neighboring towns will be needed for recommendations outside of Town of Leland jurisdiction.



MAP 3.4 - South Sector Priorities



Town of Leland
Comprehensive
Pedestrian Plan
2015

Project Prioritization - South



Prioritized Projects

Multi-use path

Sidewalk

Intersection project number

Facility project number

Programmed Facilities

Existing sidewalk

Existing multi-use path

Multi-use path

Sidewalk

LEGEND



School



WAVE Bus Stop
NCDOT, Brunswick
and/or



Town of Leland
neighboring towns
will be needed for



Town of Navassa
outside of Town of



Town of Belville
Leland Jurisdiction.



alta



Walk
Bike
Leland



Map 3.1 shows the locations of all pedestrian recommendations, including sidewalks, multi-use paths, and intersection improvements. The locations for these recommendations were selected based on steering committee input and public input. Projects identified in Table 3.1 are labeled in Maps 3.1, 3.2, 3.3, and 3.4 with corresponding project numbers. Programmed facilities refer to facilities with an identified funding source and are slated for design and/or construction.

REGIONAL CONNECTIVITY

In order to establish a well-connected pedestrian network in Leland, several recommendations were identified that fall outside of Leland's municipal limits (see Table 3-2 below). At a pedestrian scale, it's often hard to tell when one is leaving a Town and entering the next. Since the Towns of Leland, Navassa and Belville are so interconnected, several pedestrian projects were identified that would need to be implemented on a regional level (see Map 3.5).

TABLE 3.2 PROJECT LIST IN NEIGHBORING MUNICIPALITIES

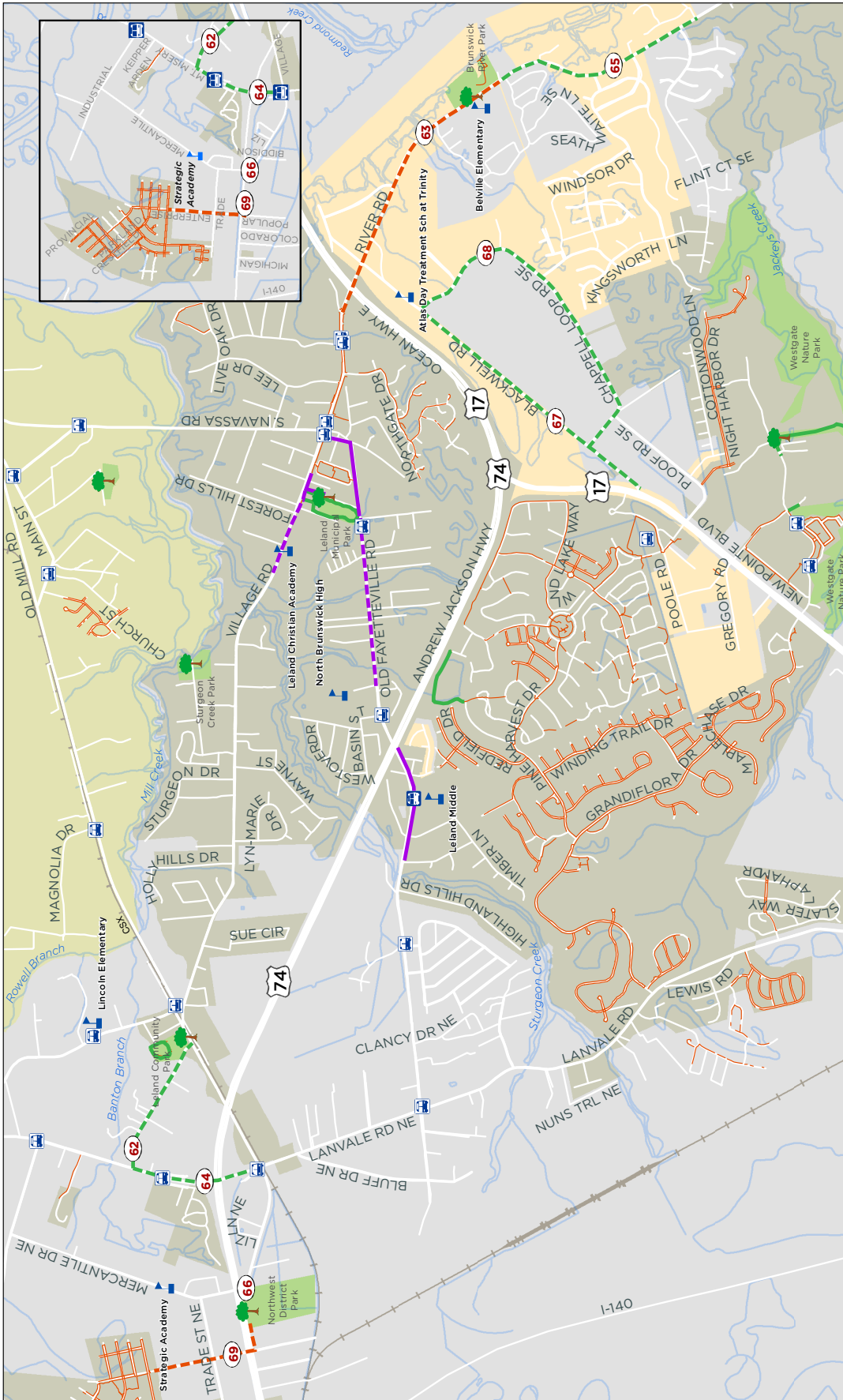
(Criteria and ranking for information purposes only)

Total Score	Project Number (Map Key)	Street Name	To	From	Facility Type	Town Sector
29	62	Leland School Road	Leland Community Park	Mt. Misery Road	Sidepath	North
22	63	Cape Fear River Access on River Road	Village Road	Cape Fear River Access	Sidewalk	North
20	64	Mt. Misery Road/Lanvale Road	Leland School Road	Village Road/Lanvale Road	Sidepath	North
15	65	River Road	Brunswick Nature Park (Wire Road)	Belville Town Limits	Sidepath	South
14	66	Fletcher Road	Lanvale Road/Village Road/Fletcher Road	Northwest District Park	Sidewalk	North
10	67	Blackwell Road	US 17	River Road	Sidepath	Central
7	68	Chapell Loop Road	Blackwell Road	Blackwell Road	Sidepath	Central
6	69	Northwest District Park Trail	Northwest District Park	Ashland Way (via Enterprise Drive)	Trail Connection	North

Coordination with NCDOT, Brunswick County and/or neighboring towns will be needed for recommendations outside of Town of Leland jurisdiction.



MAP 3.5 - Regional Projects



LEGEND

	Prioritized Projects		School
	Multi-use path		WAVE Bus Stop
	Sidewalk		Town of Leland
	Regional project number		Town of Navassa
			Town of Belville
			Parks

Town of Leland
Comprehensive
Pedestrian Plan
2015

Regional Projects

0 0.325 0.65 Miles

Coordination with NCDOT, Brunswick County and/or neighboring towns will be needed for recommendations outside of Town of Leland jurisdiction.

TABLE 3.3 INTERSECTION RECOMMENDATIONS

Road 1	Road 2	Destinations Served	Recommendation
Village Rd	Old Fayetteville Rd	Restaurants, Retail, Gas Station, Pharmacy	Upgrade existing crosswalks to high visibility crosswalks; Evaluate opportunity for pedestrian refuge island in the NE corner
Village Rd	Fairview Rd	Shopping Center with Piggly Wiggly, Gas Station, Restaurant, Retail	Upgrade existing crosswalks to high visibility crosswalks
Village Rd	Forest Hills Drive	Church, Residential Area	Install pedestrian crossing accommodations with sidewalk project on Village Road
Village Rd	Appleton Way	Residential Area	Extend sidewalk on Appleton Way to Village Road and evaluate crossing accommodations during Village Road project
Grandiflora Dr	Pine Harvest Drive	Residential Area	Install high visibility crosswalks and curb ramps on all 3 legs of intersection; pedestrian warning signs are recommended on Grandiflora Drive
Old Fayetteville Rd	Basin Street	North Brunswick High School	Pedestrian crossing accommodations should be considered when sidewalk on Old Fayetteville Road is implemented; and a sidewalk connection on Basin Street from Old Fayetteville Rd to school entrance should be considered
Old Fayetteville Rd	Pickett Rd	Residential Area	Pedestrian refuge island should be considered across Old Fayetteville Rd in conjunction with sidewalk project
US 17	Ploof Rd	Retail, Gas Station, Pharmacy	Refer to Page 3-20 to 3-21 for cutsheet
US 17	Ocean Gate Plaza	Shopping Plaza with Walmart, Retail, Banks, Restaurants, Gas Station	Partner with NCDOT Division 3 to evaluate crossing opportunities; Refer to Page 2-13 for more information on superstreets
US 17	West Gate Drive	Retail, Small Businesses, Lodging, Restaurants	Partner with NCDOT Division 3 to evaluate crossing opportunities; Refer to Page 2-13 for more information on superstreets
US 17	Brunswick Forest Parkway	Shopping Center with Lowe's Foods, Retail, Restaurants	Partner with NCDOT Division 3 to evaluate crossing opportunities; Refer to Page 2-13 for more information on superstreets
Ocean Gate Plaza	West Gate Drive	Residential Area, Shopping Center	Add ADA compliant curb ramps at all four corners of intersection with high visibility crosswalks
US 17	Kay Todd Road	Residential Area	No pedestrian crossing recommended at this time; reevaluate as development occurs
Hazels Branch Rd	Stoney Creek Lane	Small Businesses, Residential Area	No pedestrian crossing recommended at this time; reevaluate as development occurs
Westport Drive	River Rd	Residential Area	When multi-use path is implemented at River Road, consider crossing improvements at Westport Drive



PLANNING LEVEL COST ESTIMATES

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

- » Multi-Use Path/Sidepaths (10-12') \$600,000/mile
- » Sidewalk (5' minimum) \$264,000/mile

Per unit cost estimate for additional elements included in select priority projects and priority investments are as follows:

- » Rectangular Rapid Flashing Beacon \$22,250/each
- » Median Refuge Island \$13,520/each
- » High-visibility Crosswalk \$2,540/each
- » Curb Extensions \$13,000/each
- » Wayfinding Signage \$250/each

The source for the above 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. Planning level cost estimates for priority projects include 15% mobility/contingency factor. Priority investments include 20% mobility/contingency due to their complexity.

It is important to note that costs for bicycle and pedestrian infrastructure vary greatly from city to city and site to site. All cost estimates should be used only for estimating purposes and not necessarily for determining actual bid prices for a specific infrastructure project. To increase readiness for grant funding, municipalities should develop preliminary plans (30% construction drawings) for priority projects.



New sidewalk construction costs vary on several factors. Further design is needed to develop detailed project costs.



PROJECT CUTSHEETS

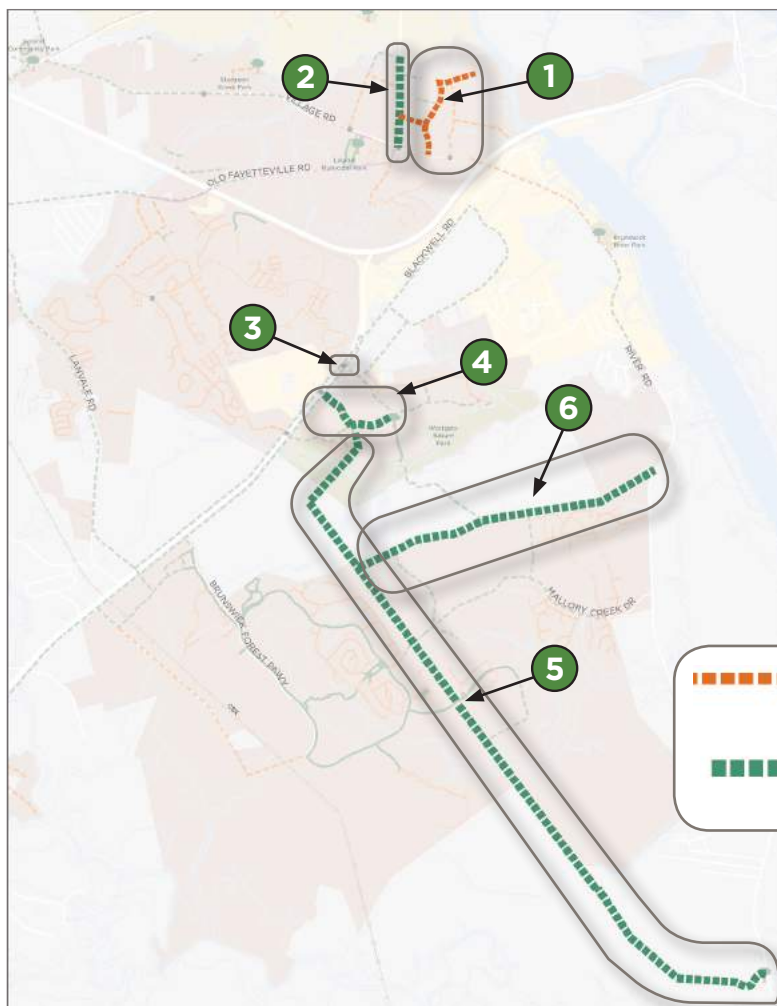
The project cutsheets in this chapter on page 3-16 through 3-27 provide further detail for select projects. These projects were selected not only by their priority ranking, but also by their constructability, connectivity to schools and/or destinations, and identified funding opportunities. During a steering committee meeting, Town staff and the project steering committee weighed in on which projects they wanted to highlight in the cutsheets as priority projects. Two projects from each sector were selected to provide project examples from across the Town. Together, these six projects showcase a sampling of project types and implementation strategies.

The higher cost and complexity of some projects may require more study and coordination. These projects are: South Leland Trail (Priority Project #5) and Southeast Leland Trail (Priority Project #6). These priority projects have the ability to yield a return on investment by giving people better access to destinations, improving safety, and providing transportation and recreation facilities. Project cost estimates are based on its length and average per-mile costs (described on page 3-14). It should be noted that right-of-way costs were not included in these estimates.

The complete project list found on pages 3-6 and 3-7 are in order of priority and should be implemented using guidance from Chapter 4 and Appendix B: Funding.

The six project segments are displayed in the map below, with more details on the following pages.

MAP 3.6 - Project Cutsheet Overview



Priority Project #	Project Name
1	Baldwin, Lee, and Live Oak Drive Sidewalk to Brunswick River Access
2	Navassa Road Multi-Use Path
3	US 17 Pedestrian Crossing
4	Ocean Gate Plaza and West Gate Drive Multi-Use Path
5	South Leland Trail
6	Southeast Leland Trail Concept

 Priority Sidewalk
 Priority Multi-Use Path



1 BALDWIN DR, LEE DR, AND LIVE OAK DR SIDEWALKS

Project at a Glance:

- » Sector: North Leland
- » Facility type: Sidewalk
- » Length: 5,600 ft (1.1 miles)
- » Width: 5 feet
- » Surface type: Concrete
- » Associated improvements: Grass buffer on sidewalks, right-of-way acquisition

Planning Level Cost Estimate:

- » \$280,000

Existing Conditions

- » Residential area with no sidewalks on either side
- » Two-lane road with 1 travel lane in each direction and no marked centerline

Pedestrian Trip Generators:

- » Brunswick River access
- » Village Road businesses
- » Residential neighborhoods

Location Map



Opportunities & Constraints

Existing sidewalk along Brookhaven Trail links to the Brunswick River access.

This project would enhance connectivity to potential improvements along Navassa Road (see project 2) with connectivity potential to Sturgeon Creek and beyond to the Town of Navassa. Crossing location to reach project 2 on the west side of Navassa Road will need further examination.

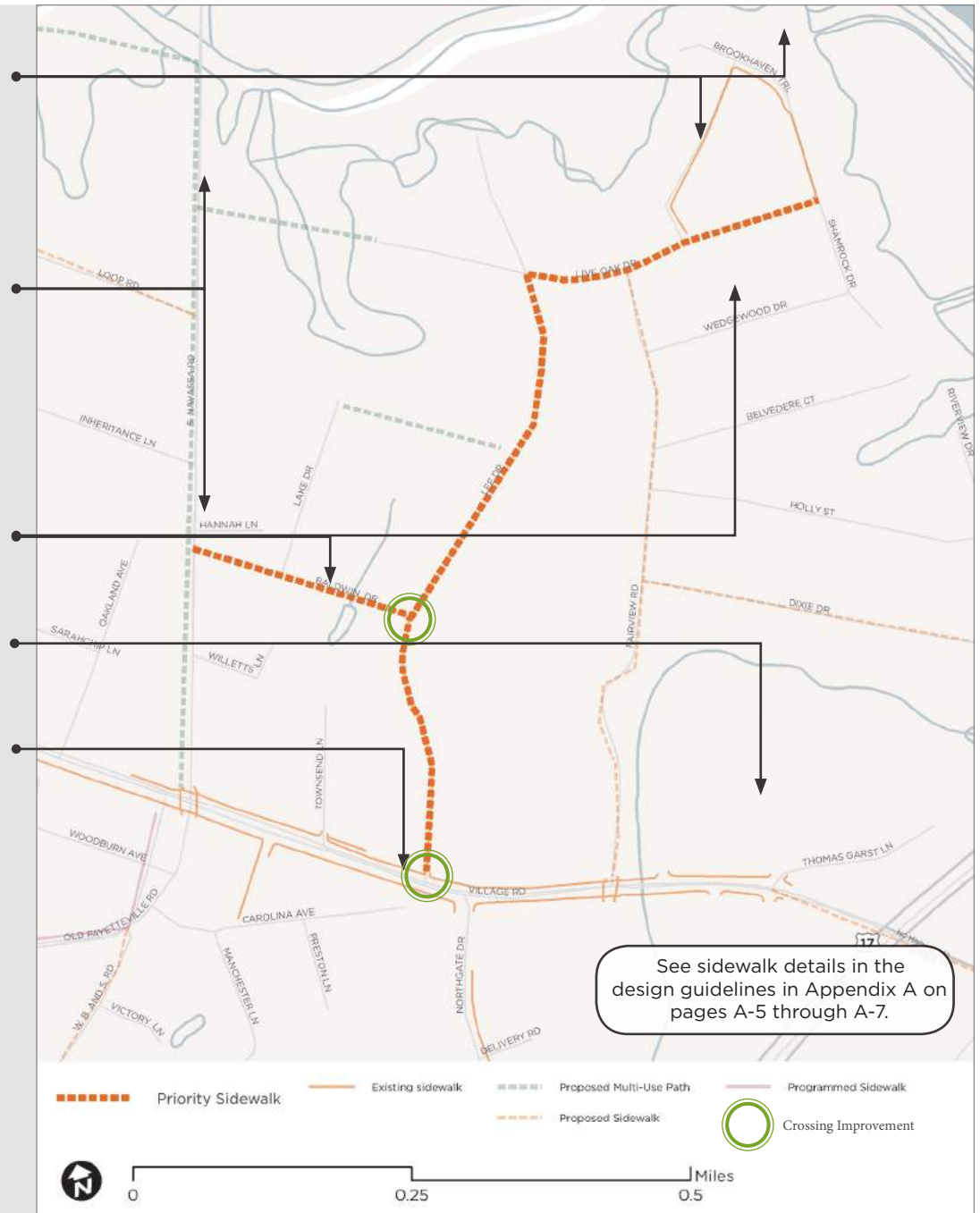
This project enhances connectivity to the residential neighborhood bounded by Navassa Road, Village Road, US 17, and the Brunswick River.

Many retail destinations are located off of Fairview Rd

This project links to existing sidewalks along Village Road provide east/west connectivity to grocery stores and multiple businesses along Village Road.

Curb and gutter likely needed for most of project. Drainage analysis and engineering design is needed

Potential right-of-way acquisition may be needed. Preliminary design phase will determine impacts to adjacent properties.





Right: Existing photo of Baldwin Drive and Lee Drive intersection facing south.



Below: Photo Simulation of Baldwin Drive and Lee Drive intersection facing south.





2 NAVASSA ROAD MULTI-USE PATH

Proposed Project at a Glance:

- » Sector: North Leland
- » Facility type: Multi-Use Path
- » Length: 3,400 ft (0.7 miles)
- » Width: 10 feet
- » Surface type: Asphalt
- » Associated improvements: Wayfinding signage, pavement markings

Planning Level Cost Estimate:

- » \$340,000

Existing Conditions

- » Residential area with no sidewalks on either side
- » Two-lane road with 1 travel lane in each direction

Pedestrian Trip Generators:

- » Sturgeon Creek access
- » Village Road businesses
- » Residential neighborhoods
- » Connectivity toward Navassa

Location Map




Opportunities & Constraints

Connectivity to Sturgeon Creek access and toward the Town of Navassa.

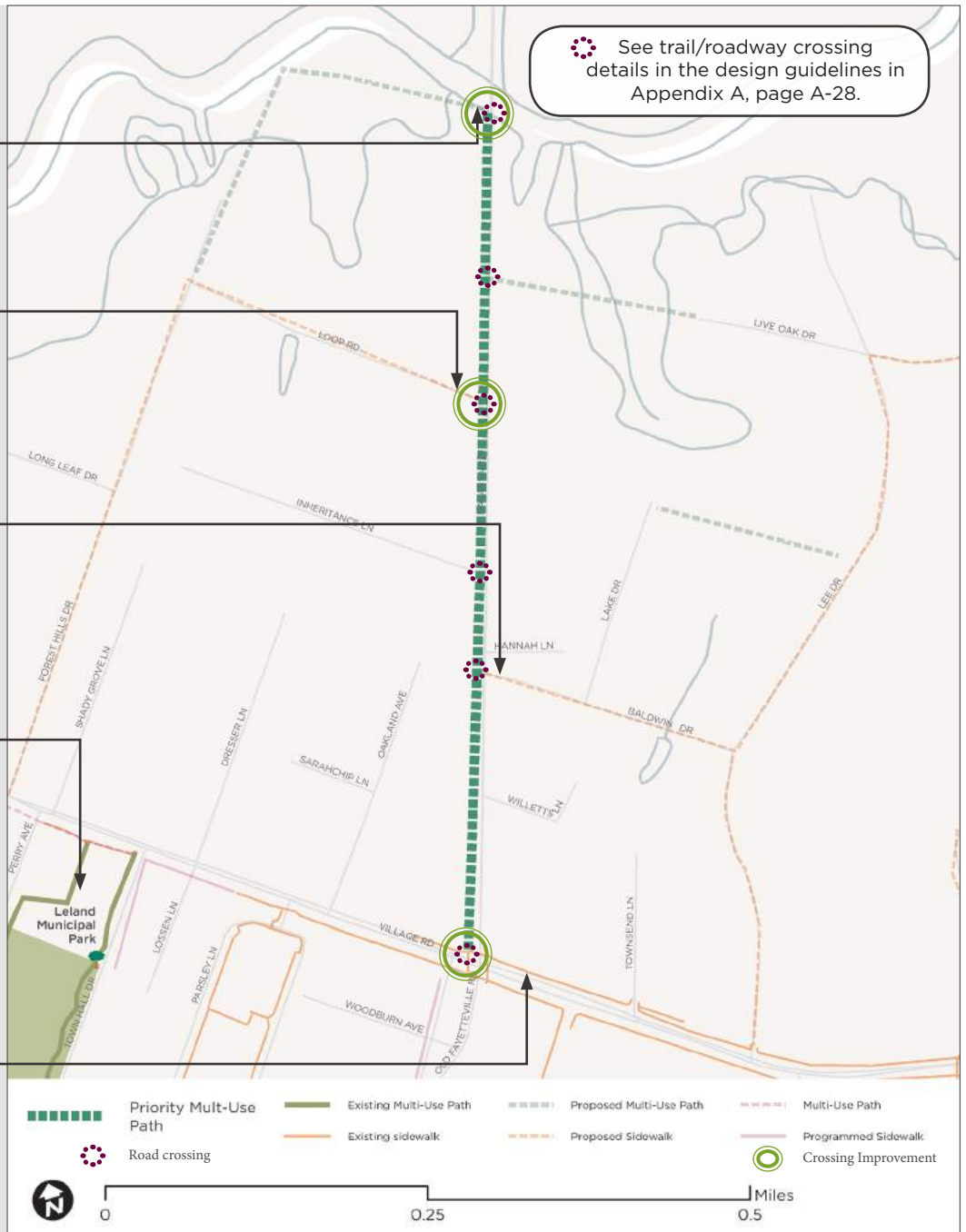
This proposed multi-use path would run along the west side of Navassa Road, significantly enhancing connectivity for the neighborhood to the west.

Further study will be needed to identify crossing locations to connect to the neighborhood east of Navassa Road.

Crossing infrastructure, existing sidewalks, and programmed sidewalks will connect this project to Leland Municipal Park.

 Crossing improvements could include pedestrian refuge island, high visibility crosswalk markings, pedestrian signals, accessible curb ramps

Existing sidewalks will connect this project toward the grocery stores and retail businesses along Village Road to the east.



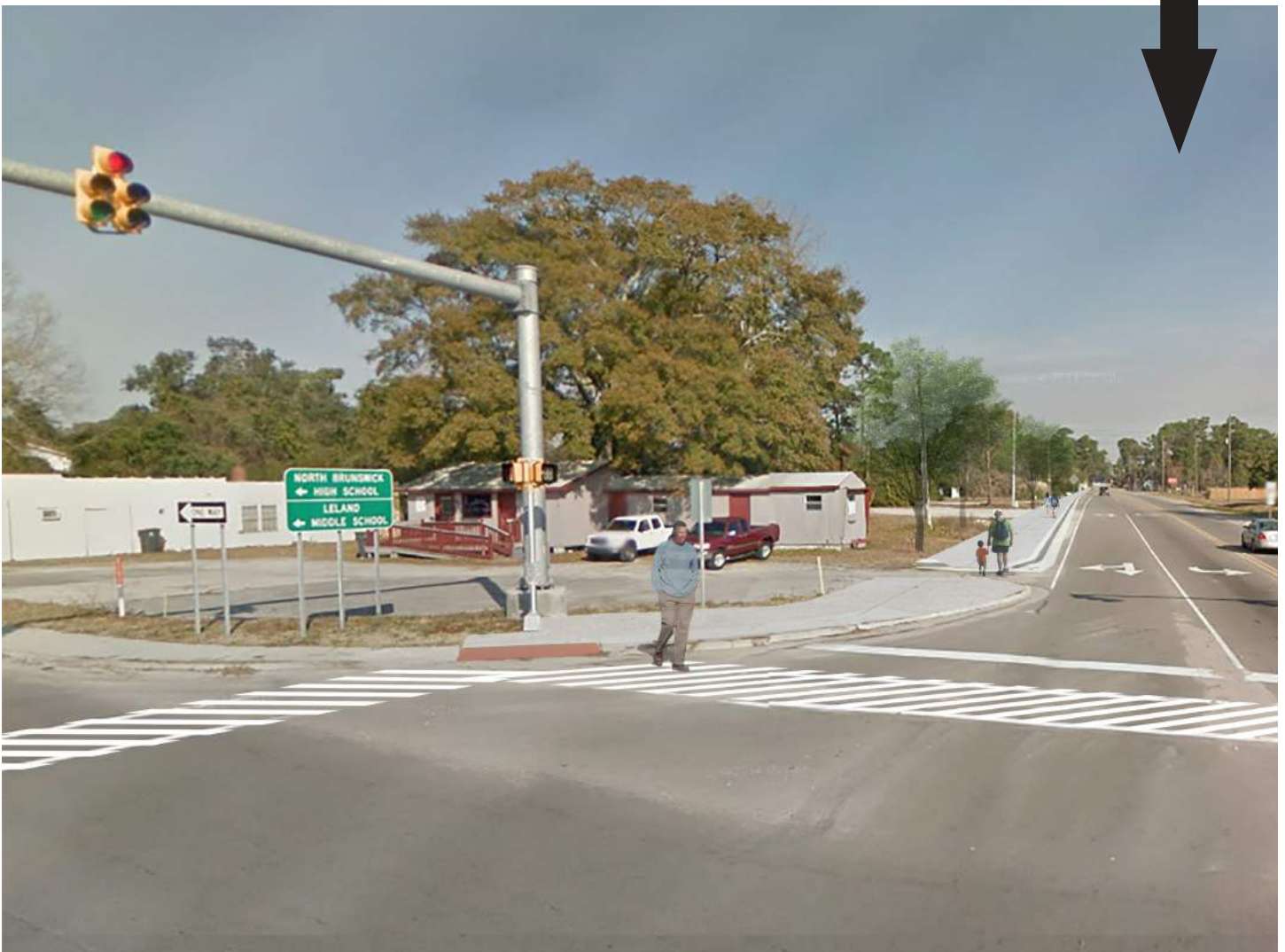


To reduce right-of-way impacts, the multi-use path is proposed next to the curb with no buffer. While this reduces pedestrian comfort, traffic volumes are low and bike traffic is expected, making the multi-use path preferred over a standard 5' sidewalk. Signage and pavement markings are recommended for this multi-use path to reduce conflicts between pedestrians and bicyclists.

Right: Existing photo of Navassa Road from the Village Road/Navassa Road intersection facing north.



Below: Photo Simulation of Navassa Road sidepath from the Village Road/Navassa Road intersection facing north.





3 US 17 AND OCEAN GATE PLAZA PEDESTRIAN CROSSING

Proposed Project at a Glance:

- » Sector: Central Leland
- » Facility type: Pedestrian crossing
- » Intersection improvements: Curb ramps, high visibility crosswalks, median with pedestrian refuge island, pedestrian countdown signal
- » Associated improvements: Street trees

Planning Level Cost Estimate:

- » \$95,000

Existing Conditions:

- » Intersection at US-17, a superstreet with 9 travel lanes (5 lanes on one side and 4 lanes on the other side)
- » Grass median on Olde Waterford Way with no pedestrian landing area
- » Median on US-17 with no pedestrian landing area

Pedestrian Trip Generators:

- » Commercial area and neighborhoods on both sides of US 17

Location Map



Opportunities & Constraints:

Install high visibility crosswalk markings.

Lessen curb radius and extend for new landing area and crossing. Curb radius must remain great enough to accommodate turning trucks.

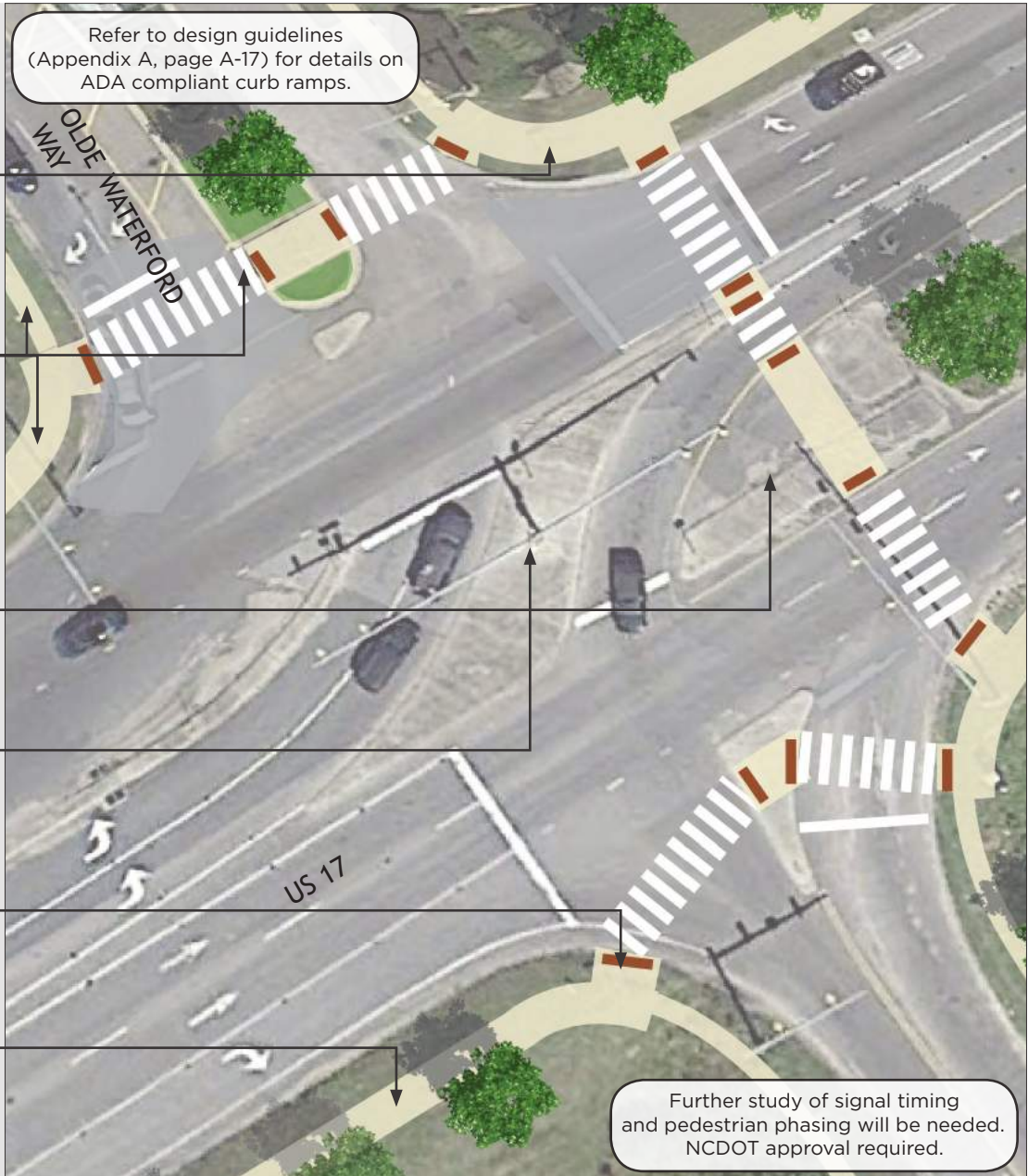
Continue sidepath through crossing of shopping center entrance with high visibility crosswalk and pedestrian refuge island. Extend existing sidewalk to the southwest corner of the intersection.

Complete median island (partially missing at present) with at-grade landing area and path.

A diagonal crossing is not feasible due to the location of the signal pole in the median island.

Upgrade all existing curb ramps to current Access Board standards

Utilize space parallel to US 17 for multi-use path construction.

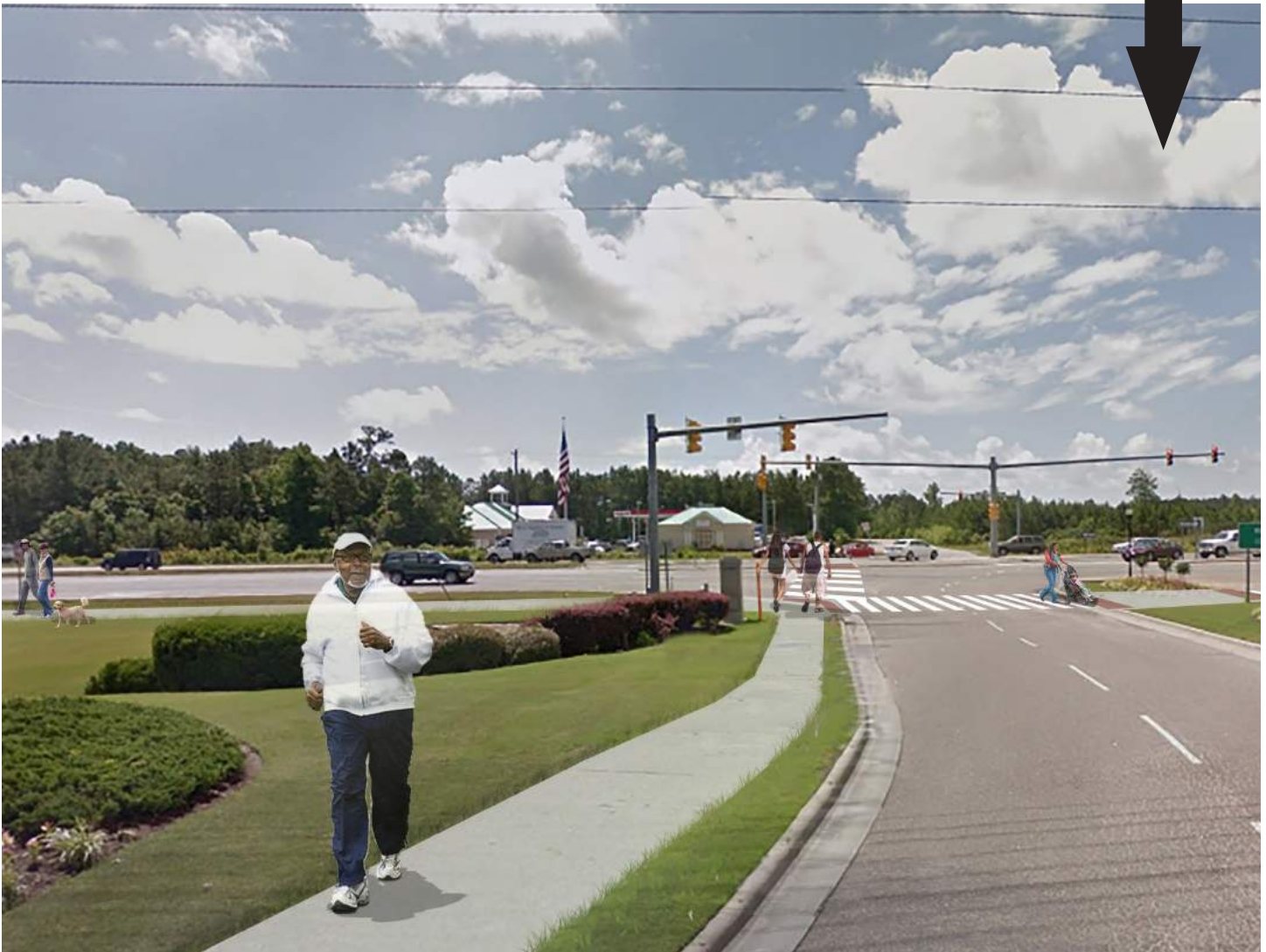




Right: Existing photo of Olde Waterford Way from the US 17 intersection facing east.



Below: Photo Simulation of the Olde Waterford Way sidewalk from the US 17 intersection facing east.





4 OCEAN GATE PLAZA AND WEST GATE DRIVE MULTI-USE PATH

Proposed Project at a Glance:

- » Sector: Central Leland
- » Facility type: Multi-Use Path
- » Length: 3,000 ft (0.6 miles)
- » Width: 10 feet
- » Surface type: Asphalt
- » Associated improvements: Wayfinding signage to mark distance to destinations, pavement markings, crossing improvements at parking lot entrances, landscaping

Planning Level Cost Estimate:

- » \$300,000

Opportunities & Constraints:

The connection opportunities provided by this project will significantly increase when crossings and multi-use trails along US 17 are implemented (project 3).

This multi-use path must cross three entrances to the Shoppes at Westgate parking lot along Ocean Gate Plaza. Warning signs for motorists should be placed at these entrances.

High visibility crosswalks, curb ramps, and yellow warning signs for pedestrian crossing will be needed at the Ocean Gate Plaza/West Gate Drive intersection.

An existing and developing trail network at Westgate Nature Park connects this project to the park and residential neighborhoods to the east and south.

A short, existing segment of multi-use path along the southeastern terminus of Ocean Gate Plaza connects this project to the proposed South Leland Trail (project 5).

Existing utility boxes detract from the public space and could be hidden using landscaping.

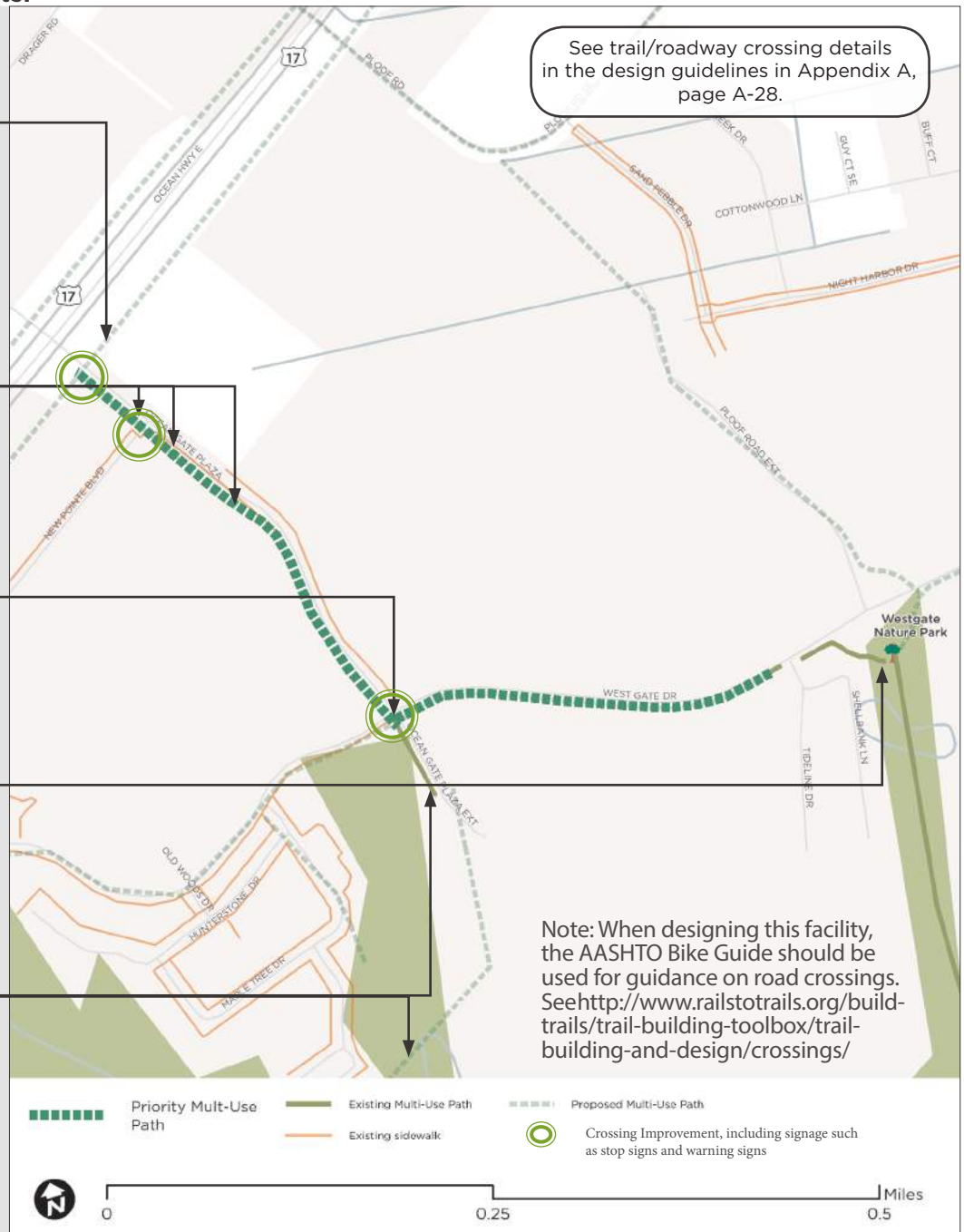
Existing Conditions:

- » Presence of sidewalks varies on Ocean Gate Plaza; some segments have sidewalks on two, one, or none of the sides
- » No sidewalks on West Gate Drive

Pedestrian Trip Generators:

- » Walmart and commercial center along US 17
- » Westgate Nature Park
- » Residential neighborhoods

Location Map

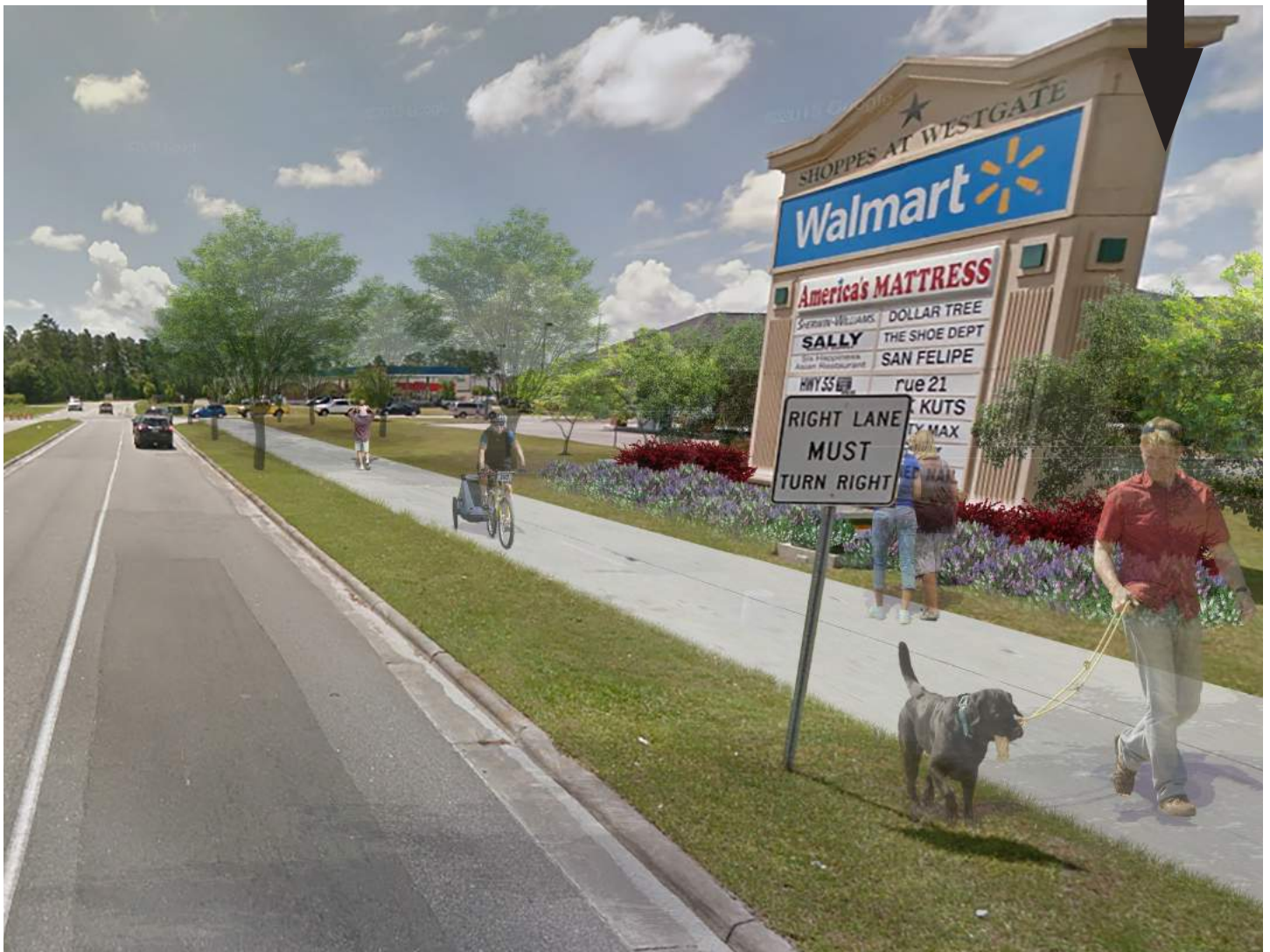




Right: Existing photo of Ocean Gate Plaza from the US 17 intersection facing east.



Below: Photo Simulation of the Ocean Gate Plaza multi-use path from the US 17 intersection facing east.





5 SOUTH LELAND TRAIL

Proposed Project at a Glance:

- » Sector: South Leland
- » Facility type: Multi-Use Trail
- » Length: 30,400 ft (5.8 miles)
- » Width: 10 feet
- » Surface type: Asphalt
- » Associated improvements: Wayfinding signage, bridge/boardwalk, trail and crossing improvements

Planning Level Cost Estimate:

- » \$3,040,000

Opportunities & Constraints:

Bridges and/or boardwalk construction likely needed for Piney Branch and Jackeys Creek crossings - further examination needed.

Several connection opportunities to the Westport, Mallory Creek, and Meadow Park neighborhoods.

Stakeholder engagement will be necessary to implement this project, including property owners, and utility companies.

Continuing southeast along Wire Road (dirt), several stream crossings will need further examination. Opportunity to utilize existing dirt road and utility corridor.

This project will connect to the Brunswick Nature Park and terminate at River Road.

This project will serve as the main artery in south/central Leland from which to build the pedestrian network laid out in this plan.

Existing Conditions:

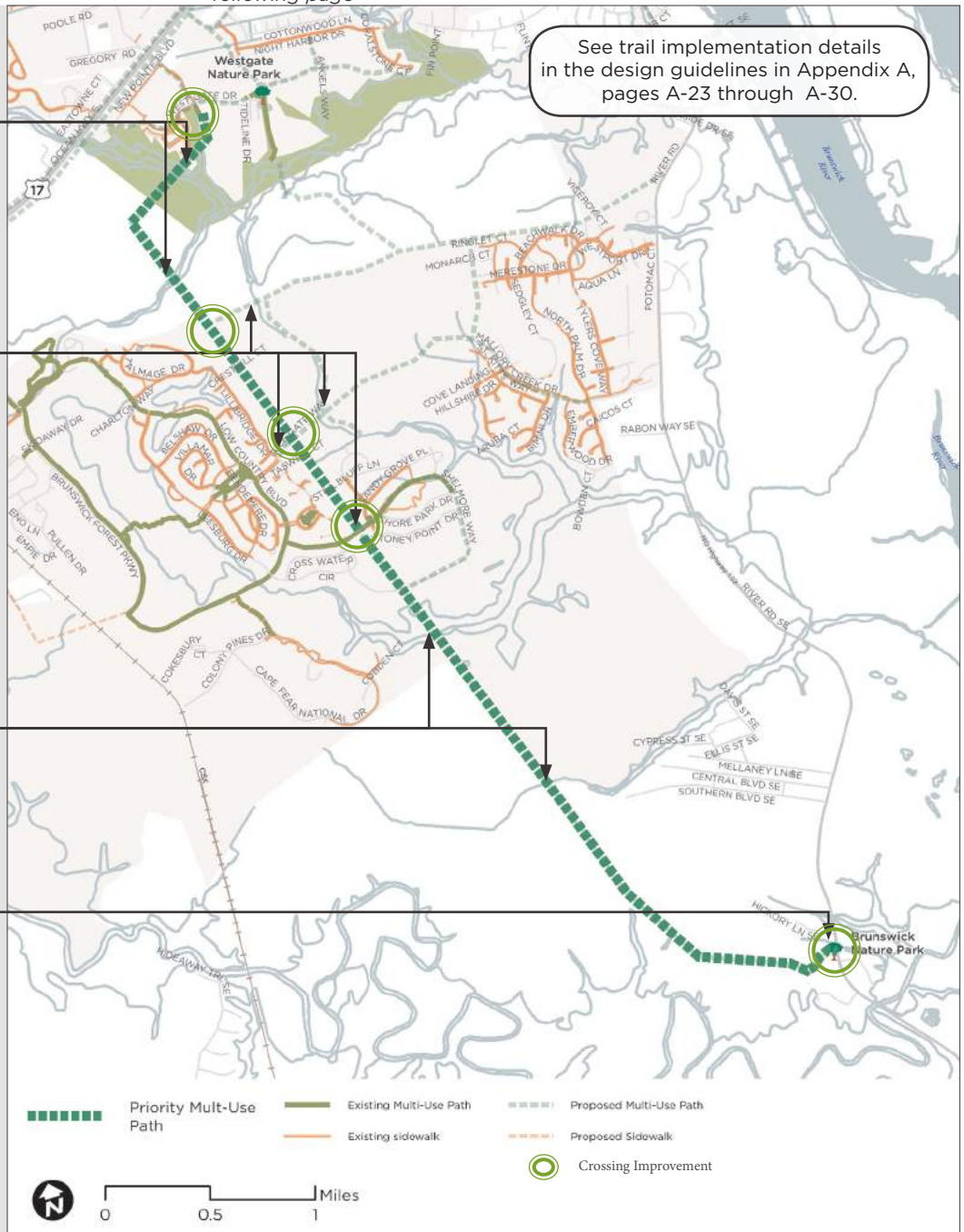
- » Proposed route goes through heavily wooded area with multiple creeks and streams
- » Wire Road is an existing dirt road

Pedestrian Trip Generators:

- » Residential neighborhoods in central and south sectors
- » Walmart & commercial center on US 17
- » Brunswick Nature Park
- » Westgate Nature Park

See *photosimulation* for this location on the following page

Location Map





Right: Existing photo of the dirt road between the powerlines and the Meadow Park neighborhood facing south.



Below: Photo Simulation of the South Leland Trail between the powerlines and the Meadow Park neighborhood facing south.





6 SOUTHEAST LELAND TRAIL CONCEPT

Proposed Project at a Glance:

- » Sector: South Leland
- » Facility type: Multi-Use Trail
- » Length: 12,300 ft (2.3 miles)
- » Width: 10 feet
- » Surface type: Asphalt, dirt
- » Concept: Trail and crossing improvements at major intersections

Planning Level Cost Estimate:

- » \$1,230,000

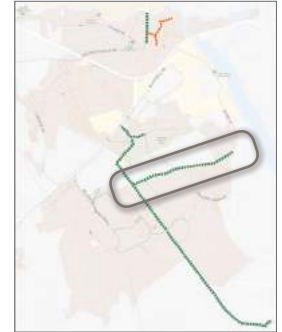
Existing Conditions:

- » Proposed route goes through heavily wooded area and existing dirt road with multiple creeks and streams

Pedestrian Trip Generators:

- » Brunswick Forest
- » Westport, Mallory Creek, and Meadowpark neighborhoods
- » South Leland Trail (project 5) destinations

Location Map



Opportunities & Constraints:

This project is still in concept development and will require further coordination and study.

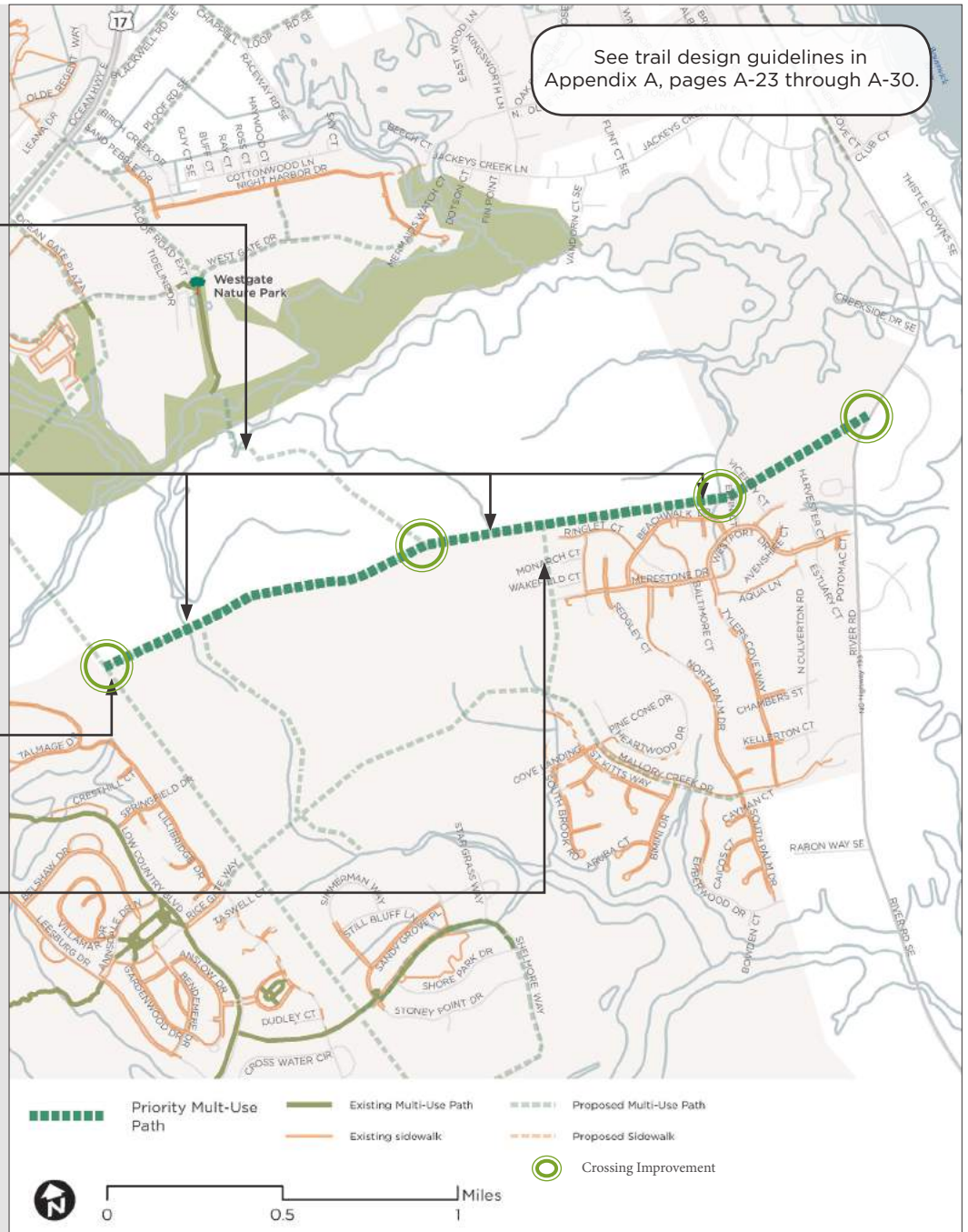
Connection opportunity toward Westgate Park, residential neighborhoods and business along US 17. Jackeys Creek serves as both a crossing challenge and destination opportunity.

Water features along the existing dirt road may serve as challenges. Further examination needed. Opportunity to utilize existing dirt road.

Connection opportunity to the South Leland Trail (project 5) and the Meadow Park neighborhood.

Connection opportunities to the Westport and Mallory Creek neighborhoods.

Stakeholder engagement will be necessary to implement this project, including property owners, and utility companies.





Right: Existing aerial photo of the east/west dirt road between River Road and the power lines in south/central Leland. This existing dirt road runs along the northern edge of the Westport neighborhood.



Below: Existing aerial photo - trail location highlighted with gray line.





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PROGRAM RECOMMENDATIONS

Below are some key program recommendations that came out of this planning process. See Chapter 4: Implementation for more information on other program recommendations related to plan implementation.

Media Campaign to Educate Motorists, Bicyclists, and Pedestrians

Watch for Me NC is a comprehensive statewide campaign with local partners aimed at reducing the number of pedestrians and bicyclists 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. The campaign is statewide and the City of Wilmington is already involved in the campaign. Leland should coordinate with the City of Wilmington and contact the NCDOT Division of Bicycle and Pedestrian Transportation to request materials. The Town could distribute the educational materials made available by NCDOT at local festivals and other events, at local retail shops and other businesses, and in renters' information packets and property owners' guest information books. Police officers could hand out bicycle lights and bells along with bicycle and pedestrian safety cards. Program promotions and educational videos could also be broadcast on the Town's website and the local government access channel.

Purpose: To educate all road users about their rights and responsibilities to increase awareness and improve traffic safety

Partners: Town of Leland Police Department, Town staff, & local bicycle and pedestrian advocates.

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



Images targeting motorists from the 'Watch for Me NC' campaign, including ad space on a bus, messaging at the pump, and bumper stickers.





Purpose: To provide a single, accessible source of all bicycle and pedestrian-relevant information for Leland residents and visitors.

Partners: Leland Planning, Town Clerk, & the Parks & Recreation Board.

One-Stop Website

Many current and potential pedestrians and bicyclists do not know where to find information on traffic laws, events, maps, tips, and recreation groups. The Town of Leland could develop a “one-stop” website that houses all pedestrian- and bicycle-related information and promotions. The url www.bikewalkleland.com was purchased as part of this planning process. 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. 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 pedestrian and bicycle information website:

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

The Town of Duck has a great example website for Leland. The Duck Trail page presents safety information, route information, and other tips for residents and tourists to enjoy walking and bicycling on the trails in Duck. www.townofduck.com/ducktrail/

TOWN of DUCK
NORTH CAROLINA

Home | Newsroom | Emergency Preparedness | Services | Town Government | Development | Visitors & Recreation | Events

Duck Trail

Like 16 | Tweet 1 | +1 0 | Share 1 | Email | Share

Duck Trail Usage and Safety

The Duck Trail is a seven-mile long, multi-use path that traverses the entire length of the Town. The trail is primarily located on the east side of Duck Road (ocean side), except for the portion that is within the Town's Village Commercial area. It provides a scenic and safe recreational venue for residents and visitors to enjoy. It also offers access points to the [Town Boardwalk](#).

Pedestrians, bicyclists, and in-line skaters share the Duck Trail. Motorized vehicles, mopeds, Segways, and the like are prohibited on the trail.

Please Observe The Following Safety Guidelines:

While Using The Trail:

- Use marked crosswalks.
- Pedestrians always have the right-of-way.
- Watch for cars entering and exiting from Duck Road (NC 12), side streets, and parking areas.
- Markers for each half mile are located on the trail.
- Pedestrians should slow down when being passed.
- Cyclists should always pass on the left and kindly alert those who are being passed.
- Clean up after your pet as a courtesy to trail users. Dogs must be on a leash.
- Follow all posted rules.

While Using The Trail In The Village:

The Village Commercial area is located between Four Seasons Lane and the Duck Post Office. In this area, the Duck Trail is located on both sides of the road and is not separated from traffic. For your safety:

- Pedestrians should walk against the direction of traffic.
- Bicyclists should ride with traffic.
- Be extra careful in this area when walking or bicycling with small children.

CONTACT US
TOWN OF DUCK
Office: 1200 Duck Road
Mailing Address: PO Box 8369, Duck, NC 27949
Phone: (252) 255-1234
Events & Meeting Hotline: (252) 255-1286
Fax: (252) 255-1236
Email: info@townofduck.com

NEWS CATEGORIES
Select Category

EVENT NEWS

- 07/13/2014 [Events This Week in Duck, July 13 to July 19, 2014](#)
- 07/07/2014 [Events This Week in Duck, July 6 to July 12, 2014](#)
- 07/04/2014 [Damage Assessment Teams Survey the Effects of Hurricane Arthur](#)
- 03/24/2014 [Duck Fire Invites You to "Wet Down" Ceremony March 31, 5:30 p.m.](#)
- 01/31/2014

[Dare County Student Art on Exhibit at Duck Town Hall](#)

UPCOMING EVENTS

Yoga on the Green
Tue, Jul 15, 2014 from 7:30am - 8:15am
@ Duck Town Green

Children's Theater - The Mystery of The Lost Colony
Tue, Jul 15, 2014 at 10:00am @ Duck



Hike & Bike Map

One of the most effective ways of encouraging people to walk and bicycle is through the use of maps and guides to show where people can walk and bike, and to guide people to safe and enjoyable routes and destinations for walking and biking. The Town should create a Leland Walk and Bike Map to reflect the most current public pedestrian and bicycle infrastructure in town, with a list of suggestions for self-guided walks and bike rides around town, and recommended routes. Coordination with the towns of Navassa and Belville will provide a regional perspective many users desire. A portion of the map should also 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. It should also be updated on a regular basis as new facilities are implemented.

Purpose: To encourage walking and bicycling by providing route and facility information and highlighting walking and bicycling destinations.

Partners: Town of Leland, Town of Belville, Town of Navassa, Wilmington MPO, and the Brunswick County & North Brunswick Chambers of Commerce.

Sample Self-Guided Walks and Maps:

- » http://www.durham-nc.com/resources/pdf/dtw2012_printer-friendly.pdf
- » <http://www.bikewalktwincities.org/maps-routes/walking-maps>



More than 19,000 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 left). Produced by Alta Planning & Design.

Purpose: To enhance resident and visitor orientation by directing pedestrians and bicyclists to popular destinations around town.

Partners: Town of Leland Public Works & Planning Department, & the North Brunswick Chamber of Commerce.

Wayfinding Signage Program

Wayfinding signage, as part of a signage program that also includes warning and regulatory signage, enhances resident and visitor orientation. The Town of Leland should develop a customized wayfinding program that includes directional signage to destinations, such as Town Hall and Westgate Nature Park. A clear wayfinding system should contribute to economic development by pointing visitors to key destinations around town.

Materials for signage should reflect the character of Leland and be selected for longevity and ease of maintenance. A wayfinding program could include directional signage, on-road markings, and kiosks with town maps. If funding is not immediately available to develop a complete wayfinding program, a good first step is temporary wayfinding signage that is colorful and informative.

Sample wayfinding signage program:

- » 2014 Croatan Regional Bicycle + Trails Plan; Signage Appendix (NCDOT)

NCDOT and the Eastern Carolina Council recently completed the 2014 Croatan Regional Bicycle + Trails Plan. This plan included guidance for bicycle route and trail signage. Leland could take a similar approach, using the newly developed WalkBike Leland logo in conjunction with the required standards for signage on NCDOT roadways.





“20’s Plenty” Campaign

Lowering residential speeds to 20 MPH has enormous safety benefits for all users, including pedestrians and bicyclists, by lowering both the rate and severity of crashes. One campaign, from the United Kingdom, is called “20’s Plenty.”

A successful campaign will bring together several different strategies, including:

- » Making residents aware of the benefits of 20 MPH roadways and engaging their partnership on raising awareness and buy-in from their neighbors.
- » Identifying specific streets on which a 20 MPH speed limit is appropriate. Likely candidates would include roads identified in pedestrian or bicycle plans as important corridors for those uses and residential streets whose residents request inclusion in a 20 MPH program.
- » Traffic engineering to ensure that the design speed of the street matches the new posted speed, such as implementing road diets or narrower lanes
- » Partnership with law enforcement to issue warnings and moving violations on designated 20 MPH streets.
- » Evaluation of vehicle speeds and reported crashes (number and severity) before and after the integrated campaign is implemented to the effort to measure results and correct course.

Purpose: To reduce crashes and crash severity by lowering vehicle speeds to 20 MPH on select street corridors.

Partners: NCDOT, Leland Police Department, Leland Public Works & Planning Department.

Video about UK “Twenty’s Plenty” campaign:

- » <http://www.streetfilms.org/no-need-for-speed-20s-plenty-for-us/>

The effect of speed

	Average for all ages	Over 60 year olds
At 40 mph	• 31% are killed	• 98% are killed
At 30 mph	• 7% are killed	• 50% are killed
At 20 mph	• 1% are killed	• 5% are killed

Data from Road Safety Web Publication No. 16 *Relationship between Speed and Risk of Fatal Injury: Pedestrians and Car Occupants* - Department for Transport (September 2010)



Active Routes to School Program

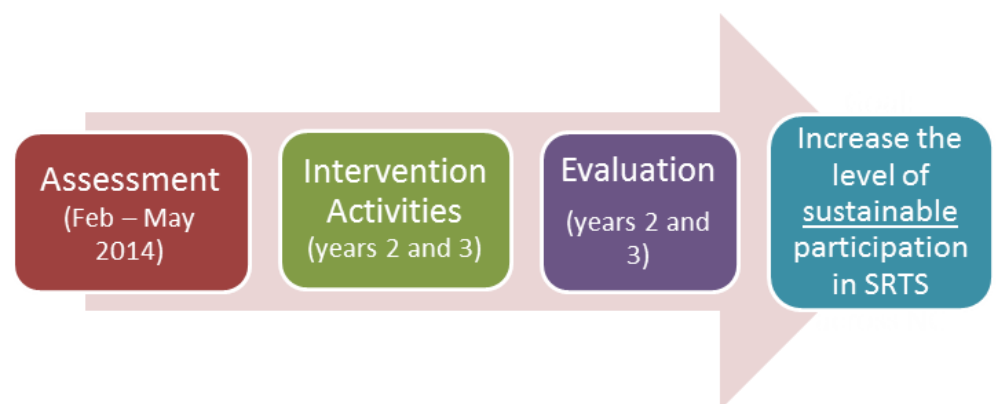
Active Routes to School is a program that resulted from the joint partnership of the North Carolina Division of Public Health (Community and Clinical Connections for Prevention and Health Branch) and the North Carolina Department of Transportation. The goal of the project is to increase the number of North Carolinians that meet the physical activity recommendations by increasing the number of elementary and middle school students who safely walk and bike to school.

The Active Routes to School project is funded until 2019. The project will focus on providing a safe, appealing environment for walking and biking, improve the quality of our children's lives and support national health objectives by increasing physical activity, reducing traffic, fuel consumption, and air pollution in the vicinity of schools.

The Active Routes to School Program will work with partner communities to increase:

- » Awareness about the importance of Safe Routes to School,
- » The number of programs that encourage safely walking and biking to or AT school (i.e., walk to school day, walking school bus, Walk Across America, etc.),
- » The number of trainings on how to implement Safe Routes to School (i.e., bike rodeo),
- » The number of policies that support safe walking and biking,
- » The number of safety features near schools, such as sidewalks, cross walks, and bike lanes,
- » Opportunities for shared use of facilities and complete street policies to improve access to physical activity

The Town of Leland should initiate a partnership with the Active Routes to School coordinator for Region 8 so that the town can begin planning for a Safe Routes to School program. The Town's Superintendent of Schools would be an ideal candidate for managing this program.



For more information, please contact Shahnee Haire, Region 8 Active Routes to School Coordinator, for more information at shahnee.Haire@arhs-nc.org.





New sidewalks at River Rd and US74

Chapter Contents:

Overview

*Organizational
Framework for
Implementation*

*Implementation
Action Steps Table*

*Key Action Step
Descriptions*

Key Partners

Performance Measures

*Facility
Development
Methods*

OVERVIEW

This chapter defines a structure for managing the implementation of the actions, policies, and projects recommended in this plan. Implementation will require leadership and dedication to pedestrian 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 cannot 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 Leland are presented in Appendix B of this plan.

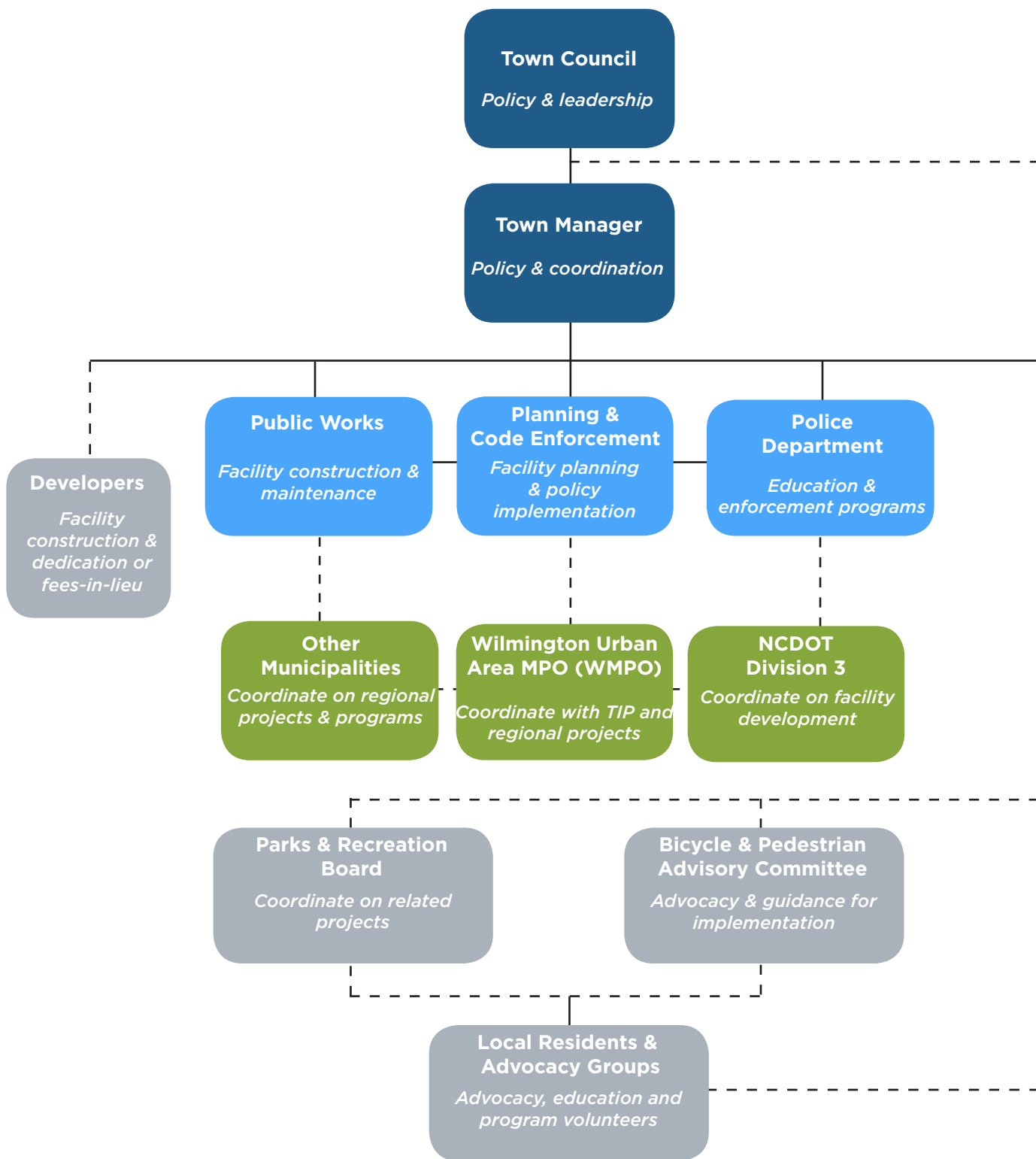
Given the present day economic challenges faced by local governments (as well as their state, federal, and private sector partners), it is difficult to know what financial resources will be available at different time frames during the implementation of this plan. However, there are still important actions 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 projects. 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.



Members of the Pedestrian Plan steering committee could be good candidates for a standing Bicycle & Pedestrian Committee (BPAC) for the Town during implementation.



ORGANIZATIONAL FRAMEWORK FOR IMPLEMENTATION



**TABLE 4.1: Implementation Action Steps**

TASK	LEAD AGENCY	SUPPORT	DETAILS	PHASE
Present Plan to Town Council	Project Consultants	Planning	Presentation to Town Council in Dec 2016.	Short-term (2016)
Approve this plan	NCDOT Bike/Ped Division	Project Consultants	Official letter of approval by Dec 2016.	Short-term (2016)
Adopt this plan	Town Council	Planning, Project Consultants	Through adoption, the Plan becomes an official planning document of the Town. Adoption shows that the Town endorses the policies and project recommendations of the plan, and also puts the Plan into the local policy documents that NCDOT reviews during project scoping and before it undertakes certain improvements and maintenance operations.	Short-term (2016)
Designate Staff	Town Council	Town Manager	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 staff from Planning and Public Works oversee the day-to-day implementation of this plan.	Short-term (2016)
Present this plan to other local and regional bodies and agencies.	Planning	Bicycle and Pedestrian Advisory Committee	This Plan, particularly its recommendations, should be presented to other local and regional bodies and agencies. Possible groups to receive a presentation might include: the Wilmington Urban Area MPO, regional transportation planners, Brunswick County planners, Town of Navassa, Town of Belville, and local advocacy groups.	Short-term (2016)
Seek adoption of this plan from WMPO	Town Manager	Bicycle and Pedestrian Advisory Committee	Through adoption, the Plan becomes an official planning document for the region. Adoption by the WMPO shows regional support for the plan's recommendations.	Short-term (2016)
Form and confirm the goals of the Bicycle and Pedestrian Advisory Committee (BPAC)	Town Council	Bicycle and Pedestrian Advisory Committee, Planning	Form the Leland Bicycle and Pedestrian Advisory Committee and confirm the goals of the BPAC to include the implementation of this plan. Alternatively, the Town can designate a representative to serve in the regional WMPO Bike/Ped Committee	Short-term (2016)
Compare recommendations to projects programmed in TIP	Town Council	Town Manager	Evaluate recommendations against 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.	Short-term (2016)
Begin Annual Meeting With Key Project Partners	Planning	Public Works, Highway Div. 3, WMPO, BPAC, and local & regional stakeholders	Key project partners (see org. chart on page 4-2) as well as YMCA, Chamber of Commerce, and school district, should meet on an annual basis to evaluate the implementation of this Plan. Meetings could also occasionally include on-site tours of priority project corridors.	Short-term/Ongoing (Beginning 2016)

**TABLE 4.1: Implementation Action Steps (Continued)**

TASK	LEAD AGENCY	SUPPORT	DETAILS	PHASE
Ensure planning efforts are integrated regionally	Bicycle and Pedestrian Advisory Committee, Planning	WMPO, Brunswick County, Town of Navassa, Town of Belville, other neighboring municipalities, NCDOT	Combining resources and efforts with surrounding municipalities, regional entities, and stakeholders is mutually beneficial. Communicate and coordinate with the regional partners on regional projects and partner for joint-funding opportunities. Participate in the formulation of regional transportation plans to ensure the recommendations of this plan are included in plans and priorities, and coordinated with regional facilities	Short-term/Ongoing (Beginning 2016)
Design Training	Public Works and NCDOT Division 3	NCDOT Bike/ Ped Division	Become familiar with the standards set forth in Appendix A of this Plan, as well as national standards for pedestrian facility design. Specific project design should be done by a qualified engineer or other project designer who is familiar with current design standards, such as the AASHTO guide, PROWAG/ADA guidance, and MUTCD. These resources can be found at https://connect.ncdot.gov/projects/BikePed/Pages/Guidance.aspx	Short-term (2016)
Incorporate pedestrian recommendations into future CTP updates	NCDOT Division 3	Planning, NCDOT Bike/ Ped Division	Incorporate pedestrian recommendations from this Plan into future updates to the CTP and into future project design plans. If a compromise to the original recommendation is needed, then contact NCDOT Division of Bicycle and Pedestrian Transportation for guidance on appropriate alternatives.	Short-term (2016)/ Ongoing (2016 onward)
Improve Existing Programs and Launch New Programs	BPAC	Planning, Public Works, Police Department, Brunswick County Department of Public Health, Parks and Recreation Board	These groups should coordinate to improve existing bicycle and pedestrian programs and to launch new programs. Program recommendations include launching a media campaign to educate motorists, bicyclists, and pedestrians and "20s Plenty" campaign.	Short-term/Ongoing (2016 onward)
Maintain Pedestrian Facilities	Public Works, NCDOT Division 3	BPAC, General Public (for reporting maintenance needs), Planning	Public Works and NCDOT should maintain existing sidewalks, crosswalks, and shoulders and address crosswalks that are missing.	Short-term/Ongoing (2016 onward)
Coordinate with Public Works Department	Public Works Director, NCDOT Division 3	Planning, NCDOT Bike/ Ped Division	Notify the Public Works Department of all upcoming roadway reconstruction or resurfacing/restriping projects, no later than the design phase. Provide sufficient time for comments.	Short-term/Ongoing (2016 onward)
Establish maintenance program for	Public Works, NCDOT Division 3	Planning, BPAC	Establish a program for checking these sidewalks for damage and maintenance of existing crosswalks.	Short-term/Ongoing (2016 onward)



TABLE 4.1: Implementation Action Steps (Continued)

TASK	LEAD AGENCY	SUPPORT	DETAILS	PHASE
Provide Enforcement and Education Training for Police Officers	Police Department	NCDOT Bike/Ped Division	Provide police officers with training through free online resources available from the National Highway Traffic Safety Administration, and through webinars available through the Association of Pedestrian and Bicycle Professionals. Provide police officers with an informational handout to be used during bicycle and pedestrian-related citations and warnings. Utilize available WatchForMe,NC materials, and apply for Leland to become a campaign partner.	Short-term/Ongoing (2016/2017 onward)
Develop a long term funding strategy	Planning	Town Council, Public Works, BPAC	To allow continued development of the overall system, capital funds for pedestrian facility construction should be set aside every year. Some 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. Refer to Appendix B for long-term funding strategies.	Short-term (2016-2017)
Communication & Outreach	BPAC, local advocacy groups	Planning, WMPO	The BPAC should establish a communication campaign to celebrate successes as facilities are developed and otherwise raise awareness of the overall pedestrian network and its benefits. A key first task of this group is to design and launch a one-stop website. Set up the one-stop website to provide information to residents and tourists on walking in town.	Short-term (2016-2017)
Adopt Complete Streets Policy	Town Council	Planning, BPAC, NCDOT	Leland should develop and adopt a Complete Streets Policy. NCDOT policy requires the agency to take local Complete Streets policy into consideration in project planning and design.	Short-term (2016-2017)
Develop wayfinding system with directional signage	Public Works, Planning	BPAC, WMPO	Develop a wayfinding system for Leland to direct pedestrians to destinations and to safe places to cross busier roads. Place signage along multi-use paths with pedestrian travel times to destinations. This signage could be integrated as part of a larger regional wayfinding system.	Short- to Mid-term (2016-2020)
Seek designation as a Walk-Friendly Community (WFC)	Planning	Town Council, Public Works, BPAC	The development and implementation of this plan is an essential first step toward becoming a designated WFC. With ongoing efforts and the short-term work program recommended here, the Town should be in a position to apply for and receive recognition within a few years.	Short- to Mid-term (2016-2020)

**TABLE 4.1: Implementation Action Steps (Continued)**

TASK	LEAD AGENCY	SUPPORT	DETAILS	PHASE
Establish Land and Right-of-Way Acquisition Mechanisms	Town Council	Planning, Code Enforcement, Public Works, BPAC	Amend development regulations and town policies to require specified pedestrian elements for all developments and have policies in place for right-of-way dedication/acquisition and facility construction as part of subdivision review and approval. For example, developers could set aside land for trails whenever a development proposal overlaps with proposed routes, as adopted. Town of Leland staff should ensure that an effective review of all pedestrian elements of proposed developments takes place.	Short- to Mid-term (2016-2020)
Improve and Implement Local Policies, including Driveway Access Management	Town Council	Planning, Code Enforcement, Public Works, BPAC, NCDOT	An access management policy should be developed with assistance from NCDOT, especially for commercial corridors.	Mid-term (2017-2020)
Develop Pedestrian Facility Specifications	Public Works	Planning, NCDOT	Town staff could prepare these in-house to save resources. It is recommended that facility designers rely on the engineering design guidance resources referenced in Appendix A, along with guidance sources recommended by the NCDOT Division of Bicycle and Pedestrian Transportation.	Mid-term (2018-2020)
Establish a Monitoring Program	Planning, BPAC	Public Works, local advocates, general public	Planning and the BPAC should brainstorm specific benchmarks to track through a monitoring program to monitor facility conditions and safety, obtain usage information, and to celebrate accomplishments. Honor the completion of projects with public events and media coverage.	Mid-term/Ongoing (2018-2020 onward)
Explore possibility of a regional multi-modal coordinator	WMPO, Town Council	BPAC, neighboring municipalities	Coordinate with neighboring municipalities to provide funding for a regional full-time Multi-Modal Transportation Coordinator who will be staffed at WMPO. This position would oversee the implementation of both infrastructure and programming related to bicycle and pedestrian safety and encouragement.	Mid- to Long-term (2018-2022)
Complete Priority Projects	Planning	Public Works, NCDOT Division 3, WMPO	Chapter 3 provides info on the Priority Projects. Aim to complete at least six of the top projects by the end of 2020.	Long-term (2021)
Plan Update	Town Council, Planning	BPAC	This Plan should be updated in 2021. 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 developed.	Long-term (2021)



KEY ACTION STEP 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 right-of-way acquisition necessary to carry out those recommendations.

Adopt This Plan

Before any other action takes place, the Town of Leland 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 pedestrian plan, Leland will be better able to shape transportation and development decisions so that they fit with the goals of this plan. Most importantly, having an adopted plan is extremely helpful in securing funding from state, federal, and private agencies. Adopting this plan does not commit the Town of Leland to dedicate or allocate funds, but rather indicates intent to implement this plan over time, starting with these action steps.

The following entities should adopt this plan:

- » Leland Town Council
- » Wilmington Urban Area Metropolitan Planning Organization

Adoption will also provide a basis for NCDOT to accommodate and include the plan recommendations into its project planning, including environmental review and scoping. This plan and its recommended on- and off-road facilities should be approved by the NCDOT and NCDENR, and they should be included in the future planning of each agency. This plan's project recommendations should be integrated into an update to the Comprehensive Transportation Plan for Brunswick 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 near Leland.

Establish Right-of-Way Acquisition Mechanism Through Development Ordinances and Review

It is recommended that each local zoning and subdivision ordinance be amended to ensure that, as developments are planned and reviewed, the pedestrian facilities and trail corridors identified in this plan are protected. This would entail amending development regulations to have developers set aside land or easements for trails whenever a development proposal overlaps with the proposed routes, as adopted. Town of Leland staff should ensure that an effective review of all pedestrian elements of proposed developments takes place.

In addition, local policies should be revised to appropriately address the needs of pedestrians as outlined in this plan. For example, revising policy language to allow for public access for trail users, as a matter of right, on all new sewer and utility easements would have a significant impact on the walking environment in Leland.



Coordinate Development Plans

The Town of Leland should ensure that adopted pedestrian and multi-use path recommendations from this plan are included in future residential and commercial developments that connect with such proposed facilities. Coordination should also occur with neighboring municipalities, such as Navassa and Belville, to ensure connectivity between municipal boundaries.

Implement Driveway Access Management

The Town of Leland should consider adding access management language to the town ordinances for both future development and retrofits to existing development, especially in commercial areas along major roads. 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

Program Action Steps

While policies provide a legal basis for on- and off-road facility development, the program recommendations included in Chapter 3 of this plan will build community support for the creation of new facilities and establish a strong bicycling and walking culture.

Designate Staff

Designate staff to oversee the implementation of this plan and the proper maintenance of the facilities that are developed. It is recommended that a combination of existing planning staff and public works 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 Leland, it makes more sense to fold these responsibilities into current staff responsibilities.

Form a Bicycle and Pedestrian Advisory Committee

The Town of Leland 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 Walk-Friendly Community (see information below). 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 the Town of Leland staff in community outreach, marketing, and educational activities recommended by this plan.

Become Designated as a Walk-Friendly Community

A goal for Leland should be to seek a "Walk Friendly Community" (WFC) designation from the UNC Highway Safety Research Center's Pedestrian and Bicycle Information Center. The WFC campaign is an awards program that recognizes municipalities that actively support pedestrian activity and safety. Davidson, Cary, Asheville, and Charlotte have been recognized as North Carolina Walk Friendly Communities.



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 network and its benefits. A key first task of this group is to design and launch a one-stop 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 Central” website provides information to a wide audience and encourages people to walk. This would be especially useful in attracting visitors who are seeking out a vacation destination where walking, jogging, and other activities on foot are safe and enjoyable. A one-stop website 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. The website should be branded around the new WalkBike Leland logo developed as part of this planning process.

Establish a Monitoring Program

From the beginning, and continuously through the life of a pedestrian facility project, the BPAC 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 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. This meeting should be organized by the designated Town staff, and should include representatives from the Organizational Chart shown on page 4-2. 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 report 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 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,



and the Town should also consider additional funding mechanisms (such as facility fees on new development or other sources that can be bonded out to increase their usefulness in planning ahead for project implementation). Local funding whether from annual allocations or other sources can be matched to outside funding sources or could be used to enhance NCDOT projects with 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.

Develop Pedestrian Facility Designs and Specifications for Proposed Projects

Town of Leland staff could prepare these in-house to save resources, using the design guidelines of this plan and the project cut-sheets as starting points. The public should have an opportunity to comment on the design of new facilities.

Improve Existing Programs and Launch New Programs

The program recommendations found in Chapter 3 provide a set of programmatic resources that will support the goals of the Town of Leland Pedestrian Transportation Plan. 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 4-3.

Provide Enforcement and Education Training for Police Officers

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 Leland Police officers could be done through free online resources available from the National Highway Traffic Safety Administration (NHTSA) (see links at www.bicyclinginfo.org/enforcement/training.cfm) and through webinars available through the Association of Pedestrian and Bicycle Professionals (APBP).

Infrastructure Action Steps

While establishing the policies and programs described, Leland should move forward with the design and construction of priority projects. They 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 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.

A stable and recurring source of revenue is needed that can then be used to leverage grant dollars from state, federal, and private sources. The ability of local agencies to generate a source of funding for pedestrian facilities depends on a variety of factors, such as taxing capacity, budgetary resources, voter preferences, and political will. It is very important that these local agencies explore the ability to establish a stable and recurring source of revenue for facilities.

Donations from individuals or companies are another potential source of funding. The BPAC should establish an “Adopt a Trail” program as a mechanism to collect these donations for the development of the greenway trail and sidepath recommendations discussed in Chapter 3. 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, Leland will demonstrate its commitment to carrying out this plan and will better sustain the enthusiasm generated during the public outreach stages of the planning process. Refer to Chapter 3: Network Recommendations for priority project ranking and the prioritization methodology.

KEY PARTNERS IN IMPLEMENTATION

Role of the Leland Town Council

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

Adoption of this plan is in line with public support. Leland’s online comment form for the planning process yielded over 130 responses and showed strong support for improving walking conditions.

Role of the Town of Leland Public Works Department

The Public Works Department handles the responsibility for the construction and maintenance of pedestrian facilities on locally owned and maintained roadways, as



well as on NCDOT roadways, where encroachment agreements are secured. Public Works staff should be prepared to:

- » Communicate and coordinate with other town departments and the BPAC on priority pedestrian projects.
- » Become familiar with the standards set forth in Appendix A of this plan, as well as state and national standards for pedestrian facility design.
- » Secure encroachment agreements for work on NCDOT-owned and maintained roadways.
- » Design, construct, and maintain pedestrian facilities. If Public Works staff are not experienced with PROWG/ADA and AASHTO pedestrian facility design guidance, the Town will need to obtain assistance of qualified consulting engineer or designer.
- » Communicate and coordinate with Brunswick County, Wilmington Urban Area MPO, and neighboring municipalities on regional facilities; partner for joint-funding opportunities.
- » Communicate and coordinate with NCDOT Division 3 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 3 to ensure that when NCDOT-owned and maintained roadways in Leland are resurfaced or reconstructed, that this plan's adopted recommendations for pedestrian facilities are included on those streets. If a compromise to the original recommendation is needed, then contact NCDOT Division of Bicycle and Pedestrian Transportation for guidance on appropriate alternatives.

Role of the Town of Leland Planning

Planning staff will take primary responsibility for the contact with new development to implement the plan (with support from the Public Works Department). For example, the staff should be prepared to:

- » Communicate and coordinate with local developers on adopted recommendations for pedestrian facilities, including paved multi-use trails.
- » Assist the Public Works Department in communicating with NCDOT and regional partners.
- » Become experts on pedestrian-related policies in North Carolina (www.ncdot.gov/bikeped/lawspolicies/policies/).

Role of the Bicycle and Pedestrian Advisory Committee

The Committee should be prepared to:

- » Meet with staff from Planning and the Public Works Department; evaluate progress of the plan's implementation and offer input regarding pedestrian facility and trail-related issues; assist Town of Leland staff in applying for grants and organizing pedestrian-related events and educational activities.
- » Build upon current levels of local support for pedestrian issues and advocate for local project funding.



Role of the Local NCDOT Division 3

Division 3 of the NCDOT is responsible for the construction and maintenance of pedestrian facilities on NCDOT-owned and maintained roadways in the Town of Leland, OR is expected to allow for the Town to do so with encroachment agreements. Division 3 should be prepared to:

- » Recognize this plan as not only as an adopted plan of the Town of Leland, but also as an approved plan of the NCDOT.
- » Become familiar with the pedestrian facility recommendations for NCDOT roadways in this plan (Chapter 3); take initiative in incorporating this plan's recommendations into the Division's schedule of improvements whenever possible.
- » Become familiar with the standards set forth in Appendix A of this plan, as well as state and national standards for 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 Leland Public Works Department 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 Town of Leland Police Department

The Town of Leland 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-related laws in North Carolina (www.ncdot.gov/bikeped/lawspolicies/laws/).
- » Continue to enforce not only pedestrian-related laws, but also motorist laws that affect walking, such as speeding, running red lights, aggressive driving, etc.
- » Participate in pedestrian-related education programs.
- » Review safety considerations with the Public Works Department as projects are implemented.

Role of Developers

Developers in Leland can play an important role in facility development whenever a project requires the enhancement of transportation facilities or the dedication and development of sidewalks, trails or crossing facilities. Developers should be prepared to:

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



Role of Local & Regional Stakeholders

Stakeholders for pedestrian facility development and related programs, such as Brunswick County, WMPO, Town of Navassa, Town of Belville, and local organizations play important roles in the implementation of this plan. Local and regional stakeholders should be prepared to:

- » Become familiar with the recommendations of this plan, and communicate & coordinate with the Town for implementation, specifically in relation to funding opportunities, such as grant writing and developing local matches for facility construction.
- » WMPO should work with the Town of Leland on populating the Transportation Improvement Program (TIP) with pedestrian infrastructure projects.
- » Brunswick County should coordinate with the Town on trail development and development projects.
- » 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 Leland.
- » Assist Town staff and the BPAC by volunteering for pedestrian-related events and educational activities and/or participate in such activities.
- » Assist Town of Leland staff and the BPAC by speaking at Town Council meetings and advocating for local pedestrian project and program funding.

Role of Volunteers

Services from volunteers, student labor, and seniors, or donations of material and equipment may be provided in-kind, to offset construction and maintenance costs. Formalized maintenance agreements, such as adopt-a-trail/greenway or adopt-a-highway can be used to provide a regulated service agreement with volunteers. Other efforts and projects can be coordinated as needed with senior class projects, scout projects, interested organizations, clubs or a neighborhood's community service to provide for 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 pedestrian and multi-use path networks.



PERFORMANCE MEASURES (EVALUATION AND MONITORING)

The Town of Leland 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 transportation and recreation in Leland:

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

FACILITY DEVELOPMENT METHODS

This section describes different construction methods for the proposed pedestrian facilities outlined in Chapter 3. Note that many types of transportation facility construction and maintenance projects can be used to create new pedestrian facilities. It is much more cost-effective to provide pedestrian facilities during roadway construction and re-construction projects than to initiate the improvements later as “retrofit” projects.

To take advantage of upcoming opportunities and to incorporate pedestrian facilities into routine transportation and utility projects, the Town of Leland 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.

NCDOT State Transportation Improvement Program

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 funded for construction before then will proceed as scheduled under the current Equity Formula; projects slated for 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 ranked based on 50% data (safety, access, demand, connectivity, and cost effectiveness) and 50% local input. (See Appendix B for more information)



In order to have programmed projects funded through STIP, the Town of Leland would have to work with the Wilmington Metropolitan Planning Organization (WMPO) to have desired projects incorporated into the Metropolitan Transportation Improvement Program (MTIP). The MTIP is an official document that contains funding information and schedules for federally-funded and state-funded projects in the WMPO area. The Town of Leland influences the development of the STIP through its role in the Technical Coordinating Committee (TCC) and Technical Advisory Committee (TAC) in the WMPO.

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 and safe crossings at 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, 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 network and the development of safe communities.

Repaving

Repaving projects provide a clean slate for revising pavement markings. When a road is repaved, the roadway should be restriped to include crosswalk markings and to create narrower lanes and provide space for bike lanes and shoulders, where feasible. In some situations, repaving could incorporate new crosswalks.

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.

Retrofit Roadways with New Pedestrian Facilities

There may be critical locations in the pedestrian network that have safety issues or are essential links to destinations. In these locations, it may be justifiable to add new



pedestrian 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.

Some roads may require a “road diet” solution in order to accommodate pedestrian facilities. Road diets involve reallocating motor vehicle travel lanes for the benefit of increasing roadway safety and efficiency for all users, and in some cases increasing space for other uses such as parking, on-street bicycle facilities, sidewalks, and/or side paths. These are generally recommended only in situations where the vehicular traffic count can be safely and efficiently accommodated with a reduced number of travel lanes. Further study may be necessary for recommended road diets to ensure that the needs of all road users are being met.

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 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 the Town of Leland 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. Posting signage that includes walk travel times to major destinations can help to increase awareness of the ease and efficiency of pedestrian travel. See Appendix A: Design Guidelines for more detailed guidance on signage and wayfinding improvements.

Town Easements

The Town of Leland should explore opportunities to revise existing easements to accommodate public access greenway trail facilities. Similarly, as new easements are acquired in the future, the possibility of public access should be considered. 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.



New roadway construction in Leland

APPENDIX A: DESIGN GUIDELINES

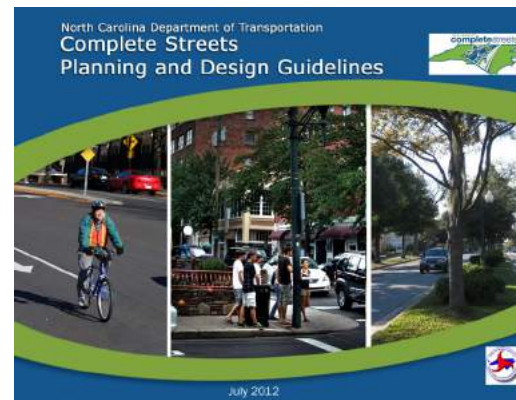
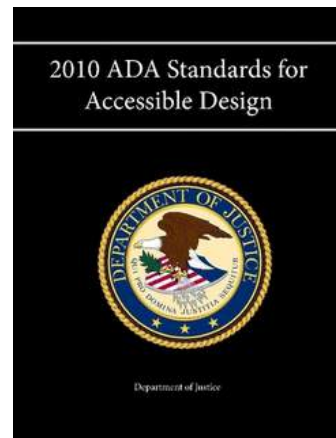
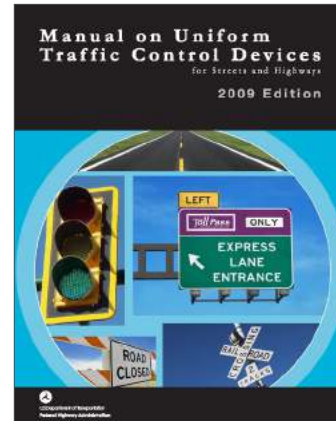
Overview | Design Needs of Pedestrians | Multi-Use Paths



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.
- » 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 Right-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. For more information, visit www.completestreets.org.



- » Additional resources include the 2012 AASHTO Bike Guide; the 2004 AASHTO Ped Guide, the 2014 NACTO Bike Guide, current PROWAG/ADA guidance to state and local governments; and Chapter 6 of the WalkBikeNC Strategic Plan.

This appendix is not a substitute for consulting up-to-date standards and guidance sources in the design of facilities. A qualified engineer or landscape architect should be consulted for the most up to date and accurate cost estimates.



PEDESTRIAN FACILITIES





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

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

↑
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.



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

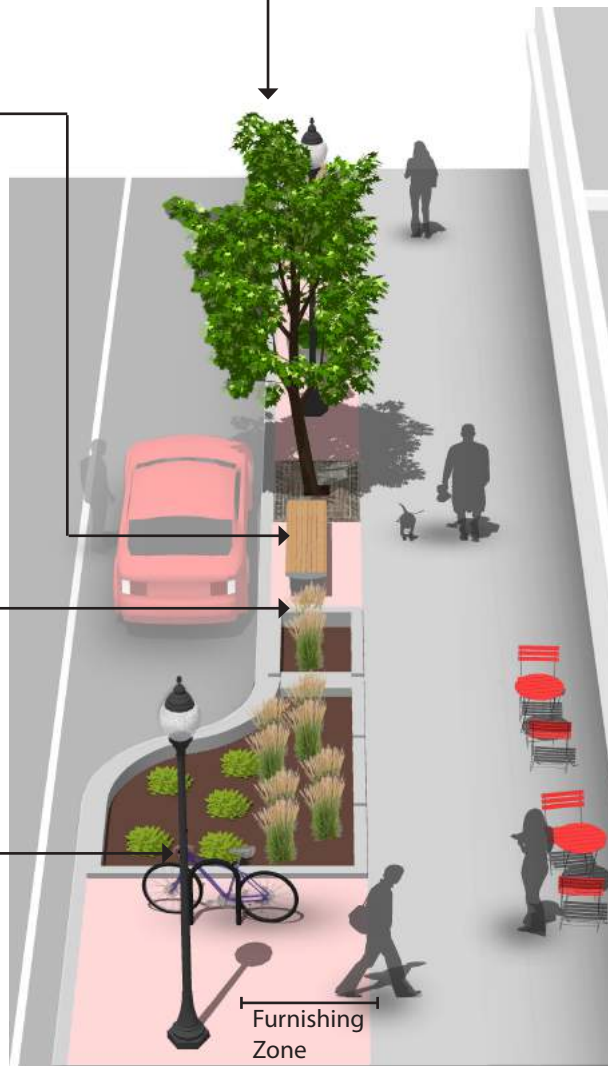
Providing benches at key rest areas and view-points encourages people of all ages to use the walkways by ensuring that they have a place to rest along the way. Benches should be 20" tall to accommodate elderly pedestrians comfortably. Benches can be simple (e.g., wood slats) or more ornate (e.g., stone, 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.

Solar powered lights are available where utility collection is difficult.



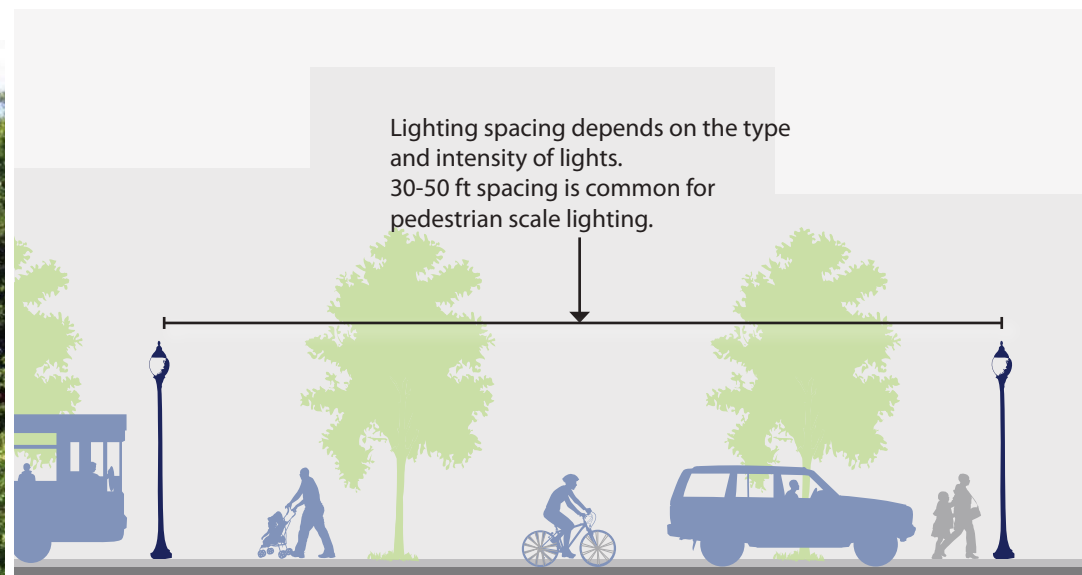
Guidance

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
- » Lighting poles should be placed in the furniture zone of the sidewalk and not interfere with pedestrian travel.



Discussion

Both street and pedestrian lighting levels should be considered for the same street corridor, especially in areas with tree canopy. "Dark Sky" lighting, lighting with full cutoff features, should be considered within residential and commercial 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.



PEDESTRIANS AT INTERSECTIONS



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 CROSSWALKS

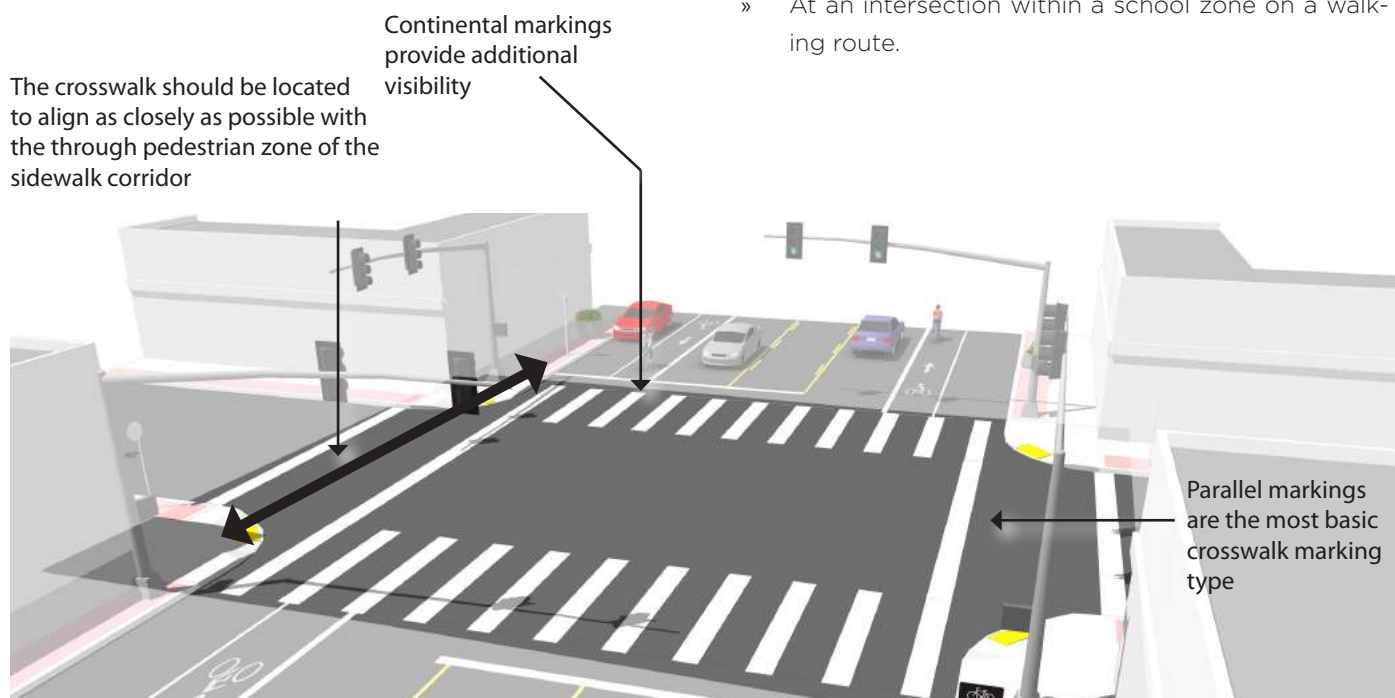
Description

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.



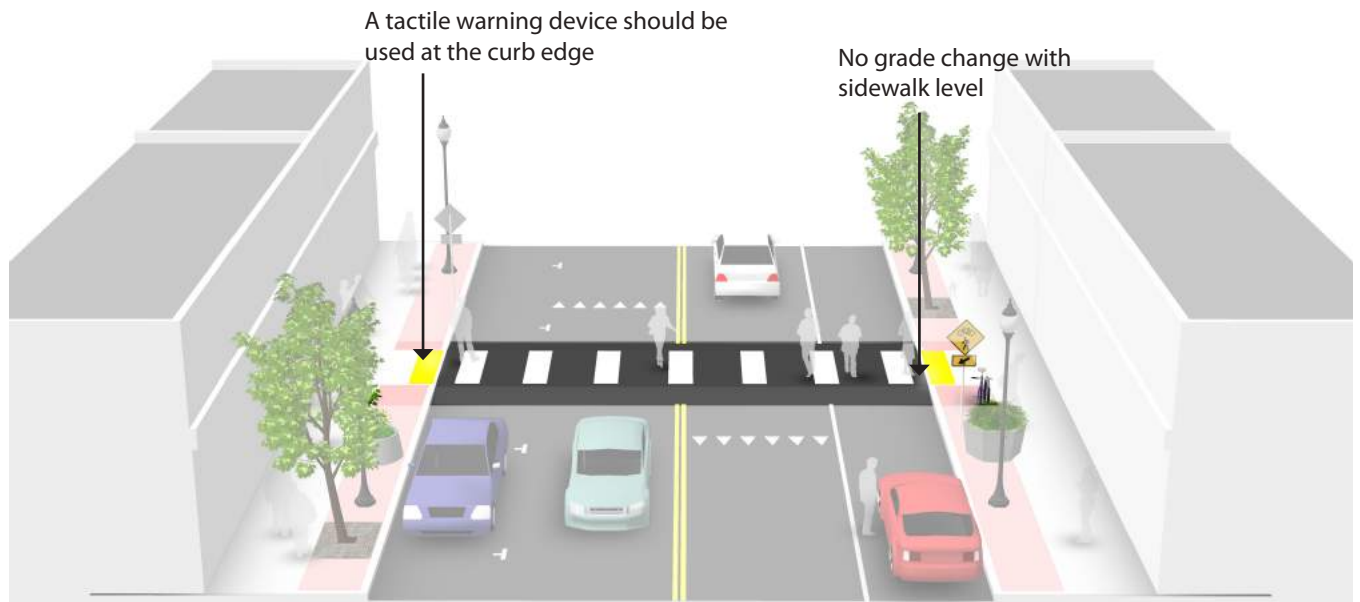
RAISED CROSSWALKS

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

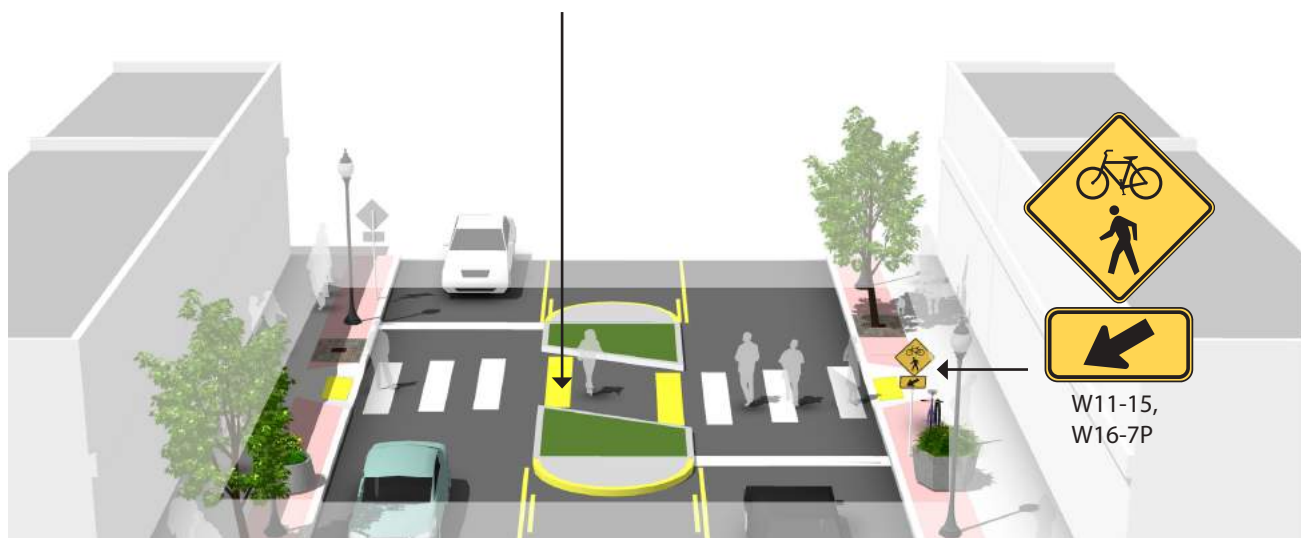
Description

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.



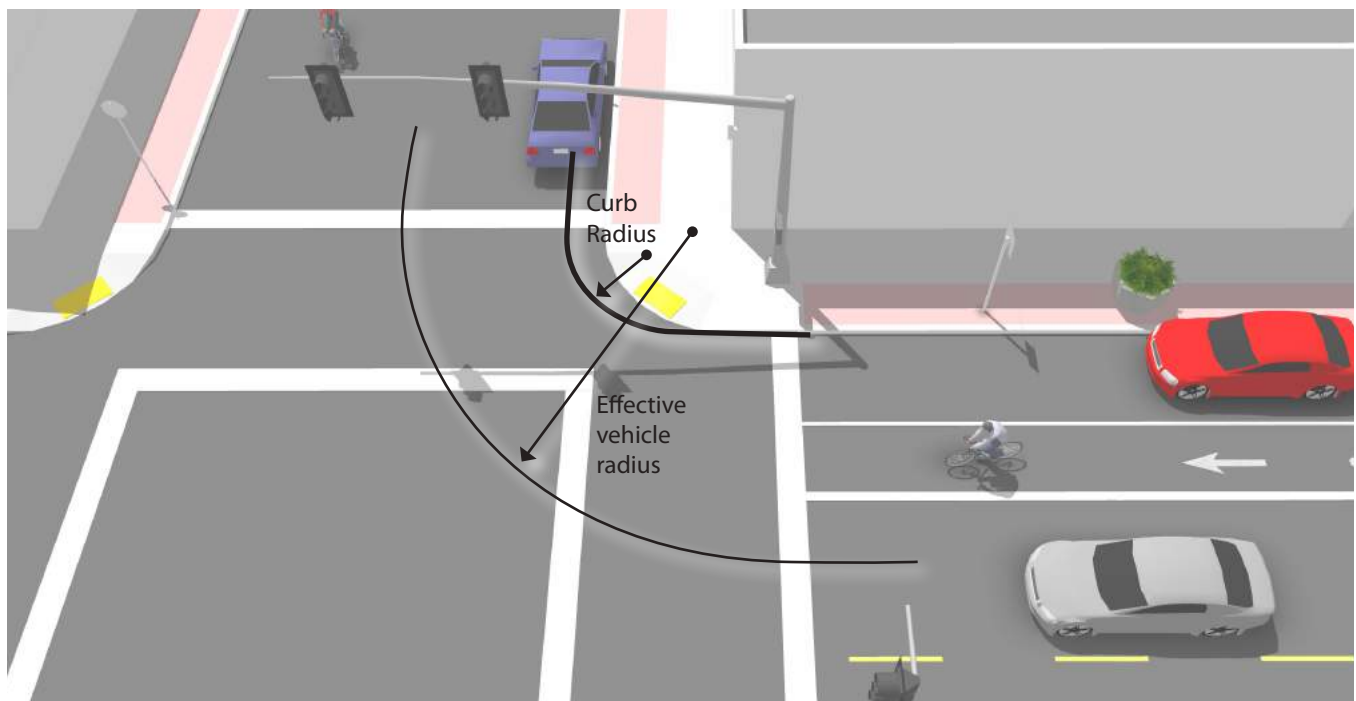
MINIMIZING CURB RADII

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.



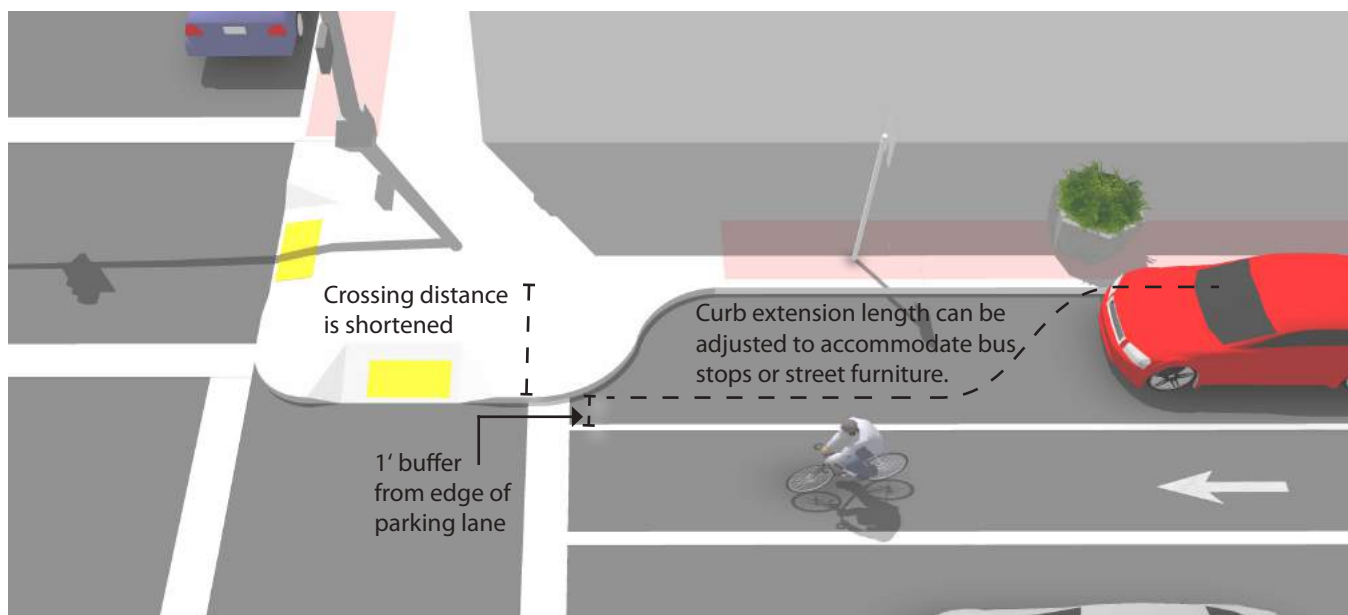
CURB EXTENSIONS

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

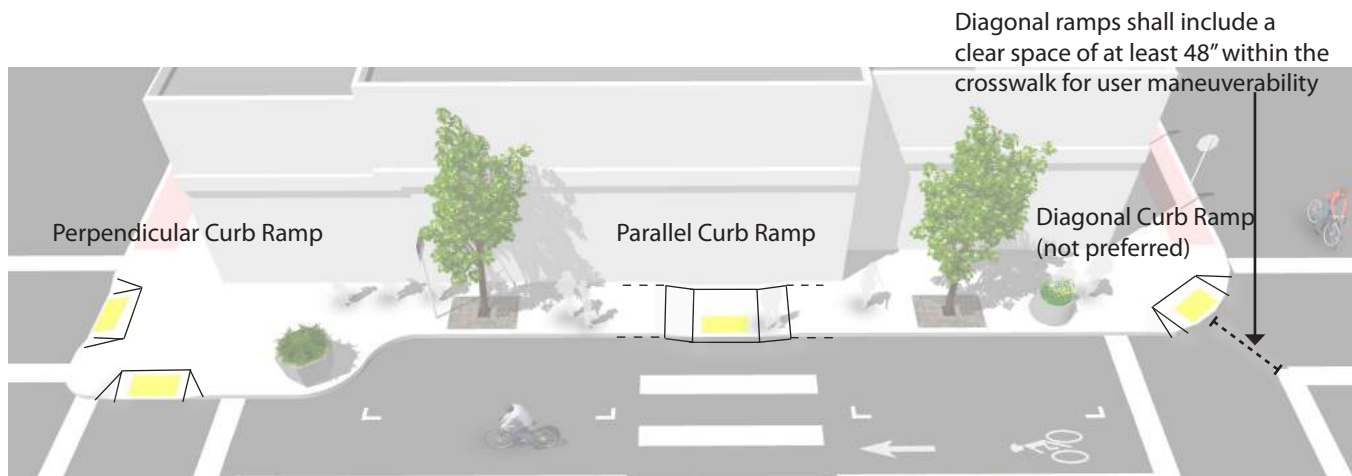
Description

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

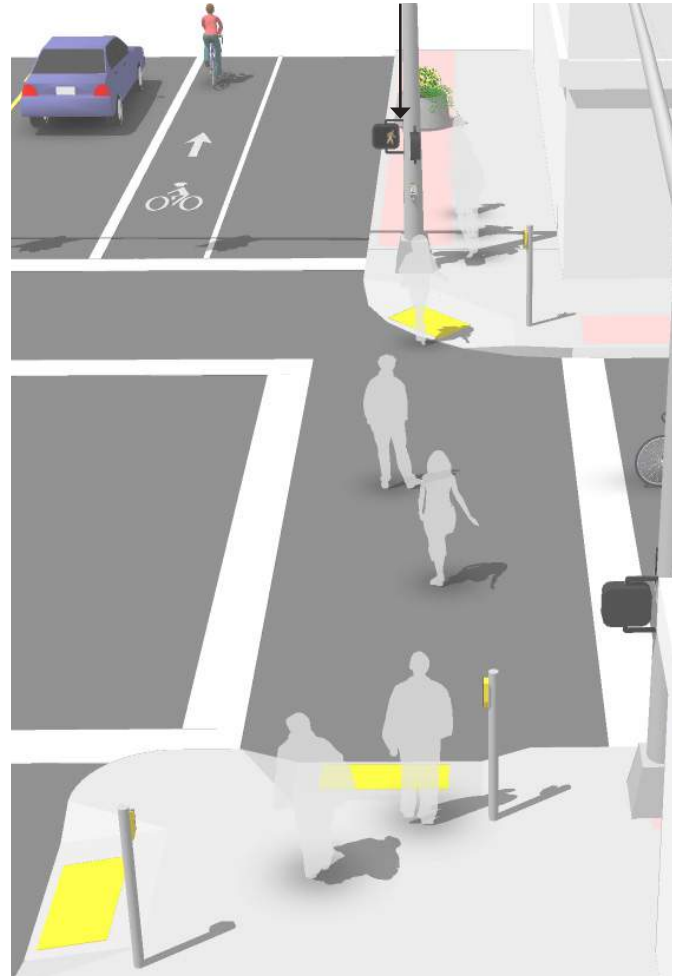
Pedestrian Signal Head

- » 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

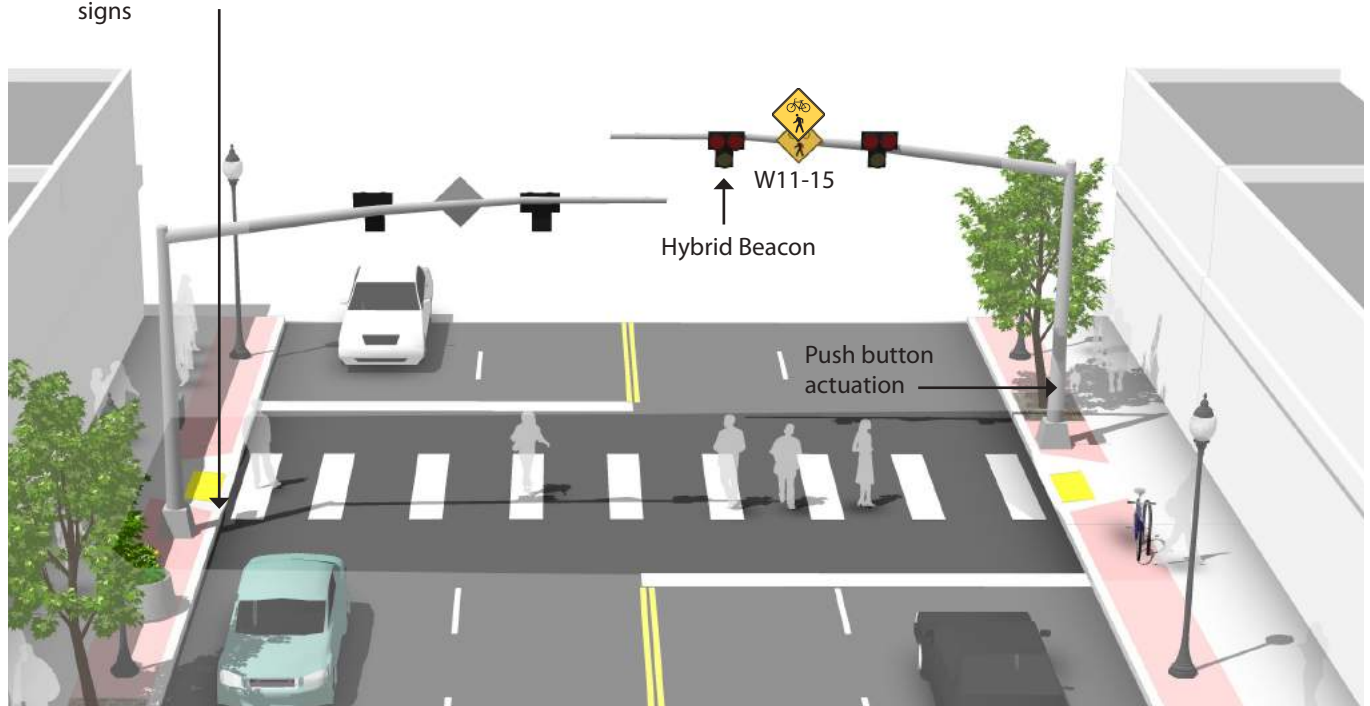
Description

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.

Should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs



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

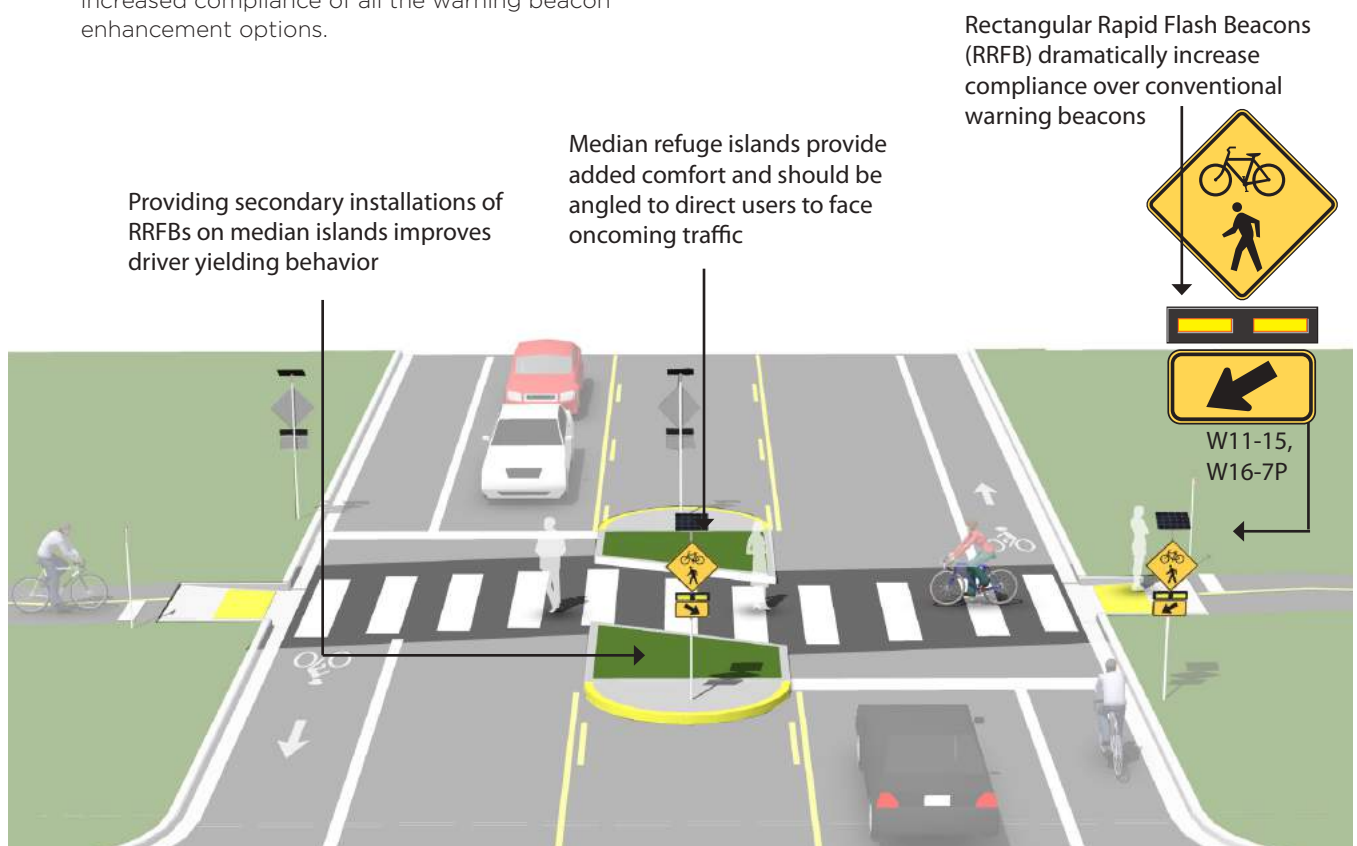
Enhanced marked crossings are unsignalized crossings with additional treatments designed to increase motor vehicle yielding compliance on multi-lane or high volume roadways.

- » 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., Carls, K., Foster, N., Georje, 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.



MULTI-USE PATHS



MULTI-USE PATHS

A multi-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 multi-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



MULTI-USE PATHS

Description

Multi-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

- » 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

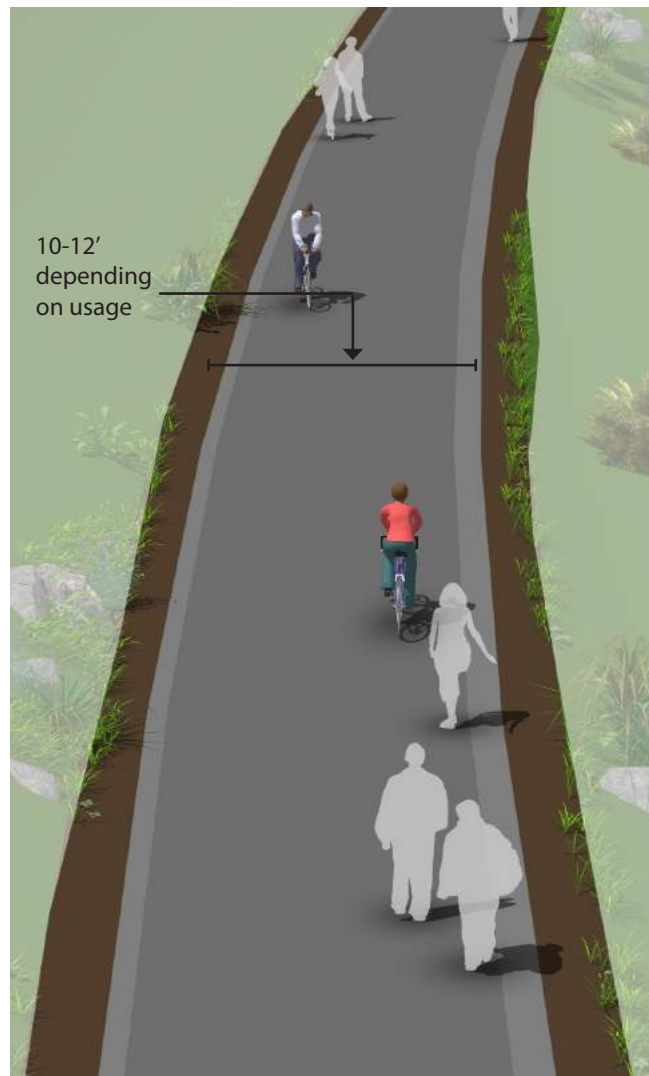
- » A 2 foot or greater shoulder on both sides of the trail should be provided. An additional foot of lateral clearance (total of 3') is required by the MUTCD for the installation of signage or other furnishings.
- » If bollards are used at intersections and access points, they should be colored brightly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



MULTI-USE PATHS ALONG ROADWAYS

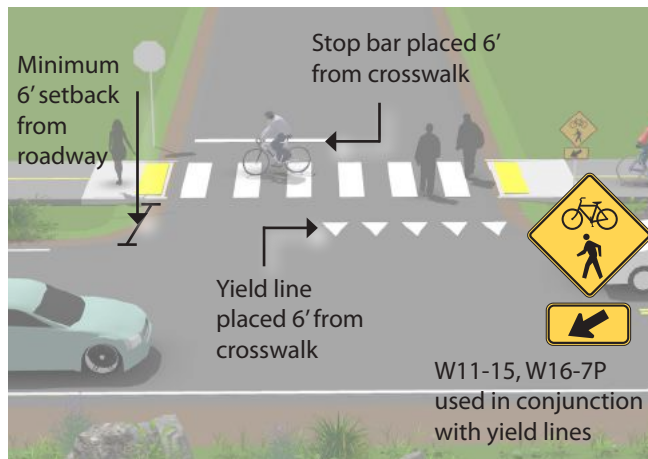
Description

Multi-use paths along roadways, also called side-paths, 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.

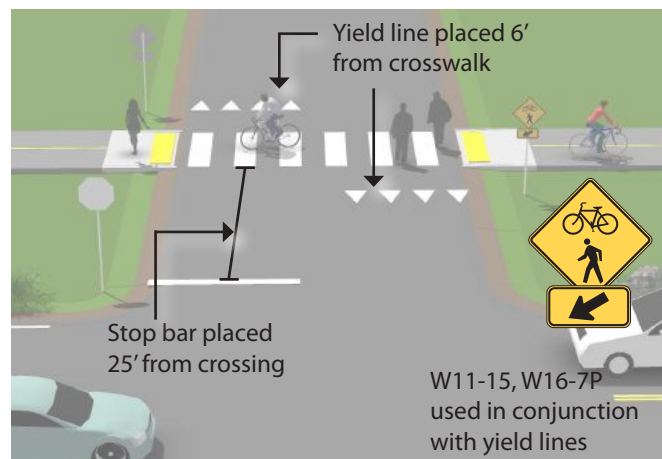
Adjacent Crossing - A separation of 6 feet emphasizes the conspicuity of riders at the approach to the crossing.



Guidance

- » Guidance for sidepaths should follow that for general design practices of multi-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.

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 multi-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.



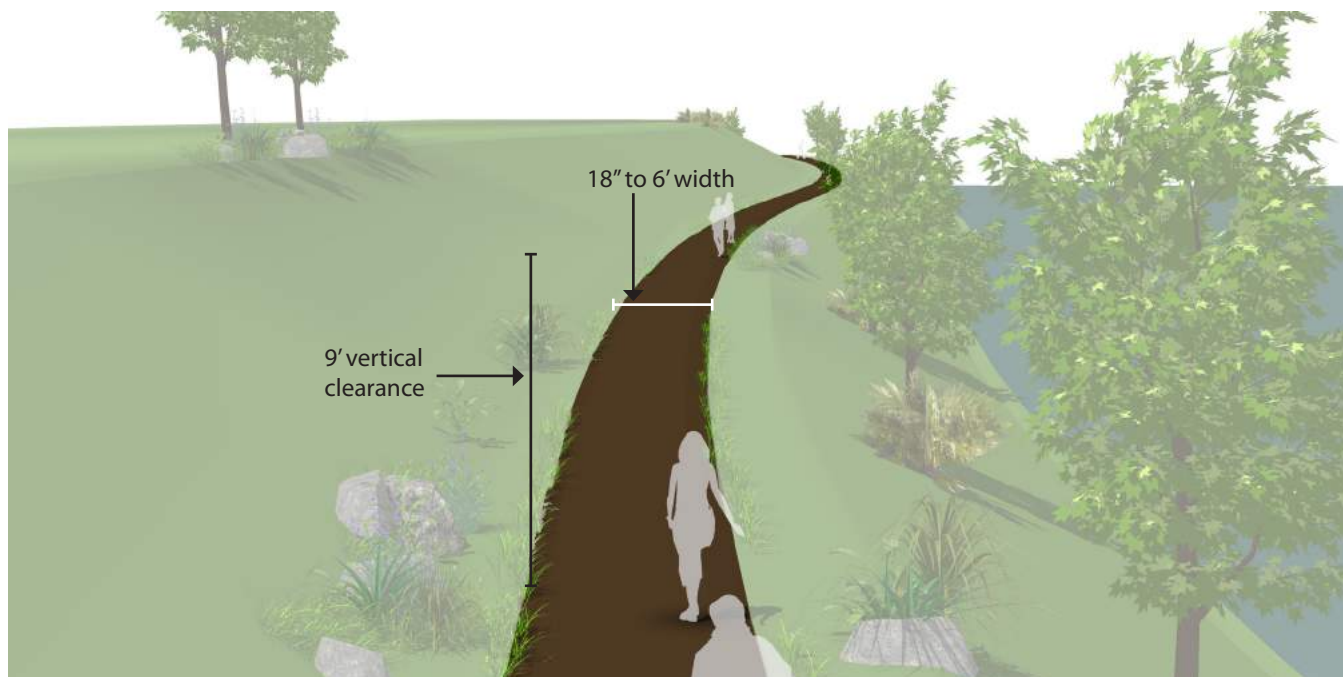
NATURAL SURFACE TRAIL

Description

Sometimes referred to as footpaths, hiking trails or single track trails, the soft surface multi-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.



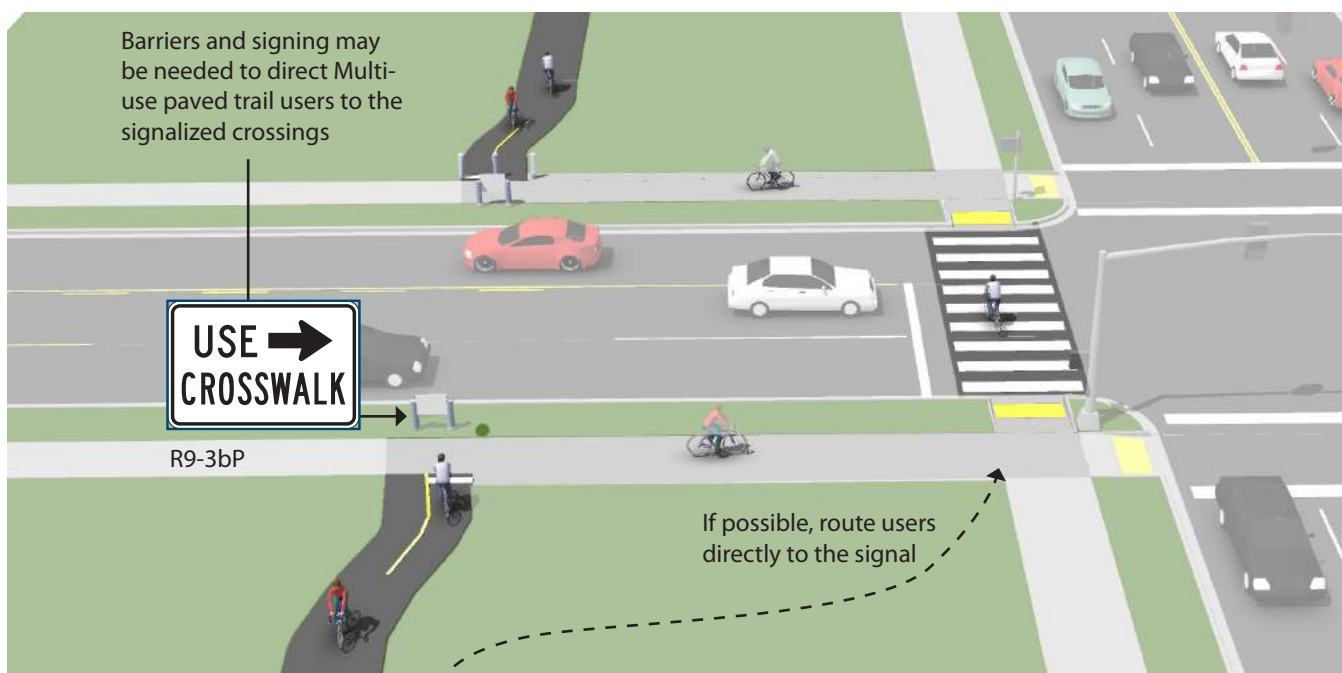
TRAIL/ROADWAY CROSSINGS: ROUTE USERS TO SIGNALIZED CROSSINGS

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 comply with ADA and PROWAG requirements and guidance



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.



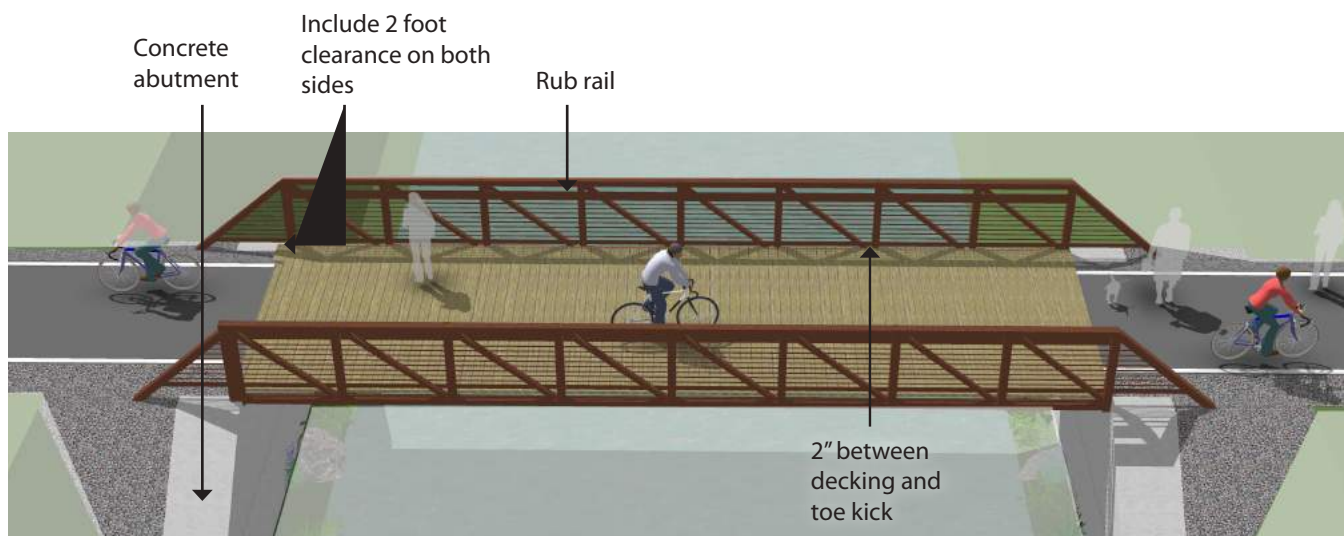
BRIDGES

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. The town of Leland should utilize WMPO for guidance on available federal funding sources.

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.

FIXING AMERICA'S SURFACE TRANSPORTATION (FAST ACT)

In December 2015, President Obama signed the FAST Act into law, which replaces the previous Moving Ahead for Progress in the Twenty-First Century (MAP-21). The Act provides a long-term funding source of \$305 billion for surface transportation and planning for FY 2016-2020. Overall, the FAST Act retains eligibility for big programs - Transportation Investments Generating Economic Recovery (TIGER), Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ), and Highway Safety Improvement Program (HSIP) - and

funding levels between highways and transit.

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: <https://www.transportation.gov/fastact>

TRANSPORTATION ALTERNATIVES

Transportation Alternatives (TA) is a funding source under the FAST Act 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.

Funding for the Surface Transportation Block Grant Program (STPBG) will grow from the current level of \$819 million per year to \$835 million in 2016 and 2017 and to \$850 million in 2018 through 2020.

The FAST Act provides \$84 million for the Recreational Trails Program. Funding is prorated among the 50 states and Washington D.C. in proportion to the relative amount of off-highway recreational fuel tax that its residents paid. To administer the funding, states hold a statewide competitive process. The legislation stipulates that funds must conform to the distribution formula of 30% for motorized projects, 30% for non-motorized projects, and 40% for mixed



used projects. Each state governor is given the opportunity to “opt out” of the RTP.

For the complete list of eligible activities, visit: <http://www.fhwa.dot.gov/fastact/factsheets/stbgfs.cfm>

For funding levels, visit: <http://trade.railstotrails.org/index>

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. For more information, visit <http://www.fhwa.dot.gov/specialfunding/stp/>

HIGHWAY SAFETY IMPROVEMENT PROGRAM

HSIP provides \$2.4 billion for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. 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. For more information: <http://www.fhwa.dot.gov/fastact/factsheets/hsipfs.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. For more information: <http://www.fhwa.dot.gov/fastact/factsheets/cmaqfs.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. For more information: <https://www.transit.dot.gov/funding/grants/enhanced-mobility-seniors-individuals-disabilities-section-5310>

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. 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.

For more information: <http://saferoutespartnership.org/healthy-communities/policy-change/federal/FAST-act-background-resources>

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 communications and be prepared to respond proactively to announcements of new grant programs. Initiatives that speak to multiple livability goals are more likely to score well than initiatives that are narrowly limited in scope to pedestrian improvement efforts. 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/sustainable-communities.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

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 October 29, 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 COASTAL WETLANDS CONSERVATION GRANT PROGRAM

Under the National Coastal Wetlands Conservation Grant Program, U.S. Fish and Wildlife Service will provide over \$21 million to 25 projects in 13 coastal and Great Lakes states with the aim to protect, restore or enhance more than 11,000 acres of coastal wetlands and adjacent upland habitats. "The Service awards grants of up to \$1 million to states based on a national competition, which enables states to determine and address their highest conservation priorities in coastal areas."

For more information: <http://www.fws.gov/coastal/CoastalGrants/>

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/five-star/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 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 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

ACCESS 10%

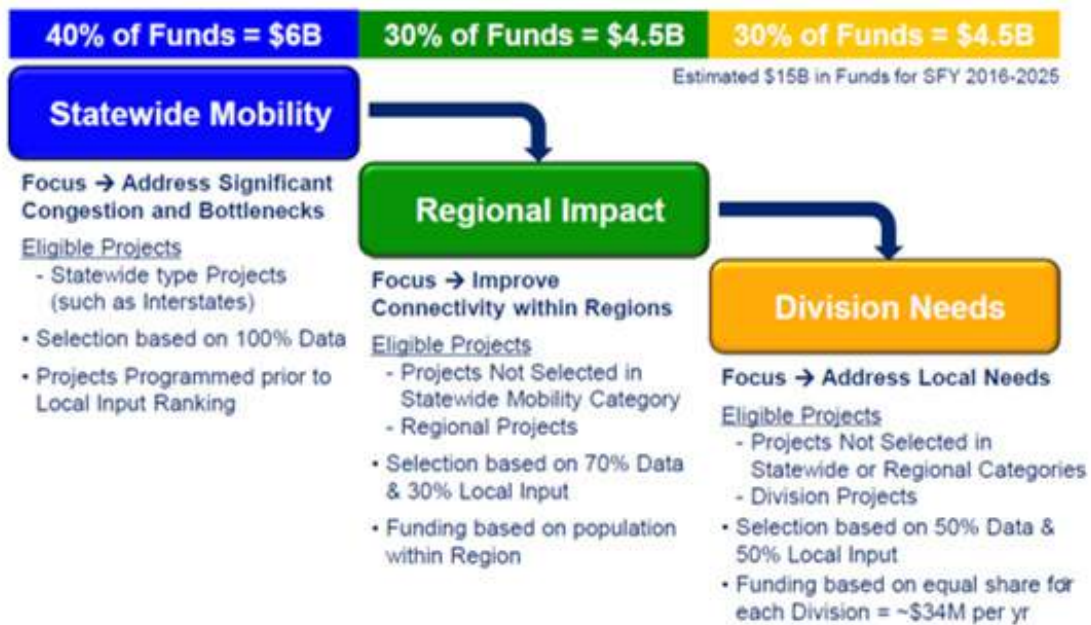
- » Definition: Destinations that draw or generate high volumes of bikes/pedestrians
- » How it's measured: Type of and distance to destination

DEMAND 10%

- » Definition: Projects serving large resident or employee user groups
- » How its measured: # of households and employees per square mile within 1 1/2 mile bicycle or 1/2 mile pedestrian facility + factor for unoccupied housing units (second homes)

HOW THE STI WORKS

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





CONNECTIVITY 10%

- » Definition: Measure impact of project on reliability and quality of network
- » How it's measured: Creates score per each STI 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 funds)
- » 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 should-

ders, 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/default.aspx>

For more about the STIP 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 pedestrian 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.

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/Tepl/Pages/Tepl-Topic.aspx?Topic_List=F22 or <https://connect.ncdot.gov/resources/safety/TrafficSafetyResources/SEG%20Program.pdf>

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>

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.eatsmart-movemorenc.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.

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 Programs (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. 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 town-wide 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.

OTHER LOCAL FUNDING OPTIONS

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

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 programs, 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.conservation-alliance.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.people-poweredmovement.org

LOCAL TRAIL SPONSORS

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash dona-

tions 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 from church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

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.americatrails.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 Health 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.