

Albemarle Regional Bicycle Plan



Acknowledgements

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Thank you to the hundreds of people who participated in the development of this plan through public comment forms, social media, public outreach events, and meetings.

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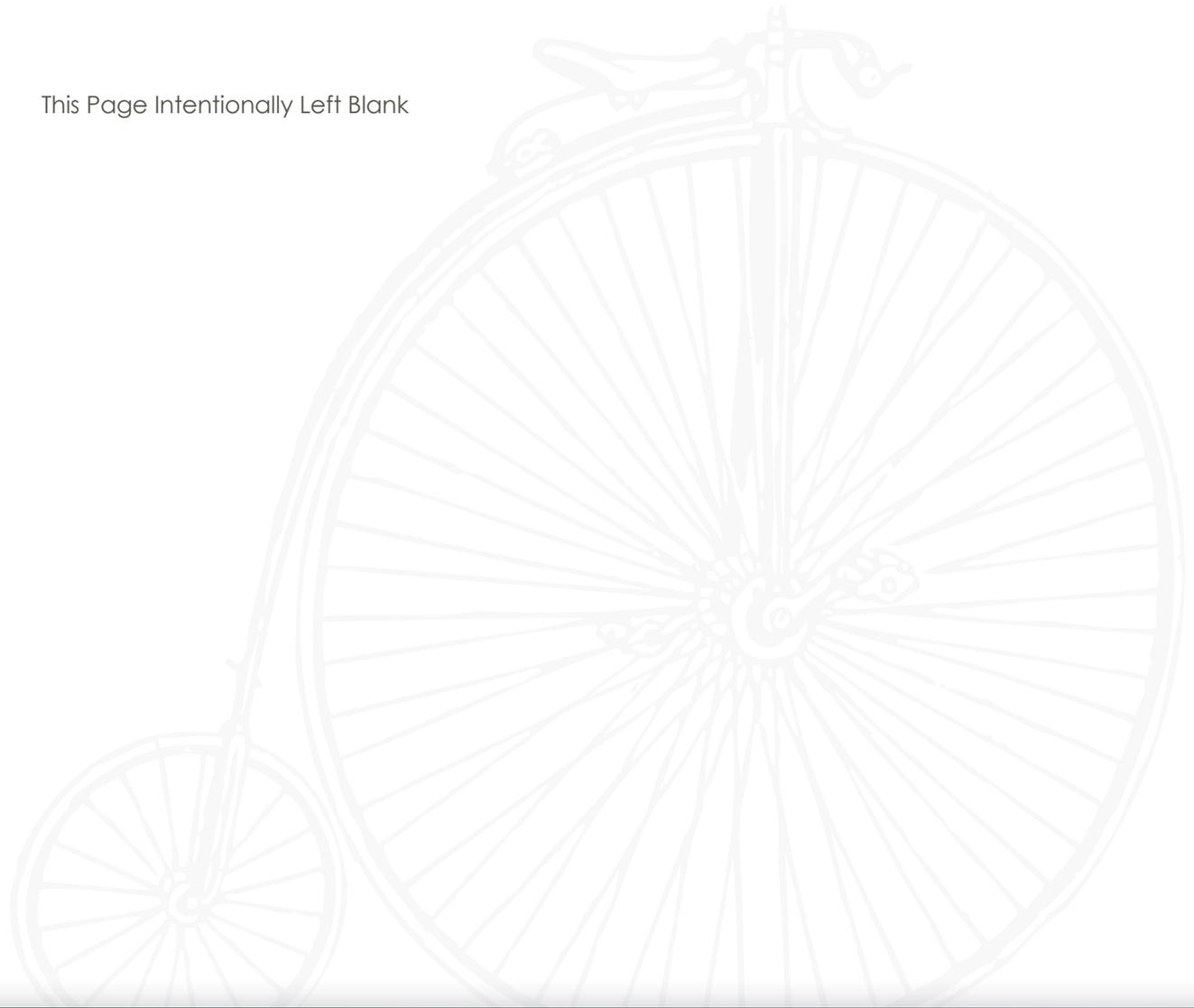
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Roanoke Island, Dock off Eagle Point

Chapter One

Introduction

PROJECT OVERVIEW

In the summer of 2012, the Albemarle Rural Planning Organization (ARPO), with funding from the North Carolina Department of Transportation (NCDOT), began developing a regional bicycle plan for the ten counties of northeastern North Carolina. The purpose of this bicycle plan is to provide a clear framework for the development of new facilities, programs, and policies that will support safe and efficient bicycling throughout the region, which includes the municipalities of Columbia, Creswell, Duck, Edenton, Elizabeth City, Gatesville, Hertford, Kill Devil Hills, Kitty Hawk, Manteo, Nags Head, Plymouth, Roper, Southern Shores, and Winfall.

Nationally, such recent trends as unstable gas prices, environmental damage, loosening social ties, economic decline, and the prevalence of health issues like obesity and heart disease are demonstrating the need for a more diverse set of transportation options and a reevaluation of our current style of development. At the same time, towns and cities around the country are recognizing that bicycle-friendly communities attract new businesses and visitors alike and help to combat many of these trends. On a regional level, this plan represents a strong commitment to take on such issues, translating them into affordable

personal mobility, carbon-free transportation, vibrant communities, appealing tourism destinations, and healthy, active lifestyles for residents and visitors of the Albemarle region. The chief outcome of this plan will be an integrated, seamless transportation network to facilitate biking as a viable transportation alternative and recreation option throughout the region.

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

This plan includes the following features:

- A thorough analysis of current conditions for cycling in the Albemarle Region
- A comprehensive, recommended bicycle network
- Design guidelines for the development of bicycle facilities
- A prioritized list of recommended strategic and low-cost improvements
- Recommendations for the integration of bicycle-friendly policy into codes and ordinances
- Recommendations for programming, maintenance, and funding

Chapter Contents

Project Overview

Study Area & Subregions

Vision Statement and Goals

Planning Process

The Value of a Bicycle-Friendly Region

Types of Bicyclists



STUDY AREA & SUBREGIONS

The Albemarle region as defined in this plan includes the ten counties of Camden, Chowan, Currituck, Dare, Gates, Hyde, Pasquotank, Perquimans, Tyrrell, and Washington. The region is rich in natural heritage and deeply rooted in history. The physical variation and unique natural destinations and historic sites throughout the region characterize the towns, farms, and crossroads communities that traverse its many rivers and estuaries. In physical terms, the region is divided by the Albemarle and Pamlico Sounds into three subregions. The major analysis and recommendations sections of this plan are structured by these subregions, which are termed North of Sound, South of Sound, and the Outer Banks. All recommendations are consistent across the subregions and aim toward a single vision for the entire region, as laid out on the following page.

Note: Where demographic data is presented by subregion, the results follow county boundaries rather than geographic boundaries because of the lack of available data for the latter. Thus, unincorporated areas of Currituck County on the Outer Banks, including Corolla, are grouped in with the North of Sound subregion, and unincorporated portions of Dare County are grouped in with the South of Sound subregion. Data for Ocracoke, however, has been included with the Outer Banks figures despite its inclusion in Hyde County since data was available for this village.

VISION STATEMENT & GOALS

The following vision statement guides the Albemarle Regional Bike Plan:

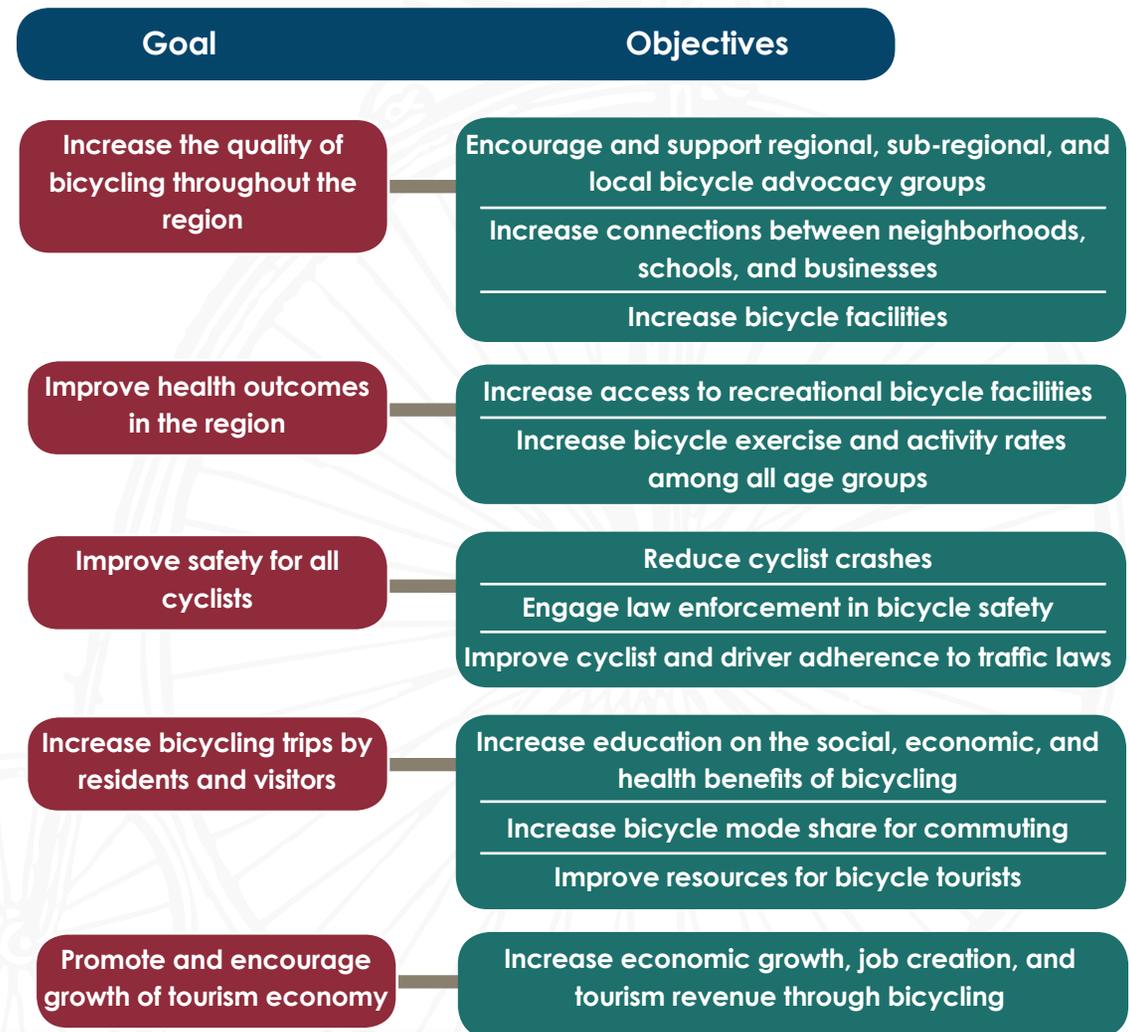
*The Albemarle region is a **Bicycle Destination for the World** where roadways comfortably accommodate all modes of transportation. Opportunities exist for residents and visitors to safely and efficiently bicycle for both transportation and recreation. Cycling is a common, fun, and preferred means of transportation, recreation, and healthy living that improves our communities.*

The purpose of this plan is to make this vision a reality. Specific goals derived from this vision are listed below.

- Goal 1: Increase the quality of bicycling throughout the region*
- Goal 2: Improve health outcomes in the region*
- Goal 3: Improve safety for all cyclists*
- Goal 4: Increase bicycling trips by residents and visitors*
- Goal 5: Promote and encourage the growth of the tourism economy*

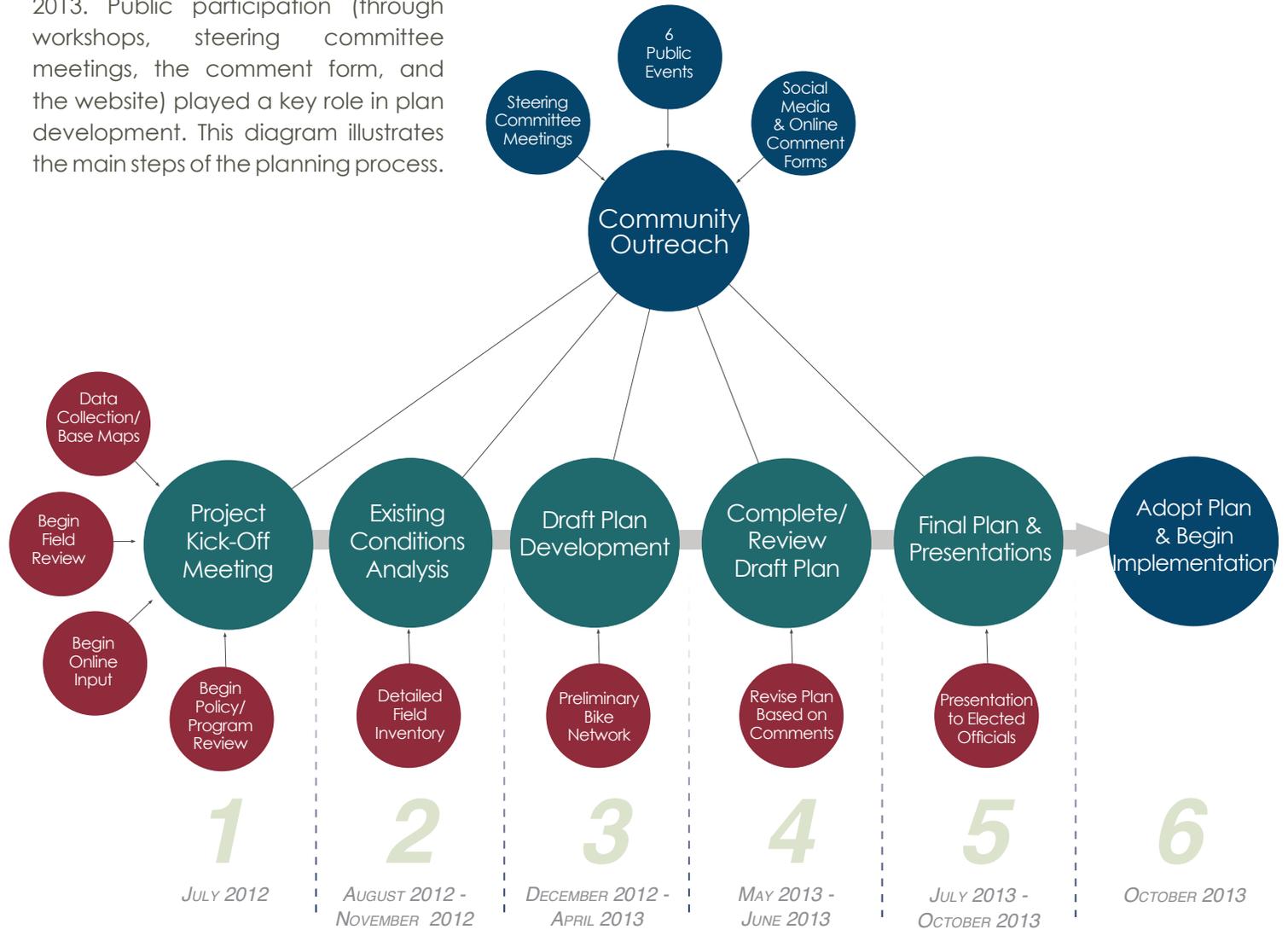
While the RPO and local government agencies must provide leadership and resources for this effort, overall success will also require continued, active participation and encouragement from residents and community organizations throughout the region. This plan aims for full implementation within 30 years of completion.

The following objectives clarify what must be done to achieve each goal. The plan's recommendations and implementation strategy will build on the Albemarle region's existing bicycling infrastructure and bicycling community to achieve these objectives, and ultimately to achieve the plan's vision



PLANNING PROCESS

The planning process began in July 2012 and concluded in October of 2013. Public participation (through workshops, steering committee meetings, the comment form, and the website) played a key role in plan development. This diagram illustrates the main steps of the planning process.



THE VALUE OF A BICYCLE-FRIENDLY REGION

Improvements that encourage bicycling can provide a wide range of benefits to a community and its residents. Better bicycling facilities improve safety and encourage more people to ride, which in turn improves health, provides a boost to the local economy, creates a cleaner environment, reduces congestion and fuel costs, and contributes to a better quality of life and sense of community.

Communities across the country are experiencing the benefits of providing a supportive environment for bicycling. With a better bicycle network, the Albemarle region can create stronger, more vibrant communities and take advantage of the many benefits described below.

IMPROVED HEALTH THROUGH ACTIVE LIVING

Regular physical activity is recognized as an important contributor to good health. The Centers for Disease Control and Prevention (CDC) recommend 30 minutes of moderate physical activity each day for adults and 60 minutes each day for children.¹ Unfortunately, many people do not meet these recommendations because they lack environments where they can be physically active. The CDC reports that “physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes

to the obesity epidemic.”² These conditions also increase families’ medical expenses; each year North Carolinians spend over \$24 billion on health care costs associated with a lack of physical activity, excess weight, type II diabetes, and poor nutrition.³

Having accessible bicycle facilities available, such as bike lanes and paths, can help people more easily incorporate physical activity into their daily lives. Sixty percent of North Carolinians say they would increase their level of physical activity if they had better access to walking and bicycling facilities, such as sidewalks and trails.⁴ Regular physical activity, such as bicycling, is shown to have numerous health benefits:⁵

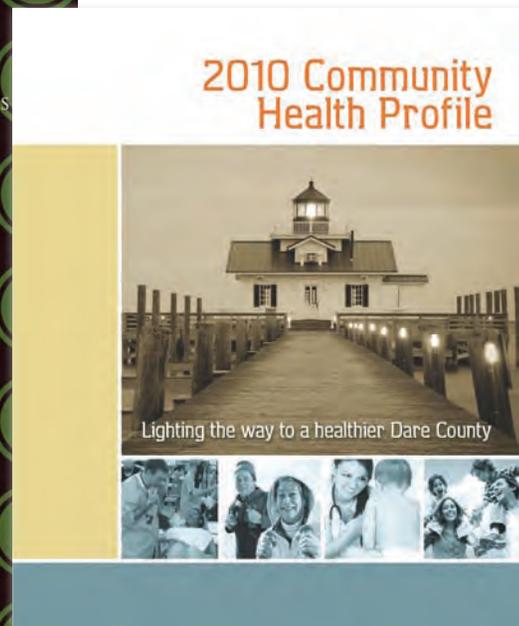
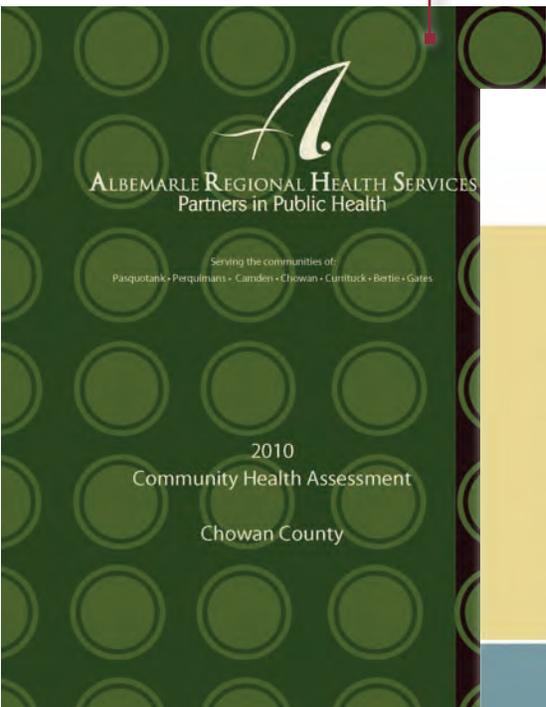
- Reduces the risk and severity of heart disease and diabetes
- Reduces the risk of some types of cancer
- Improves mood
- Controls weight
- Reduces the risk of premature death



Cyclists making use of the Corolla Bike Path.

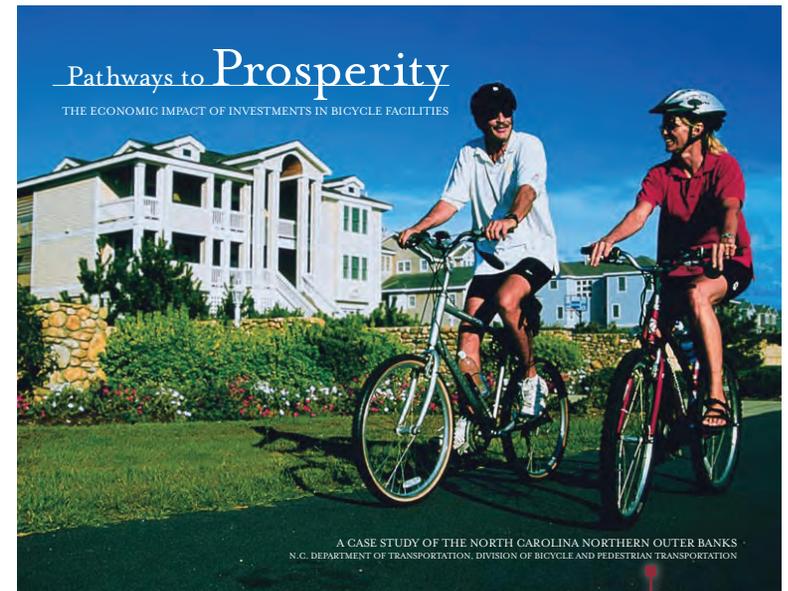
According to the 2010 Regional Community Health Assessment by Albemarle Regional Health Services, heart disease and cancer are the two leading causes of death in the Albemarle region.⁶ Moreover, the cancer and heart disease rates for Chowan, Currituck, Pasquotank, and Perquimans counties are higher than the state rate. In addition, Dare County's own 2010 Community Health Assessment shows that childhood obesity rates in the county surpass those of North Carolina, which ranks fifth highest of the 50 states in childhood obesity.⁷ Establishing a safe and well-connected network of bike lanes and paths throughout the Albemarle region will provide residents with access to the physical activity options that they need to maintain good health and reduce the risk of disease.

2010 County Health Assessments for Camden, Chowan, Currituck, Gates, Pasquotank, and Perquimans Counties are available at www.arhs-nc.org/cha/2010



INCREASED TOURISM ATTRACTION AND PROPERTY VALUES

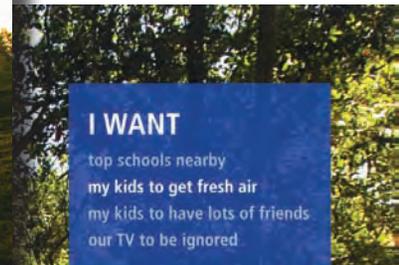
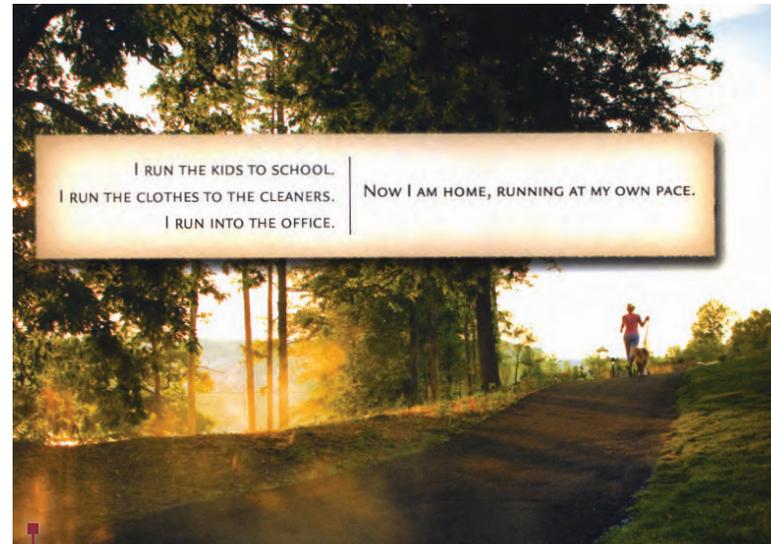
Local investments in bicycling attract visitors and boost tourism revenues. A study of the impact of bicycle tourism in the 2004 Northern Outer Banks reports that a one-time investment of \$6.7 million in bicycling improvements resulted in \$60 million in tourism revenue every year. An estimated 1,400 jobs are created or supported annually with expenditures from bicycle tourists, with 680,000 tourists engaging in some bicycle activity in the region annually. The same study shows that bicycle facilities also encourage return visits; 43 percent of visitors surveyed said that



Download the full report, "Pathways to Prosperity", from: <http://www.ncdot.gov/bikeped/researchreports>

bicycling was a factor in their decision to visit the Northern Outer Banks, and 53 percent reported that the quality of bicycle facilities would be a major factor in their decision to return in the future. Considering the increase in visitation to the Outer Banks since the data was collected for this report (2003), relative increased interest in bicycling, and inflation, the annual impact is estimated at over \$100 million in 2012. See Appendix A for details on this estimate.

Bicycle facilities such as bike lanes, paths, and greenway trails are popular community amenities that add value to properties nearby. According to a 2002 survey by the National Association of Realtors and the National Association of Homebuilders, homebuyers rank trails as the second-most important community amenity out of 18 choices, above golf courses, ball fields, parks, security, and others.⁸ This preference for trails is reflected in property values around the country. In the Shepard's Vineyard residential development in Apex, North Carolina, homes along the regional greenway were priced \$5,000 higher than other residences in the development – and these homes were still the first to sell.⁹ A study of home values along the Little Miami Scenic Trail in Ohio found that single-family home values increased by \$7.05 for every foot closer a home is to the trail. These higher prices reflect how trails and greenways add to the desirability of a community, attracting homebuyers and visitors alike.



At the award-winning Fishhawk Ranch, nearly 30 miles of trails weave throughout the community, connecting the many parks, amenities, villages and neighbors. Soon to be one of the largest community trail systems in the country, each pathway was carefully positioned to minimize the impact on the existing plant life.



A place where video games get lonely from lack of use. A place where people are always going somewhere—families hiking on the miles of trails, or kids biking to our onsite top-rated schools. A place with best-in-class amenities, including a huge Aquatic Club. A place with a natural setting and tight-knit neighbors that always seem to be doing something together. All this and beautiful homes to match? That's FishHawk Ranch.





IMPROVED ENVIRONMENTAL QUALITY

Providing the option of bicycling as an alternative to driving can reduce the volume of car-related emissions, which in turn improves air quality. Cleaner air reduces the risk and complications of asthma, particularly for children, the elderly, and people with heart conditions or respiratory illnesses.¹⁰ Lower automobile traffic volumes also help to reduce neighborhood noise levels and improve local water quality by reducing automobile-related discharges that are washed into local rivers, streams, and lakes. Based on existing bicycle mode shares in the Albemarle region, estimated annual bicycling benefits already include 837,000 less vehicle miles traveled with 681,000 pounds of CO₂ emissions reduced (See Appendix A for more information).

Greenways and trails are a key component of any bicycle network and carry environmental benefits as well. Greenways help to preserve wildlife habitats and act as buffers against natural hazards, such as flooding. By conserving plant cover, greenways also preserve the natural air filtration processes provided by plants, filtering out harmful pollutants, such as ozone, sulfur dioxide, carbon monoxide, and airborne heavy metal particles. By providing a vegetative buffer along streams, rivers, and other waterways, greenways also prevent soil erosion and filter out pollution from agricultural operations and road runoff.

*Boardwalk at the Walter B Jones, Sr.
Center for the Sounds, Columbia, NC*

TRANSPORTATION BENEFITS

Many North Carolinians do not have access to a vehicle or are unable to drive. According to the 2001 National Household Travel Survey, 12 percent of persons age 15 or older do not drive, and 8 percent of U.S. households do not own an automobile. Providing a well-connected bicycle network provides those who are unable or unwilling to drive with a safe transportation option. Bicycle improvements can increase access to important destinations for the young, the elderly, low-income families, and others who may be unable to drive or do not have a motor vehicle.

Investing in bicycle facilities can also help to reduce congestion and the pollution, gas costs, wasted time, and stress that comes with it. Each person who makes a trip by bicycle is one less car on the road or in the parking lot. A network of wide shoulders, bike lanes, and paths gives people the option of making a trip by bike, which helps to alleviate congestion for everyone. Bicycle facilities can also help to substantially reduce transportation costs by providing a way of getting around without a car for some trips. About half of all trips taken by car are three miles or less, equivalent to a 15-minute bike ride.¹¹ With a safe, convenient bicycle network, some of these shorter trips could be comfortably made by bike, saving money on gas, parking costs, and vehicle wear and tear over time.

BETTER QUALITY OF LIFE

Increasingly, citizens are demanding a cleaner, safer, more enjoyable community that provides amenities for adults and children alike. Trails for biking and walking are considered one of the most important amenities a neighborhood can have. Communities with quality greenways, trails, and bicycle routes attract new residents as well as new businesses and industries. Getting outdoors and being physically active also helps to relieve stress, improve mood, and foster social connections between residents.

Transportation and recreation options will be especially important for older Americans in the coming years. According to the Brookings Institution, the number of older Americans is expected to double over the next 25 years. Seniors who find themselves unable to drive or who become uncomfortable with driving will find that their mobility is severely limited if another transportation option isn't available. Trails and paths will provide seniors with a place to take a low-intensity bike ride or a stroll around the neighborhood, or a way to get to nearby shops and services. Paths and trails are also valuable transportation connections for



A cyclist visiting the Elizabeth City Farmers Market.

the elderly because they accommodate motorized wheelchairs, which can provide many seniors with the independent mobility that they would not have otherwise. The aging trend across America is particularly relevant to the Albemarle region. The percentage of residents over the age of 65 in this region is two percentage points higher than that of the state, or 18 percent greater. In the South of Sound subregion, that percentage jumps to 33 percent, with a median age 5.6 years greater than the state average. Both the South of Sound and Outer Banks subregions hold significant older populations that may increasingly seek alternatives to driving as they age.

Children can also benefit greatly from a safe, well-connected bicycle network in their neighborhoods. In recent years, increased traffic and a lack of pedestrian and bicycle facilities have made it less safe for children to travel to school or to a friend's

house. In 1969, 48 percent of students walked or biked to school, but by 2001, less than 16 percent of students walked or biked to or from school. By reevaluating and improving the regional bicycle network, children in the Albemarle region could once again safely bike in their communities. According to the National Center for Safe Routes to School, "Walking or biking to school gives children time for physical activity and a sense of responsibility and independence; allows them to enjoy being outside; and provides them with time to socialize with their parents and friends and to get to know their neighborhoods."¹² Ensuring that children have safe connections to their schools and throughout their neighborhoods can encourage them to spend time outdoors, get the physical activity they need for good health, and offer a higher quality of life.

Age Distribution in the Albemarle Region

Geography	< 19	20 - 34	35 - 54	55 - 64	> 65	Median Age
North Carolina	27.0%	20.0%	28.7%	11.5%	12.6%	37.1
Albemarle region	25.4%	16.7%	29.8%	13.2%	14.9%	40.9
North of Sound subregion	26.6%	17.0%	29.2%	12.5%	14.7%	40.0
South of Sound subregion	23.7%	15.5%	29.6%	14.3%	16.9%	42.7
Outer Banks subregion	22.3%	16.5%	31.9%	14.9%	14.3%	42.9

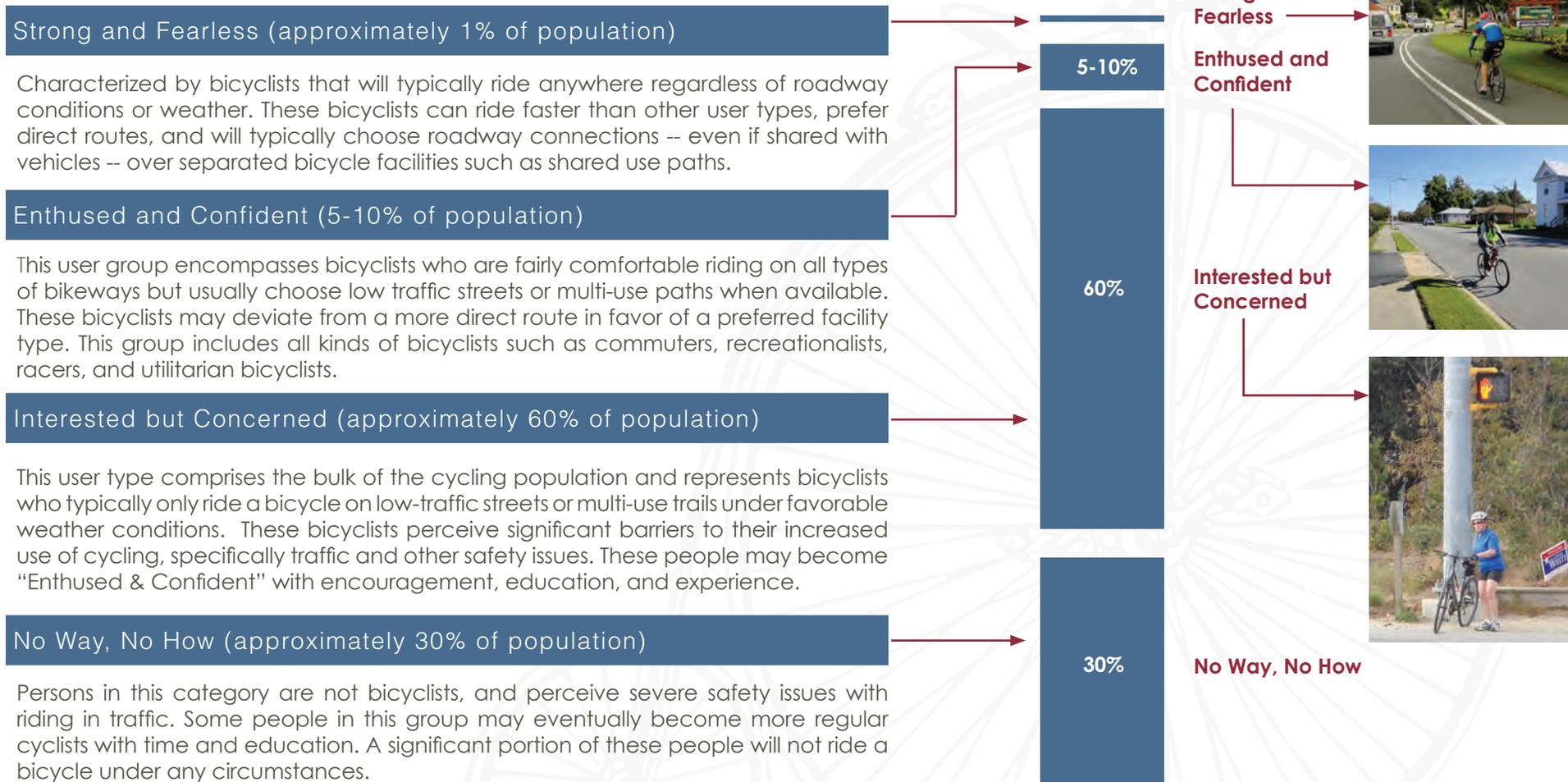


TYPES OF BICYCLISTS

There are a variety of bicyclists of all skill levels in the Albemarle region. This plan seeks to meet the needs of the "Strong and Fearless," "Enthusied and Confident," and "Interested but Concerned." Bicycle infrastructure should accommodate as many user

types as possible, with the goal of creating safe bicycling environments to encourage more ridership. A framework for understanding the characteristics, attitudes, and infrastructure preferences of different bicyclists in the US population as a whole is illustrated below.

TABLE 1.1 TYPES OF BICYCLISTS ¹³



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Edenton, View of Edenton Bay at Water Street

Chapter Two

Existing Conditions

OVERVIEW

Many factors influence the quality and quantity of cycling in a particular place. The presence of bicycling facilities, distribution of land uses, connectivity of the road network, and norms regarding sharing of the road are just a few. Further, these factors and others influence the viability of particular improvements and therefore will guide the recommendations of this plan. Recommendations will vary throughout the region given the significant variation in both culture and the built environment seen across it.

This chapter provides a brief overview of these factors and their variations across the region, as well as their relevance to cycling today and to potential improvements for cycling in the future. This overview is presented in a series of descriptive maps. Following this map series, an explanation of the methods used to gather public input is provided. Finally, plans, programs, and policies relevant to bicycling in the Albemarle region are summarized.

The following maps provide a summary of existing conditions in the Albemarle region:

- Regional Land Use
- Destinations
- Major Routes
- Population Density
- Employment Density
- Equity
- Commute Mode Share
- Crash Density
- Previous Plans

Chapter Contents

Overview

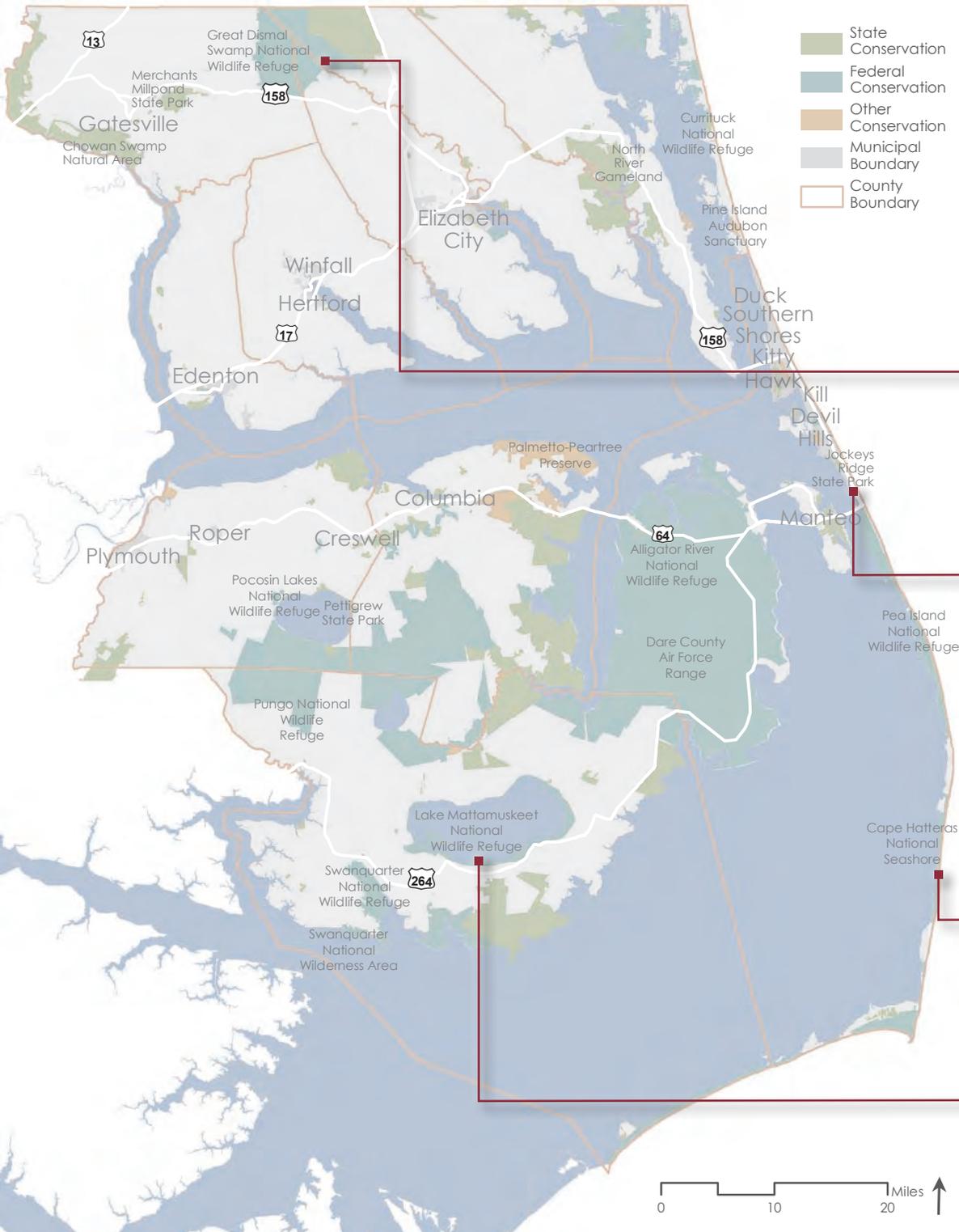
Descriptive Map Series

Land Use Summary

Public Input

Program Summary

*Plan and Policy
Summary*



REGIONAL LAND USE

The Albemarle region holds extensive public lands at the state and federal level ranging from national wildlife refuges to state parks to military lands. These public holdings provide both opportunities for partnerships and potential constraints to the development of bicycle facilities.

The Great Dismal Swamp National Wildlife Refuge (NWR) extends into Virginia and provides trails for biking and hiking.

Jockys Ridge State Park hosts the tallest natural sand dune on the east coast and beautiful sunsets, attracting millions of visitors.

Cape Hatteras National Seashore extends 70 miles from Nags Head to Ocracoke, with several historic landmarks along the way including the Cape Hatteras Lighthouse.

Mattamuskeet NWR boasts the state's largest natural lake. The lake is a popular destinations for birders, as it attracts thousands of wintering waterfowl each year.



DESTINATIONS

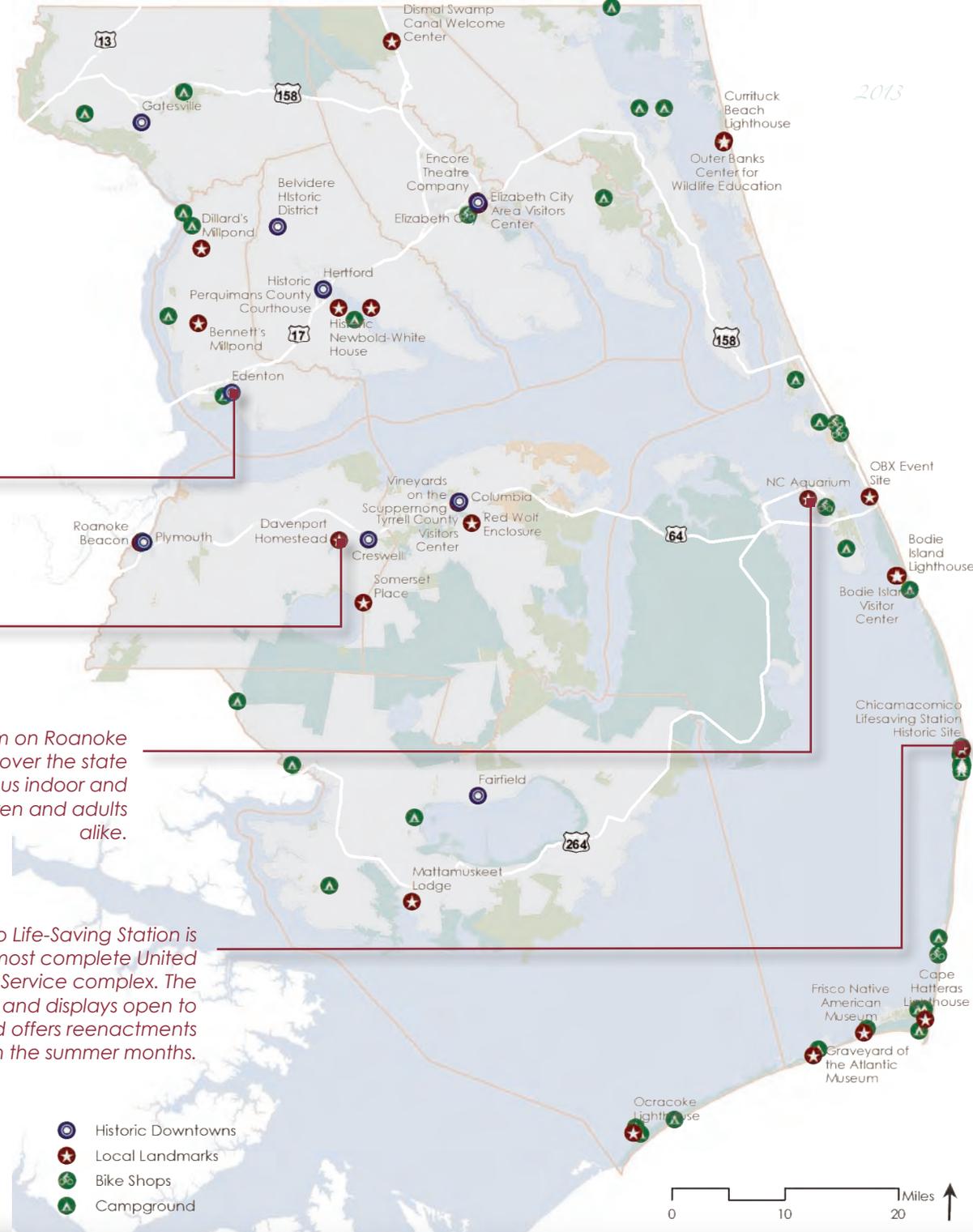
The Albemarle region has a long history dating back to the first English colony in the New World. Many historic sites are preserved, offering visitors a rich assortment of destinations. A few notable sites are described below with information from the Historic Albemarle Tour (www.historicalbemarletour.org.) The region also offers extensive camping and recreation opportunities, including hiking, mountain biking, fishing, wildlife viewing, and hunting.

Historic Edenton is North Carolina's second oldest town, incorporated in 1722 seventeen years after Bath, where the notorious pirate Blackbeard's name is recorded. The Cupola House and the Chowan County Courthouse are two National Historic Landmarks located here.

The Davenport Homestead in Creswell provides a glimpse of life in the 18th century. It was built by the future North Carolina senator Daniel Davenport of Washington County.

The North Carolina Aquarium on Roanoke Island attracts visitors from all over the state to the coast, offering numerous indoor and outdoor programs for children and adults alike.

The Chicamacomico Life-Saving Station is the nation's largest, most complete United States Life-Saving Service complex. The site contains artifacts and displays open to self-guided tours and offers reenactments in the summer months.



LAND USE SUMMARY

From the beaches of the Outer Banks to the farms of Gates County to the townscape of Edenton, the 10-county Albemarle region is as large as it is diverse. The region's diversity may be characterized by 7 normative settlement types, which are described below in more detail and can be used to structure appropriate, context-sensitive transportation, and land use planning decisions.

NATURAL

Albemarle's natural land exists in an unaltered or nearly unaltered state, including forests, fields, swamps, creeks, rivers, harbor, beach, grassland, and other environments. Via a few regional roads or shared use paths, some of the region's most stunning natural environments are accessible by bicycle. Ex. Dismal Swamp State Park

FARMLAND

Farmland in the Albemarle region is characterized by flat, sparsely populated land dedicated almost entirely to the growing of crops (tobacco, cotton, etc.) and the tending of livestock. The limited built landscape is comprised of single-family homes on large plots of land located close to rural roadways, which often include numerous other structures used for related activities. The scenic quality is high, but the bicycling appeal varies along these roads; traffic is generally light but speeds are relatively high and many roads do not have shoulders. Ex. Lake Landing

HAMLET

Located at the intersection of two or more regional thoroughfares, hamlets are small clusters of buildings that feature residential or agricultural land uses. The transition between a hamlet and farmland or natural land is almost immediate, which makes recreational bicycling appealing. Ex. Fairfield

VILLAGE

Villages maintain a small, irregular network of streets connecting a cluster of homes and a limited amount of other land uses, including local retail and other small businesses, places of worship, parks, and schools. To this last point, villages in the Albemarle region are regional focal points because they often accommodate the county's elementary or middle schools. Ex. Winfall

TOWN

Towns are typically located adjacent to the Albemarle Sound, or along one of its major tidal tributaries. They feature a regular grid of streets, and a wider variety of land uses than villages. Residential neighborhoods and other civic and commercial uses are clustered around a historic main street core that includes 2-3 story mixed-used buildings. While most towns in the Albemarle region have retained a meaningful relationship with their countryside, recent auto-oriented development on the fringe is slowly altering the compact town fabric and making walking and bicycling more difficult. Ex. Edenton

CITY

Cities are the cultural, governmental, commercial, and educational centers for a given region. They feature the highest diversity and density of land uses, connected by a network of streets that encourage bicycling and walking. Recent auto-oriented development created by land use regulations are damaging not only the fringe, but also the core, which makes walking and bicycling challenging where it should be the easiest. Ex. Elizabeth City

BEACH DISTRICT

Districts feature large swaths of land dedicated to a single purpose. In the Outer Banks, this includes either residential or commercial uses. Beach districts feature relatively high density but lack the mixed-use neighborhood structure found in traditional towns and cities, as described above. Ex. Kill Devil Hills

SUBREGION SETTLEMENT TYPES

OUTER BANKS



Natural Hamlet Village Town Beach District

NORTH OF SOUND



Natural Farmland Hamlet Village Town



City

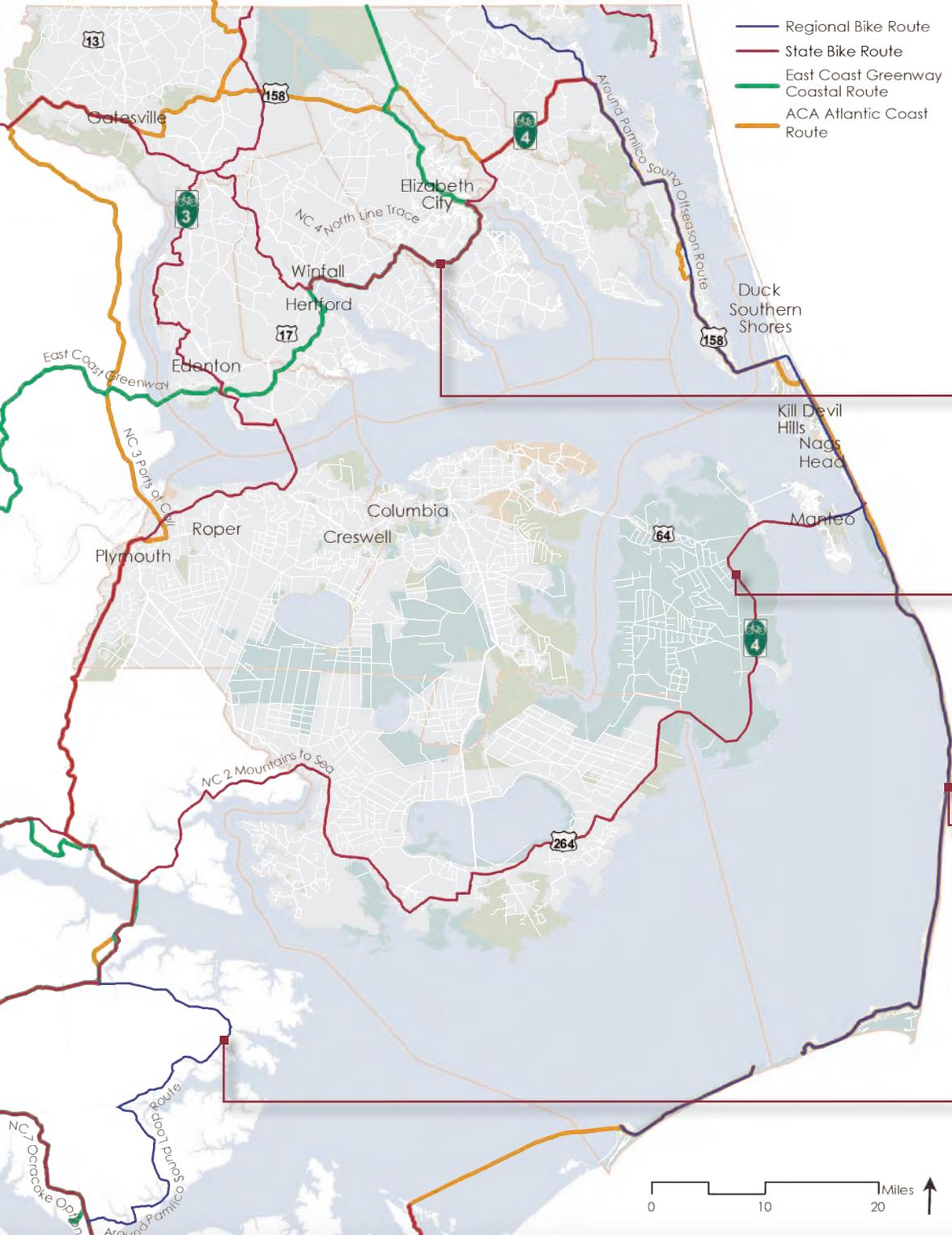
SOUTH OF SOUND



Natural Farmland Hamlet



Village Town



MAJOR ROUTES

A variety of regional, state, and national bicycle routes are currently designated through the Albemarle region. Three state bike routes, the Adventure Cycling Association's Atlantic Coast Route's two alternatives, the East Coast Greenway Coastal Route, and the regional Around Pamlico Sound route all draw long-distance cyclists to the area.

The East Coast Greenway (ECG) is a long-distance urban trail project in development that will eventually connect 25 major cities from Maine to Florida. Through North Carolina, the ECG splits into spine and coastal route alternatives.

State Bike Routes 2,3, and 4; the Mountains to Sea, Ports of Call, and North Line Trace routes; connect most of the Towns in the Albemarle region. These routes are part of the nine-route, 2,400-mile long system that connects scenic landscapes around the state. The majority of state bike routes do not contain exclusive space for bicyclists, such as paved shoulders or bicycle lanes.

Note: State bike routes shown throughout this plan represent updated routes developed in 2013 as part of the North Carolina Statewide Pedestrian & Bicycle Plan.

The Adventure Cycling Association is a non-profit organization that produces cycling maps to encourage long-distance cycling around the country. Two alternatives of the ACA's Atlantic Coast Route weave through the Albemarle region, overlapping with many of the other routes described here.

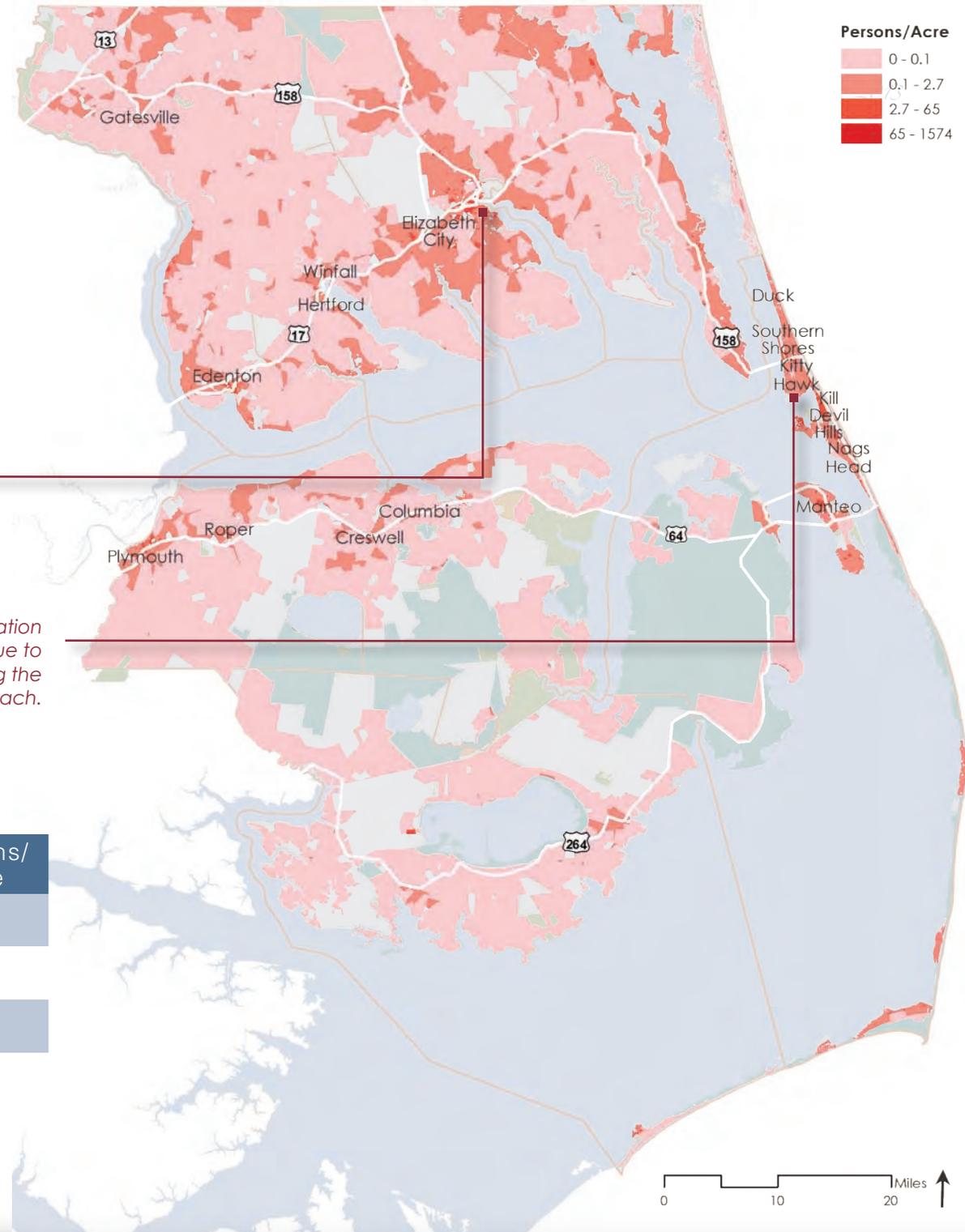
The Around Pamlico Sound route connects five state parks, historic sites, the National Seashore and other destinations around the region. Given the large difference in traffic patterns during the summer, on- and off-season routes provide options for cyclists looking to loop the region.

POPULATION DENSITY

Two-thirds of the Albemarle population lives in the North of Sound subregion, and one third of those in the largest municipality, Elizabeth City. The Outer Banks subregion is second with twenty percent of the population, but is estimated to increase six-fold each summer with the influx of visitors, according to the Outer Banks Chamber of Commerce. This estimate brings the peak season population of the region to almost 350,000 or twice that of the off-season.

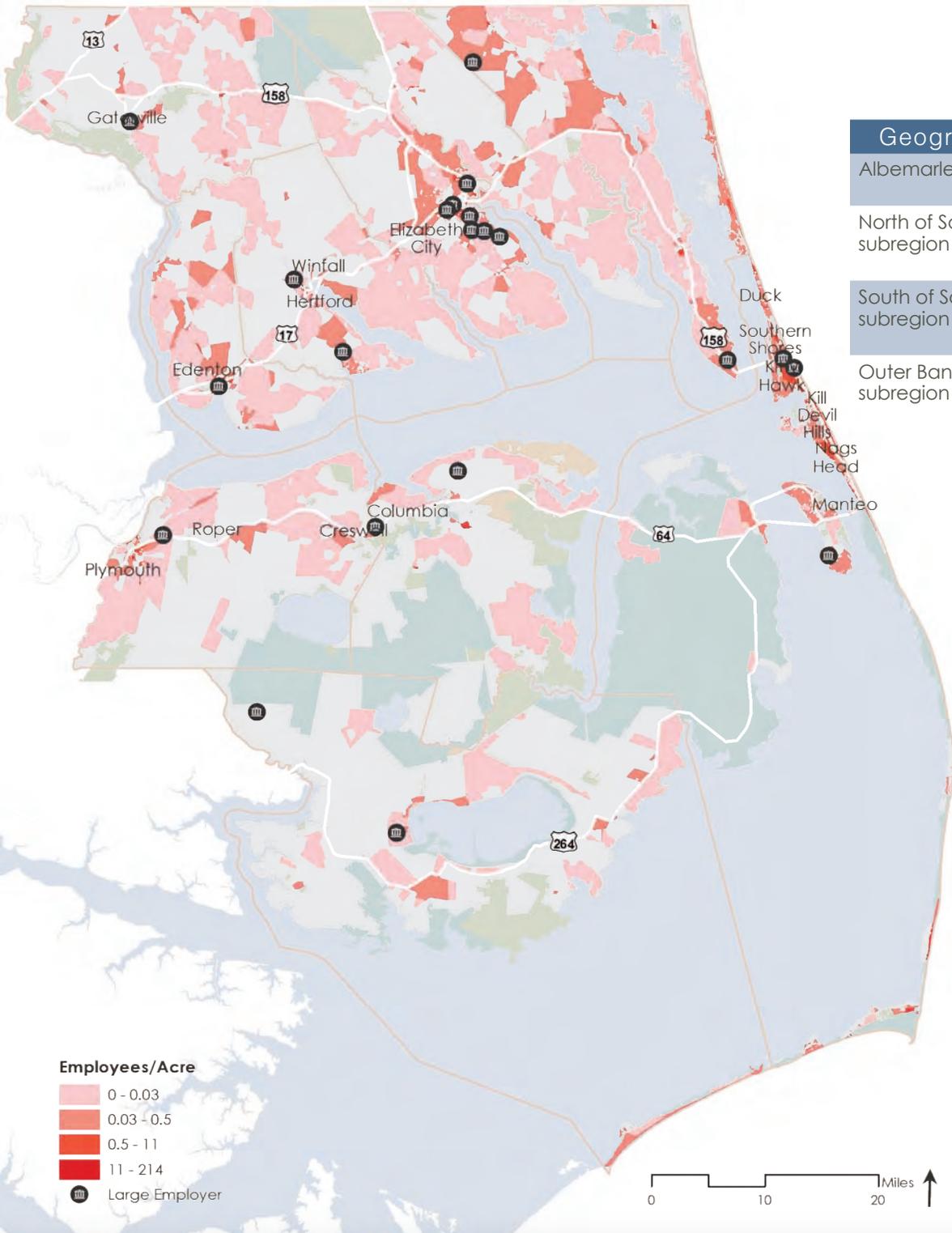
Elizabeth City holds the largest year-round population center in the region.

The Central Outer Banks see the largest population shift between peak season and off-season due to the large number of visitors that vacation along the beach.



Geography	Population	Households	Persons/Acre
Albemarle region	170,167	67,024	0.08
North of Sound subregion	113,174	43,064	0.12
South of Sound subregion	22,913	8,286	0.01
Outer Banks subregion	34,080	15,674	0.23





EMPLOYMENT DENSITY

Geography	#1	#2	#3
Albemarle region	Retail Trade (20%)	Educational Services (14%)	Accommodation & Food Services (13%)
North of Sound subregion	Educational Services (18%)	Retail Trade (17%)	Health Care & Social Assistance (14%)
South of Sound subregion	Educational Services (16%)	Health Care & Social Assistance (14%)	Retail Trade (13%)
Outer Banks subregion	Retail Trade (26%)	Accommodation & Food Services (20%)	Real Estate & Rental & Leasing (12%)

Employment is largely concentrated in the Outer Banks and North of Sound subregions, particularly in and around Elizabeth City. 56 percent of all jobs are found in the North of Sound subregion, where two-thirds of the population lives. The Outer Banks subregion contains a high share of jobs relative to its population; 33 percent of all jobs are in the Outer Banks, yet just 20 percent of the population resides there. The South of Sound subregion has relatively balanced employment and population densities, with 11 percent of the jobs and 14 percent of the population. These figures suggest that many workers in the Albemarle region likely commute from the North of Sound and South of Sound to the Outer Banks for work.

In the Outer Banks, the top employment sectors are primarily tourism-related; retail trade, accommodation and food services, and real estate, rental and leasing together make up 58 percent of jobs. While agriculture and fishing have historically been major sources of employment in the Albemarle region and remain a vibrant part of the economy, landscape, and culture, today they account for just 2 percent of jobs. These jobs are almost entirely located in the North of Sound (61%) and South of Sound (35%) subregions, with few agriculture and fishing jobs in the Outer Banks.

Equity

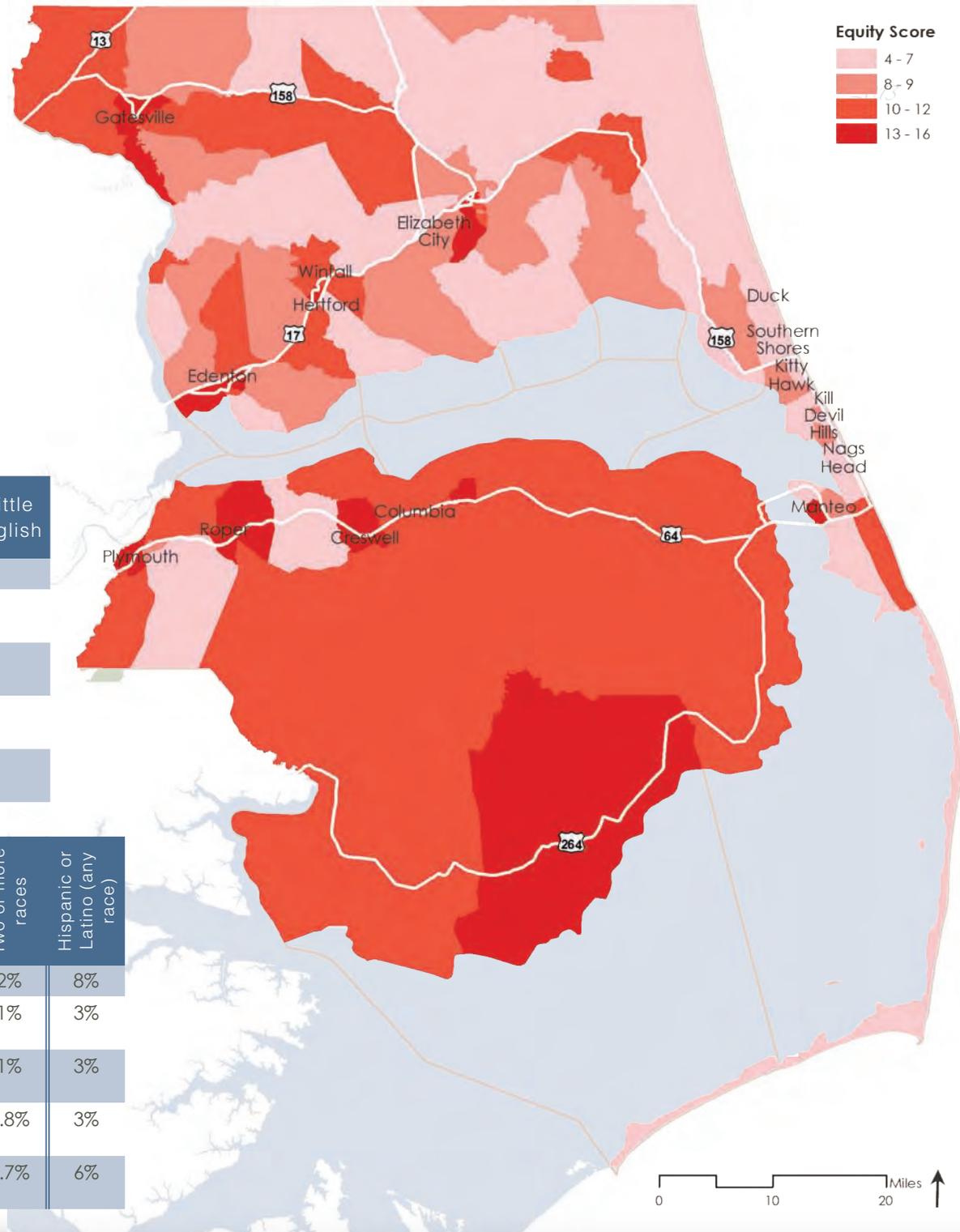
An important goal of this plan is to recommend a course for the Albemarle region that will benefit all residents, including those typically underserved or underrepresented. An equity analysis was completed to identify the locations where such residents are located in order to target public outreach to those areas and ensure recommendations meet the needs of those residents. The map at right displays an 'equity score', which represents a composite of several factors – Race, vehicle availability, income, and English fluency.

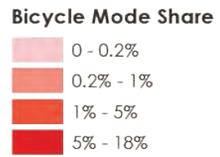
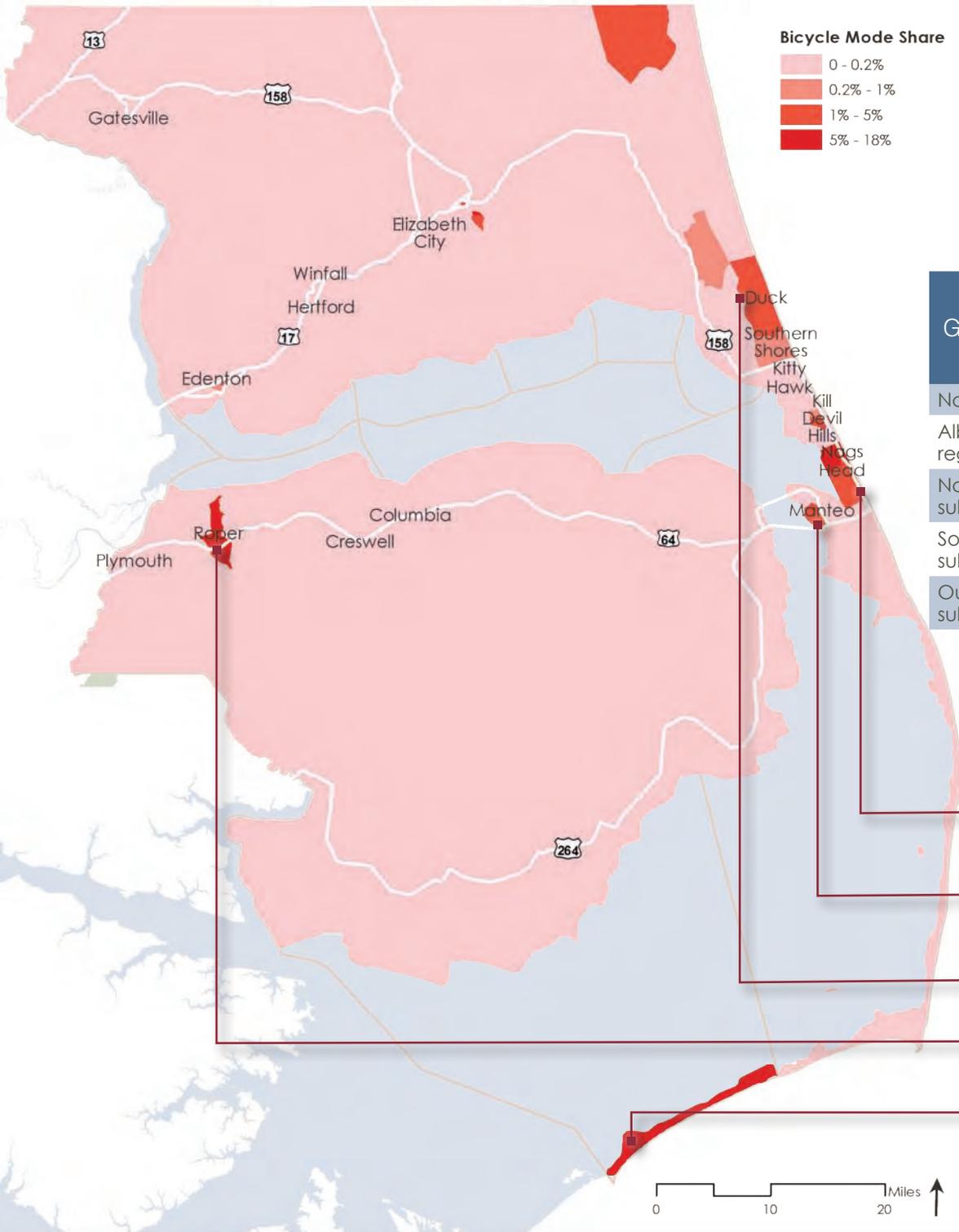
Demographics in the Albemarle Region

Geography	No vehicle available	Median Household Income	Speak little to no English
North Carolina	2.5%	\$45,570	2.9%
Albemarle region	1.8%	\$46,548	1.4%
North of Sound subregion	1.9%	\$46,957	1.2%
South of Sound subregion	4.9%	\$33,888	1.8%
Outer Banks subregion	0.4%	\$53,701	2.1%

Race and Ethnicity in the Albemarle Region

Geography	White	Black or African Amer.	Amer. Indian and Alaska Native	Asian	Some other race	Two or more races	Hispanic or Latino (any race)
North Carolina	70%	21%	1%	2%	4%	2%	8%
Albemarle region	72%	25%	0%	1%	1%	1%	3%
North of Sound subregion	69%	27%	0.4%	0.7%	1%	1%	3%
South of Sound subregion	50%	46%	0.4%	0.2%	2%	0.8%	3%
Outer Banks subregion	94%	4%	0.3%	0.3%	1%	0.7%	6%





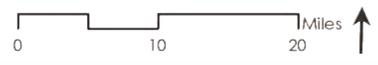
COMMUTE MODE SHARE

Bicycle mode share is greater than the state average of 0.2 percent in two of Albemarle's three subregions. South of the Albemarle Sound, the percentage of commuters who bicycle to work is two times that of the state rate, and in the Outer Banks it is four times as high.

Geography	Employed Population	Drive alone	Carpool	Transit	Bicycle	Walk	Other
North Carolina	4,205,946	81%	11%	1%	0.2%	2%	1%
Albemarle region	75,213	78%	13%	0.4%	0.4%	2.0%	3%
North of Sound subregion	49,692	80%	13%	0.4%	0.2%	2%	3%
South of Sound subregion	7,696	72%	17%	0.6%	0.5%	3%	2%
Outer Banks subregion	17,825	76%	11%	0.3%	0.8%	2%	2%

Several towns have even higher bike mode shares, where bicycling is a part of the daily culture. In the following towns, more than one percent of commuters travel by bicycle:

- Nags Head - 3.1%
- Manteo - 2.7%
- Duck - 8%
- Roper - 18%
- Ocracoke - 18%



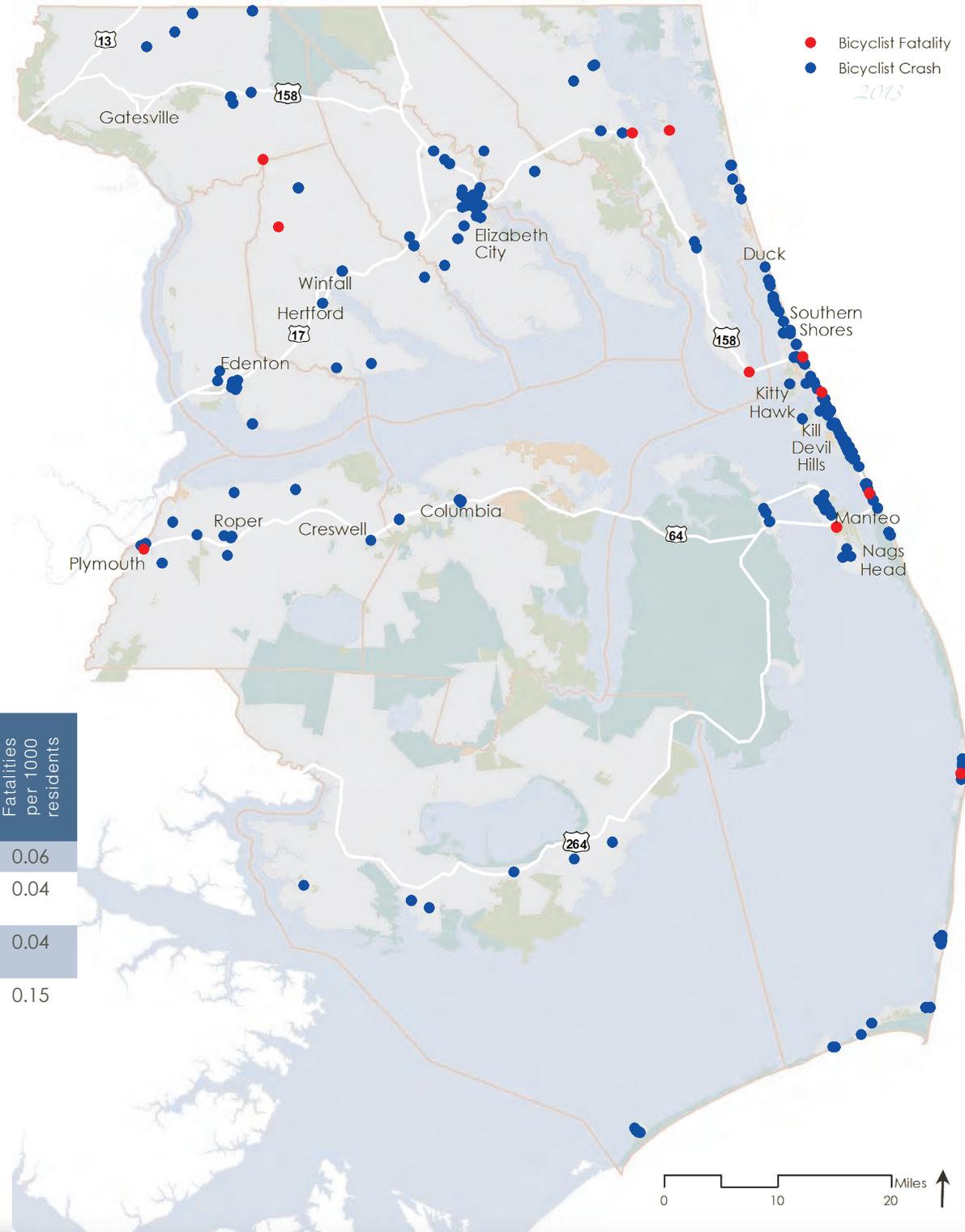
CRASH DENSITY

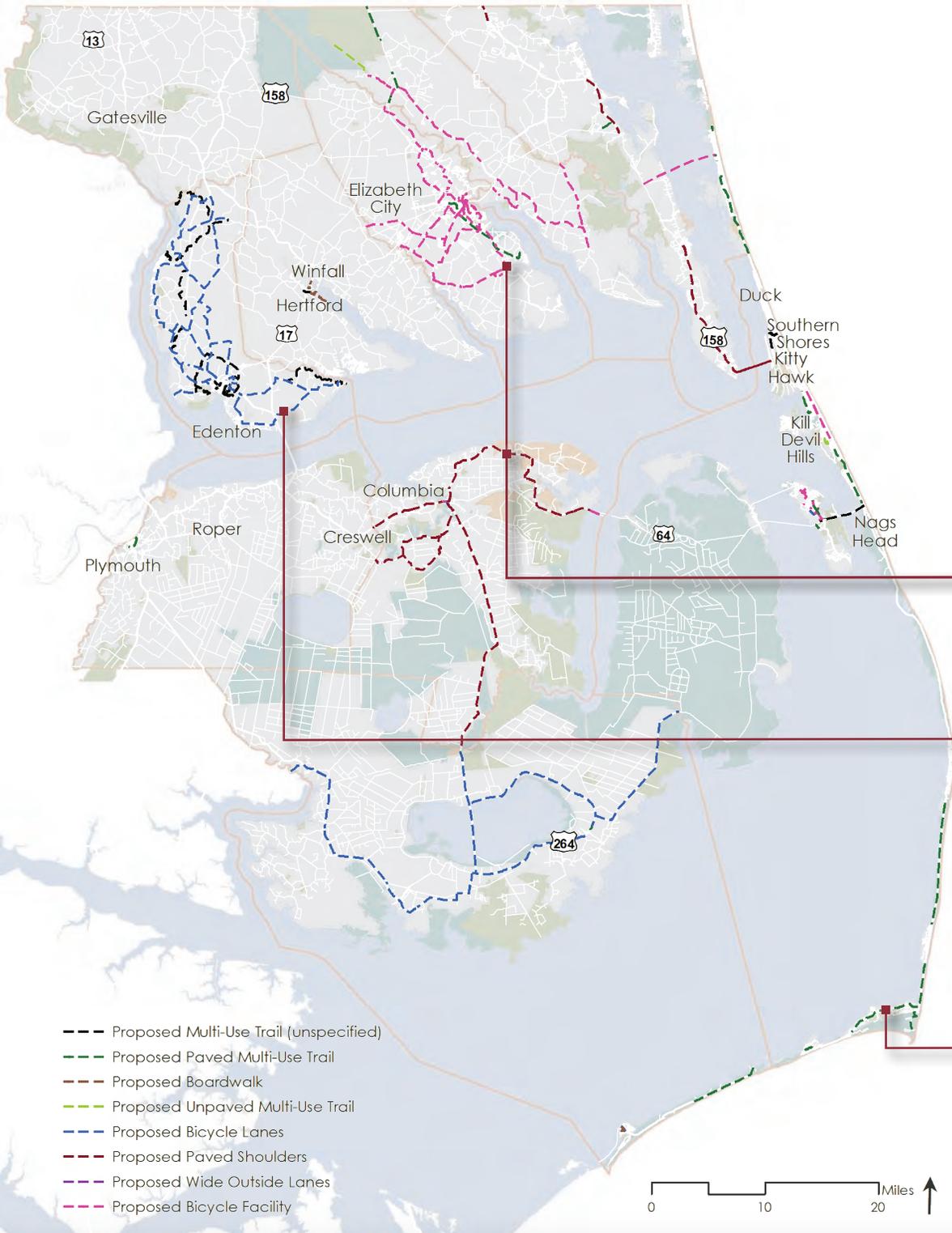
Cyclist crashes over the last ten years reveal safety patterns across the Albemarle region. Crashes are overrepresented in the Outer Banks relative to its year-round population, but there are two possible explanations for this. First, the Outer Banks population is greatly increased in the summer, and over half of the crashes took place between June and August. Second, bicycle mode share is greater in the Outer Banks, so crashes per bicycle trip may actually be lower. The following table displays crashes per bicycle commuter, a proxy for crashes per bicycle trip, and reveals that the Outer Banks is still overrepresented relative to the other subregions. This proxy does not account for visiting cyclists and non-work trips, however, and is therefore limited.

Notably, 42 percent of crashes took place in rural areas outside the municipalities of the region. These are likely occurring on rural roads with narrow shoulders and fast-moving vehicles.

Geography	Crashes	Crashes per 1000 residents	Crashes per bicycle commuters	Fatalities	Fatalities per 1000 residents
Albemarle region	277	1.6	1.04	11	0.06
North of Sound subregion	87	0.8	0.95	5	0.04
South of Sound subregion	28	1.2	0.78	1	0.04
Outer Banks subregion	162	4.8	1.17	5	0.15

Source: NCDOT





PREVIOUS PLANS

Many existing plans for municipalities and counties in the Albemarle region contain recommendations relevant to cycling. These vary from proposals for specific facility locations to program and policy recommendations. The findings and recommendations of these plans provide the starting point for this plan. Recommendations are considered in light of recent trends and the goals and vision of this plan, and then incorporated or modified as appropriate. The map at left displays the facility recommendations from existing plans.

Recent Comprehensive Transportation Plans for several counties including Camden, Currituck, Hyde, Tyrell, and Pasquotank recommend bicycle facilities varying from paved shoulders and bicycle lanes to multi-use paths.

The 2003 Chowan County and Edenton Greenway and Open Space Plan recommends a system of trails and protected areas along streams and other natural resources in the county.

The Hatteras Island Pathways Plan recommends a sidepath along the length of NC 12 to provide a recreational resource and connection in and between the island's four villages. As a result of this study, 8 miles of sidepath within these four villages was constructed in 2013.

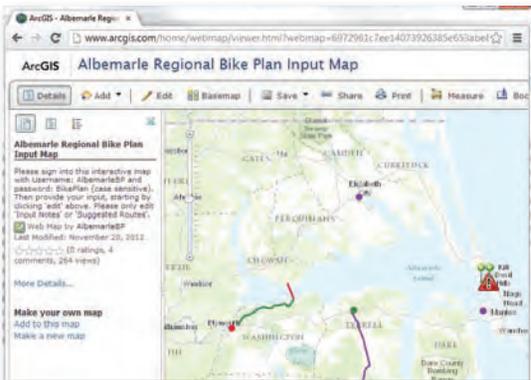
PUBLIC INPUT

Public input is critical to the success of any planning effort. The planning team gathered feedback from the public in many ways to inform and guide this plan. The major public input strategies used are shown briefly below. For more information on the public input process and findings, see [Appendix B](#).

Project website with links to project information



ArcGIS online input map website



Facebook page

Online comment form and hardcopy companion



A series of public workshops were held in October 2012 and May 2013 to receive input into the process.

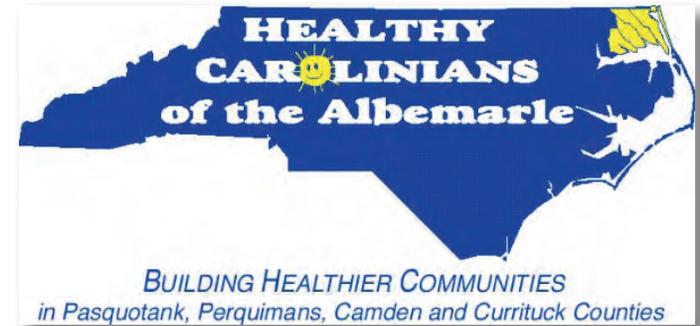


The first fall public input event took place at the Elizabeth City Farmers Market

PROGRAM SUMMARY

In addition to the natural and built environment, the social environment in the form of programs and resources helps to create and sustain a bicycle-friendly community or region. A useful framework for describing the categories into which such resources fall is the four E's: Education, Enforcement, Encouragement, and Engineering. While the last E represents physical infrastructure, the first three require programmatic solutions. The following programs and resources currently exist in the Albemarle region. For a description of each organization, see Appendix A.

- Outer Banks Visitors Bureau
- Three Rivers Healthy Carolinians
- Tyrrell County Ecotourism Committee



STATE ORGANIZATIONS AND RESOURCES

- Eat Smart Move More NC
- North Carolina Amateur Sports
- North Carolina Department of Health and Human Services
- North Carolina Department of Transportation

REGIONAL ORGANIZATIONS AND RESOURCES

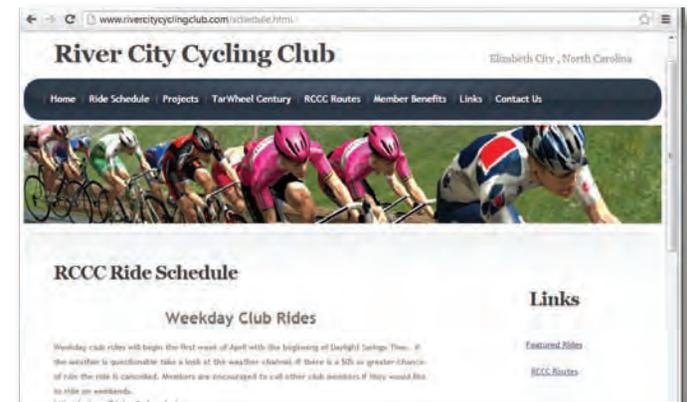
- Albemarle Regional Health Services
- Currituck County Visitors Center
- Gates Partners for Health
- Greater Tyrrell County Chamber of Commerce
- Healthy Carolinians of the Albemarle

LOCAL ORGANIZATIONS AND RESOURCES

- Cycle Speedway
- River City Cycling Club
- Numerous bicycle shops and rentals



The Inner Banks Cycle Shop in Plymouth both sells and services bicycles.



PLAN AND POLICY SUMMARY

Certain areas in the Outer Banks notwithstanding, Albemarle's relatively slow growth has kept its rural character and historic townscapes intact. This is fortunate because on their own, rural counties, small towns, and villages typically have few resources in which to proactively engage planning. While also limited in its resources, the Albemarle Regional Planning Organization provides a framework and support for the planning and development of the region.

A decade of regional, county, and local planning and policy documents were reviewed as part of this planning effort. Very few of the efforts are directly related to bicycle planning. Yet, all levels of land use, transportation, and urban design must be considered together as it's their coordination, or lack thereof, that ultimately determines the appeal of bicycling for recreation, transportation, and utility purposes.

CAMA / LAND USE PLANS / COMPREHENSIVE PLANS

Established in 1974, the Coastal Area Management Act (CAMA) requires each of the 20 coastal counties in North Carolina to develop a local land use plan in accordance with guidelines established by the Coastal Resources Commission.

A sample of CAMA plans reviewed include those from Gates County, Duck, Manteo, Chowan County/Edenton, Dare County, Perquimans County, Tyrell County, Nags Head, Pasquotank County/Elizabeth

City, and Southern Shores. Given their wide scope, CAMA plans address a wide range of issues but generally offer few details. All CAMA plans do address general transportation issues, and most (especially the most recent plans) include the goal of developing more bicycle facilities.

The Camden County Comprehensive Plan was completed in 2012 and serves as an update to the County's 2005 CAMA plan. This new plan "provides a more strategic set of goals, policies, and actions for the future, while also carrying forward the state mandated critical policies in the CAMA Plan that affect local day-to-day decision making." The Plan, which relates to the County's Unified Development Ordinance and upcoming Comprehensive Transportation Plan, explicitly includes bicycling and walking as a key part of a multi-modal transportation system

ZONING / BICYCLE PARKING ORDINANCES

Zoning is typically embedded within a county's Unified Development Ordinance. While most communities in the region envision a future that promotes growth while protecting their rural character and historic centers, the reality is that many of the zoning tools found in these ordinances do not always ensure such a result. Moreover, the disconnect between stated land use/zoning and transportation goals with the actual tools used to project transportation needs commonly undermine a community's ability to implement their vision.

In order to maintain and/or create new bicycle and

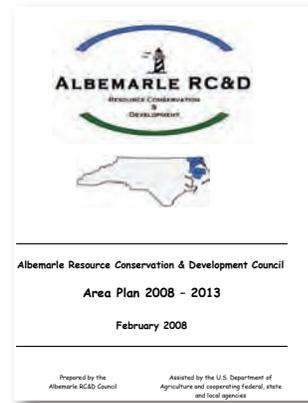
pedestrian-friendly development, bicycle parking regulations are often embedded within zoning codes. Currituck County has developed their own bicycle parking ordinances.

CONSERVATION PLANS

The general thrust of the CAMA planning process includes efforts to conserve Albemarle's rural and natural character on a local and countywide basis. The Albemarle Resource Conservation and Development Council Area planning process is intended to support local efforts, but to also set a broader regional agenda with goals and policies addressing a variety of conservation and development challenges.

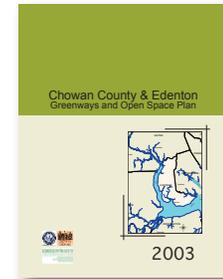
The most recent Albemarle Resource Conservation & Development Council Area Plan was completed in 2008. The 5-year plan addresses the need to balance conservation efforts with development in the 10-county region.

The Great Dismal Swamp and Nansemond National Wildlife Refuges Comprehensive Plan (2006) is a product of the US Fish & Wildlife Service. The Plan's focus is on conserving wildlife and its habitat, with a desire to expand the Great Dismal Swamp Bicycle Trail.



OPEN SPACE AND RECREATION PLANS

As the Albemarle region continues to grow, there exists a need to maintain open space and expand recreational opportunities. In recognition of this need, Chowan County and the Town of Edenton worked together in 2003 to create the Chowan County & Edenton Greenway and Open Space Plan. The Plan serves as the guiding policy and physical planning document for protecting open space, increasing recreational and increasing active transportation opportunities through the development of multi-use greenways.



The Town of Nags Head recently finished its own Parks and Recreation Plan, which includes a number of physical recommendations for the ongoing development of a trail and wayfinding system.

COMPREHENSIVE TRANSPORTATION PLANS

Each county within the Albemarle RPO is required to produce a comprehensive transportation plan (CTP). The following plans were either ongoing or completed recently as of fall 2012:

- 2011 Camden County CTP
- 2012 Currituck County CTP
- 2012 Hyde County CTP (Draft)
- 2012 Tyrell County CTP (Draft)
- 2012 Pasquotank County CTP Deficiency

Analysis

- 2012 Dare County CTP Survey Results

Each CTP now includes recommendations for making multi-modal improvements, including the identification of specific corridors slated for bikeway treatments. In rural areas the recommendations generally call for the addition of shoulders or shared use paths, while in towns and cities the recommendations typically include bicycle lanes.

While the addition of bikeways into the CTPs is a positive step forward, a lack of coordination between transportation and land use planning is still apparent. Additionally, there exists an opportunity to expand the range of best practices to include more bikeways, policies, and tools that could demonstrably improve bicycling in the Albemarle region.

BICYCLE PLANS

While CAMA, CTP, and various recreational/open space plan efforts have incorporated bikeway improvement recommendations (the engineering hardware) local, county, and regional plans have yet to fully include education, encouragement, evaluation, equity, and enforcement goals and policies (the software). This makes the Albemarle Region Bicycle Plan the first of its kind.

In addition to the above planning efforts, two specific bicycling related studies have been completed in the region. The first is the 2004 Case Study of the Northern OBX: Economic Impacts of Investments in Bicycle

Facilities, which describes the favorable return on investment gained from relatively small investments in bicycle infrastructure.

The second study is the 2011 Dismal Swamp Canal Trail Extension Plan, which looks at extending the existing facility.

PEDESTRIAN PLANS

While this current planning effort is focused on bicycling, pedestrian-friendly environments are almost always bicycle-friendly as well. To date, the towns of Columbia, Hertford, and Edenton have completed pedestrian plans in the Albemarle region.

CORRIDOR PLANS

Corridor planning provides an opportunity to directly coordinate transportation and land use planning so that development and conservation are appropriately balanced.

The 2011 Camden Co/US 17 Hwy Corridor Plan, which includes the greenway extension recommendations made in the Dismal Swamp Canal Trail Extension Plan, is one example of corridor planning in the Albemarle region. Dealing primarily with a rural section of Camden County, this type of planning should be expanded to other areas in the region to help limit development that only makes congestion worse, bicycling and walking less appealing, and the built environment less in keeping with the region's unique character.

STATE POLICIES

Several state policies help to support bicycling and walking in the Albemarle region. Key excerpts of these policies are provided below, with links to more information.

Complete Streets Policy

"This policy requires that NCDOT's planners and designers will consider and incorporate multimodal alternatives in the design and improvement of all appropriate transportation projects within a growth area of a town or city unless exceptional circumstances exist. Routine maintenance projects may be excluded from this requirement; if an appropriate source of funding is not available."

More information: <http://www.completestreetsnc.org/> and http://www.bytrain.org/fra/general/ncdot_streets_policy.pdf

NCDOT Bicycle Policy Guidelines

"The Board of Transportation finds that bicycling is a bonafide highway purpose subject to the same rights and responsibilities and eligible for the same considerations as other highway purposes... It is the policy of the Board of Transportation that bicycle facility planning be included in the state thoroughfare and project planning process."

More information: http://www.ncdot.gov/bikeped/download/bikeped_laws_Bicycle_Policy.pdf

NCDOT Greenway Policy

"The Department will incorporate locally adopted plans for greenways into the ongoing planning processes within the Statewide Planning (thoroughfare plans) and the Planning and Environmental (project plans) Branches of the Division of Highways. This incorporation of greenway plans will be consistent throughout the department. Consideration will be given to including the greenway access as a part of the highway improvement."

More information: http://www.ncdot.gov/_templates/download/external.html?pdf=http%3A//www.ncdot.gov/bikeped/download/bikeped_laws_Greenway_Admin_Action.pdf

NCDOT Board of Transportation Resolution for Bicycling and Walking

"NOW, THEREFORE, BE IT RESOLVED, the North Carolina Board of Transportation concurs that bicycling and walking accommodations shall be a routine part of the North Carolina Department of Transportation's planning, design, construction, and operations activities and supports the Department's study and consideration of methods of improving the inclusion of these modes into the everyday operations of North Carolina's transportation system; and BE IT FURTHER RESOLVED, North Carolina cities and towns are encouraged to make bicycling and pedestrian improvements an integral part of their transportation

planning and programming.”

More information: http://www.ncdot.gov/bikeped/download/bikeped_laws_BOT_Mainstreaming_Resolution.pdf

Bridge Policy

“Sidewalks shall be included on new bridges with curb and gutter approach roadways that are without control of access; in some cases, only one side may warrant a sidewalk. Sidewalks should not be included on controlled access facilities. A determination on providing sidewalks on one or both sides of new bridges will be made during the planning process according to the NCDOT Pedestrian Policy Guidelines. A minimum handrail height of 42” is required.”

“When a bikeway is required, the bridge shall be designed in accordance with AASHTO standard bicycle accommodations and North Carolina Bicycle Facilities Planning and Design Guidelines to give safe access to bicycles where feasible. A minimum handrail height of 54” is required where bicyclists will be riding next to the handrail. “

More information: <https://connect.ncdot.gov/projects/Roadway/RoadwayDesignAdministrativeDocuments/Bridge%20Policy.pdf>



NC-12, Hatteras Island



Chapter Three

Needs Assessment

OVERVIEW

Building on the findings of Chapter Two, this chapter takes a closer look at the existing facilities and conditions within each subregion and identifies the major needs of each subregion.

NORTH OF SOUND SUBREGION NEEDS ASSESSMENT

AMENITIES OF THE SUBREGION

The North of Sound subregion includes the upriver communities along the Pasquotank, Perquimans, and Chowan Rivers: Elizabeth City, Hertford, Winfall, Edenton, and Gatesville. The rivers are major tributaries of the Albemarle Sound. The North of Sound subregion offers several wilderness areas, including the Great Dismal Swamp National Wildlife Refuge, Dismal Swamp State Park, Merchants Millpond State Park, and Chowan Swamp State Natural Area. These natural areas offer opportunities for paddling, mountain biking, fishing, and birding. The remainder of the North of Sound subregion is largely rural with coastal farmland.

Elizabeth City is a major commercial hub and the largest city in the Albemarle region. The town's waterfront

is popular for its docks, shops, spas, and attractions, including a historic museum. There are events year-round, held at the waterfront, that celebrate historic events, culture, and holidays. Active events, such as the TarWheel Century Bicycle Ride, International Cup Regatta, and River City Bull Bash, draw residents and visitors alike.

Hertford boasts some of the richest historic structures in the state, such as the Newbold-White House and Leigh's Plantation. Victorian and Georgian homes line the banks of the Perquimans River and are toured by visitors year-round. The downtown offers shopping, dining, and architectural walking tours. Missing Mill Park is within walking distance from downtown; it offers paddling, fishing, and picnicking, and it hosts a seasonal farmers market.

Edenton is a waterfront village with a colonial history and an active downtown. Historic district tours are held daily, and visitors can enjoy shopping, dining, special events, and bed and breakfast lodging. There are many active outdoor recreation events and opportunities for sailing, paddling, and bicycling.

Gatesville and Winfall are much smaller river towns

Chapter Contents

Overview

North of Sound Subregion Needs Assessment

South of Sound Subregion Needs Assessment

Outer Banks Subregion Needs Assessment

with rich farmlands and views of the rivers. Both towns are known for their historic homes and plantations. Gatesville offers paddling and wildlife viewing at Bennetts Creek and is a gateway to Merchants Millpond State Park.

Water Street Park, Elizabeth City



Mid-Atlantic Park, Elizabeth City



Typical cotton field



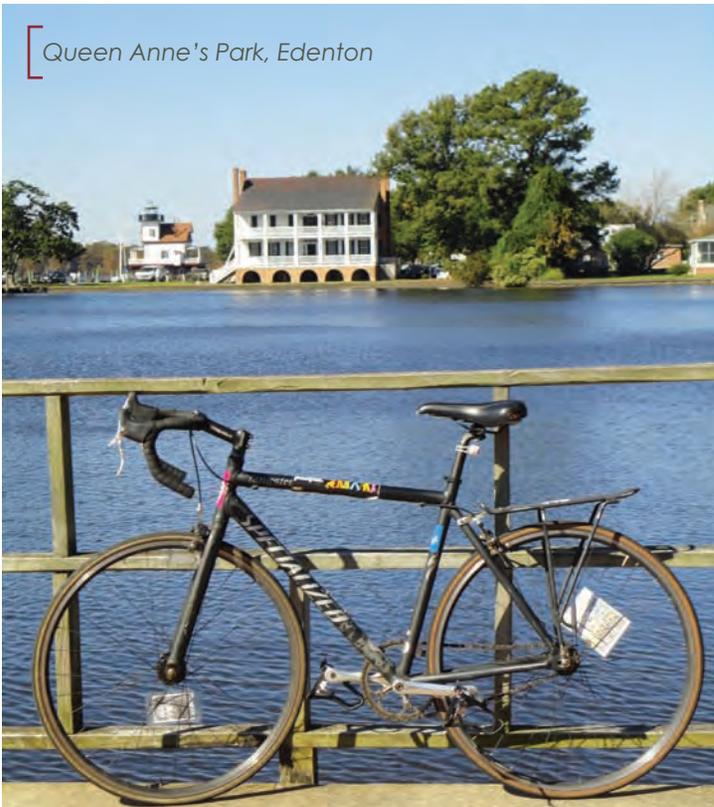
[YMCA, Barco



[Water Street Park, Edenton



[Queen Anne's Park, Edenton



[Downtown Hertford



EXISTING BICYCLE FACILITIES

Few bicycling facilities exist in the North of Sound subregion, as displayed on the following maps. Facilities are summarized in the table at right and shown relative to the area's population and total road network mileage. While a few miles of paved shoulder are present around Gatesville and Hertford, the majority of roads in this subregion have no separated space for cyclists. The Dismal Swamp Greenway is the only existing multi-use trail in the area, and is complemented by unpaved trail through the Dismal Swamp State Park.



Trail users are comfortably away from highway traffic along the Dismal Swamp Canal Trail.

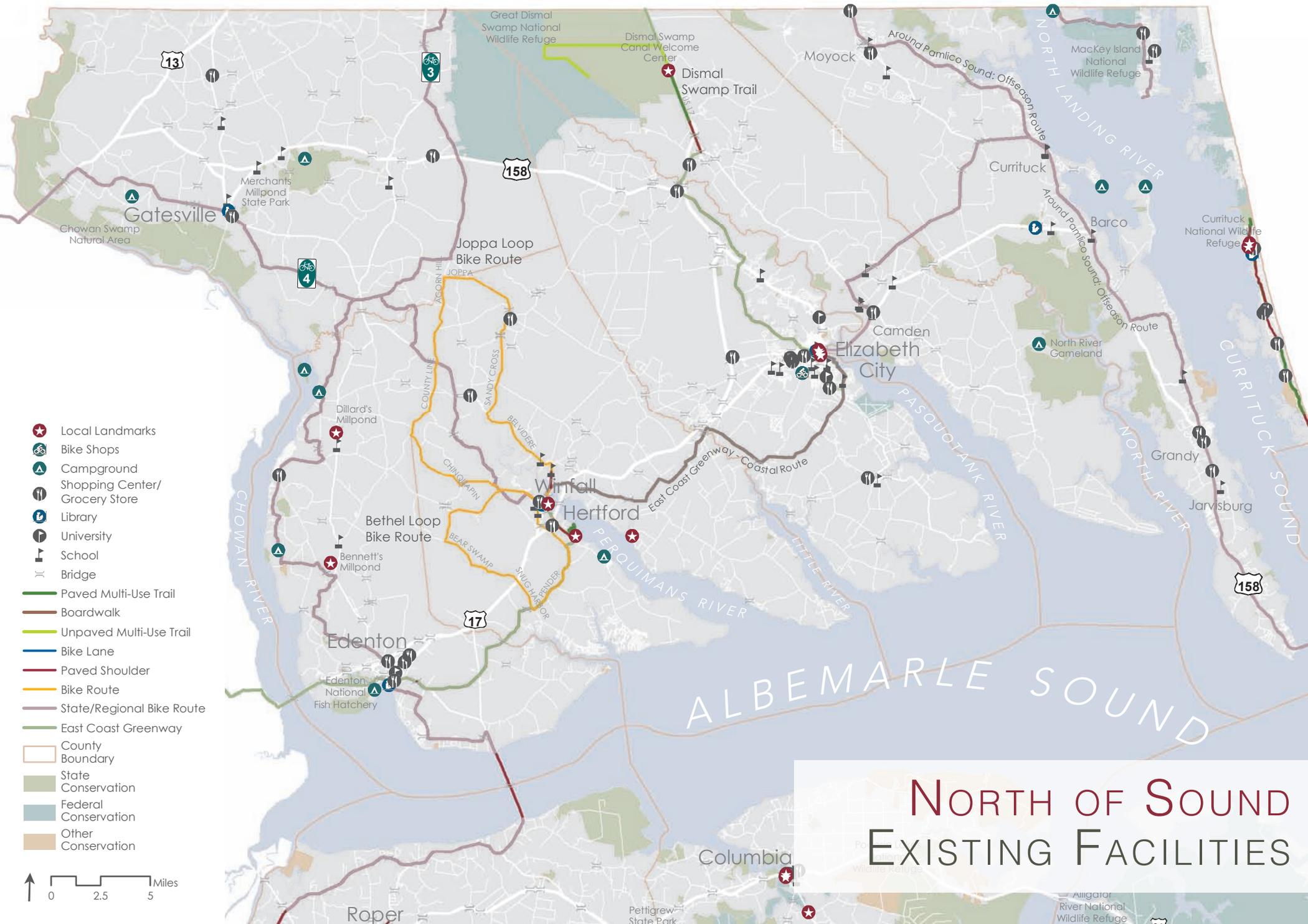
Two state bike routes traverse the subregion (see page 2-7 for more information). State bike routes are signed but do not contain exclusive facilities for bicyclists. Similarly, several local signed routes have been designated through and around Hertford, totaling 55 miles. These include the 1968 Bike Trail, the Joppa Loop Bike Route, and the Bethel Loop Bike Route. The latter two routes are not signed. None of these local bike routes have other facilities like bike lanes.

Facility Type	Mileage
Designated Route	55
Bicycle Lane (BL)	0
Multi-Use Trail (T)	14
Paved Shoulder (PS)	6
Total Physical Facilities (BL + T + PS)	20
Physical Facility Miles/1,000 Roadway Miles	8
Physical Facility Miles/1,000 Residents	0.2

BICYCLING OPPORTUNITIES

This region is composed largely of rural farmland with historic port towns along river entryways to the Albemarle Sound. Despite a lack of bicycle facilities, some existing roadway and traffic conditions do create opportunities for bicycling:

- Low-volume, two-lane roadways offer calm, scenic long-distance bicycling.
- The historic towns of Edenton, Hertford, and Elizabeth City are compact featuring grid roadway networks that are connected and accessible by bicycle.
- The Dismal Swamp Canal Trail, part of the East Coast Greenway and parallel to US-17, provides a scenic, off-road, long distance multi-use trail that is planned to connect to Virginia. However, the closest population center to the existing portion of the Dismal Swamp Canal Trail is Elizabeth City, approximately 15 miles away.



NORTH OF SOUND EXISTING FACILITIES

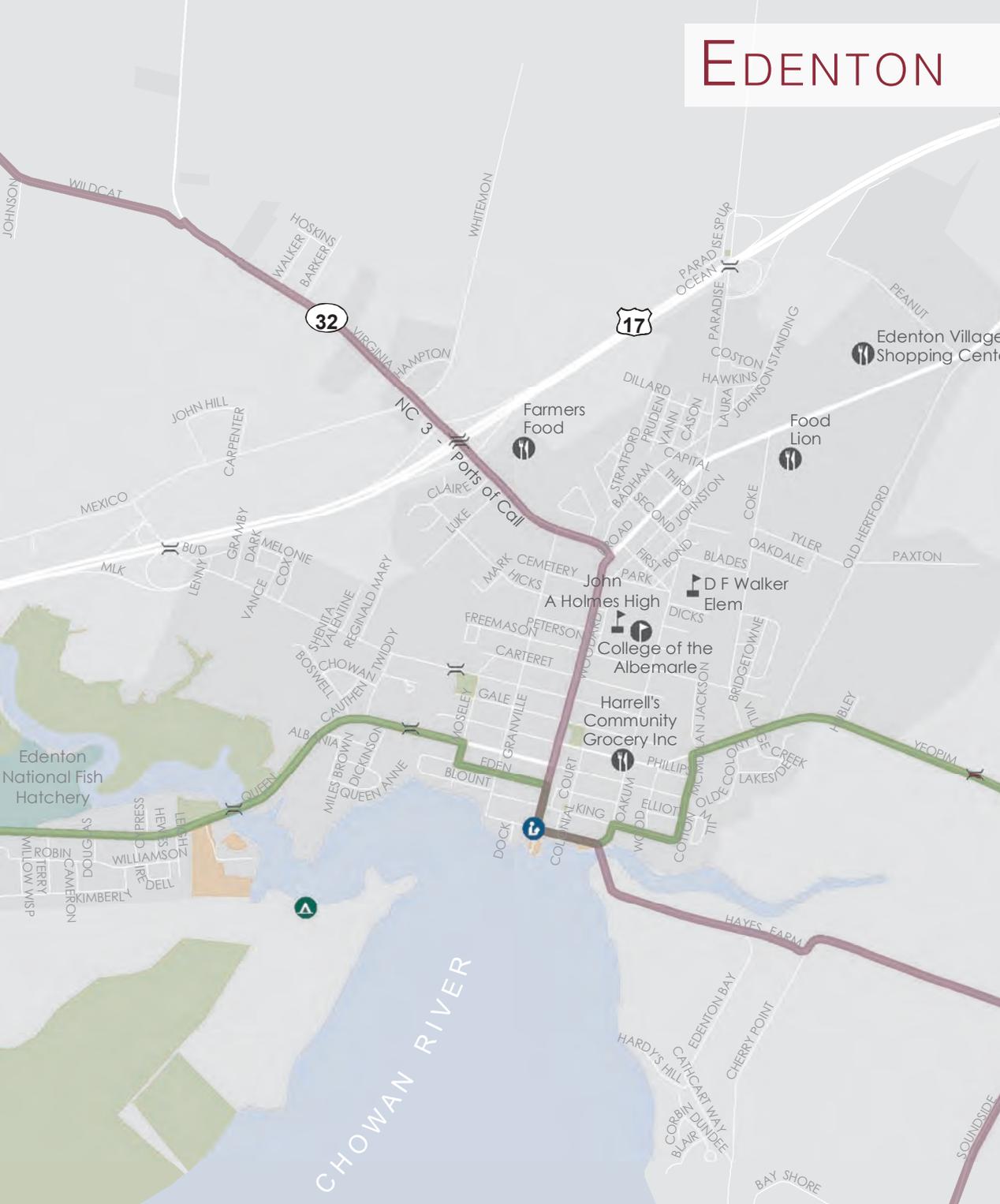
ELIZABETH CITY



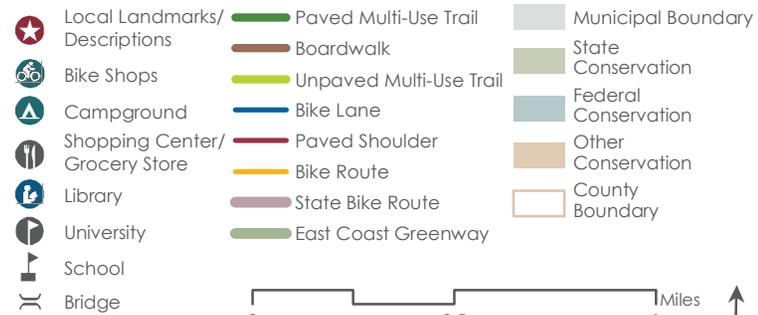
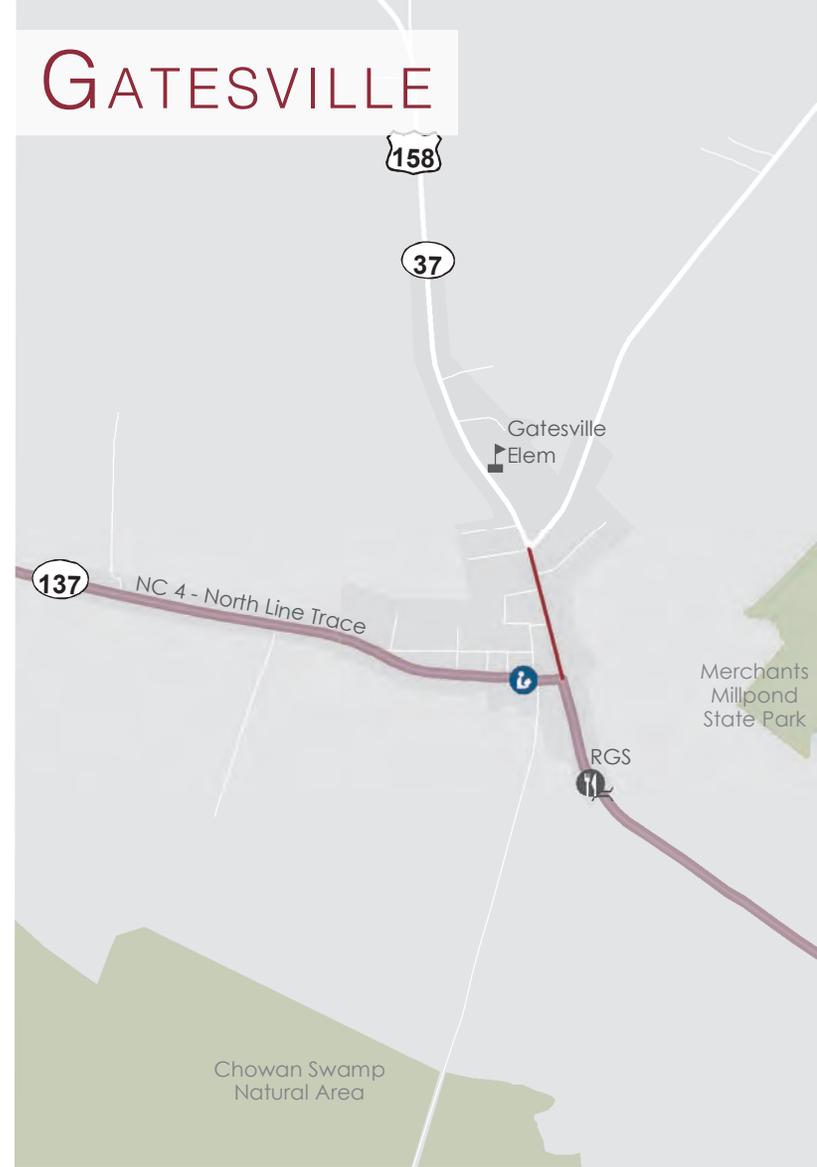
	Local Landmarks/ Destinations		Paved Multi-Use Trail		Municipal Boundary
	Bike Shops		Boardwalk		Parks
	Campground		Unpaved Multi-Use Trail		State Conservation
	Shopping Center/ Grocery Store		Bike Lane		Federal Conservation
	Library		Paved Shoulder		Other Conservation
	University		Bike Route		Other Conservation
	School		State Bike Route		Other Conservation
	Bridge		East Coast Greenway		County Boundary

0 0.5 1 Miles ↑

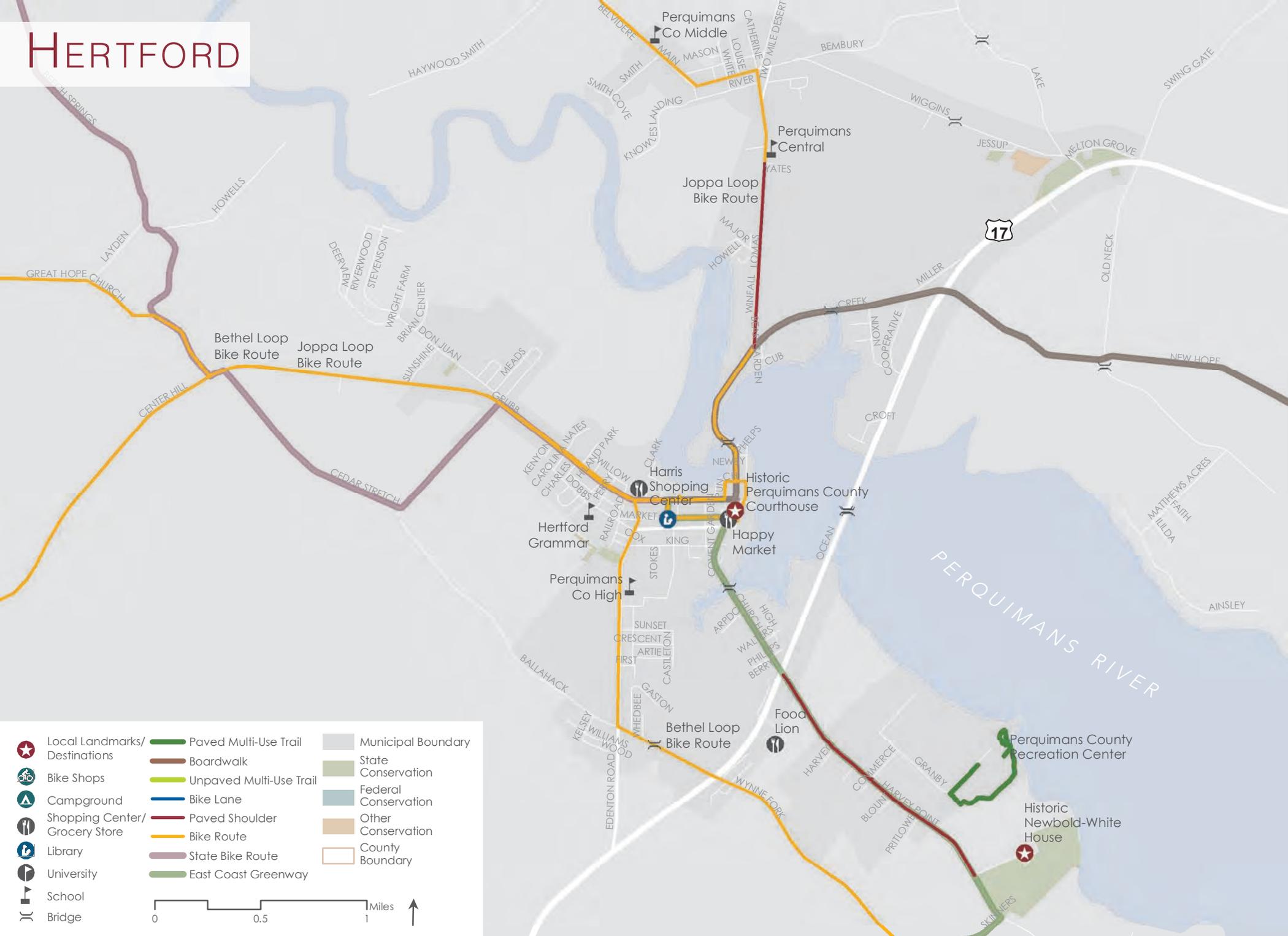
EDENTON



GATESVILLE



HERTFORD



BICYCLE FACILITY OPPORTUNITIES

There are very few bicycle facilities in the region. However, there are opportunities to implement new bicycle facilities with the following methods:

- Add paved shoulder during resurfacing/ reconstruction along commonly-used roadways
- Develop bicycle boulevards utilizing existing grid networks in Hertford, Edenton, and Elizabeth City.
- Stripe, restripe, or implement road diets to incorporate bicycle facilities where sufficient roadway width exists, especially in Gatesville, Hertford, Edenton, and Elizabeth City.
- Utilize roadway right-of-way or railroad right-of-way to develop multi-use trails, especially in Edenton, Hertford, and Elizabeth City.
- Include bicycle facility space with bridge reconstruction.



Even active rail lines could provide opportunities for rail-with-trail projects, as seen in this view of the rail corridor from Bear Swamp Road.



Additional paved shoulder space is needed along bicycling routes, such as NC Highway 37, east of Gatesville.



Many small, recently reconstructed bridges in the subregion include adequate width for separated bicyclist space, such as Yeopim Rd, just outside Edenton.

BICYCLIST ACTIVITY AND BEHAVIOR

Bicyclist activity was observed during field observations (October, 2012), with local residents making up the majority of ridership. Activity and behavior characteristics include:

- High¹ daily, utilitarian bicycle activity in lower-income urban areas of Edenton, Hertford, and Elizabeth City.

- » Often, these bicyclists were observed not wearing helmets, riding against traffic, and riding on sidewalks.

- Light recreational bicycle activity on lower-volume, rural roadways with heavier usage on weekends.

- » These bicyclists tend to ride along the correct side of the roadway and wear helmets.

- Medium bicycle activity on the Dismal Swamp Canal Trail, primarily for recreation.

- » These bicyclists tend to wear helmets.

¹High, Medium, and Light descriptions of activity are relative terms based on field observations. They do not indicate a specific daily volume of cyclists.

Even though the NC Highway 94 bridge is marked with signage at its entrance, it is still a barrier to bicycling due to narrow shoulder space.

PHYSICAL BARRIERS TO BICYCLING

Generally, there are more barriers than opportunities for bicycling. Key barriers include:

- **Bridge barriers:** Multiple bridges serve as barriers due to a lack of paved shoulder, low bridge railings, traffic, and exposed, windy conditions. Key barriers are:
 - » US-17 Bridge (Hertford) – Limited paved shoulder, high traffic speeds, low railings
 - » Business US-17 Bridge (Hertford) – Although it contains narrow lane widths and no separated space for bicyclists, traffic speeds are lower, bridge length is short, sidewalk is present between the roadway and the railing, and the bridge is less exposed, making this bridge manageable for bicyclists.
 - » NC-94/NC-32 (Creswell to Edenton) – Limited paved shoulder, low railings, high exposure,



Cyclists were observed without helmets, as shown here on Riverside Drive and Church Street in Elizabeth City.



high traffic speeds, long bridge

- » US-17 Bridge (Edenton) - Limited paved shoulder, high traffic speeds, low railings
- » US-158 Bridge (Elizabeth City) – No paved shoulder, high traffic speeds, high traffic volumes
- » US-158 Bridge (Kitty Hawk) - Limited paved shoulder, high traffic speeds, high traffic volumes especially in high tourist season, low railings, long bridge

- **Connectivity issues:** There is a lack of connectivity between existing bicycle facilities and destinations.
- **Crossing high-volume, high speed roadways:** There are numerous busy roadways that are difficult for bicyclists to cross safely.
- **High-volume, high-speed roadways:** There are many high-volume arterial roadways throughout the region with high speeds, including US-17 and US-158.
- **Narrow roadways and lanes:** There are also many roadways throughout the region that are too narrow for bicyclists to travel safely. These roads have little or no shoulder, often contain blind curves, and have relatively high vehicle travel speeds which pose multiple hazards for bicyclists.
- **Driveway access management:** A high frequency of driveways and parking lot curb-cuts present repeated hazards to cyclists as the automobile

crosses the cyclists' path of travel, especially in urban and suburban areas of Elizabeth City.

- **Roadways currently designed for automobile only:** Many roads were designed around the automobile and need to be redesigned or re-striped to become more bicycle friendly. Narrowing existing lanes and adding planted medians, sidewalks, and shade trees could help reduce speeding and its associated hazards.

BARRIERS TO BICYCLE FACILITY DEVELOPMENT

- **Bridge barriers:** Bridges in North Carolina have an average lifespan of 75 years. Reconstruction and/or the addition of bicycle facilities is a costly endeavor.
- **Environmental Constraints:** Environmentally-sensitive areas are scattered throughout the region, including the Great Dismal Swamp. Micro-scale barriers include ditches and macro-scale barriers include large wetlands.
- **Land ownership/right-of-way:** Land acquisition can be a difficult and costly process. Multi-use trails, separated from the roadway, often fall outside the roadway right-of-way.



This cyclist in Elizabeth City is more comfortable on the grass than riding in traffic on the commercial corridor of US-17.

SOUTH OF SOUND SUBREGION NEEDS ASSESSMENT

AMENITIES OF THE SUBREGION

Abundant farmlands, fresh water lakes, and wilderness areas characterize the region south of Albemarle Sound. Framed on three sides by the Pamlico, Roanoke, and Albemarle Sounds, the subregion is quiet and more remote than its neighbors to the north and east. Water is the hallmark natural feature of the area. The Alligator River, Pamlico River, Scuppernong River, and Roanoke River offer a multitude of wildlife viewing and natural resource-based recreation opportunities. Phelps Lake, New Lake, Pocosin Lake, and Lake Mattamuskeet provide hiking, paddling, fishing, bicycling, and other passive uses. There are four national wildlife refuges in the southern subregion:

Swanquarter, Mattamuskeet, Pocosin Lakes, and Alligator River. Many of the refuges include recreation opportunities, such as hiking and bicycling. Pettigrew State Park and the Upper Pungo River Complex offer paddling and hiking trails. Several small towns, including Plymouth and Columbia, dot the north side of the subregion. The remainder of the area is punctuated by historic structures along crossroads communities and rural landscapes.

Phelps Lake, Pettigrew State Park



Canal along NC-94



Engelhard



Plymouth has a small population and is the largest town in the south of sound region. It has become more of a draw for tourists in recent years due to its access to the Roanoke River along the riverfront boardwalk and its historic value during the American Civil War. The Roanoke River Lighthouse, Roanoke River Maritime Museum, and Port 'O Plymouth Museum are located in downtown. A recently opened bicycle shop offers bicycle rentals and sales along Water Street, which also boasts the Rail Switch Nature Trail along with shops and eateries.

Columbia sits along the Scuppernong River and is the location of the historic Somerset Place, an antebellum plantation from the 1780s.

Visitors can shop, dine, and visit the Pocosin Lakes National Wildlife Refuge (NWR) Headquarters, which includes a boardwalk trail along the Scuppernong River. Walking tours of historic buildings, the Columbia Theater Cultural Resources Center, and the Pocosin Arts Center are several cultural attractions. Columbia is a gateway to the Palmetto-Peartree Preserve, Pocosin Lakes NWR, and Pettigrew State Park. Activities range from horseback riding to hiking, biking, camping, and paddling in these locations.



Historic Nebraska House



Downtown Plymouth



Nature Trail, Columbia

EXISTING FACILITIES

With the exception of a few miles of paved shoulder and two state bike routes (see page 2-7 for more information), bicycling facilities do not exist South of the Albemarle Sound. Even considering the low population of this subregion, this puts the indicators of facilities per roadway mile and facilities per resident at the lowest in the region. The following summary table does not include state bike route mileage.

Facility Type	Mileage
Designated Route	0
Bicycle Lane (BL)	0
Multi-Use Trail (T)	0
Paved Shoulder (PS)	6
Total Physical Facilities (BL + T + PS)	6
Physical Facility Miles/1,000 Roadway Miles	2
Physical Facility Miles/1,000 Residents	0.2

BICYCLING OPPORTUNITIES

Despite a lack of bicycle facilities, the south region does have existing roadway and traffic conditions opportunistic for bicycling:

- Low-volume, rural, two-lane roadways offer calm, scenic, long-distance bicycling.
- The historic towns of Plymouth and Columbia feature compact downtown cores with grid roadway networks accessible by bicycle.

- Plymouth includes a locally-owned bicycle shop with access to air, water, bicycle rentals, maps, and recommended routes.
- Numerous natural areas offer access to on- and off-road bicycle facilities, including the Pocosin Lakes and Alligator River National Wildlife Refuges and Pettigrew State Park.

BICYCLE FACILITY OPPORTUNITIES

There are very few bicycle facilities in the region. However, there are opportunities to implement new bicycle facilities with the following methods:

- Add paved shoulder during resurfacing/reconstruction along commonly used roadways such as 264 and 94.
- Develop bicycle facilities along low-traffic roadways that parallel busier roadways utilizing existing grid networks in Plymouth and Columbia.
- Incorporate bicycle route signage and wayfinding signage near destinations in more remote areas of the south region.
- Utilize roadway right-of-way to develop multi-use trails, where possible, along busy thoroughfares into Plymouth and Columbia.

ALBEMARLE SOUND



- ★ Local Landmarks
- 🚲 Bike Shops
- ▲ Campground
- 🛒 Shopping Center/ Grocery Store
- 📖 Library
- 🎓 University
- 🏫 School
- ⚖ Bridge
- Paved Multi-Use Trail
- Boardwalk
- Unpaved Multi-Use Trail
- Bike Lane
- Paved Shoulder
- Bike Route
- State Bike Route
- East Coast Greenway
- State Conservation
- Federal Conservation
- Other Conservation
- County Boundary



SOUTH OF SOUND EXISTING FACILITIES

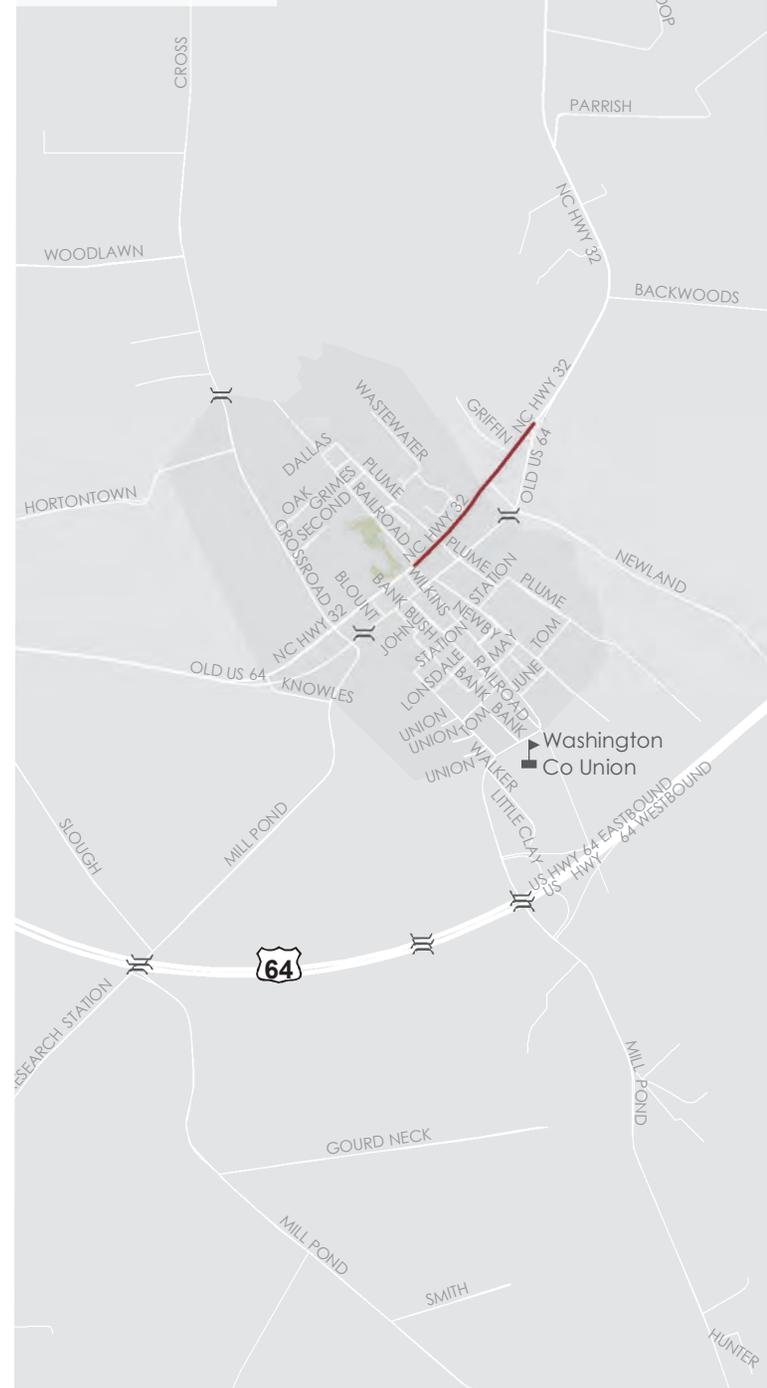
-  Local Landmarks/ Destinations
-  Bike Shops
-  Campground
-  Shopping Center/ Grocery Store
-  Library
-  University
-  School
-  Bridge
-  Paved Multi-Use Trail
-  Boardwalk
-  Unpaved Multi-Use Trail
-  Bike Lane
-  Paved Shoulder
-  Bike Route
-  State Bike Route
-  East Coast Greenway
-  Municipal Boundary
-  State Conservation
-  Federal Conservation
-  Other Conservation
-  County Boundary



PLYMOUTH



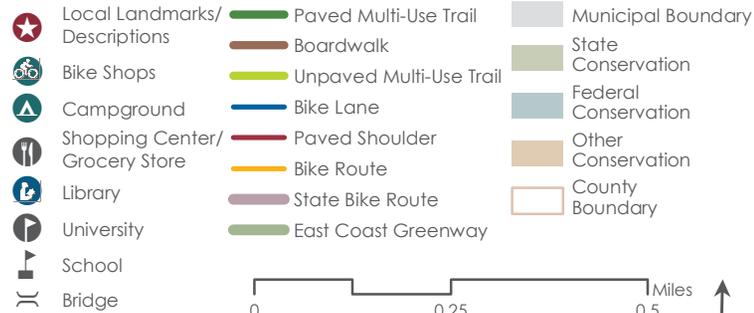
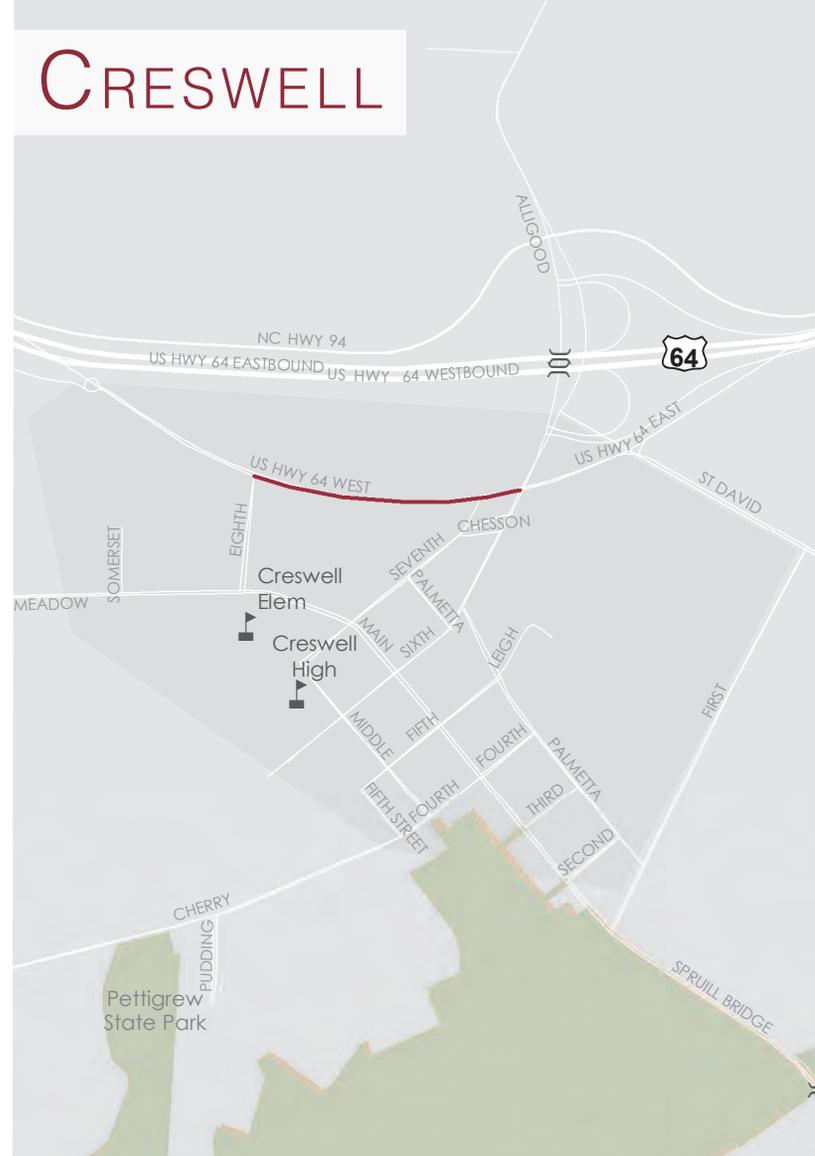
ROPER



COLUMBIA



CRESWELL



BICYCLIST ACTIVITY AND BEHAVIOR

Bicyclist activity was observed during field observations (October, 2012), with local residents making up the majority of ridership. Activity and behavior characteristics, based on both field observations and reports of local stakeholders, include:

- Utilitarian bicycle activity in lower-income urban areas of Plymouth, Creswell, Roper, and Columbia.
 - » Often, these bicyclists were observed not wearing helmets, riding against traffic, erratically crossing roadways, or riding on sidewalks.

- Recreational bicycle activity on lower-volume, rural roadways with heavier usage on weekends.
 - » These bicyclists tend to ride along the correct side of the roadway and wear helmets.

PHYSICAL BARRIERS TO BICYCLING

A number of physical barriers deter people from considering trips made by bicycle. In addition to an absence of on- or off-road dedicated facilities, unsafe roadway intersections, high-volume and high-speed roadways, and issues with connected facilities

discourage even experienced bicyclists.

- **Remote corridors:** Many of the roadways in this part of the Albemarle region are rural, remote, or traverse large wildlife refuges. This type of condition is desirable to a limited number of experienced recreational bicyclists.
- **Distance between destinations:** There are a number of attractive destinations and activities in this region, however the mileage that separates them is extensive. For example, Columbia to Lake Mattamuskeet is 32 miles one way; Plymouth to Pettigrew State Park is 20 miles one way.
- **Lack of safe facilities:** Within the more populated areas (Columbia and Plymouth), more practical uses of bicycling were observed with users connecting to employment and commercial areas. Many users were observed riding in the center of roadways, the wrong direction, or on sidewalks because of the lack of dedicated facilities connecting these destinations.
- **Absence of bicycle support facilities:** With the exception of the areas in and around small towns and crossroads communities, it is likely that a majority of the bicycling that occurs in this region is happening on a recreational level. Recreational riders need more frequent access to water, rest areas, and toilets than other types of bicyclists, facilities that are not readily available in this region.



Plymouth and Manteo are both over 30 miles from Columbia.



Restrooms in Engelhard

- **Bridge barriers:** Multiple large-scale roadway bridges are missing shoulders and proper railings, include high traffic volumes and speeds, and present exposed, windy conditions.
- **Narrow roadways and lanes:** Many roadways throughout the region are too narrow for bicyclists to travel safely. These roads have little or no shoulder, often contain blind curves, and have relatively high vehicle travel speeds that pose multiple hazards for bicyclists.



NC-94 bridge over the sound

BARRIERS TO BICYCLE FACILITY DEVELOPMENT

Physical barriers also prevent the construction of bicycle facilities. Roadway metrics and the surrounding landscape often determine the feasibility of facility development.

- **Drainage:** While roadways are characteristically flat and appear to be candidates for on-road bicycle facilities, there are drainage channels varying in width and depth along the majority of roadways in the region.
- **Environmental Constraints:** A number of existing natural areas include wildlife refuges, wetlands, and estuaries, presenting development barriers for future facilities.
- **Land ownership/right-of-way:** Land acquisition can be a difficult and costly process. Multi-use trails, separated from the roadway, often fall outside the roadway right-of-way.



A canal along NC-94 constrains the cross-section available for roadway widening or the addition of a multi-use trail.

OUTER BANKS SUBREGION NEEDS ASSESSMENT

AMENITIES OF THE SUBREGION

The Outer Banks subregion includes Ocracoke Island north to Cape Hatteras National Seashore, from Manteo and Nags Head north to Corolla. This 100-mile-long area is a series of barrier islands and a popular tourist destination for its historical value, ecological fragility, and windswept beaches. North Carolina State Highway 12 connects the majority of the barrier islands, extending from Corolla to Hatteras Village and linking many of the small Outer Banks towns and villages. Ocracoke Island is accessible by ferry. The National Park Service manages the Cape Hatteras

National Seashore from Bodie Island to Ocracoke Island. There are numerous natural and cultural resources available along the seashore, including day use areas and opportunities for outdoor recreational activities, such as camping, hiking, and biking.

Towns and communities along the Outer Banks region include Corolla, Duck, Southern Shores, Kitty



An ocean view in Corolla



Soundside sunset

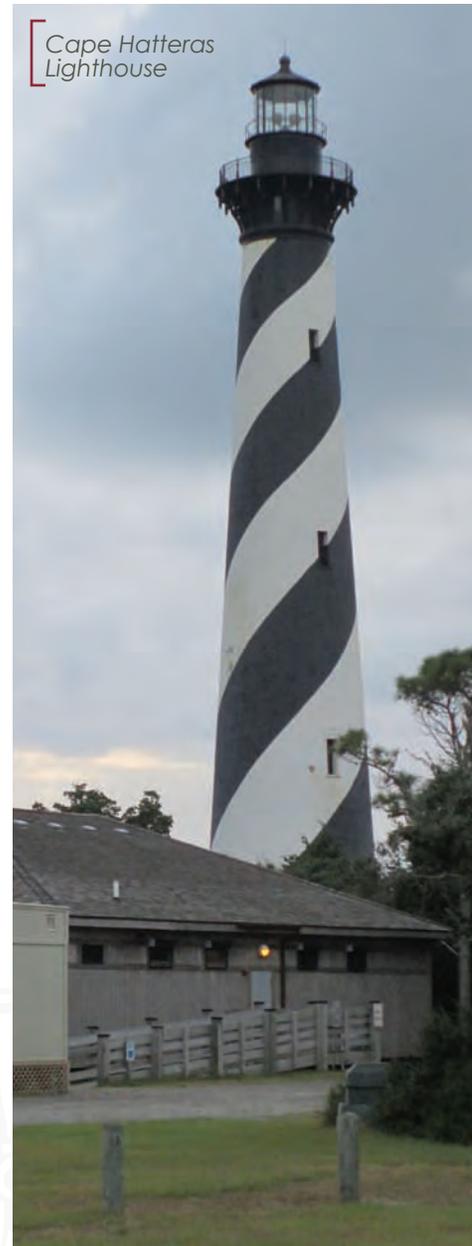


Main Street, Ocracoke

Hawk, Kill Devil Hills, Nags Head, Manteo, Wanchese, Rodanthe, Waves, Salvo, Avon, Buxton, Frisco, Hatteras, and Ocracoke, each unique in its lifestyle. Many of these communities share similar historical value and offer user access to parks, natural areas, and educational and cultural facilities. The Currituck Heritage Park, Jockey's Ridge State Park, Nags Head Woods Ecological Preserve, Wright Brothers National Memorial, Buxton Woods Coastal Reserve, Pea Island National Wildlife Refuge, and the Cape Hatteras National Seashore are the most significant attractions on the Outer Banks, drawing many tourists each year. In addition to the activities offered within these areas, museums, lighthouses, fishing piers, watersport access, bicycling trails, walking trails, and camping areas are available in and around many of the Outer Banks communities. The towns and villages offer restaurants, shops, waterfront docks, music, arts, and cultural activities.



[Downtown Duck



[Cape Hatteras Lighthouse



[Manteo docks



[Veteran's greenway, Kill Devil Hills

EXISTING FACILITIES

The Outer Banks contains the greatest mileage of bicycling facilities of the three subregions, as summarized below. The majority of facilities are in the form of paved shoulders or multi-use trails. Two local signed routes also exist: the Wright Brothers Bikeway and the Ten Mile Loop Route. The Around Pamlico Sound regional route is also designated through this subregion (see page 2-7 for more information) but is not signed and not included in the following summary table.

Facility Type	Mileage
Designated Route	26
Bicycle Lane (BL)	2
Multi-Use Trail (T)	66
Paved Shoulder (PS)	146
Total Physical Facilities (BL + T + PS)	214
Physical Facility Miles/1,000 Roadway Miles	299
Physical Facility Miles/1,000 Residents	6

BICYCLING OPPORTUNITIES

This subregion offers bicycling opportunities for all types and levels of cyclists. With the exception of the bridges that provide access to and from the Outer Banks, the terrain is primarily flat, making traveling by bicycle appealing to all levels of cyclists. In addition to the attractive beaches, there are many destinations throughout this subregion, including the Wright

Brothers Memorial, retail centers, historic lighthouses, and a wealth of restaurant. The following existing roadway and traffic conditions create opportunities for bicycling:

- “Bicycles - Share the Road” signs exist throughout Dare County on US 158, US-64, US-264, and NC 12, helping to raise awareness of both motorists and cyclists.
- The communities of the Outer Banks are compact, with destinations accessible by short trips.
- Low-volume neighborhood roads offer convenient and safe travel opportunities.



Cyclists on a comfortable road in Kitty Hawk



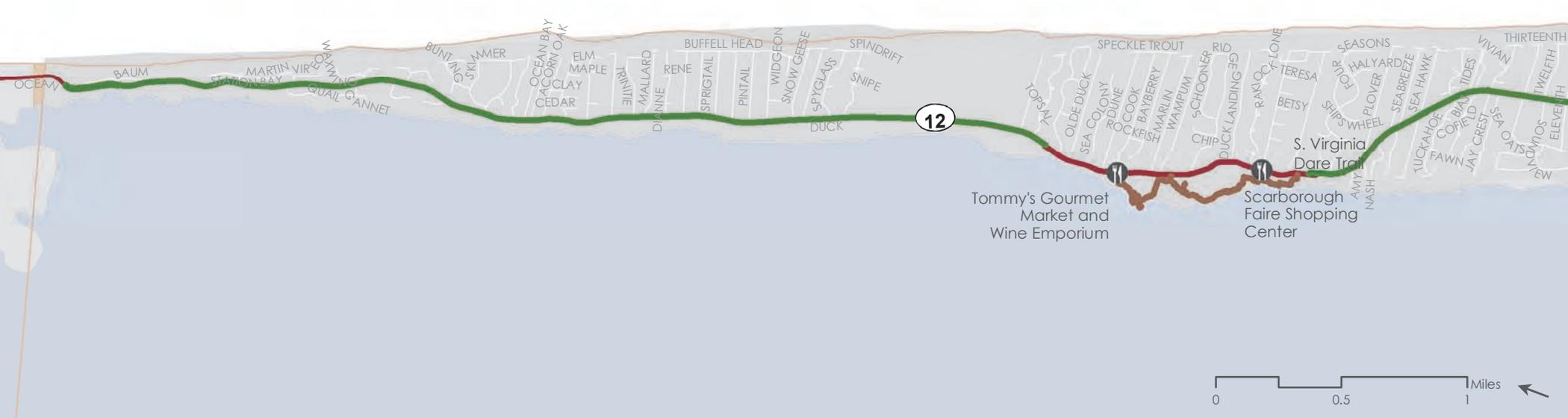
OUTER BANKS EXISTING FACILITIES

COROLLA

-  Local Landmarks/ Destinations
-  Bike Shops
-  Campground
-  Shopping Center/ Grocery Store
-  Library
-  University
-  School
-  Bridge
-  Paved Multi-Use Trail
-  Boardwalk
-  Unpaved Multi-Use Trail
-  Bike Lane
-  Bike Route
-  State Bike Route
-  East Coast Greenway
-  Municipal Boundary
-  State Conservation
-  Federal Conservation
-  Other Conservation
-  County Boundary



DUCK





SOUTHERN SHORES



KITTY HAWK



KILL DEVIL HILLS



NAGS HEAD

- Local Landmarks/ Destinations
- Bike Shops
- Campground
- Shopping Center/ Grocery Store
- Library
- School
- Bridge
- Paved Multi-Use Trail
- Boardwalk
- Unpaved Multi-Use Trail
- Bike Lane
- Paved Shoulder
- Bike Route
- State/Regional Bike Rte.
- East Coast Greenway
- Municipal Boundary
- State Conservation
- Federal Conservation
- Other Conservation
- County Boundary





MANTEO

BICYCLE FACILITY OPPORTUNITIES

Many bicycling facilities in this subregion do not meet current industry design standards. Existing multi-use trails and paved shoulders vary in width and hold debris or sand in some areas. While environmental and right-of-way constraints prevent wider facilities in some cases, substantial opportunities exist in other locations to enhance existing facilities and provide additional facilities to meet the growing needs of this subregion. Facilities could be implemented with the following methods:

- Add paved shoulder during resurfacing/reconstruction along commonly used roadways.
 - Develop north-south and east-west bicycle boulevards as part of existing roadway corridors, such as Lindberg Avenue and Eckner Street in Kitty Hawk, Memorial Avenue in Kill Devil Hills and Nags Head, Bay Street and Fifth Street in Kill Devil Hills, and Eighth Street and Barnes Street in Nags Head.
 - Utilize roadway right-of-way to develop multi-use trails, especially along US-158 from Southern Shores through Nags Head, along NC-12 through Hatteras Island, and between



Existing paved shoulders in Duck



Memorial Boulevard, Nags Head



Existing paved shoulders in Nags Head

the Jennette's Pier area and Jockey's Ridge State Park.

- Expand/upgrade existing trails to industry standards where room exists, especially along NC 12 south of Archdale Street in Kill Devil Hills.
- Build short greenways connections in each

community linking existing trails, on-road facilities, and destinations.

BICYCLIST ACTIVITY AND BEHAVIOR

Both local and tourist cyclists were observed on roadways and off-road facilities during fieldwork investigations. In addition to these groups, a significant foreign student population locates in the Outer Banks each summer for work in restaurants, hotels, and other businesses. A 2002 Star-News article ("Banking on Foreign Students") estimated that 1,300 to 2,500 students are employed each summer. Students are often observed travelling to work by bicycle on busy roadways, since many do not own cars.

Activity and behavior characteristics include:

- High¹ daily, utilitarian, bicycle activity in neighborhoods, on existing trails, and in areas surrounding retail centers.
 - » Often, these bicyclists were observed not



Kids riding on Eckner St in Kitty Hawk wearing their helmets.

wearing helmets, riding against traffic, or riding on sidewalks.

- Medium activity on connector roads, parallel to US 158 and NC 12.
 - » Often, these bicyclists were observed riding with traffic.
- Light bicycling in areas along US-158; the majority of cyclists were observed crossing US-158 to reach a destination, rather than riding along the roadway.

¹High, Medium, and Light descriptions of activity are relative terms based on field observations. They do not indicate a specific daily volume of cyclists.

PHYSICAL BARRIERS TO BICYCLING

The Outer Banks subregion has developed significantly as a vacation destination and the existing roadway network has accordingly been designed for the efficient movement of automobiles. Currently, there are physical barriers to bicycling along existing roadways in each community. Key barriers include:

- **Connectivity issues:** There is a lack of connectivity between existing bicycle facilities and destinations.



Narrow roadways like 6th Avenue in Kill Devil Hills leave little room for bicycle facilities.

- **Crossing high-volume, high speed roadways:** US-158 is a busy roadway that offers direct access to numerous destinations, but is difficult for bicyclists to cross and navigate safely.
- **Narrow roadways and lanes:** There are also many roadways throughout the region that are too narrow for bicyclists to travel safely on them. These roads have little or no shoulder, often contain open drainage on either side of the roadway, and have speed limits that are not enforced.

- **Driveway access management:** A high frequency of driveways and parking lot curb-cuts present repeated hazards to cyclists as automobiles cross cyclists' paths of travel along NC-12, US-158, and in Manteo.

- **Roadways currently designed for automobile only:** Many roads were designed around the automobile and need to be redesigned or re-stripped to become more bicycle friendly. Narrowing existing lanes and adding planted medians, sidewalks, and shade trees could help reduce speeding and its



Continuous stretches of driveway in Ocracoke increase potential conflict points between cyclists and drivers.

associated hazards.

BARRIERS TO BICYCLE FACILITY DEVELOPMENT

As the tourism market continues to grow in this subregion, so will the demand and need for on-road and off-road facilities for bicycling. Existing barriers to the development of bicycle facilities include the following:

- **Bridge barriers:** Recreational cyclists looking to travel to the mainland have to travel on US-158 across the Wright Memorial Bridge which features narrow travel lanes and high automobile speeds.
- **Environmental Constraints:** Environmentally-sensitive areas are scattered throughout the region, including areas impacted by drifting sand dunes. Dune drift creates an unpredictable environment for the expansion of the multi-use trail along NC-12 in Kitty Hawk. This trail currently requires continuous maintenance due to the



Drifting dunes along NC-12 in Kitty Hawk regularly fill the road's paved shoulder with sand.

accumulation of sand across its width.

- **Land ownership/right-of-way:** Land acquisition can be a difficult and costly process. Along many roads where a multi-use trail is desired, such as Colington Road, the roadway right-of-way does not provide enough width for a trail, making acquisition necessary for trail development.
- **Narrow and constrained roadway corridors:** Numerous roadway corridors in this area are narrow and constrained by development or open drainage on either side, making them difficult to retrofit with separated on-road bicycle facilities such as paved shoulders, bicycle lanes or buffered bicycle lanes.





Downtown Edenton

Chapter Four

Infrastructure Recommendations

OVERVIEW

This plan recommends a complete network of bicycle facilities for the Albemarle region that will link neighborhoods, schools, businesses, and communities. The network consists of existing and proposed on-road and off-road facilities such as bicycle lanes, signed routes, and greenways. It also includes ancillary facilities like bike parking and intersection improvements.

This section covers the methodology for developing the bicycle network, descriptions of the facility types that make it up, and network maps by subregion and community.

METHODOLOGY

TYPES OF CYCLISTS

The recommended bicycle network accommodates all potential cyclists. Off-road paths and marked bicycle boulevards on low-traffic streets are more likely to attract the 'interested but concerned' population, for example, while paved shoulders and bicycle lanes on higher-traffic roadways are suitable for 'enthused and confident' and 'strong and fearless' cyclists (for more on this topic, see *Table 1.1 Types of Bicyclists*, page 1-12).

INPUTS

The recommended network was developed using many inputs, which are summarized below.



Chapter Contents

Overview

Methodology

Facility Types

Summary of Recommendations

Ancillary Facilities

North of Sound Proposed Network

South of Sound Proposed Network

Outer Banks Proposed Network

This diagram illustrates the various recommended facility types, from those that are least separated from motorized vehicle traffic, to those that are the most separated.



FACILITY TYPES

The facility types recommended for the region accommodate the types of cyclists described in Chapter 1 as well as the range of settlement types and roadways environments present across the region. Many facility types are appropriate in multiple settlement types, such as signed roadways and multi-use trails, while others are most appropriate in certain areas. The design guidelines in Appendix D provides guidance on where each facility type is most applicable. In certain circumstances, facility types may also work in additional settlement types based on context and professional judgment.

Note: Cycle tracks were considered in several locations during this planning process. While a cycle track was not ultimately recommended in this plan, the facility remains a part of the toolbox that cities and towns in the region should consider as they move

forward and improve their bicycle networks. For that reason, cycle tracks remain in the graphic above and are explained in Appendix D.

SIGNED SHARED ROADWAY (SIGNED ROUTE): Roadways where bikeway signage and markings are used to increase driver awareness of bicycles



Signed Shared Roadway; color corresponds to map legend.

on the roadway. Signed Routes may also include traffic calming devices and intersection crossing treatments to enhance bicycle travel. These routes are recommended where calm roadways linking neighborhoods, schools, and parks serve as alternate routes to unsafe corridors. Sharrow markings may be considered in special circumstances such as higher traffic volumes.

SHARED LANE MARKINGS (SHARROWS):

Pavement markings used to indicate shared space for bicyclists and motorists. Sharrows are used on roads where dedicated bicycle lanes are desirable but not possible due to constraints (roadway width, on-street parking, etc). Placed every 100 to 250 feet along a corridor, sharrows make motorists aware of the



Shared Lane Markings; color corresponds to map legend.

potential presence of cyclists, direct cyclists to ride in the proper direction, and remind cyclists to ride further from parked cars to avoid 'dooring' collisions.

BICYCLE BOULEVARD: Low-volume and low-speed streets that have been optimized for bicycle travel. Bicycle Boulevard treatments can be applied at several different intensities, which should be identified in detail during project design. Wayfinding signs, pavement markings, traffic calming and intersection treatments are potential elements of these facilities.



Bicycle Boulevard; color corresponds to map legend.

PAVED SHOULDER: The part of a roadway that is contiguous to the travel lane, separated by a stripe. A minimum width of four feet is preferred. Paved shoulders are appropriate on rural roadways with low traffic volumes.



Paved Shoulder; color corresponds to map legend.

BICYCLE LANE: A portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential and exclusive use of bicyclists. Bicycle lanes are always located on both sides of the road (except one way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. The minimum width for a bicycle lane is four feet; five- and six-foot bike lanes are typical for collector and arterial roads. Various methods of

bicycle lane construction are described below. For additional design guidance on these methods, see the Appendix D: Design Guidelines section titled 'Retrofitting Existing Streets to Add Bikeways'.

- **New Construction:** Projects requiring the addition of pavement width to accommodate bicycle lanes. It is likely that these bicycle facilities will be implemented with future roadway construction projects.
- **Stripe:** Projects that require only the striping of a bicycle lane, with no other changes needed to the roadway.
- **Restripe:** Projects that require lane width reduction to accommodate bicycle lanes. Narrowing the widths of travel lanes has been demonstrated to



Bicycle Lanes; color corresponds to map legend.

have no effect on overall roadway capacity. In this plan, a restripe is recommended where existing travel lanes can be reduced to a minimum of 10 feet. These projects can occur during roadway resurfacing projects.

- *Road Diet:* Projects reducing the number of travel lanes accommodate bicycle lanes. Road diets typically change four-lane roads to three-lane roads with one center turn lane and have traffic calming benefits. These projects can occur during roadway resurfacing projects.

BUFFERED BICYCLE LANE: A bicycle lane with additional buffer space between the edge of the bicycle lane and the auto lane. Buffered bicycle lanes increase separation and comfort on high volume or high-speed roads, especially those with large-vehicle traffic.



Buffered Bicycle Lanes; color corresponds to map legend.

MULTI-USE TRAIL: Facility separated from the roadway designed for both bicycling and walking. Multi-Use Trails are the preferred facility for novice and average bicyclists. Multi-Use Trails located within the roadway corridor right-of-way, or adjacent to roads, are called 'Sidepaths'. Those within or adjacent to railroad right-of-ways are called 'Rails-to-Trails.'



Multi-Use Trail; color corresponds to map legend.

CORRIDOR IMPROVEMENTS: Full roadway redesign involving driveway consolidation and reduction, landscaping, intersection improvements, and possible lane reconfiguration. Corridor improvements are recommended along roadways where a bike facility cannot be safely implemented without significant changes to the corridor. A full corridor study addressing the items above is recommended in these areas.



Corridor Improvements; color corresponds to map legend.

SUMMARY OF RECOMMENDATIONS

The table below summarizes the linear facility recommendations. This table does not include recommendations for improvements to existing facilities. This is especially applicable to the Outer Banks subregion, where maintenance and facility upgrades must play a large role in completing the bicycle network.

Facility Type	North of Sound	South of Sound	Outer Banks	Total Mileage
Signed Route		16	9	25
Sharrow	14	6	5	24
Bike Boulevard	3		9	12
Paved Shoulder	286	256	18	559
Bicycle Lane	15	3	12	31
New	6	1	6	12
Restripe	5	1	7	12
Road Diet	1	0		2
Stripe	3	1		4
Buffered Bike Lane	16		1	17
New	14		1	15
Stripe	1			1
Greenway	62	19	72	153
Corridor Improvements	2		18	20
All Facilities	397	301	143	841

The following section summarizes the rationale for the recommendations by subregion and municipality.

NORTH OF SOUND

Facility recommendations are concentrated in the town centers to link destinations, while paved shoulders are recommended on rural roadways connecting those towns. Sidepaths and bicycle lanes are also recommended in several growing population centers in unincorporated areas, such as Moyock, Barco, and Grandy. Two notable regional greenway recommendations are the extension of the Dismal Swamp Greenway to the Virginia state line and a rail-trail between Edenton and Hertford.

Edenton

Several bicycle lanes are recommended in Edenton with either a stripe, restripe, or road diet installation method. These facilities are affordable to implement, taking advantage of existing right-of-way, and connect to schools, grocery stores, and downtown. Greenway recommendations in Edenton are built off of the Town's current Greenway Plan and integrated into a comprehensive bicycle network.

Elizabeth City

A combination of bicycle boulevards, sharrows, sidepaths, and bike lanes are recommended in Elizabeth City to connect neighborhoods, downtown, and shopping centers. These facilities largely make use of existing rights-of-way and aim to improve connectivity for cyclists while directing them away from the busiest roadways.

Gatesville

A bicycle lane stripe and restripe is recommended through Gatesville to take advantage of the roadway width through the town in an affordable way.

Hertford & Winfall

Several opportunities were identified for bicycle lane stripes and restripes in Hertford and Winfall. Sharrows on lower-traffic roadways and constrained locations complement these recommendations, as well as greenways linking Hertford's downtown to shopping and an existing trail south of town.

SOUTH OF SOUND

Like the north of sound subregion, recommendations south of the sound are concentrated within the town centers with paved shoulders recommended along rural roadways connecting the towns. Additional facilities are also recommended in the unincorporated areas of Mattamuskeet, Engelhard, and Manns Harbor. A sidepath is recommended on NC 94 across Lake Mattamuskeet to provide a space for cyclists to take advantage of the great wildlife viewing opportunities at the lake.

Columbia & Plymouth

A sidepath is recommended along US 64 through both Plymouth and Columbia to better meet the current demand for access from the neighborhoods in these towns to nearby grocery stores and shopping centers. Additionally, several bike lane stripes take advantage

of existing wide roadways, and sharrows and signed routes direct cyclists onto preferred routes.

Creswell & Roper

Sharrows are recommended along key corridors in Creswell & Roper, which link to paved shoulder recommendations coming into the towns. These facilities notify drivers to expect cyclists and indicate proper lane positioning to cyclists.

OUTER BANKS

Facility recommendations in the Outer Banks subregion aim to provide alternatives to the busy US 158 and NC 12 corridors and improve connectivity to existing facilities. (See page 4-21 for more detail on those major corridors). Sidepaths and bike boulevards are recommended throughout to meet the needs and desires of the many families visiting the Outer Banks each year. These facilities are recommended through Cape Hatteras as well to build on the recent path that has been installed on NC 12 and improve bikeability through the southern Outer Banks.

Duck & Corolla

Sidepath extensions are recommended in Duck & Corolla to expand the reach of the existing sidepaths and link neighborhoods. A signed route is also recommended in Corolla to alert cyclists to a low-traffic parallel alternative to NC 12. A redesign of the Duck Trail through the center of Duck is recommended to better serve both pedestrians and cyclists there.

See 'Demonstration Projects' for more details.

Kill Devil Hills, Kitty Hawk & Nags Head

Apart from the recommendations on the two major corridors through these towns (see page 4-21) several sidepaths, sharrows, and signed routes are recommended to improve connectivity for cyclists and build on existing bike infrastructure. Bicycle boulevards are recommended in all three towns where roadways are connected for several blocks in a row between US 158 and NC 12. These boulevards will provide an alternative option for cyclists that prefer low-traffic roadways and can be implemented affordably within existing right-of-way.

Manteo

Sharrows are recommended through the center of Manteo as an affordable option for the constrained environment. A bicycle boulevard is recommended parallel to much of that route as a low-traffic alternative. Additional sharrows, short trail segments, and signed routes generate overall connectivity for cyclists through the Town.

Southern Shores

A sidepath is recommended along Dogwood Trail in Southern Shores to provide a separated facility for cyclists consistent with those in other parts of the town. This sidepath will complete a multi-use trail loop around the town together with the existing paths along NC 12 and US 158.

ANCILLARY FACILITIES

In order to create safe, bikeable communities, it is critical to take a comprehensive approach that looks beyond the construction of linear bike facilities. This includes, but is not limited to, roadway crossings, automobile speed reduction, and end-of-trip facilities such as bicycle parking.

BICYCLE PARKING & END OF TRIP FACILITIES

Bike parking is an essential, but often forgotten, component of a complete bicycle network. Well-designed and well-placed bike parking at key destinations makes cycling a feasible option for trips to work, the grocery store, shopping, parks, and schools. Parking should be abundant, secure, and complementary to the surrounding streetscape. It should be as convenient as motor vehicle parking. Bike parking can be broadly defined as either short-term or long-term parking:

- *Short-term parking* is meant to accommodate visitors, customers, messengers and others expected to depart within two hours; requires approved standard rack, appropriate location, and installation. (Image: right, above)
- *Long-term parking* is meant to accommodate employees, students, residents, commuters, and others expected to park more than two hours. This parking is to be provided in a secure, weather-protected manner and location. (Image: right, below)



This trail-side pocket park in Corolla, NC, features several examples of ancillary facilities, including short-term bicycle parking, picnic benches, a water fountain, and a trash can.



Long-term parking is an important ancillary facility for those parking their bicycles for more than two hours.

Short-term bicycle parking facilities include racks which permit the locking of the bicycle frame and at least one wheel to the rack and support the bicycle in a stable position without damage to wheels, frame, or components. Short-term bicycle parking is currently provided in some communities of the Albemarle region, but is especially needed near retail and commercial establishments as well as near popular tourist destinations.

Each community should work with property owners to encourage the installation of additional bicycle parking (short and long-term) at key destinations. Policies should also be put in place to ensure the inclusion of bike parking in new developments. See Chapter 5: Program & Policy Recommendations for more detail on bike parking policies. Additionally, Appendix D presents specific design guidelines for bicycle parking that address many different implementation scenarios.

SPEED LIMIT REDUCTION

Speed limit reduction should be strongly considered along some of the roadways in the Albemarle region, especially on roadways within cities and towns. Traffic speed is considered a major deterrent to bicycling by the public. It is recommended that further study be conducted locally to determine appropriate speed limit reduction locations and that enforcement also be a part of a comprehensive solution.

INTERSECTIONS & CROSSINGS

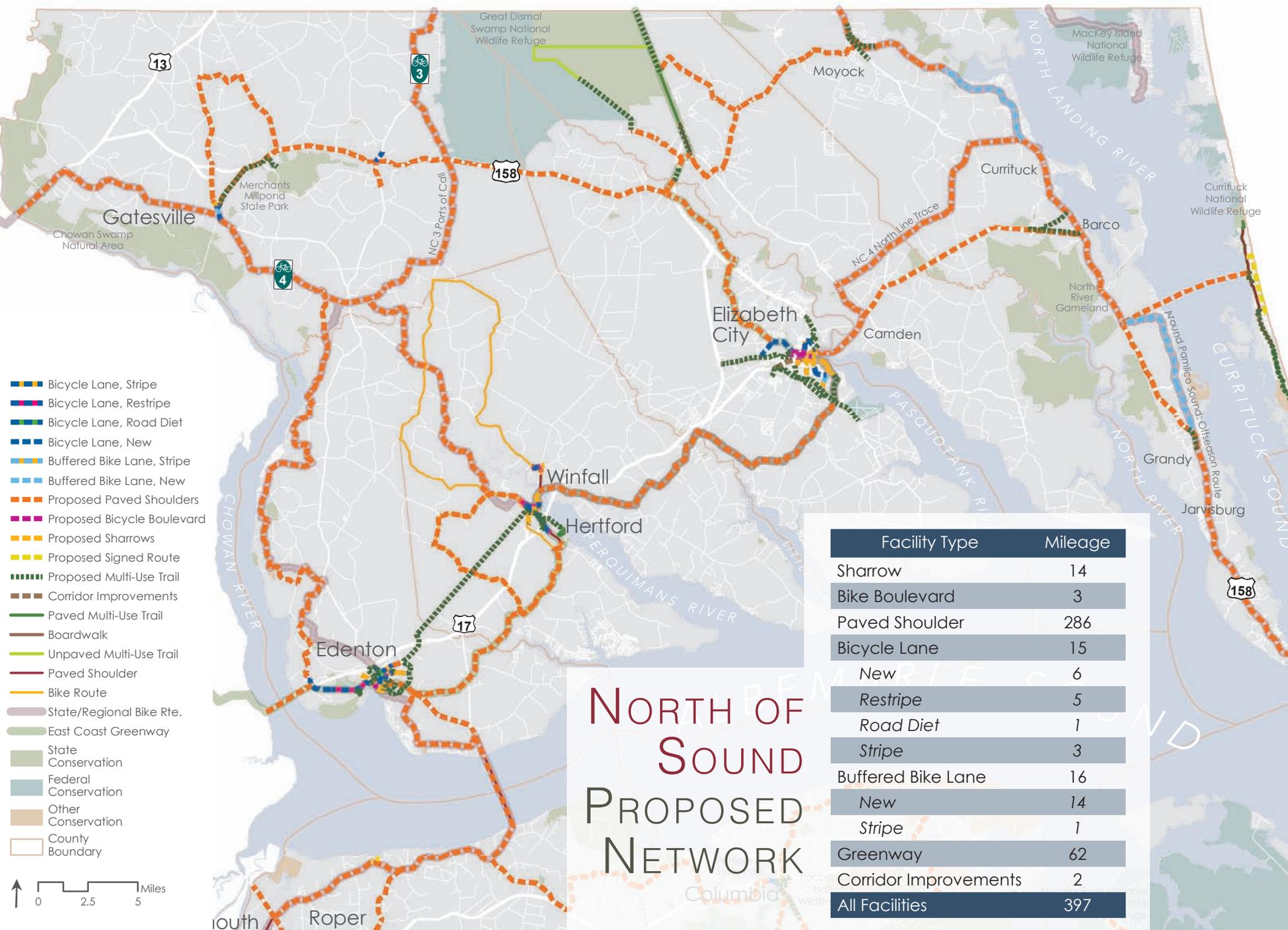
Roadway crossings present a particular challenge for bicyclists. The Albemarle region contains many complex intersections and uncontrolled roadway crossings that are barriers to cyclists. Many of these intersections and unsignalized crossings require further study at the local level to determine appropriate treatment and placement of crossings. For detailed design guidance on intersection improvements, see Appendix D: Design Guidelines sections titled 'Bikeways at Intersections', 'Signalized Intersections', and 'Multi-Use Trails.'

BRIDGES

NCDOT's bridge policy requires that several bicycle facility design standards be met where a bikeway is required (See page 2-20). These standards should be applied whenever a bridge in this region is replaced or repaired along a roadway where bicycles are permitted.

SUPPORT FACILITIES

Restrooms and water fountains are key needs of long-distance, recreational cyclists. In many areas of the region these amenities are not readily available. As a first step, local planners should work with the Albemarle Rural Planning Organization to add information about the locations of these amenities on the regional bike website (see Chapter 7 Action Steps table). As needs are identified during that process, the ARPO and local planners should work with NCDOT to consider installing public rest stops, or work with private entities to identify private facilities that are open to the public with or without a small purchase.



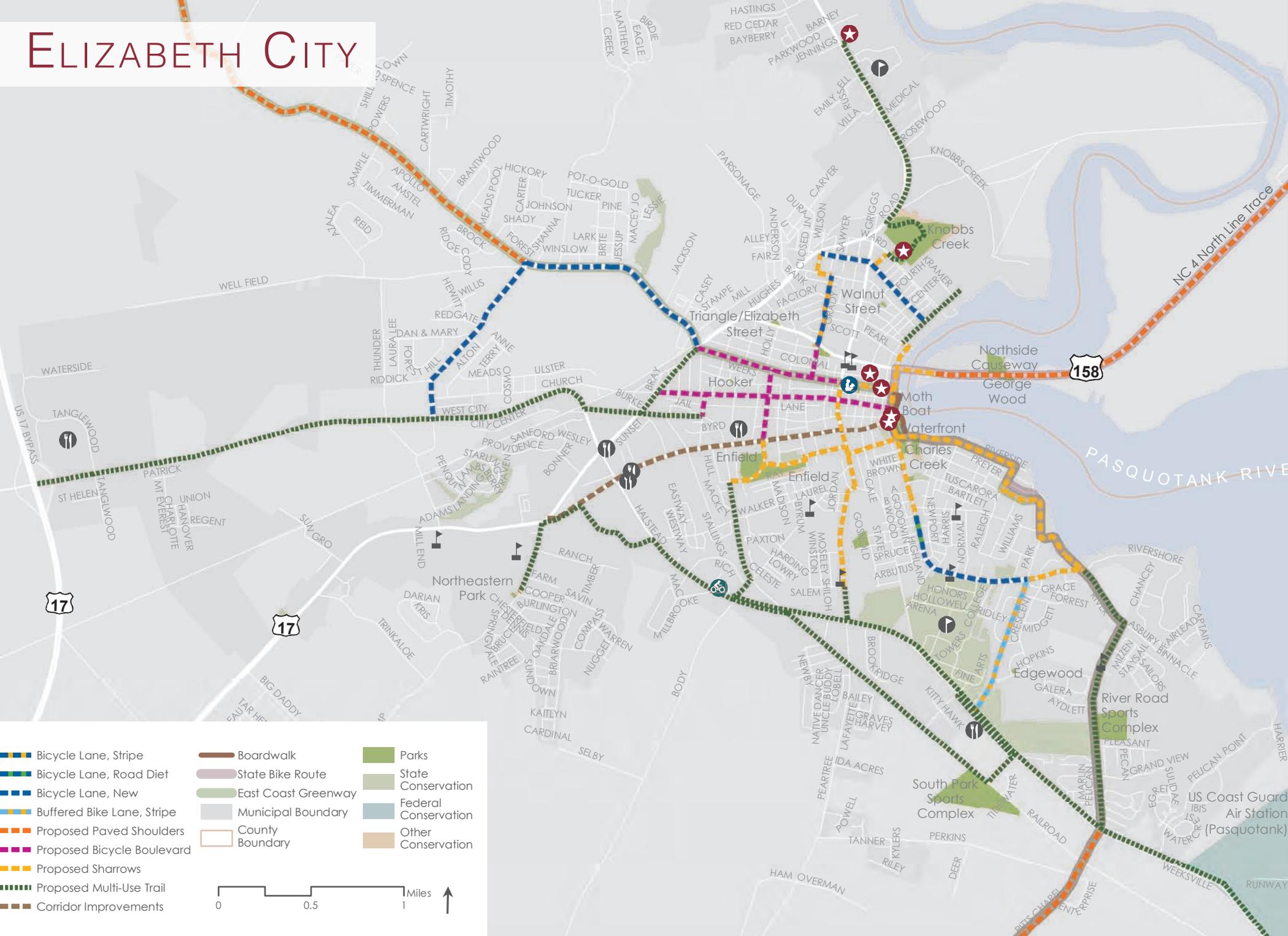
- █ Bicycle Lane, Stripe
- █ Bicycle Lane, Restripe
- █ Bicycle Lane, Road Diet
- █ Bicycle Lane, New
- █ Buffered Bike Lane, Stripe
- █ Buffered Bike Lane, New
- █ Proposed Paved Shoulders
- █ Proposed Bicycle Boulevard
- █ Proposed Sharrows
- █ Proposed Signed Route
- █ Proposed Multi-Use Trail
- █ Corridor Improvements
- █ Paved Multi-Use Trail
- █ Boardwalk
- █ Unpaved Multi-Use Trail
- █ Paved Shoulder
- █ Bike Route
- █ State/Regional Bike Rte.
- █ East Coast Greenway
- █ State Conservation
- █ Federal Conservation
- █ Other Conservation
- County Boundary

Facility Type	Mileage
Sharrow	14
Bike Boulevard	3
Paved Shoulder	286
Bicycle Lane	15
New	6
Restripe	5
Road Diet	1
Stripe	3
Buffered Bike Lane	16
New	14
Stripe	1
Greenway	62
Corridor Improvements	2
All Facilities	397

NORTH OF SOUND PROPOSED NETWORK



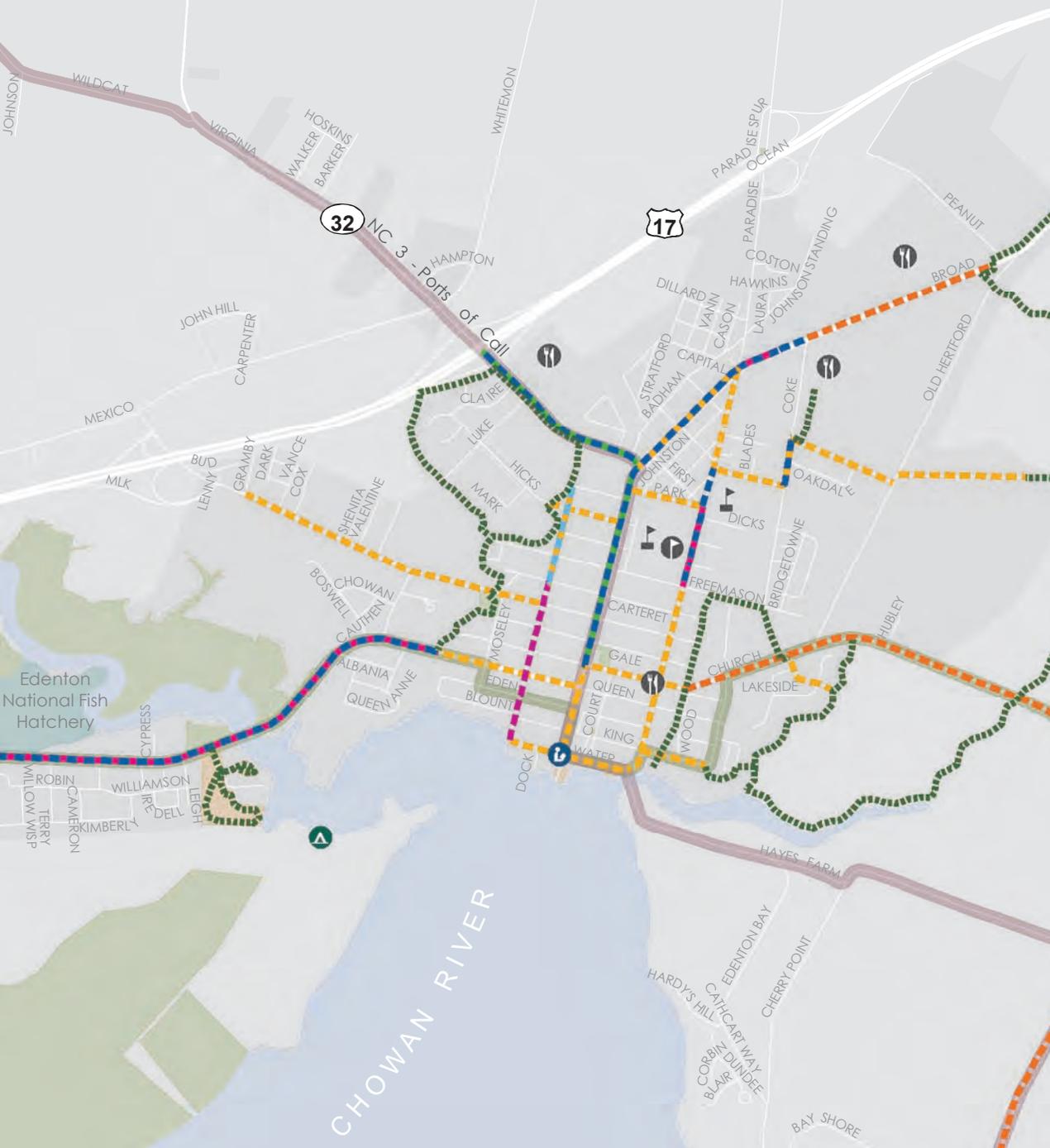
ELIZABETH CITY



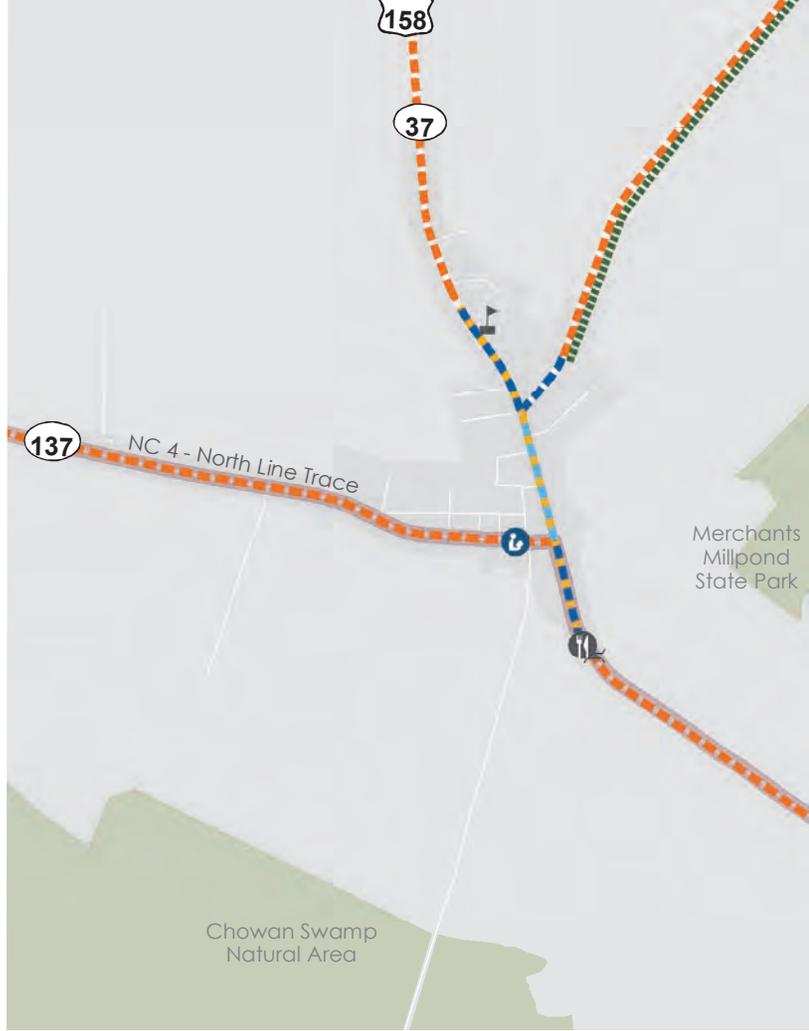
	Bicycle Lane, Stripe		Boardwalk		Parks
	Bicycle Lane, Road Diet		State Bike Route		State Conservation
	Bicycle Lane, New		East Coast Greenway		Federal Conservation
	Buffered Bike Lane, Stripe		Municipal Boundary		Other Conservation
	Proposed Paved Shoulders		County Boundary		
	Proposed Bicycle Boulevard		Corridor Improvements		
	Proposed Sharrows				
	Proposed Multi-Use Trail				

0 0.5 1 Miles ↑

EDENTON



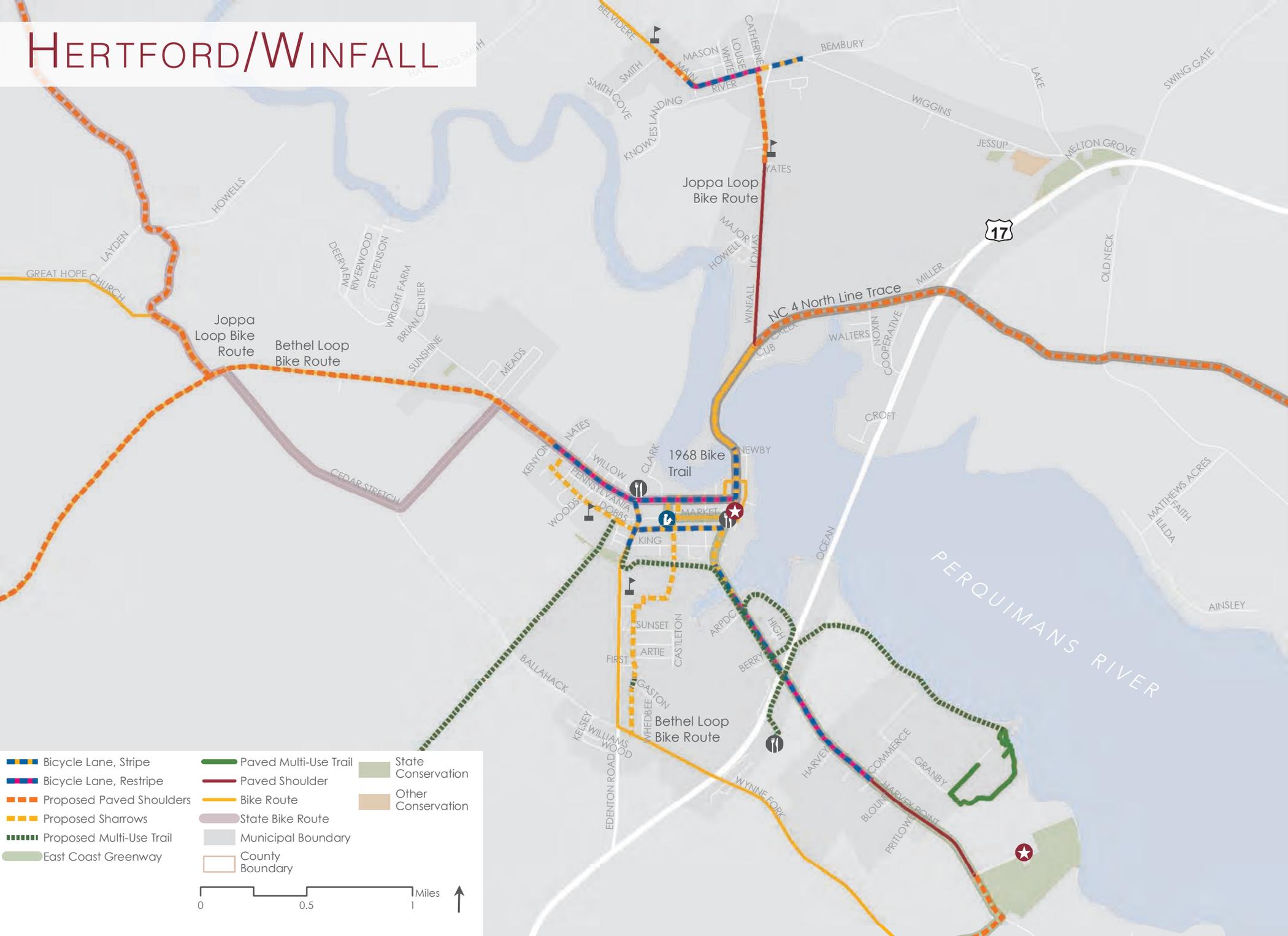
GATESVILLE



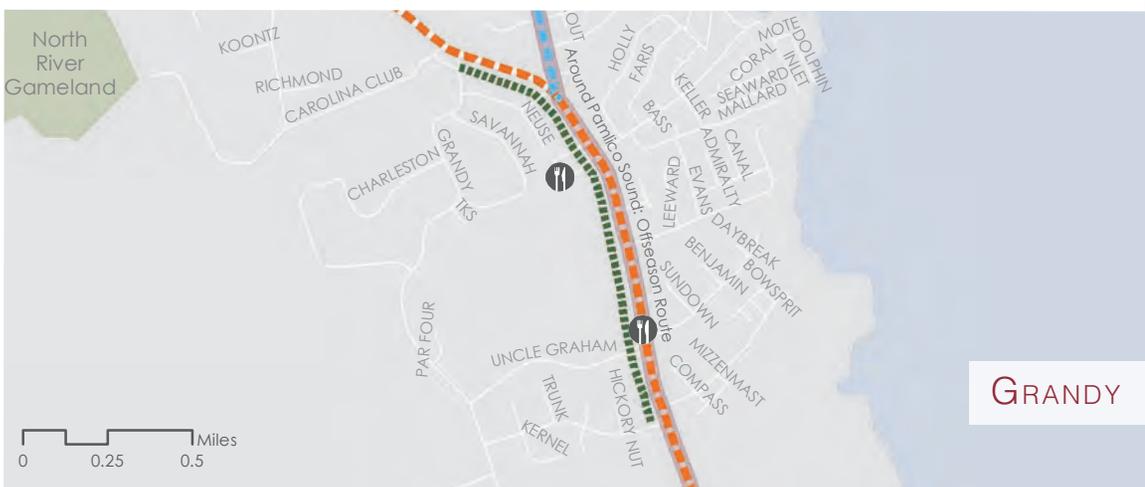
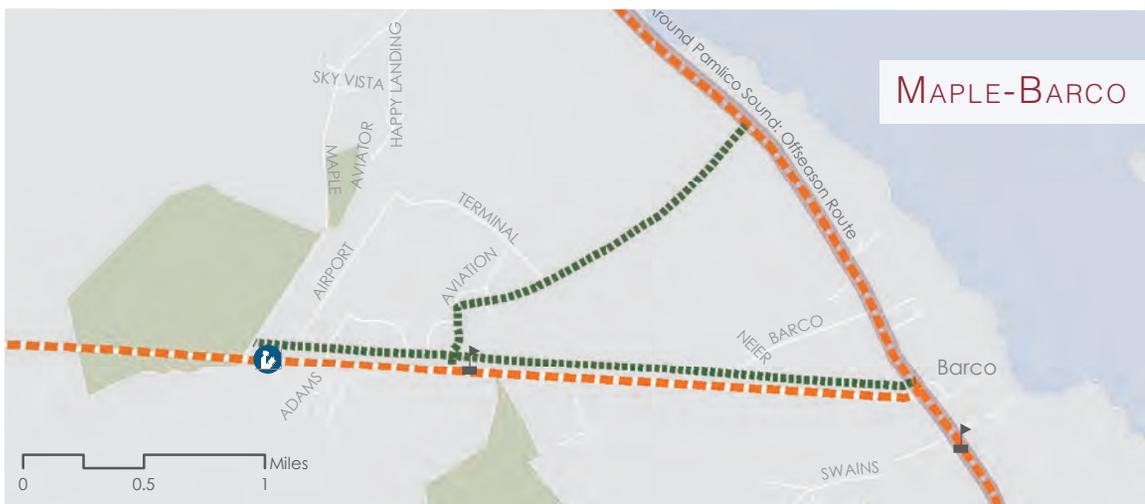
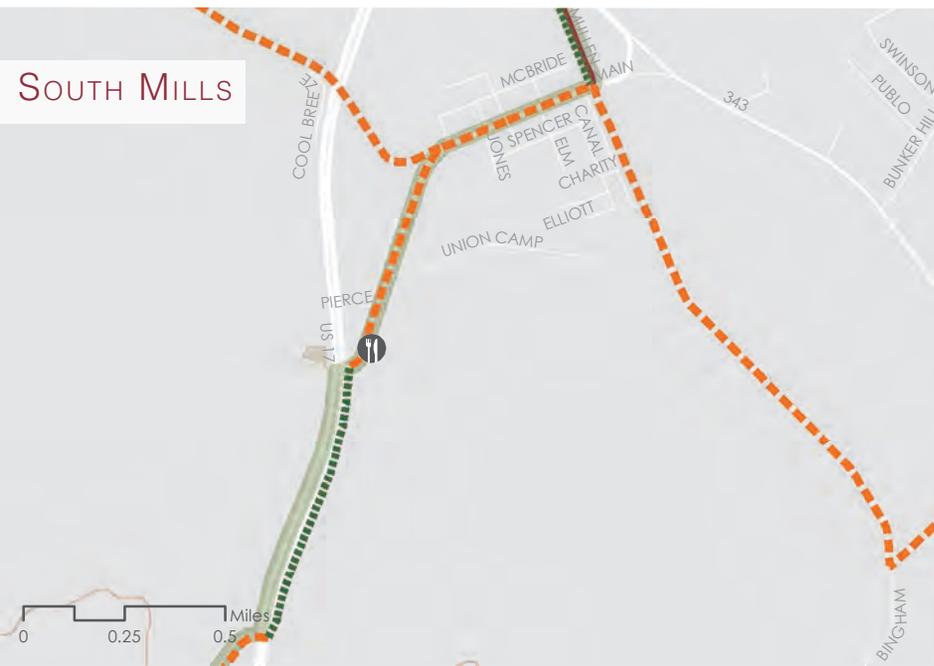
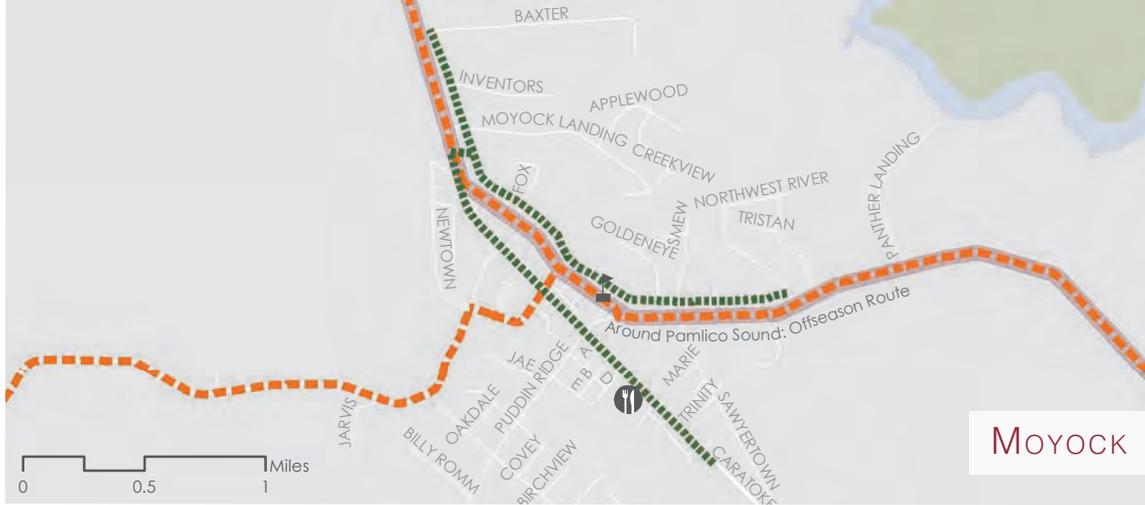
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|--|----------------------------|--|--------------------|--|----------------------|
| | Bicycle Lane, Stripe | | Paved Shoulder | | State Conservation |
| | Bicycle Lane, Restripe | | State Bike Route | | East Coast Greenway |
| | Bicycle Lane, Road Diet | | Municipal Boundary | | Federal Conservation |
| | Bicycle Lane, New | | County Boundary | | Other Conservation |
| | Buffered Bike Lane, Stripe | | | | |
| | Proposed Paved Shoulders | | | | |
| | Proposed Bicycle Boulevard | | | | |
| | Proposed Sharrows | | | | |
| | Proposed Multi-Use Trail | | | | |



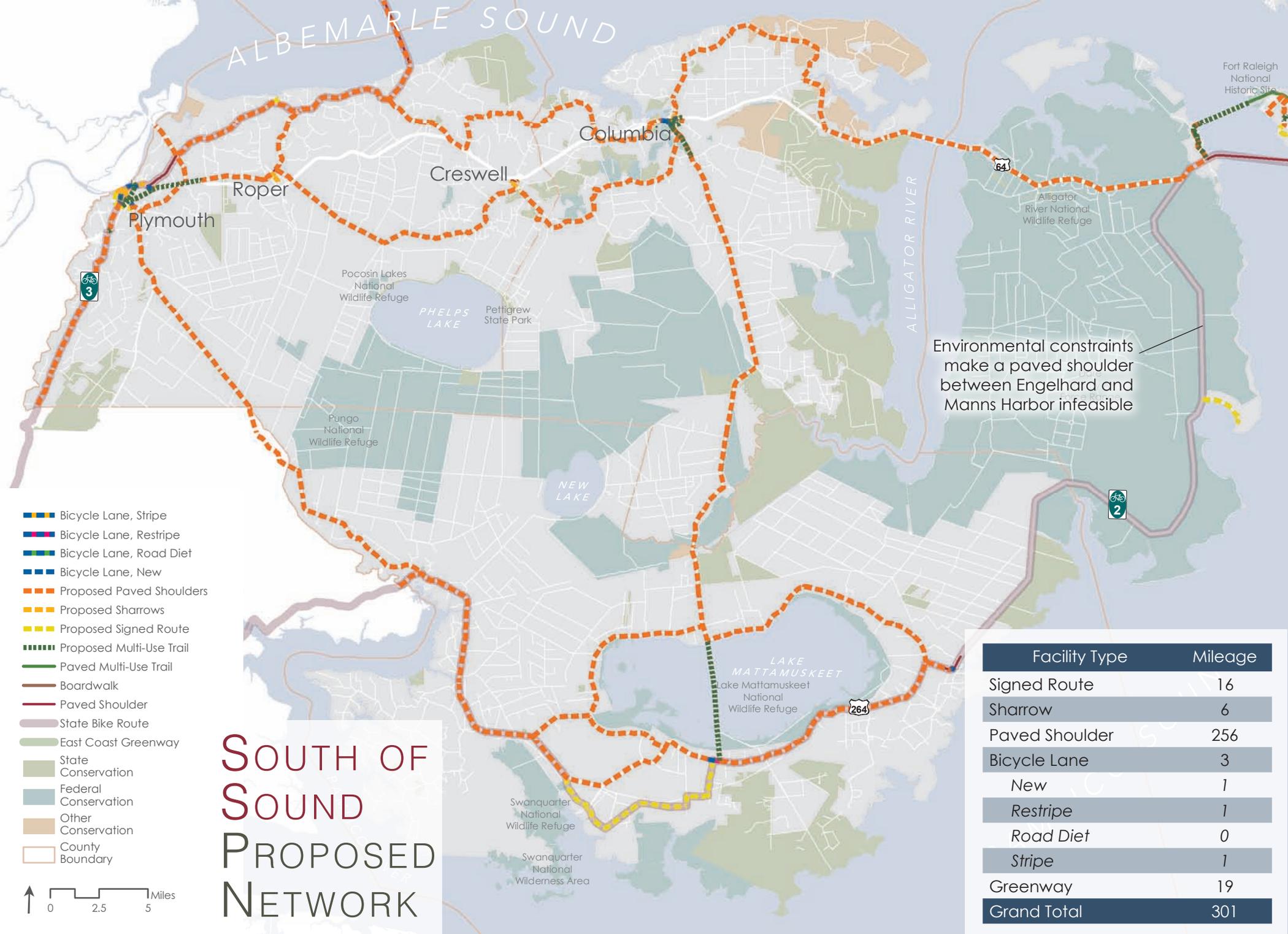
HERTFORD/WINFALL



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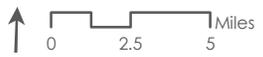


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SOUTH OF SOUND PROPOSED NETWORK

- Bicycle Lane, Stripe
- Bicycle Lane, Restripe
- Bicycle Lane, Road Diet
- Bicycle Lane, New
- Proposed Paved Shoulders
- Proposed Sharrows
- Proposed Signed Route
- Proposed Multi-Use Trail
- Paved Multi-Use Trail
- Boardwalk
- Paved Shoulder
- State Bike Route
- East Coast Greenway
- State Conservation
- Federal Conservation
- Other Conservation
- County Boundary



Facility Type	Mileage
Signed Route	16
Sharrow	6
Paved Shoulder	256
Bicycle Lane	3
New	1
Restripe	1
Road Diet	0
Stripe	1
Greenway	19
Grand Total	301

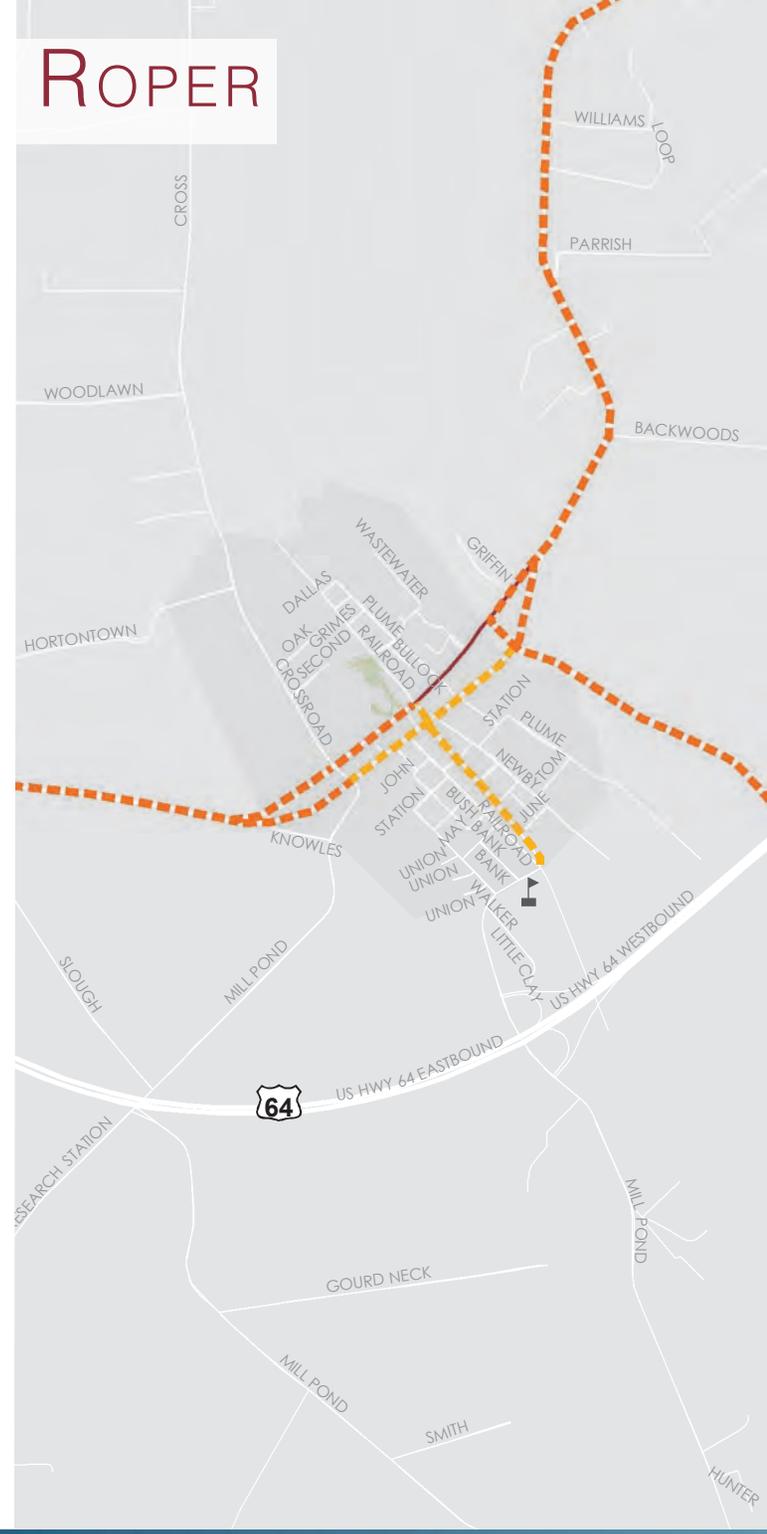
Environmental constraints make a paved shoulder between Engelhard and Manns Harbor infeasible

- Bicycle Lane, Stripe
- Bicycle Lane, Restripe
- Bicycle Lane, Road Diet
- Bicycle Lane, New
- Proposed Paved Shoulders
- Proposed Sharrows
- Proposed Signed Route
- Proposed Multi-Use Trail
- Paved Shoulder
- State Bike Route
- Municipal Boundary
- State Conservation
- Other Conservation
- County Boundary



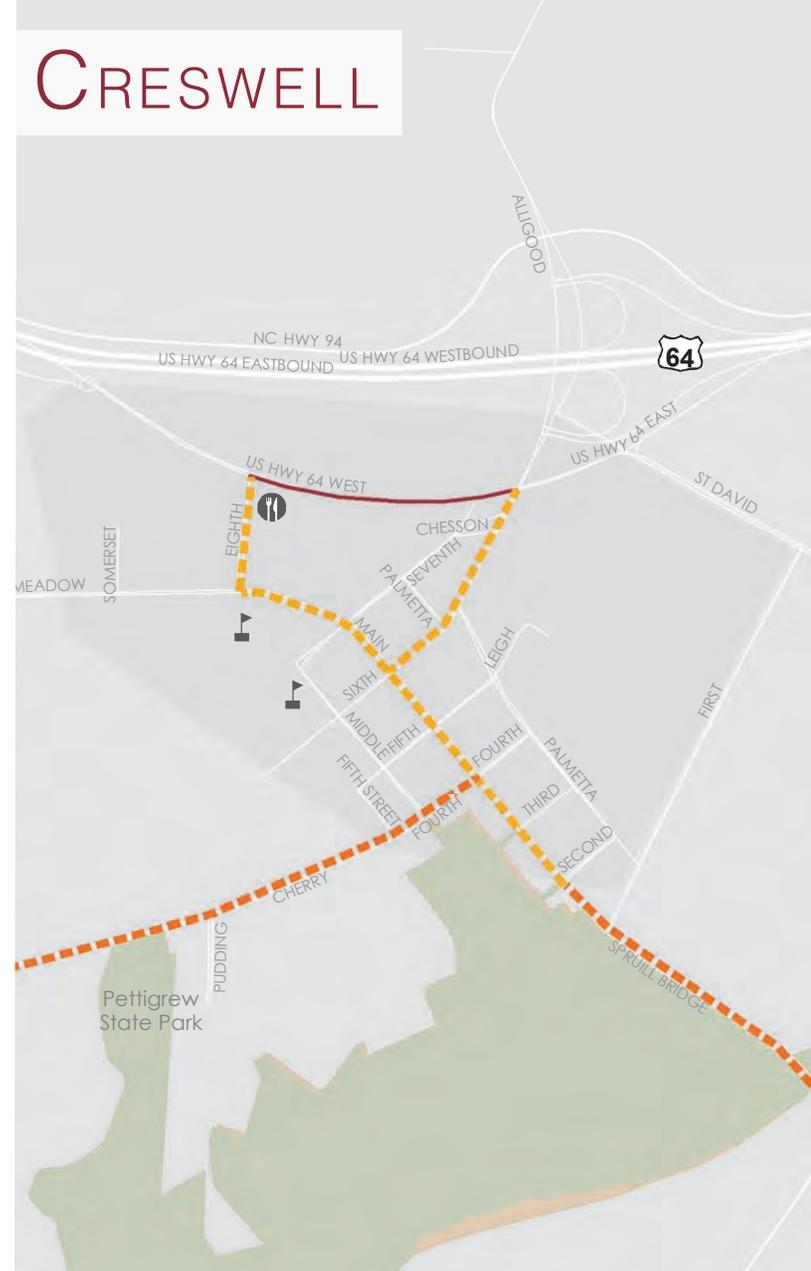
PLYMOUTH

ROPER



COLUMBIA

CRESWELL



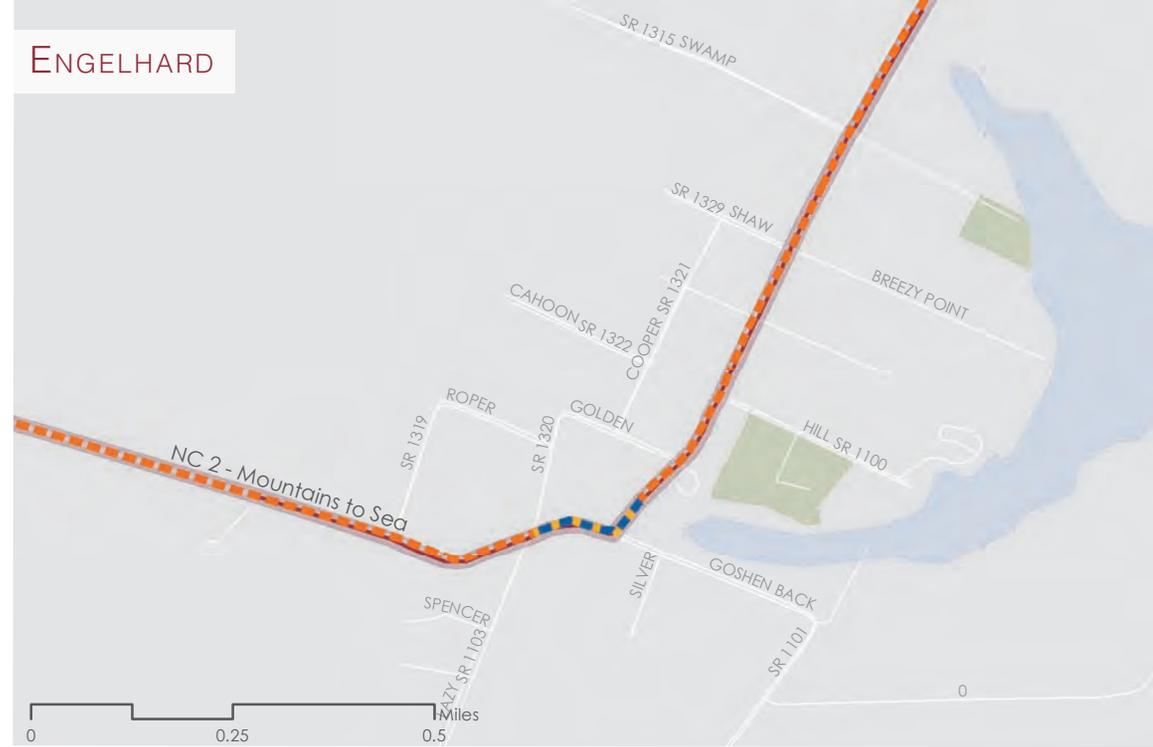
- Bicycle Lane, Stripe
- Boardwalk
- State Conservation
- Bicycle Lane, New
- Municipal Boundary
- Federal Conservation
- Proposed Paved Shoulders
- County Boundary
- Other Conservation
- Proposed Sharrows
- Proposed Multi-Use Trail



MANN'S HARBOR



ENGELHARD



MATTAMUSKEET



- | | | |
|----------------------------|----------------------------|-------------------------|
| Bicycle Lane, Stripe | Proposed Cycle Track | Boardwalk |
| Bicycle Lane, Restripe | Proposed Paved Shoulders | Unpaved Multi-Use Trail |
| Bicycle Lane, Road Diet | Proposed Bicycle Boulevard | Bike Lane |
| Bicycle Lane, New | Proposed Sharrows | Paved Shoulder |
| Buffered Bike Lane, Stripe | Proposed Signed Route | Bike Route |
| Buffered Bike Lane, Widen | Proposed Multi-Use Trail | State Bike Route |
| Buffered Bike Lane, New | Corridor Improvements | Federal Conservation |
| | Paved Multi-Use Trail | |

OUTER BANKS MAJOR CORRIDORS

Two major corridors along the Outer Banks - US 158 and NC 12 - present particular challenges to bicycle transportation that cannot be addressed solely with new bike facility recommendations. While each community located along these corridors has its own distinct character, many of these challenges are consistent across communities. The following paragraphs describe constraints along these corridors and recommended studies and solutions.

US-158

US-158 is a primary roadway corridor travelling from Southern Shores to Nags Head. Multi-use side paths are recommended to be located within the right-of-way for the entire length of this corridor. A number of complex intersections and uncontrolled roadway crossings on US 158 bar safe access to the many commercial destinations located along it. This is because 1) they cannot be avoided, or 2) creation of a detour would require a major inconvenience for bicyclists, who would be unlikely to use it. Cyclists crossing US-158 have to cross five lanes of traffic, often at non-signalized intersections. No refuge islands exist on US-158, and signal timing at the intersections that are signalized is not adequate for cyclists to safely cross. A full study of US 158 is recommended to determine appropriate treatment and placement of crossings. At minimum, high-visibility crosswalks should be located wherever an intersection connects to beach access. For more information on this corridor, see Chapter 5: Demonstration Projects.

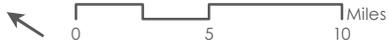


*Two-way cycle track facility designed with green paint
Photo credit: Transportation nation blog*

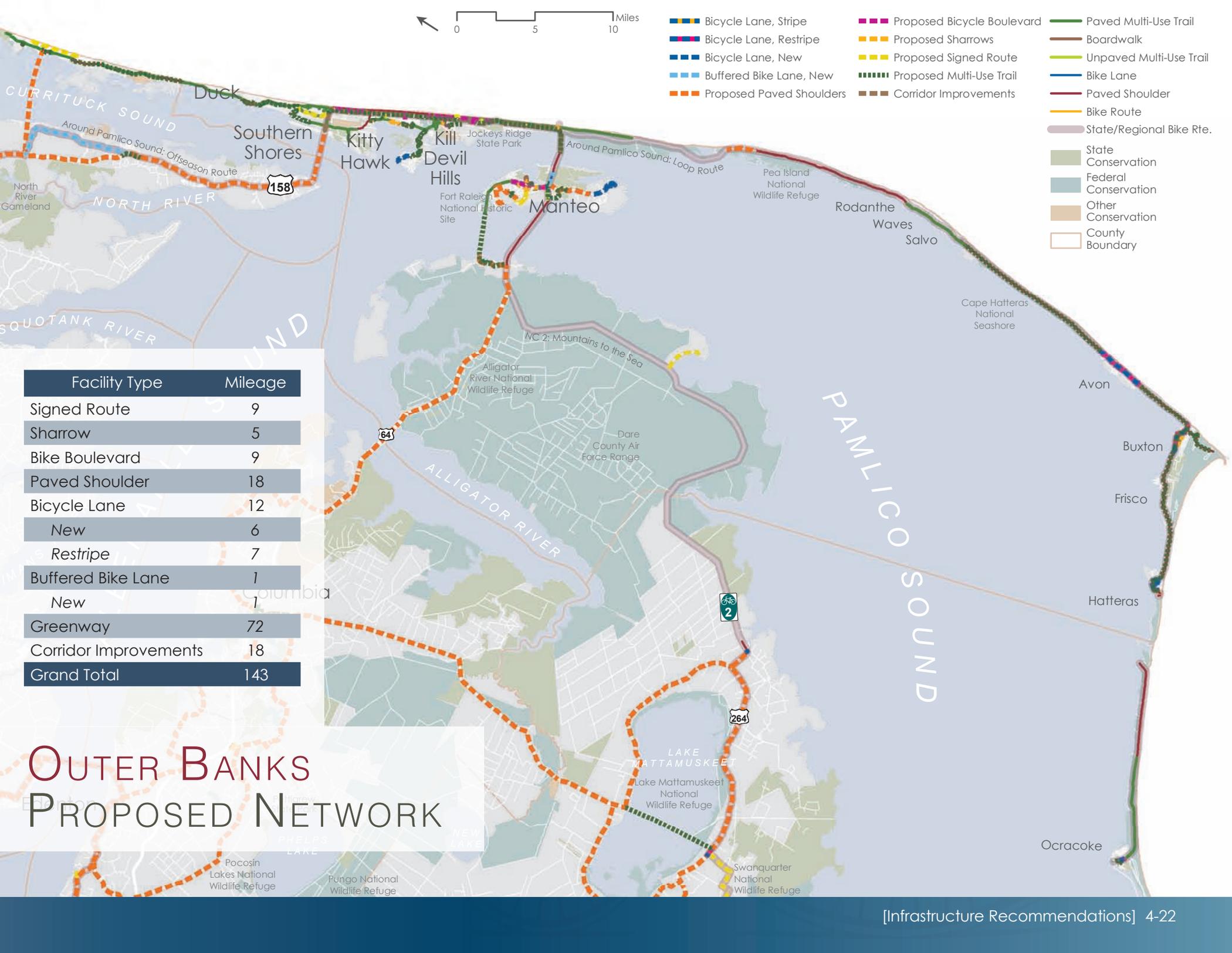
NC-12

NC-12 is also called "Beach Road" and passes through every community on the Outer Banks from Corolla to Ocracoke Island. Sidewalks and sidepaths exist along the majority of NC-12. However, due to the close proximity of Beach Road to the sand dunes along the beach, the existing sidepaths were not built to the recommended ten-foot wide standard. Environmental conditions pose a significant challenge to maintenance of these facilities. In many areas, sand from the sand dunes washes across the sidewalks or sidepath, making the facility unusable. A plan for more frequent maintenance of the facility should be put in place through a coordinated effort of municipal staff along the corridor.

In southern Nags Head, near the Jennette's Pier/Whalebone Junction area, the side path becomes an on-road facility with numerous driveway conflict points as a result of wide curb-cuts and uncontrolled driveway access areas. This area should be considered for further study to determine how to reduce driveway access areas. One potential near-term solution to increasing the visibility of the sidepath and cyclists traveling on the side path is to resurface the side path in this area using colorful paint or longer lasting plastic or epoxy material embedded with reflective glass beads. The photo at left illustrates an example of a two-way cycle track facility designed with green paint. This paint will signal to motorists that the sidepath is not part of the roadway open to vehicles.



- Bicycle Lane, Stripe
- Bicycle Lane, Restripe
- Bicycle Lane, New
- Buffered Bike Lane, New
- Proposed Paved Shoulders
- Proposed Bicycle Boulevard
- Proposed Sharrows
- Proposed Signed Route
- Proposed Multi-Use Trail
- Corridor Improvements
- Paved Multi-Use Trail
- Boardwalk
- Unpaved Multi-Use Trail
- Bike Lane
- Paved Shoulder
- Bike Route
- State/Regional Bike Rte.
- State Conservation
- Federal Conservation
- Other Conservation
- County Boundary



Facility Type	Mileage
Signed Route	9
Sharrow	5
Bike Boulevard	9
Paved Shoulder	18
Bicycle Lane	12
New	6
Restripe	7
Buffered Bike Lane	1
New	1
Greenway	72
Corridor Improvements	18
Grand Total	143

OUTER BANKS PROPOSED NETWORK

COROLLA

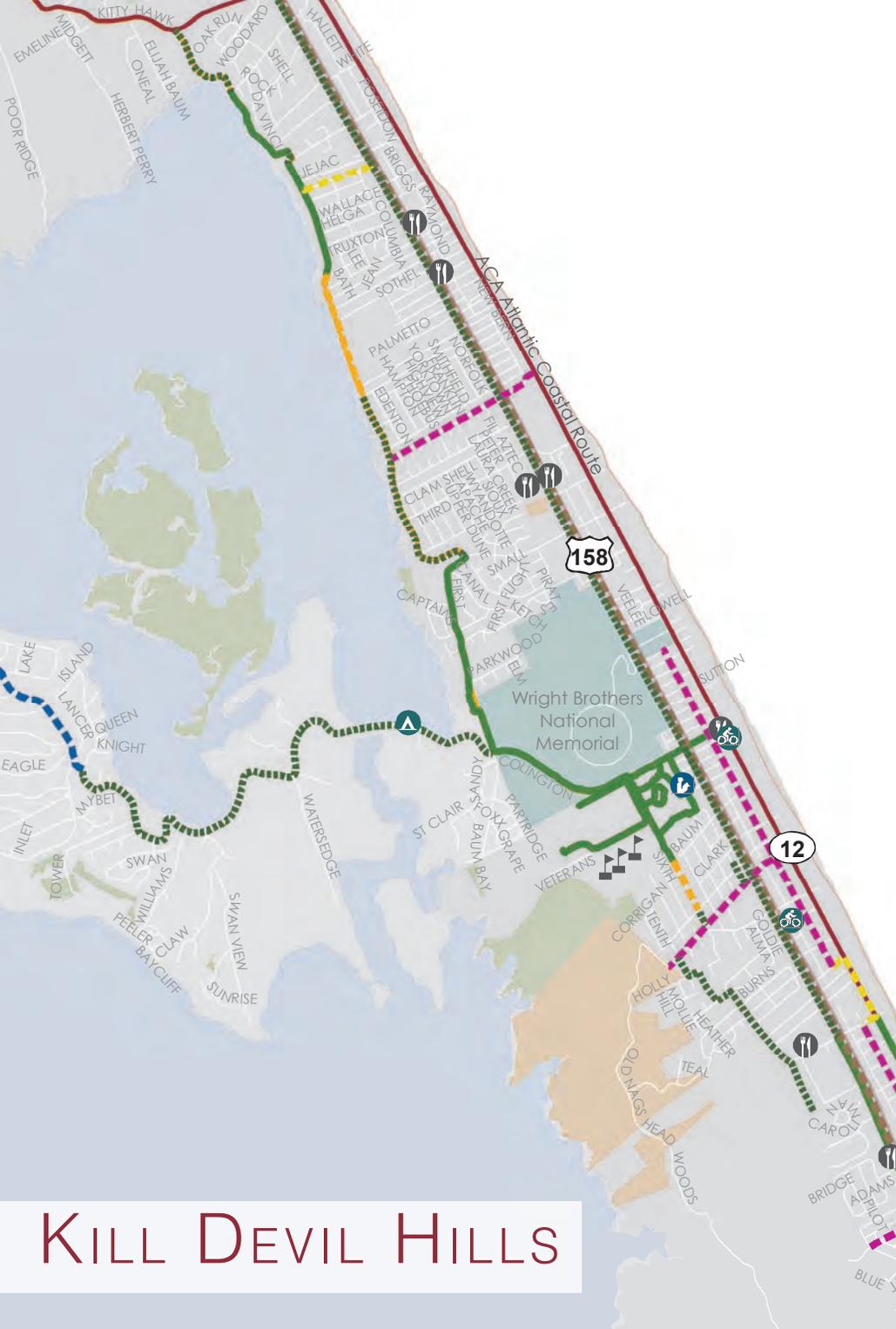
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|--|----------------------------|--|----------------------------|--|-------------------------|--|----------------------|
| | Bicycle Lane, Stripe | | Proposed Cycle Track | | Paved Multi-Use Trail | | Municipal Boundary |
| | Bicycle Lane, Restripe | | Proposed Paved Shoulders | | Boardwalk | | State Conservation |
| | Bicycle Lane, Road Diet | | Proposed Bicycle Boulevard | | Unpaved Multi-Use Trail | | Federal Conservation |
| | Bicycle Lane, New | | Proposed Sharrows | | Bike Lane | | Other Conservation |
| | Buffered Bike Lane, Stripe | | Proposed Signed Route | | Paved Shoulder | | County Boundary |
| | Buffered Bike Lane, Widen | | Proposed Multi-Use Trail | | Bike Route | | |
| | Buffered Bike Lane, New | | Corridor Improvements | | | | |



DUCK



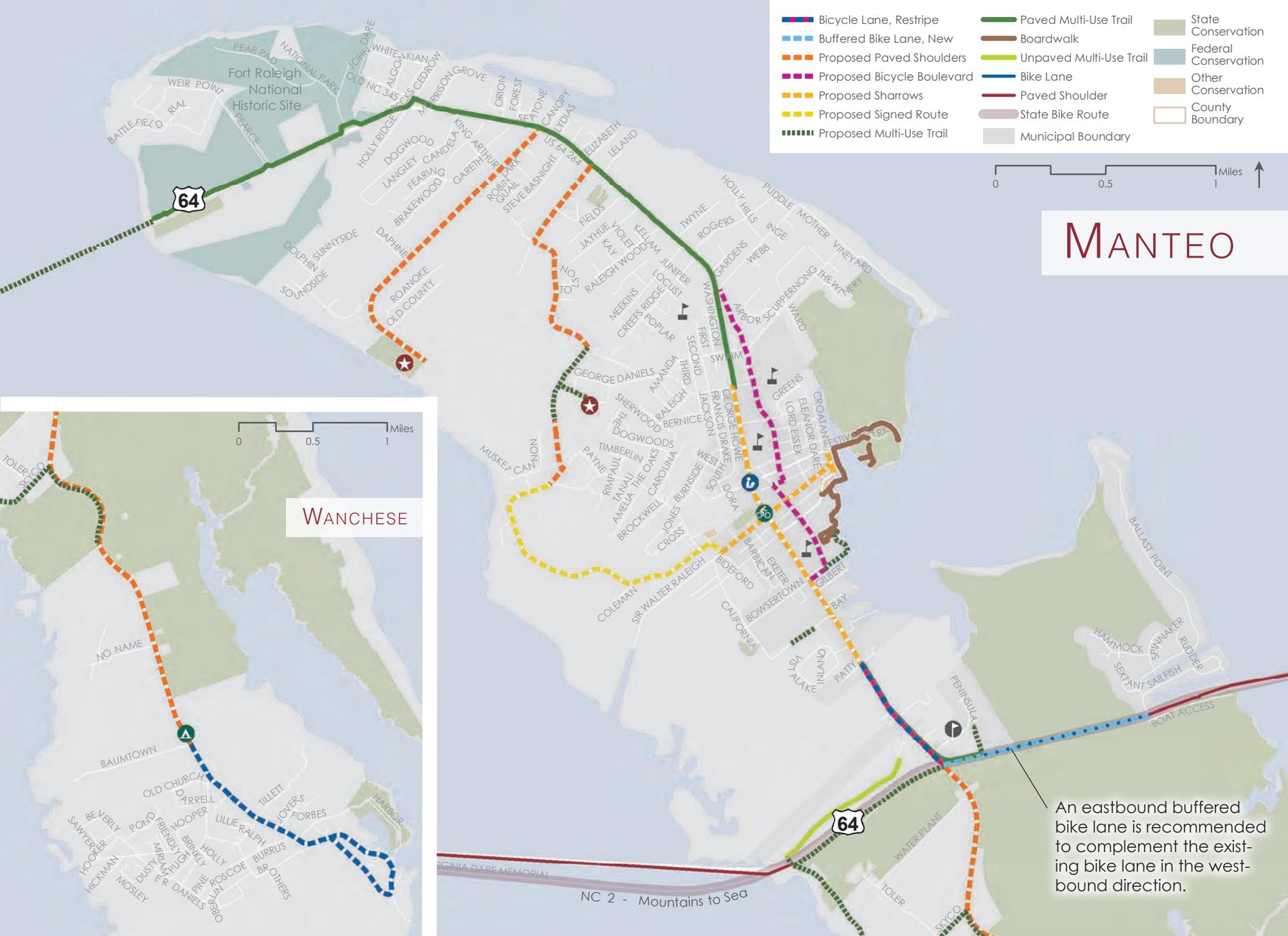




KILL DEVIL HILLS



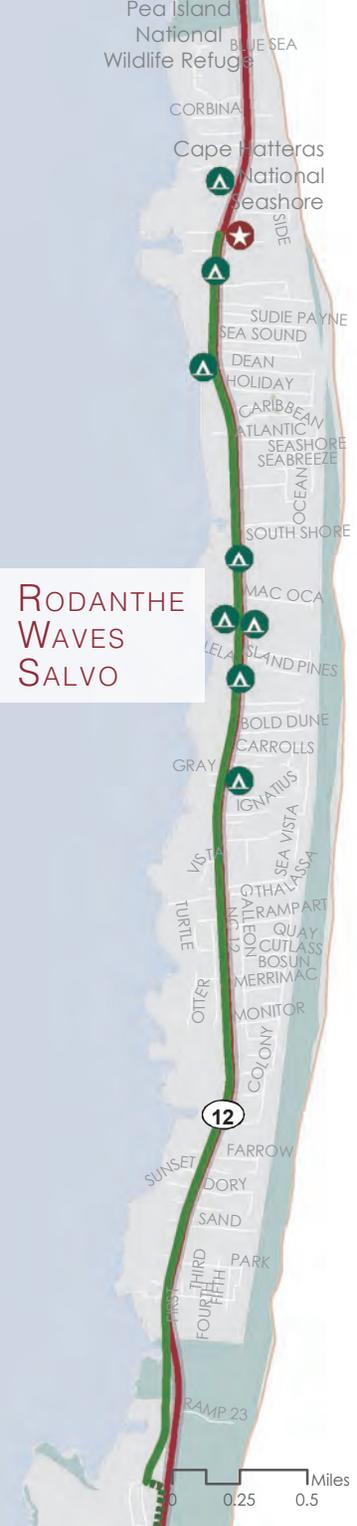
NAGS HEAD



MANTEO

WANCHESE

An eastbound buffered bike lane is recommended to complement the existing bike lane in the westbound direction.



0 0.25 0.5 Miles

BUXTON/FRISCO



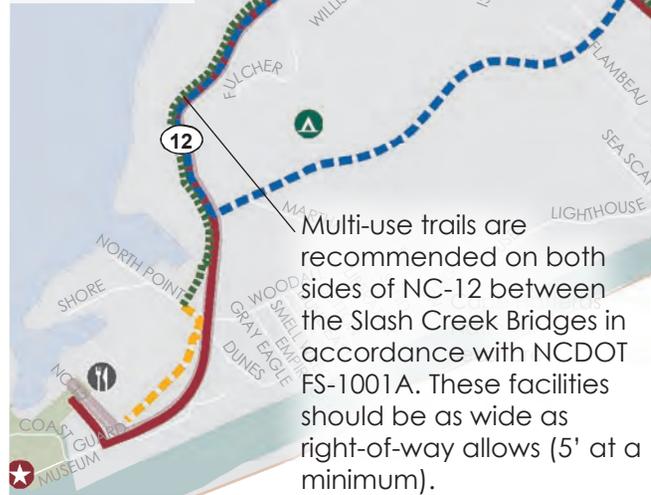
0 0.25 0.5 Miles

AVON



0 0.1 0.2 Miles

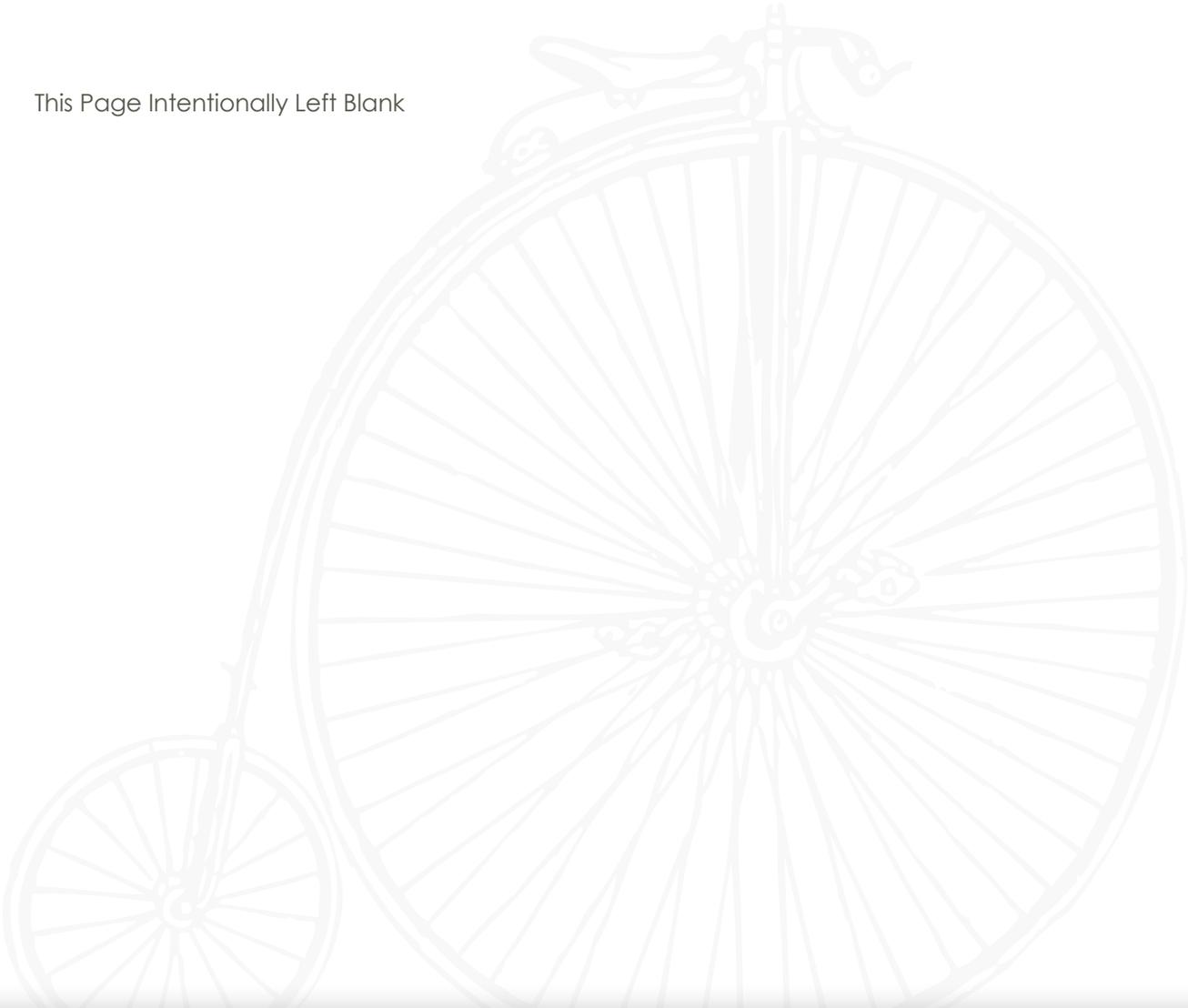
HATTERAS



- Bicycle Lane, Stripe
- Proposed Cycle Track
- Paved Multi-Use Trail
- Bicycle Lane, Restripe
- Proposed Paved Shoulders
- Boardwalk
- State Conservation
- Bicycle Lane, Road Diet
- Proposed Bicycle Boulevard
- Unpaved Multi-Use Trail
- Federal Conservation
- Bicycle Lane, New
- Proposed Sharrows
- Bike Lane
- County Boundary
- Buffered Bike Lane, Stripe
- Proposed Signed Route
- Paved Shoulder
- Bike Route
- Buffered Bike Lane, Widen
- Proposed Multi-Use Trail
- Corridor Improvements
- Buffered Bike Lane, New



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Before

Photo simulation of the recommended Caratoke Highway sidepath. For more information on this specific project, see page 5-8.



After

Chapter Five

Priority & Demonstration Projects

OVERVIEW

A comprehensive bicycle network for the region was presented in Chapter 4. This chapter features the results of a prioritization of that network, as well as detailed analysis of select demonstration projects. Exhibits describing these demonstration projects contain design direction, cost estimates, and potential funding sources.

The prioritization results are presented for rough guidance only. While it is ideal to develop facilities in order of priority, it is best to also construct facilities as opportunities arise. Some of the most cost-effective opportunities to provide bicycle facilities are during routine roadway construction, reconstruction, and repaving projects. A new commercial development or a roadway widening project, for instance, would provide the means to build facilities as a component of an existing effort, regardless of priority ranking through this process.

PRIORITIZATION METHODOLOGY

Prioritization began by breaking down infrastructure recommendations into discrete segments at logical points, such as major intersections. These segments were then prioritized with scores based on the

weighted criteria listed below, which was custom designed for this plan based on Steering Committee input, public input through the online comment form, and existing conditions.

Where characteristics are relative (i.e. access to a higher-density residential area), criteria were applied such that a particular project is compared only to other projects within its county, rather than all projects across the region. Thus, scores are only comparable within counties.

Chapter Contents

Overview

Prioritization Methodology

Prioritization Results

Demonstration Project Selection

Demonstration Project Exhibits

Criteria	Weight
Provides access ¹ to a school (any level)	5
Provides access to a higher-density residential area	4
Provides access to a higher-density commercial area	4
Provides access to a park or recreation center (including the beach)	4
Connects to an existing or funded trail	4
Serves low-income areas with low car-ownership rates	4
Segment contains reported bike accidents or provides an alternative to a corridor with a high number of reported accidents	4
Higher relative feasibility (no acquisition required)	4
Top 1-5 "Most in need of improvement" from online comment form	4
Top 6-10 "Most in need of improvement" from online comment form	3
Segment contains a Top 10 Intersection "Most in need of improvement"	3

¹ Access is defined as a connection to the destination's driveway entrance to the nearest public street



PRIORITIZATION RESULTS

The results of prioritization are shown graphically at left. The top three priorities from each county are presented below. The full results of prioritization, showing the criteria met by each proposed facility and associated scores, are presented in Appendix C.

Facility Location	Facility Type	Street Name	From	To
<i>CAMDEN COUNTY</i>				
County	Paved Shoulder	US 158	Pasquotank County	NC 343
County	Paved Shoulder	NC 343	Scotland Rd	158 W
County	Greenway	343 N/Mullen Dr	US 17	Main St
<i>CHOWAN COUNTY</i>				
Edenton	Bicycle Lane, Road Diet	Broad St	Church St	Virginia Rd
Edenton	Bicycle Lane, Road Diet	Virginia Rd	US 17	Broad St
Edenton	Sharrow	Oakum St	Water St	Freemason St
<i>CURRITUCK COUNTY</i>				
County	Paved Shoulder	US 158/Shortcut Rd	NC 343	Tulls Creek Rd
Corolla	Signed Route	Shad St/Lighthouse Dr/Albacore St	Ocean Trl	Ocean Trl
County	Paved Shoulder	Caratoke Hwy	Tulls Creek Rd	Shortcut Rd

Facility Location	Facility Type	Street Name	From	To
<i>DARE COUNTY</i>				
Manteo	Sharrow	US 64/US 264	Harriot St	Patty Ln
County	Greenway	NC 12	Park Dr (Avon)	Eagle Pass Rd
Buxton	Bicycle Lane, Restripe	NC 12	Crooked Ridge Trl	Lighthouse Rd
<i>GATES COUNTY</i>				
County	Paved Shoulder	US 158	Maple St	Acorn Hill Rd/ Folly Rd
Gatesville	Bicycle Lane, Stripe	Main St	Court St	Town Edge
Gatesville	Bicycle Lane, Stripe	Main St	Gatesville Elementary School	Maple St
<i>HYDE COUNTY</i>				
County	Signed Route	NC 45/Oyster Creek Rd/ Juniper Bay Rd	US 264	Turnpike Rd at schools
County	Bicycle Lane, Restripe	US 264	W of school complex	NC 94
County	Paved Shoulder	US 264	NC 94	Golden St
<i>PASQUOTANK COUNTY</i>				
Elizabeth City	Greenway	Oak Stump Rd/ Ehringhaus St/ Halstead Blvd	Cooper Ln	Roanoke Ave/ RR Crossing
Elizabeth City	Bike Boulevard	Church St	Hughes Blvd	Water St
Elizabeth City	Sharrow	Main St	Road St	Water St

Facility Location	Facility Type	Street Name	From	To
<i>PERQUIMANS COUNTY</i>				
Hertford	Greenway	Off Road/ Church St	King St	Shopping center S of US 17
Hertford	Bicycle Lane, Restripe	Church St	N of Albemarle Sound	US 17
Hertford	Bicycle Lane, Restripe	Harvey Point Rd	US 17	Commerce Dr
<i>TYRRELL COUNTY</i>				
Columbia	Greenway	US 64	Water St	La Keiser Dr
Columbia	Sharrow	Main St	Water St	Road St
Columbia	Bicycle Lane, Stripe	Main St	Road St	US 64
<i>WASHINGTON COUNTY</i>				
Creswell	Sharrow	Main St	Eighth St	Second St
Creswell	Sharrow	Eighth St	US 64	Main St
Plymouth	Sharrow	Washington St	Water St	RR N of US 64



DEMONSTRATION PROJECT SELECTION

Twenty Demonstration Projects were selected from the recommended network for detailed analysis. The results of this analysis are presented on the following pages in summary exhibits. These exhibits are intended to illustrate how different recommended facilities might best be implemented in areas across the region. To meet that goal, segments were selected using a combination of the following inputs:

- Weighted score from prioritization,
- Geographic representation, and
- Facility type representation.

The result of this selection is a group of projects representing all subregions, counties, and municipalities of the region. These projects also cover a variety of facility types within each subregion. Projects are presented in random order by subregion. In combination with the Design Guidelines presented in Appendix D, these demonstration projects provide guidance on implementation of bike facilities across the region.

The following pages show planning level design concepts only. Project development will require local and NCDOT review and approval. Right-of-way costs are not included in cost estimates, since these must be negotiated at the time of implementation.

DEMONSTRATION PROJECT EXHIBITS

NORTH OF SOUND

Code	County	Location	Project Description	Page #
NS-A	Gates	Gatesville	Main Street Bike Lane	5-5
NS-B	Currituck	Moyock	Caratoke Highway Sidepath	5-6
NS-C	Chowan	Edenton	Broad Street Bike Lane/ Sharrow	5-7
NS-D	Pasquotank	Elizabeth City	Church Street Bike Boulevard	5-9
NS-E	Pasquotank	Elizabeth City	Ehringhaus Street Corridor Improvements	5-11
NS-F	Perquimans	Hertford	Hertford Greenway	5-13
NS-G	Perquimans	Hertford	Church Street Bike Lane/ Sharrow	5-14
NS-H	Camden	County	Dismal Swamp Greenway Extension	5-15

SOUTH OF SOUND

Code	County	Location	Project Description	Page #
SS-A	Hyde	Engelhard	US 264 Bike Lane	5-16
SS-B	Tyrrell	Columbia	US 64 Sidepath	5-17
SS-C	Washington	Plymouth	US 64 Sidepath	5-18
SS-D	Washington	Plymouth	Water Street/Park Drive Sharrow/ Bike Lane	5-19

OUTER BANKS

Code	County	Location	Project Description	Page #
OBX-A	Dare	Manteo	US 64 Sharrow/ Bike Lane	5-20
OBX-B	Dare	Nags Head/Kitty Hawk/Kill Devil Hills	US 158 Corridor Improvements	5-21
OBX-C	Dare	Buxton	NC 12 Sidepath/ Bike Lane	5-23
OBX-D	Dare	Duck	NC 12 Cycle Track	5-24
OBX-E	Dare	Nags Head	Memorial Avenue Bike Boulevard	5-25
OBX-F	Currituck	Corolla	Lighthouse Drive Signed Route	5-27
OBX-G	Dare	Southern Shores	Dogwood Trail Bike Boulevard	5-28
OBX-H	Dare	County	Colington Road Cycle Track	5-29



A: MAIN STREET- GATESVILLE

Main Street in Gatesville is a wide corridor with non-delineated—and largely underutilized—on-street parking. The parallel parking spaces are mainly used by the funeral home. Numerous homes front the corridor and have individual driveways. The recommended improvement is to restripe the corridor to add bicycle lanes, which could occur without changing the existing curb and gutter.

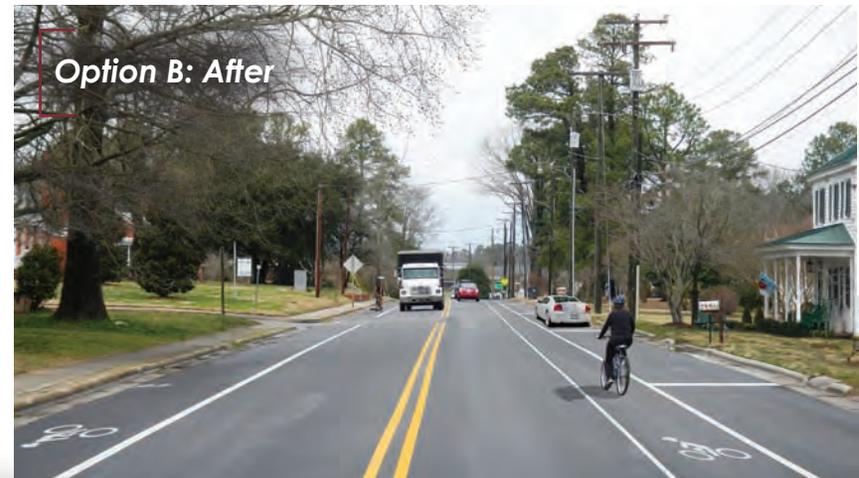
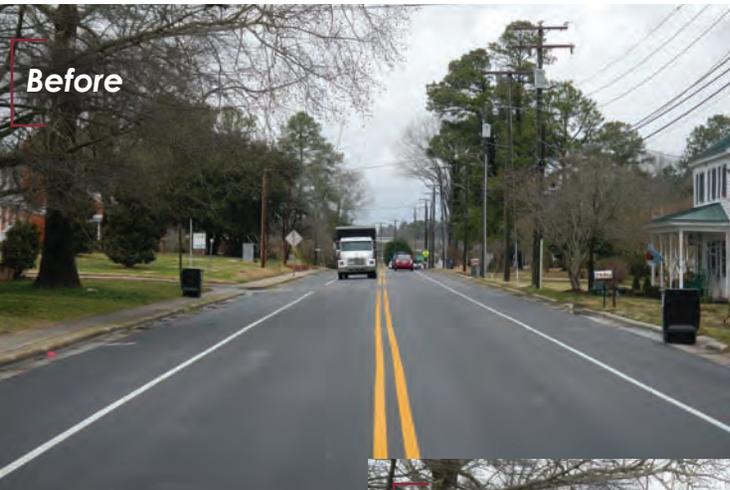
Extents and Facility Type: Gatesville Elementary School to Town limits: Bicycle Lane (Stripe)

Length: 0.9 miles

Traffic Volumes: Up to 3,200 AADT (Average Annual Daily Traffic)

Overview and Purpose: Main Street serves various municipal and civic uses and provides access to the downtown area and Gatesville Elementary. The width of the travel lanes and excess on-street parking could be redistributed to bicyclists through a low-cost restriping exercise. Two options are presented in the photosimulations below. The first option removes parking from both sides of the street and adds buffered bicycle lanes. The second option consolidates the parking to the southbound side to provide room for bicycle lanes. The second option requires narrow (9') travel lanes. Community input and feedback from NCDOT is needed to determine whether parking is necessary between Maple Street and Court Street.

Planning Level Cost Estimate: \$198,000 (assumes the full removal of on-street parking as shown in Option A).





B: CARATOKE HIGHWAY- MOYOCK
 NC 168, known as Caratoke Highway, is an important route between North Carolina and Virginia, and an evacuation route for the Outer Banks. The highway is also the primary route within the small town of Moyock. Currently, NC 168 is not suitable for bicycle travel due to high traffic volumes, speeding vehicles, and a lack of bicycle facilities. The recommended treatment is a sidepath along the highway with intersection improvements at Camellia Road.

Extents and Facility Type: Shingle Landing Road to Powells Lane: Sidepath

Length: 1.3 miles

Traffic Volumes: Up to 21,000 AADT

Overview and Purpose: The sidepath is recommended to the south, with special considerations at Camellia Drive. Issues and constraints include limited right-of-way, utilities, numerous driveway conflicts,

and a stream crossing that will require a bridge and guardrail. Paved shoulders and a multi-use trail near Moyock Elementary School will complete the local network.

Planning Level Cost Estimate: \$981,250 (excludes cost of secondary multi-use trail north of school; excludes paved shoulder improvements).



C: BROAD STREET- EDENTON

Broad Street is one of the main entrances into historic Edenton and provides access to the downtown area, waterfront, and a variety of civic and retail uses. The corridor transitions from a more suburban four-lane section north of Church Street to an urban section with on-street parking. The corridor is also heavily traveled by local bicyclists. The recommended treatments are bicycle lanes or sharrows combined with streetscape and parking improvements.

Extents and Facility Type: Water Street to Church Street: Sharrow; Church Street to Virginia Avenue: Bicycle Lane (Road Diet); Virginia Avenue to Oakum Street: Bicycle Lane (Stripe)

Length: 1.3 miles

Traffic Volumes: Up to 7,800 AADT

Overview and Purpose: The purpose of this project is to blend improvements to the bicycle network with an enhanced gateway to the historic district. A recommended road diet would reduce the four-lane section north of Church Street to a two-lane divided section with bicycle lanes. South of Church Street, sharrows are recommended to enhance the awareness of motorists to bicycle traffic and to help direct bicyclists to the safest area of the travel lane. The safety of bicyclists would be further enhanced with back-in angled parking, which provides motorists with better vision of bicyclists and pedestrians as they exit a parking space.

Planning Level Cost Estimate: \$346,438 (restripe includes 0.3 miles of conversion to back-in angle parking; excludes cost of landscaped median for potential 2-lane divided road diet; excludes improvements to side streets).



Broad Street - Downtown Segment



Complete road diet
4-lane section to 2-lane divided
with bicycle lanes



Paint sharrows



Install bicycle
activation signal



Install high visibility crosswalks
throughout corridor

Consider converting on-street parking
to back-in angle parking.
Further study and business engagement required.



Paint sharrows



Install bicycle
activation signal



Paint sharrows





D: CHURCH STREET - ELIZABETH CITY

Church Street is a parallel route to Ehringhaus Street and Main Street. It connects the waterfront and downtown Elizabeth City with Hughes Boulevard (US 17 Business) by traveling through established residential areas and the historic district. Given the safety concerns for bicycle travel on Ehringhaus Street, Church Street was identified as a candidate for a bicycle boulevard.

Extents and Facility Type: Hughes Boulevard to Water Street: Bicycle Boulevard

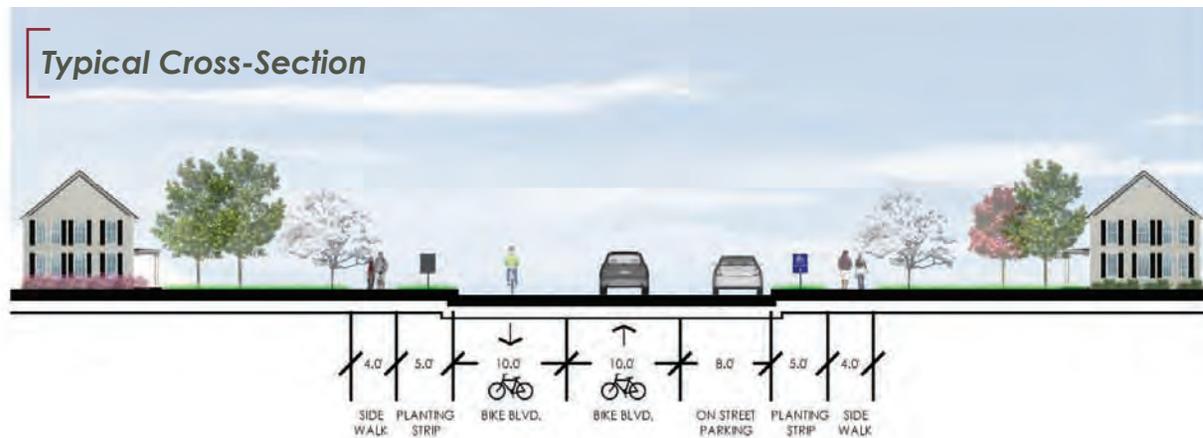
Length: 1.3 miles

Traffic Volumes: No Data

Overview and Purpose: The recommended bicycle boulevard would make Church Street more attractive and visible for bicyclists while minimizing the travel speeds of motor vehicles. Signage would direct

bicyclists from Ehringhaus Street and other roads to the corridor. Improvements at intersections such as mini traffic circles can help slow traffic and emphasize the priority of bicycle travel on Church Street. Issues and constraints include a narrow cross section (especially east of Road Street), in-street stormwater drains, numerous driveways, and non-delineated parallel parking. The bicycle boulevard could be enhanced by striping parking on one side. The exhibit shows potential plans for signage and pavement markings and identifies locations where traffic calming circles are appropriate. The signage plan also indicates destination points to increase accessibility.

Planning Level Cost Estimate: \$146,740





E: EHRINGHAUS STREET - ELIZABETH CITY

More than 20,000 vehicles per day travel Ehringhaus along its trek from downtown to US 17 and points west. The heavily commercialized corridor typically is a five-lane section with extensive driveway cuts, heavy traffic volumes, and large amounts of turning traffic. These features combine to make the corridor inhospitable to bicycle traffic and in need of improvements.

Extents and Facility Type: Hughes Boulevard to Water Street: Corridor Improvements

Length: 2.0 miles

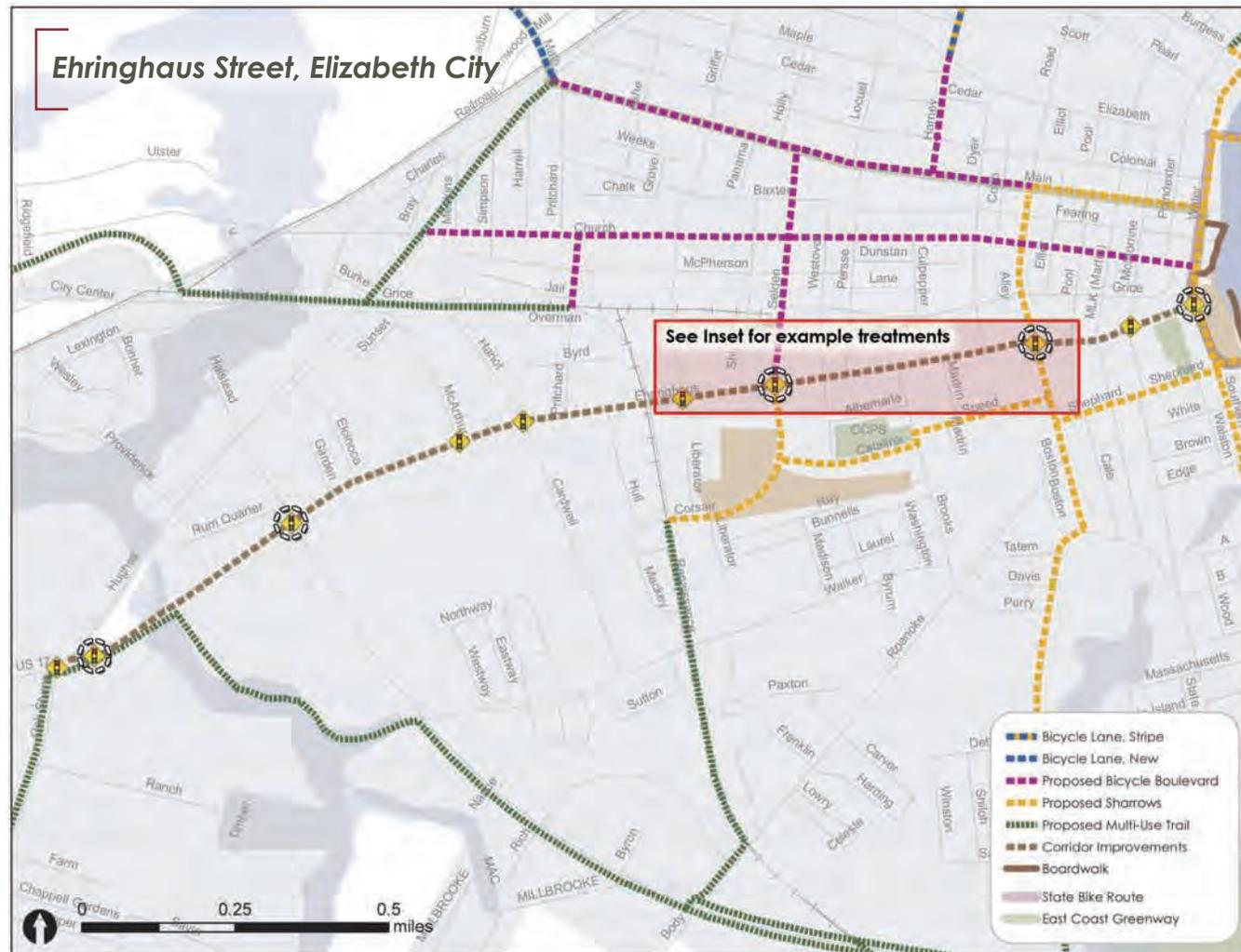
Traffic Volumes: Up to 20,000 AADT

Overview and Purpose: Many cyclist crashes have occurred along this corridor, demonstrating the need for bicycle safety improvements. The complexity of the land use and transportation dynamics along the two-mile corridor are beyond the scope of a regional bicycle plan. As a result, a transportation and land use corridor study is needed to consider how redevelopment and strategic enhancements can improve multimodal operations. Throughout the full length of the corridor, appropriate improvements may include restriping for wide outside lanes, consolidating driveways, installing a plantable median, intersection enhancements, and signage. The exhibit at right describes best practices for access management including an inset that shows a simplified representation of potential treatments. Improvements to Ehringhaus Street do not negate the

need for the adoption of Church Street as a bicycle boulevard. Each of these two roadways will attract different cyclist types.

Planning Level Cost Estimate: TBD (based on outcome of corridor-based land use and transportation study)

Ehringhaus Street, Elizabeth City



Best Practices Toolbox

Travelway Improvements

- Conduct a land use/transportation corridor study
- Restripe for wide outside lanes
 - Complete by narrowing two-way left turn lane during resurfacing
- Construct planted median in accordance with corridor study
 - Develop and adhere to acceptable spacing standards
 - Identify specific locations for left-over crossings and cross access
 - Explore opportunities for depressed medians with rain gardens
- Coordinate traffic signals
- Install Share the Road signs



Intersection Enhancements

- Implement bicycle activation at key crossings (e.g. Selden St, Road St, Water St)
- Construct high visibility crosswalks
- Install pedestrian countdown signals
- Ensure advance warning of bicycle crossing (e.g. bicycle boulevard sign at Selden St)



Site Access Treatments

- Consolidate driveways through redevelopment
- Relocate driveways away from intersection (minimum 100')
- Implement cross access and backdoor access (especially in locations with a non-traversable median)
- Ensure proper "throat" length for driveways

Land Use Considerations

- Create land use policies and regulations that distribute local traffic
- Address common issues such as separation of uses and single access points
- Develop an overlay district to help implement recommendations from the corridor study



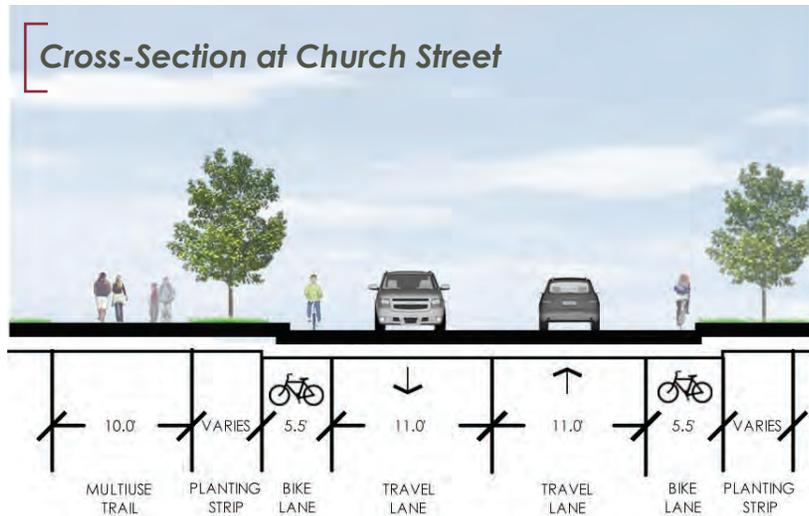
F: GREENWAY - HERTFORD

The Perquimans County Recreation Center on the banks of the Perquimans River is a significant community resource. To encourage an active lifestyle and to provide safe travel separated from traffic between the recreation center and downtown, a series of multi-use trails are recommended. These trails include greenways on independent alignments and sidepaths along Church Street.

Extents and Facility Type: King Street to Shopping Center south of US 17: Greenway

Length: 2.4 miles

Traffic Volumes: Not Applicable



Overview and Purpose: The recommended network of multi-use trails will connect the heart of Hertford, including Perquimans County High School, with the community facilities at the Perquimans County Recreation Center. The network maximizes exposure to the Perquimans River east of US 17. West of US 17, the trail forms a sidepath along Church Street over the bridge just south of downtown before turning west and following the creekbed.

Right-of-way acquisition will be required along the creekbed between Church Street and King Street. Right-of-way along Church Street typically is 60 feet, though it expands to approximately 150 feet from White Street south across the bridge. Design challenges include limited right-of-way and driveway conflicts approaching US 17. The segment parallel to US 17 between Harvey Point Road and the shopping center will require special attention due to shoulder slope and setback requirements from the travel lanes. As an alternative, placement of the multi-use trail outside the existing right-of-way adjacent to the commercial property may be preferable.

The exhibit at left provides a cross-section view on Church Street of the sidepath along the corridor with bicycle lanes.

Planning Level Cost Estimate: \$1,131,250 (excludes loop trail to water or connection to recreation center; significant water crossing not included in cost estimate; additional contingency added to account for construction hardships).



Overview and Purpose: Over the past decade, the Town of Hertford has seen renewed interest in development southeast of US 17. Connecting this growth (including commercial and industrial properties such as the Food Lion, residences, and a county park) to the historic downtown is a priority. The recommended on-street improvements offer cost-effective solutions that could be coupled with multi-use trails to provide adequate facilities for all users. The exhibit focuses on improvements at the intersection of Church Street/Harvey Point Road and US 17 to show how the various facilities will interact. Constraints include limited right-of-way, the proximity of utilities, drainage/flooding concerns, and bridge crossings. In addition to the recommended facilities, additional signage is needed to indicate the route to the Perquimans County Recreation Center.

G: CHURCH STREET - HERTFORD

Church Street provides the southern gateway entrance to the historic downtown area from US 17. Southeast of US 17, Harvey Point Road connects the core of the town with the Perquimans County Recreation Center and industrial park. To facilitate the safe on-street travel of bicyclists across the Town, a series of sharrows and bicycle lanes are recommended. The preferred treatment varies based on the existing cross section and character of the road.

Extents and Facility Type:

Church Street - Phelps Street to Winfall Boulevard: Sharrow, Grubb Street to Phelps Street: Bicycle Lane (Restripe), Grubb Street to White Street: Sharrow, White Street to South of Creek Bridge: Bicycle Lane (Restripe), South of Creek Bridge to US 17: Bicycle Lane (Restripe); Harvey Point Road - US 17 to

Commerce Drive: Bicycle Lane (Restripe)

Length: 2.4 miles

Traffic Volumes: Up to 4,800 AADT

Planning Level Cost Estimate: \$317,513



H: GREENWAY - DISMAL SWAMP

Extents and Facility Type: Dismal Swamp Canal Welcome Center to Virginia state line: Greenway

Length: 3.5 miles

Traffic Volumes: Up to 11,000 AADT (US 17)

Purpose and Need: The Dismal Swamp Canal Trail Extension is a regionally significant greenway that will connect the existing Dismal Swamp Canal Trail to the Virginia state line, running parallel between US 17 and the Dismal Swamp Canal. A feasibility study with 30% design plans was completed in 2011 for this segment. A separate project would extend the trail in Virginia 1.6 miles north from the state line to link with an 8.3-mile segment of existing trail that connects to Dominion Boulevard in Chesapeake.

Background and History: Construction on the existing 3-mile trail began in 2001. From the trail's southern terminus at NC 343, a 5-foot paved shoulder along NC 343 and Mullen Road provides access to South Mills. A feasibility study of the trail extension was completed in 2011. The study included a full survey from the Virginia line to the Welcome Center. Based on the survey, a route was mapped and 30% design documents developed.

Design Status: The route was designed to minimize tree removal while maintaining a safe buffer between the trail and travel lanes on US 17. At the Welcome Center, the trail meanders between the canal and the existing sidewalk to join the existing trailhead at its northern terminus. The proposed trail lies within NCDOT right-of-way and easement from the Welcome Center.

At the Welcome Center, the route travels between the parking area and the Dismal Swamp Canal until it joins the existing trail.

Environmental Concerns

Minimizing environmental impacts to the historic Dismal Swamp Canal and the surrounding area was a key consideration for the trail design developed as part of the feasibility study. The study notes that an Environmental Assessment (EA) will be required due to the trail's proximity to the historic canal, the presence of endangered species in the area, and the placement of the trail on park property. In addition to minimizing the removal of vegetation, the trail design also warrants minimal grading and does not require retaining walls.

Next Steps

The extension of the Dismal Swamp Canal Trail will add a critical link of what could become a 16.5-mile segment of greenway along the banks of the historic Dismal Swamp Canal. With assistance from the State of Virginia, the completed greenway will connect the Chesapeake area of Virginia to the Great Dismal Swamp Welcome Center and the Village of South Mills in North Carolina. With the right-of-way obtained and 30% design plan in hand, local stakeholders should continue to seek funding for environmental documentation, full design, and construction.

Planning Level Cost Estimate: \$1.6 million (from the Dismal Canal Trail Extension final report)

A: US 264 - ENGELHARD

US 264 carries up to 2,300 vehicles through the small fishing community of Engelhard on an average day. Despite being a rural outpost, Engelhard offers numerous community activity centers, including retail stores, a hotel, banks, and restaurants. The community also hosts a popular seafood festival each spring. The recommended treatment takes advantage of the wide 32' cross section and creates bicycle lanes through a striping exercise. A small bridge over Far Creek on the eastern edge of the recommended corridor is a constraint.

Extents and Facility Type: Golden Street to Golden Street: Bicycle Lane (Stripe)

Length: 0.2 miles

Traffic Volumes: 900 - 1,100 AADT

Overview and Purpose: While pedestrians are accommodated with sidewalks and a boardwalk in Engelhard, bicyclists do not have a dedicated facility. The width of US 264 through the unincorporated community is sufficient to allow dedicated bicycle lanes through a low-cost striping exercise. The resulting facility will narrow the travel lanes to discourage speeding, further improving safety for bicyclists. The exhibit includes a cross section and photosimulation at the western edge of the proposed bicycle lane near the East Carolina Bank offices. The cross section also shows the existing boardwalk.

Planning Level Cost Estimate: \$6,600

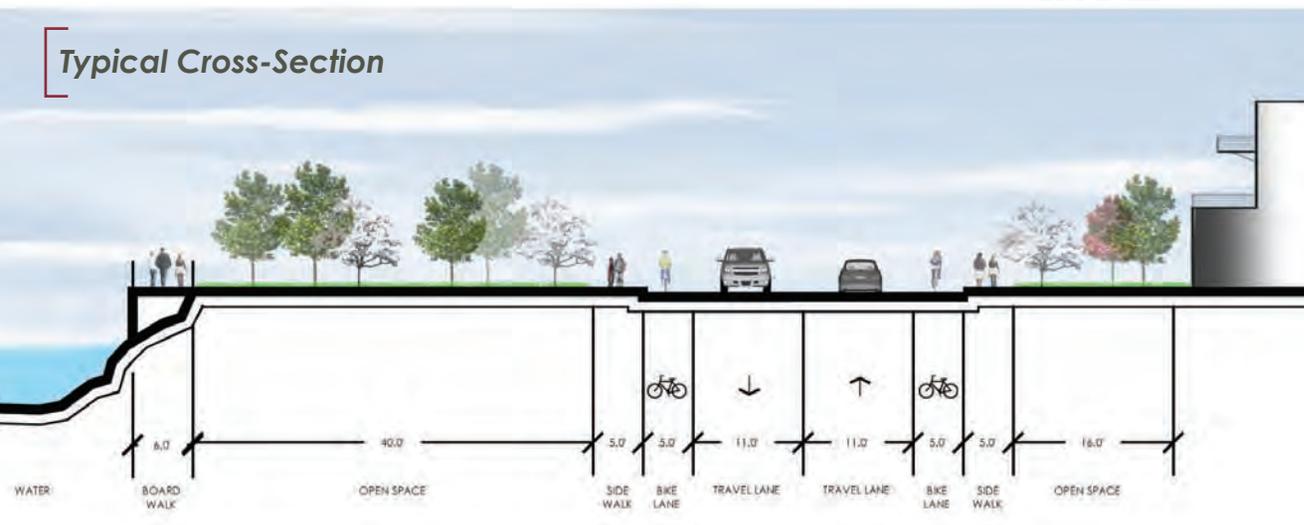


Before



After

Typical Cross-Section





B: SIDEPATH - COLUMBIA

Columbia, the Hyde County seat on the banks of the Scuppernon River, sits halfway between Plymouth and Manteo. As the county seat, it accommodates numerous civic uses, including Columbia Middle School and county services. Columbia has a high rate of bicycle use due to its small, relatively compact town design and lower income profile. The recommended sidepath will provide a safer option for bicyclists traveling along US 64 between downtown and the town's largest shopping center.

Extents and Facility Type: Water Street to LaKeiser Drive: Sidepath

Length: 0.8 miles

Traffic Volumes: Up to 8,600 AADT

Overview and Purpose: A sidewalk currently exists where the sidepath is recommended. The sidewalk should be widened to form a multi-use sidepath. The eastern terminus of the proposed

sidepath is the Food Lion shopping center near LaKeiser Drive. From there, users can enjoy a dedicated facility on the westbound side of US 64 to the banks of the Scuppernon River. Construction of the sidepath will require consideration for right-of-way constraints, utilities close to roadway, and major intersection crossings. The exhibit highlights the segment between Road Street and Main Street, showing the interaction of the proposed sidepath

with a variety of on-street facilities (sharrows on Fonsoe and Road Streets and bicycle lanes on Main Street).

Planning Level Cost Estimate: \$845,000 (excludes improvements to side streets, including Main Street)

C: SIDEPATH - PLYMOUTH

With traffic volumes on US 64 exceeding 21,000 vehicles per day and a community that takes to the street on bicycle for everyday trips, creating safe bicycling options in Plymouth is a critical concern. US 64 provides local access to Washington County Hospital, several shopping centers, and numerous restaurants. The recommended sidepaths on US 64 between West Avenue and Main Street form the spine of an expanded on- and off-street bicycle network in Plymouth.

Extents and Facility Type: West Avenue to Main Street: Sidepath



Length: 1.9 miles

Traffic Volumes: Up to 21,000 AADT

Overview and Purpose: The key connection along the corridor is the Food Lion near Washington County hospital. Given the high traffic volumes on US 64, concerns for speeding traffic, and limited signalized crossing opportunities, dual sidepaths

are recommended. Sidepaths along both sides of the road will allow bicyclists and pedestrians to travel the full extent of the corridor and minimize the need for crossing at unsignalized locations. Design constraints include driveway conflicts, right-of-way constraints, and a lack of offset utilities. The exhibit shows a detailed view of the intersection of US 64 and NC 32. It highlights the numerous driveway

conflicts and shows supplemental facilities on NC 32 (sharrows to the north and bicycle lanes to the south of the railroad).

Planning Level Cost Estimate: \$2,786,000 (excludes multi-use trail (rail-to-trail conversion) north of US 64; excludes improvements to side streets; significant hardships expected).



D: WATER STREET/PARK DRIVE - PLYMOUTH

Bicycling activity in Plymouth was observed to be among the highest in the 10-county region. The downtown area boasts numerous activity centers and destinations of interest to bicyclists, including retail and civic uses typical of a small downtown as well as a bicycle shop, two schools, a hospital and the waterfront bicycle shop. When combined with the local demand for bicycling, these activity centers establish the area as a priority. The recommended network of on-street facilities in the downtown area includes bicycle lanes and sharrows depending on the existing cross section of the street.

Extents and Facility Type: Park Drive/Martin Lane - Madison Street to Main Street: Bicycle Lane (Restripe); Water Street - Main Street to Madison Street: Sharrow

Length: 0.9 miles

Traffic Volumes: No Data

Overview and Purpose: Using a combination of bicycle lanes and sharrows, the recommended treatments in Plymouth will create a continuous bicycle corridor through downtown. These improvements can be realized through a cost-effective striping exercise. The exhibits show a pair of photosimulations that illustrate existing and proposed conditions. At Park Drive near the Port O' Plymouth Museum bicycle lanes and a centerline are added to the wide 32' cross-section. On Water Street in the heart of downtown, sharrows are recommended to direct bicyclists to the proper placement in the lane, a particularly important improvement due to the presence of parallel parking. It should be noted that drainage issues on Water Street may preclude striping bicycle lanes in that section, and coordination is needed with NCDOT.

Planning Level Cost Estimate: \$18,975

Water St. Before



Water St. After

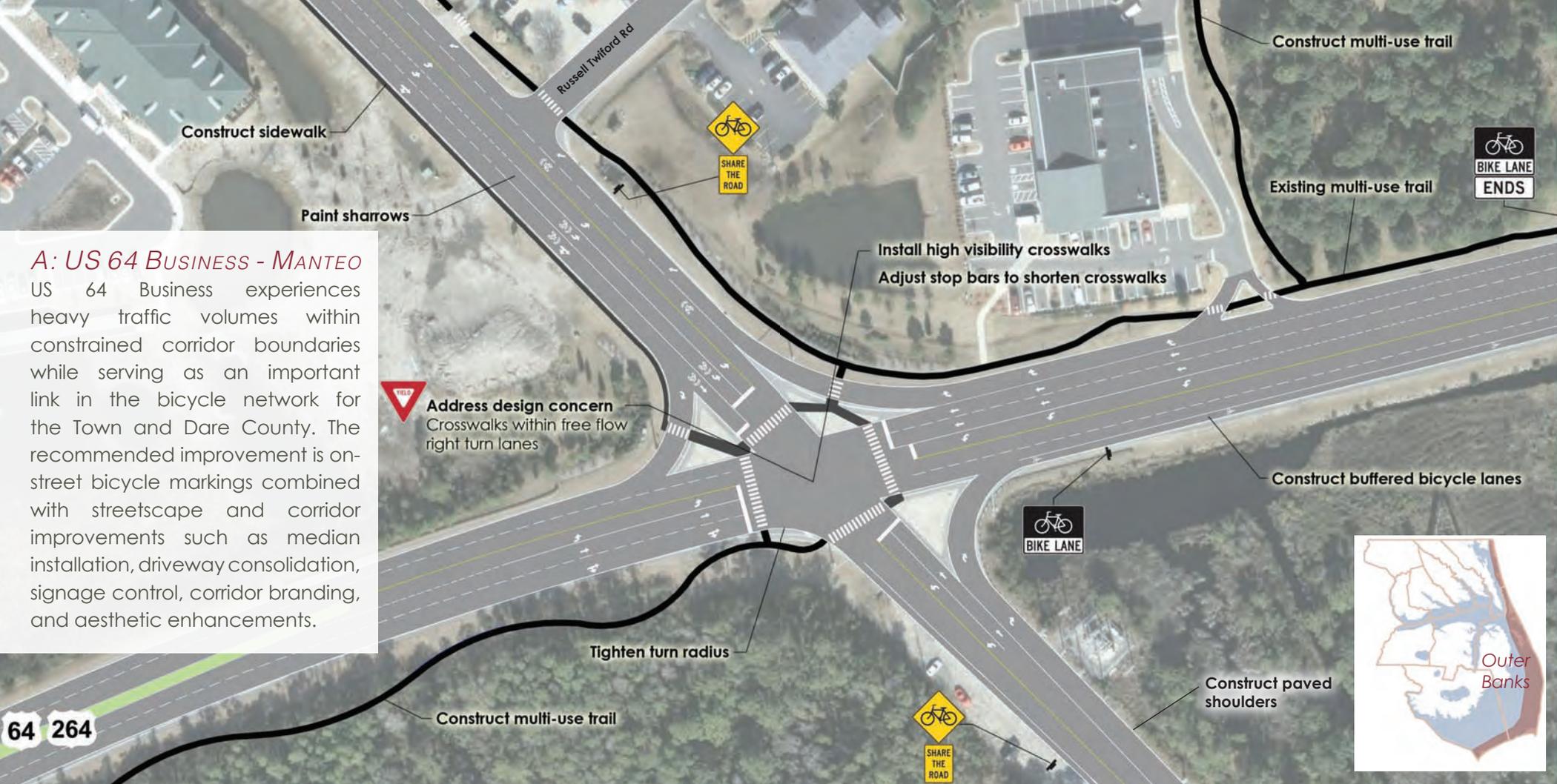


Park Dr. Before



Park Dr. After





A: US 64 BUSINESS - MANTEO

US 64 Business experiences heavy traffic volumes within constrained corridor boundaries while serving as an important link in the bicycle network for the Town and Dare County. The recommended improvement is on-street bicycle markings combined with streetscape and corridor improvements such as median installation, driveway consolidation, signage control, corridor branding, and aesthetic enhancements.

Extents and Facility Type

Harriot Street to Patty Lane: Sharrow; Patty Lane to US 64/US 264: Sharrow (or Bicycle Lane Restripe)

Length: 1.4 miles

Traffic Volumes: Up to 17,000 AADT

Overview and Purpose: US 64 Business provides the spine for the commercial, cultural, and recreational heart of Manteo. Key connections include three schools (Manteo High School, Dare County Alternative High School, and Manteo

Elementary School), College of the Albemarle Dare campus, Dare County Library, Roanoke Island Festival Park, civic buildings, and a local bicycle shop. The striping exercise represents a low cost opportunity to raise awareness to the presence of bicyclists along this route. Streetscape improvements will provide predictability to vehicular traffic, minimize conflicts between cyclists and motor vehicles, and enhance the visual appeal of the corridor. Improvements must occur within the existing boundaries of the

corridor, as corridor regulations prohibit changes to the sidewalks and street trees. The exhibit focuses on improvements to the intersection of US 64/US 264 and US 64 Business.

Planning Level Cost Estimate: \$42,550 (excludes multi-use trail along US 64/264).



B: US 158 - KITTY HAWK/KILL DEVIL HILLS/NAGS HEAD

US 158 bears the weight of local access and regional mobility. Locally, the corridor serves as the commercial and residential lifeline for Kitty Hawk, Kill Devil Hills, and Nags Head. It also provides critical mobility for regional trips and during evacuations. US 158 is designated as a boulevard in need of upgrade as part of the state's Strategic Highway Network. Several issues make the corridor dangerous for bicycle travel: high traffic volumes, unpredictable automobile movements, an inconsistent bicycle network, and limited safe crossing opportunities.

Extents and Facility Type: Byrd Street (Kitty Hawk) to Washington-Baum Bridge (Nags Head): Corridor Improvements

Length: 18.3 miles

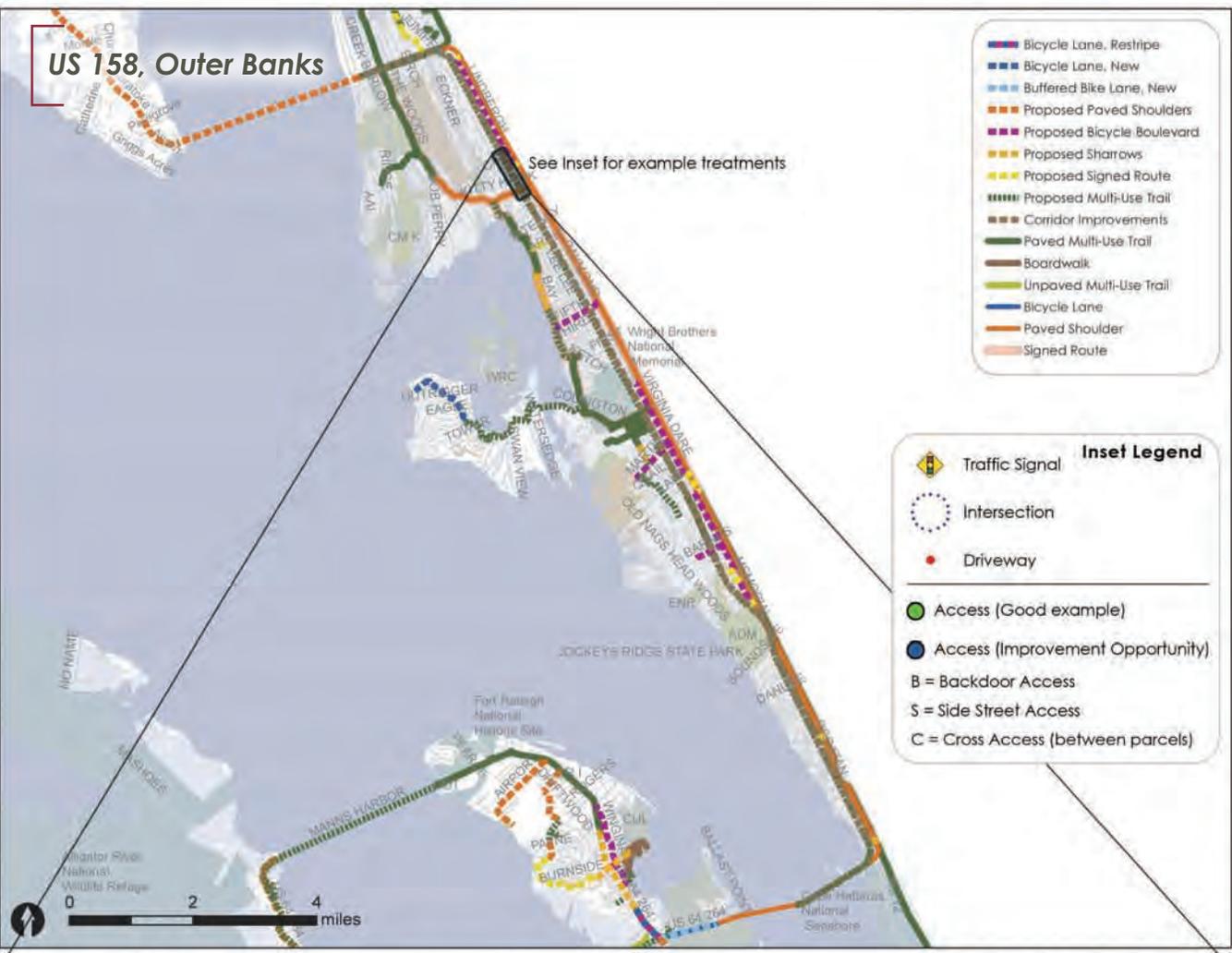
Traffic Volumes: Up to 27,000 AADT

Overview and Purpose: US 158 provides access to numerous activity centers (e.g. the Wright Brothers National Memorial and Jockey's Ridge State Park) as well as the majority of the beach's commercial properties and residences. Many cyclist crashes have occurred along the corridor, indicating a need to address bicycle safety. A comprehensive corridor study is needed to understand fully the existing conditions, future concerns for multimodal travel, and potential countermeasures. The likely outcome of the

corridor study would be an engineering approach toward filling gaps in the existing sidepath, adding non-traversable medians, consolidating driveways, and improving intersections. The exhibit describes best practices for access management including an inset that highlights issues and best practices in action for a roadway segment representative of the corridor at large. The recommended corridor study could be funded through a joint effort between the municipalities and the RPO.

Planning Level Cost Estimate: TBD based on outcome of corridor-based land use and transportation study.

US 158, Outer Banks



Best Practices Toolbox

Travelway Improvements



- Conduct a land use/transportation corridor study
- Identify locations to divert bicycle traffic to parallel routes
- Identify gaps in the sidepath and ways to complete the network
- Construct planted median in accordance with corridor study
 - Develop and adhere to acceptable spacing standards
 - Identify specific locations for left-over crossings and cross access
 - Explore opportunities for depressed medians with rain gardens
- Coordinate traffic signals
- Install Share the Road signs

Intersection Enhancements



- Develop engineered solutions for intersection treatments
- Implement bicycle activation at key crossings (e.g. Dogwood Rd, Fifth St, Ocean Bay Blvd, Barnes St)
- Construct high visibility crosswalks
- Install pedestrian countdown signals
- Ensure advance warning of bicycle crossings



Site Access Treatments

- Consolidate driveways through redevelopment
- Relocate driveways away from intersection (minimum 100')
- Implement cross access and backdoor access where appropriate (especially in locations with a non-traversable median)
- Ensure proper "throat" length for driveways

Land Use Considerations

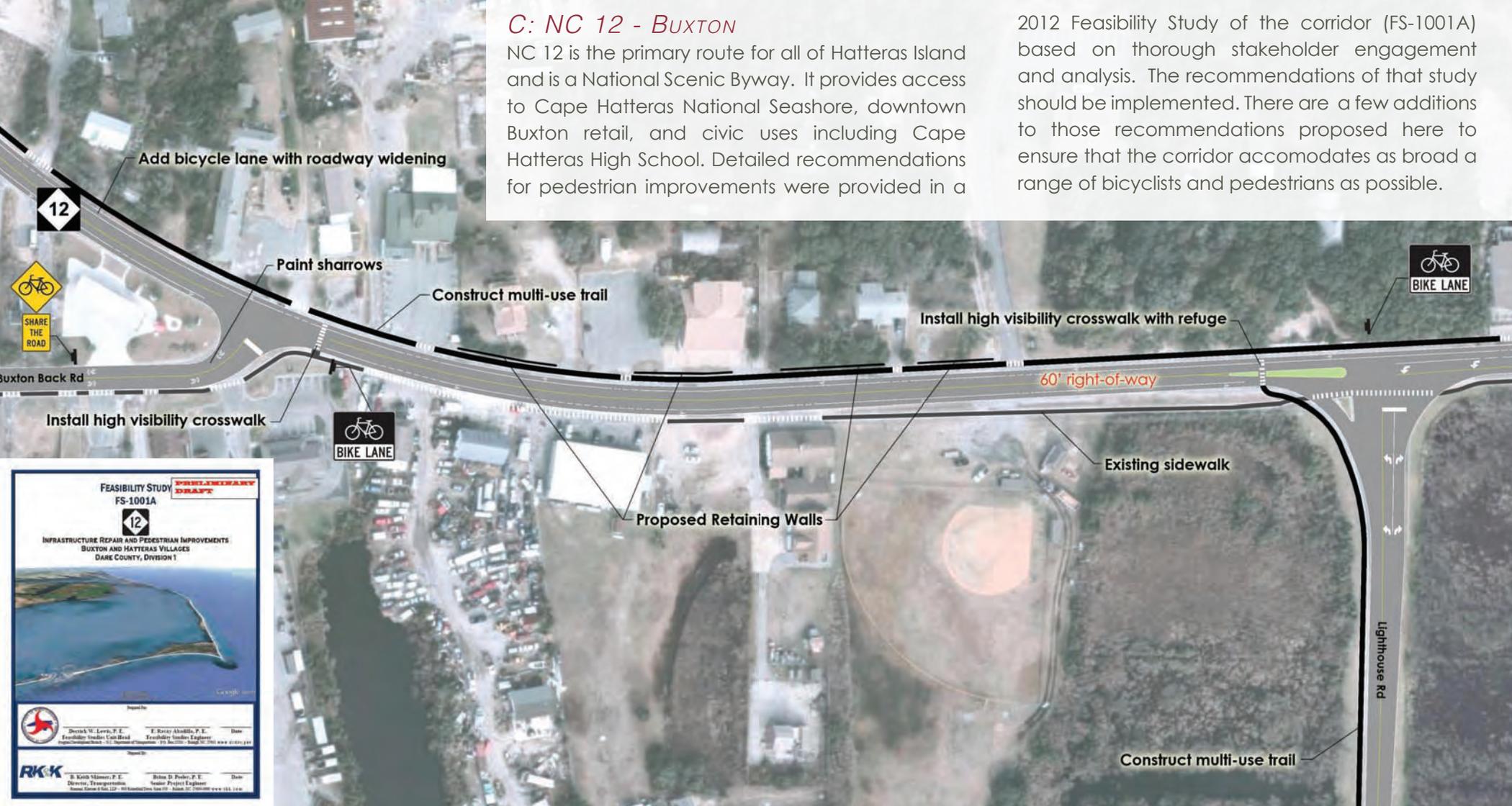
- Create land use policies and regulations that distribute local traffic (coordinate among municipalities)
- Address common issues such as separation of uses and single access points
- Develop an overlay district to help implement recommendations from the corridor study



C: NC 12 - BUXTON

NC 12 is the primary route for all of Hatteras Island and is a National Scenic Byway. It provides access to Cape Hatteras National Seashore, downtown Buxton retail, and civic uses including Cape Hatteras High School. Detailed recommendations for pedestrian improvements were provided in a

2012 Feasibility Study of the corridor (FS-1001A) based on thorough stakeholder engagement and analysis. The recommendations of that study should be implemented. There are a few additions to those recommendations proposed here to ensure that the corridor accommodates as broad a range of bicyclists and pedestrians as possible.



Extents and Facility Type: Buxton Back Road to Buxton Village border: Sidepath and Bicycle Lane (Restripe).

Length: 0.7 miles

Traffic Volumes: Up to 9,500 AADT

Recommendations: Feasibility Study 1001A recommends widening the travel lanes to 15' each, with 12' lanes, 3' paved shoulder for

cyclists, and 5' sidewalks indicated for both cyclists and pedestrians (therefore functioning as sidepaths). This plan recommends that 10' lanes be considered during design and implementation of this project to accommodate full 5' bike lanes that will attract more users. These bike lanes are especially important given the constrained right-of-way that prevents wider sidepaths. If right-of-way does allow it in any locations, the

sidepaths should be widened beyond 5' to better accommodate multiple user types.

Planning Level Cost Estimate: \$4,250,000 (from Feasibility Study 1001A).

D: NC 12 - Duck

Over the past decade, the communities on NC 12 north of US 158 have made significant improvements to the bicycle and pedestrian network, including sidepaths and bicycle lanes. In Duck, the sidepath dissolves into a pair of buffered paved shoulders shared by pedestrians and cyclists. During the peak tourist season, these shared lanes are highly congested. The recommended treatment links the sidepaths at either end of town by consolidating the paved shoulders into an on-street, buffered multi-use sidepath on the northbound side of the road.

Extents and Facility Type: North of Barrier Island Station to existing trail south of Scarborough Lane: Sidepath

Length: 1.1 miles

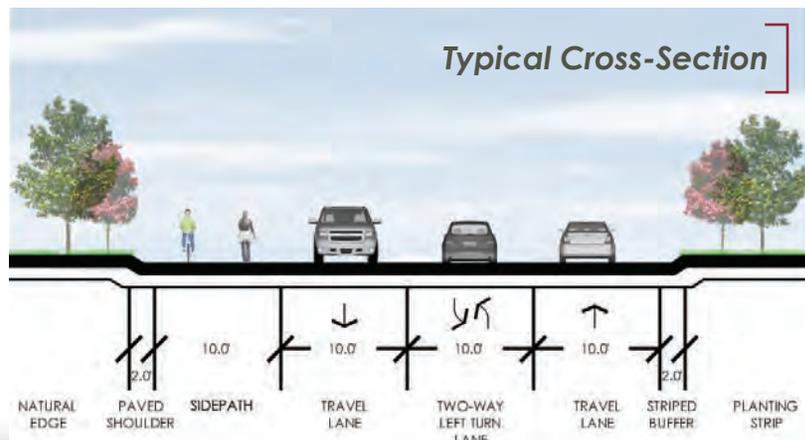
Traffic Volumes: Up to 10,000 AADT

Overview and Purpose: The sidepaths on either side of town transition to bicycle lanes and create crossing concerns. The existing design also fails to provide a comfortable environment for all users.

The recommended improvement shifts the current buffered bike lanes/shared paths to the northbound side of the road, creating a multi-use trail along the roadbed that matches the existing sidepaths at the town edges. The treatment is largely a restriping exercise within the existing pavement, though additional shoulder may be required in some locations. Bollards are recommended to alert motorists of the potential presence of bicyclists and pedestrians. Other barriers were considered but ultimately not selected because of their cost and impact on stormwater flow.

Design considerations should include intersection and driveway breaks, limited right-of-way, and the constrained cross-section at the northern end. Bicycle- and pedestrian-friendly crossings at intersections and destination points also should be emphasized. The exhibit shows a photosimulation and cross section of the proposed treatment.

Planning Level Cost Estimate: \$316,250





E: MEMORIAL AVENUE - NAGS HEAD

Memorial Avenue is a parallel route to US 158 and NC 12 in Nags Head. The 2.1-mile corridor mostly traverses a residential area with individual driveway access throughout its extents. An emerging gallery district exists near Gallery Row and Driftwood Street. Because US 158 is not well suited for bicycle travel, bicyclists should be encouraged to use Memorial Avenue. The recommended bicycle boulevard would make the route more attractive and visible for bicyclists while attempting to minimize cut-through vehicular traffic. Memorial Avenue is discontinued for one block, so the bicycle boulevard diverts to a signed route at Bladen Street.

Extents and Facility Type: Eighth Street to Hollowell Street: Bicycle Boulevard

Length: 2.1 miles

Traffic Volumes: No Data

Overview and Purpose: The Memorial Avenue Bicycle Boulevard is designed to make the route an attractive alternative to bicyclists. The intent is to encourage bicycle travel along Memorial Avenue while discouraging through trips of excessive speeds by automobiles. The conversion requires new signage, pavement markings, and improved intersections. The exhibit shows potential plans for signage and pavement markings while also identifying locations where stop signs along Memorial Avenue should be

oriented to the side streets and where intersection should be retrofitted with traffic calming features. The signage plan also indicates destination points to increase accessibility. Future plans for the Gallery District should include the bicycle boulevard concept.

Planning Level Cost Estimate: \$199,788 (assumes improvements to Memorial Avenue and Barnes Street as shown in exhibit)

Memorial Avenue, Nags Head



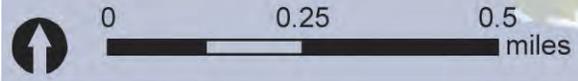
- Grocery Store
- Local Destination
- School
- Proposed Bicycle Boulevard
- Proposed Signed Route
- Proposed Multi-Use Trail
- Corridor Improvements
- Paved Multi-Use Trail
- Paved Shoulder
- Signed Route
- State Bike Route
- Wetland
- State Conservation Land
- Other Conservation Land
- Municipal Boundary

- Traffic calming circle
- Relocate stop signs from Memorial Avenue to cross street
- Bike Boulevard pavement marking
- Bike route sign with directional arrows where appropriate

Street Sign Concepts

- Memorial Ave BICYCLE BOULEVARD
- Barnes St BICYCLE BOULEVARD

Traffic Calming Circle Examples



F: LIGHTHOUSE DRIVE - COROLLA

Lighthouse Drive nearly stretches the full length of Corolla and provides a parallel option to NC 12. The facility is a low volume residential street extending 3.6 miles from north to south. The corridor is suitable for a signed bicycle route, which typically is designated along residential streets with lower traffic volumes and where additional roadway width is not possible or warranted.

Extents and Facility Type: Shad Street, Lighthouse Drive, and Albacore Street: Signed Route

Length: 3.6 miles

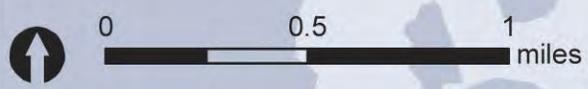
Traffic Volumes: No Data

Overview and Purpose: Lighthouse Road is a low volume corridor near the beach that is conducive to additional bicycle traffic. However, signage is needed to direct cyclists to this corridor from NC 12. Concerns along the route include residential uses with numerous driveways, poor drainage, trashcans in the roadway, and limited right-of-way. However, as a low volume, low speed corridor, bicyclists should be able to blend with traffic. The exhibit shows standard bike route signs with directional arrows where necessary. This signage can be designed in accordance with Corolla's 2013 wayfinding project.

Planning Level Cost Estimate: \$9,504



- Proposed Paved Shoulders
- Proposed Signed Route
- - - Proposed Multi-Use Trail
- Paved Multi-Use Trail
- Paved Shoulder





G: DOGWOOD TRAIL - SOUTHERN SHORES

South Dogwood Trail and East Dogwood Trail create a 3.3-mile parallel route to NC 12 through Southern Shores and bordering the Duck Woods Country Club. The corridor is an attractive alternative for north and southbound bicyclists given its lower traffic volumes in comparison to NC 12. The recommended construction of a sidepath is intended to facilitate safer bicycle travel north of US 158.

Extents and Facility Type: US 158/Croatan Highway to Ocean Boulevard: Sidepath

Length: 3.3 miles

Traffic Volumes: No Data

Overview and Purpose: An existing sidepath extends nearly one mile north from the intersection of South Dogwood Trail and US 158/Croatan Highway to just beyond Ginguite Trail. The completion of a sidepath along Dogwood Trail would require widening (if feasible - the current

path is functionally a sidewalk) and extending the existing path an additional 2.3 miles. Existing right-of-way should be sufficient, though construction likely would require the removal of trees and shrubbery. Design constraints include two narrow bridges (one on South Dogwood Trail 180 feet north of Fairway Drive and one on East Dogwood

Trail 350 feet east of its terminus with South Dogwood Trail) and driveway conflicts. For the Regional Bicycle Plan, special consideration was given to the intersection of Dogwood Trail and US 158. The exhibit illustrates these improvements.

Planning Level Cost Estimate: \$2,366,000



H: COLINGTON ROAD - DARE COUNTY

Colington Road is often cited as a critical—and overlooked—corridor on the Outer Banks. More than 8,000 residents in the Colington area depend on the road to reach US 158. NCDOT was exploring options to widen the corridor as of spring 2013, which includes a few alternatives for bicycle facilities. This plan's recommended treatment is a multi-use sidepath on the westbound side of the corridor.

Extents and Facility Type: Kill Devil Hills to End of Colington Drive: Sidepath

Length: 3.9 miles

Traffic Volumes: No Data

Overview and Purpose: Many bicyclists feel more comfortable being separated from traffic. A delineated sidepath on Colington Road as shown in the photosimulation would establish a dedicated

facility on the westbound side of the road for both bicyclists and pedestrians. The residents of Colington Road have expressed their desire for a fully separated facility, and this recommendation aims to create as much separation as possible given the corridor's constraints. Issues and constraints include significantly constrained right-of-way, sharp curves, wetlands, driveway openings, bridge crossings, and poor drainage. These constraints are detailed in the exhibit and would require community involvement during planning and design.

If the constraints associated with this recommendation are not overcome in time for near-term roadway work, paved shoulders should be provided at a minimum as a temporary measure.

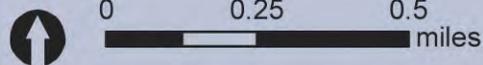
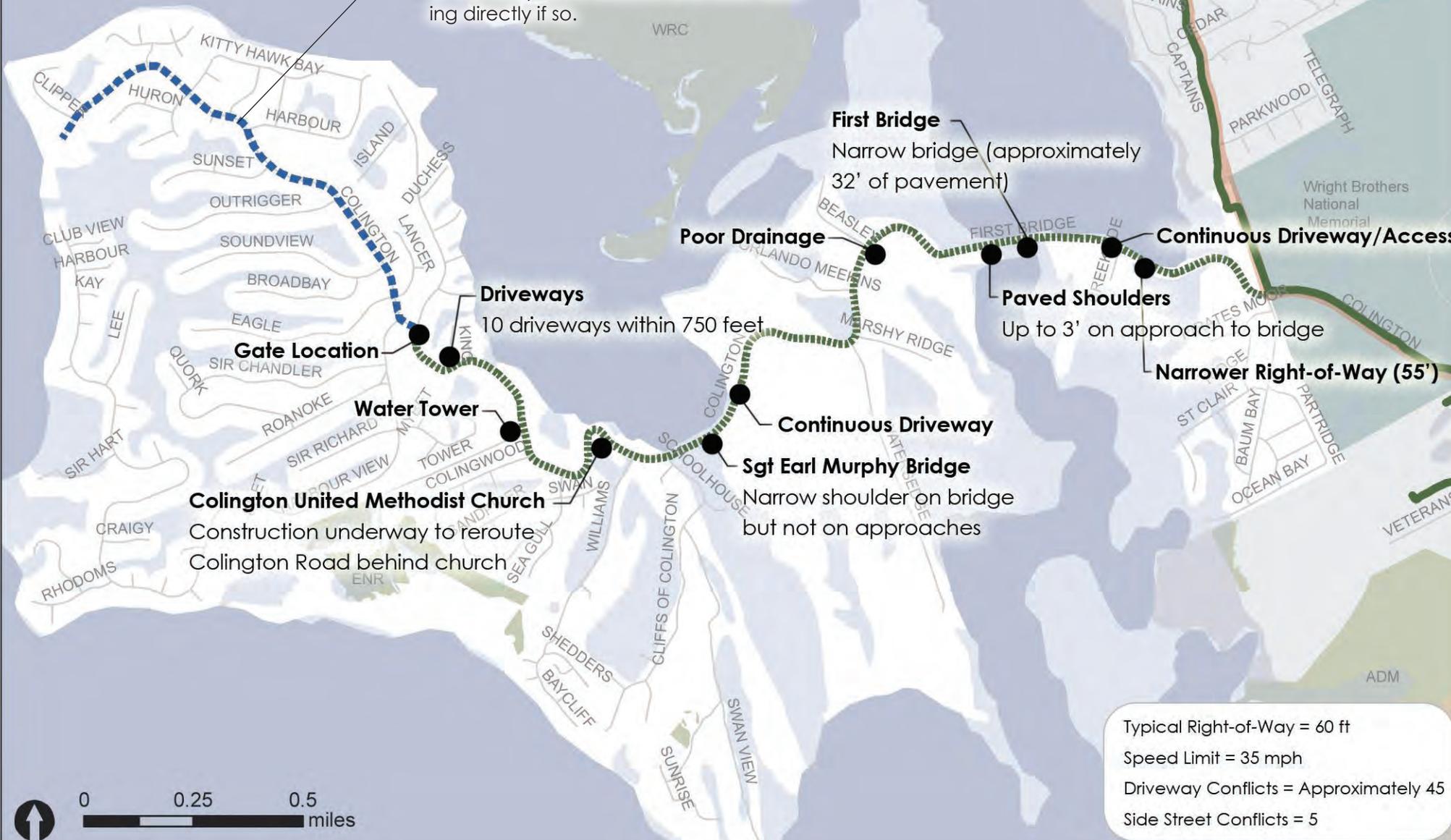
Planning Level Cost Estimate: \$5,265,000 (Additional contingency added to account for construction hardships)



Colington Road, Dare County

- Bicycle Lane, New
- Proposed Multi-Use Trail
- Corridor Improvements
- Paved Multi-Use Trail
- Signed Route

Colington Drive
 This road is privately owned, so residents should determine if a bicycle connection to the sidepath is desired and seek funding directly if so.



Typical Right-of-Way = 60 ft
 Speed Limit = 35 mph
 Driveway Conflicts = Approximately 45
 Side Street Conflicts = 5

Sidewalk construction along US 158 in Nags Head, NC



Chapter 6

Programs and Policies

OVERVIEW

Infrastructure alone will not expand bicycling in the Albemarle Region. Programs and policies are additional critical elements that encourage and support bicycling activity. The development of a more bicycle-friendly culture requires diverse efforts throughout a given region, and the Albemarle Region has many local, regional, and national resources from which to draw. This section identifies opportunities and resources for bicycle programs and policies.

PROGRAMS INTRODUCTION

Targeted education, encouragement, enforcement, and evaluation strategies improve residents' health, safety, and their ability to incorporate bicycling into everyday life. Consequently, they support the development and use of physical infrastructure. Visitors to the Albemarle region will also benefit from the implementation of such programs, which will target all potential cyclists and motorists. A program may be presented as a campaign, on-going initiative, or one-time event, depending on its purpose. In essence, these different efforts market bicycling to the general public and ensure the maximum return on investment in bicycling facilities in the form of increased mode

shift to bicycling.

This section provides recommendations in each of the four "E" categories - Education, Enforcement, Encouragement, and Evaluation - that will support the goals of the Albemarle Regional Bicycle Plan. (Engineering, the fifth "E", is addressed through the infrastructure recommendations of Chapter Four.) These initiatives can be undertaken by local agencies, regional organizations, community organizations, or by any combination of partnerships between such agencies and organizations. Program recommendations were developed with the guidance of the project's Steering Committee and were based on the following inputs:

- knowledge about existing programs in the region;
- the Vision, Goals, and Objectives for this plan; and
- stated community needs and concerns (as communicated through public outreach and engagement activities and discussions at Steering Committee meetings).

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EDUCATION

Providing educational opportunities is critical for increasing bicycling across the Albemarle region. Education programs should span all age groups, cultures, abilities, and population groups, and they should include motorists as well as current and potential cyclists. The focus of an educational campaign can range from information about the rights and responsibilities of road users to tips for safe behavior; from awareness of the area-wide benefits of bicycling to technical trainings for local agency staff. Educational programs for decision-makers, such as engineering and planning staff, raise the level of local expertise. They develop the skill sets needed to design and construct state of the art bikeways, walkways, and greenways for the short- and long-term future of the bicycling environment at the local and regional levels.

ENCOURAGEMENT

Encouragement programs are critical for promoting and increasing bicycling. These programs should address all ages, abilities, and user groups including school age children, young adults, college students, working adults, and seniors. They should also address both recreational and utilitarian cycling.

According to a 2008 survey by the National Highway Traffic Safety Administration (NHTSA), “Seventy-one percent of Americans said they would like

to bicycle more than they do now.” As bicycle infrastructure improvements are made, communities in the Albemarle region must simultaneously develop targeted strategies for encouraging bicycling and communicate information about safe and inviting places to bicycle. Encouragement programs that promote transportation and recreation choices and healthy, active lifestyles will help to develop a more bicycle-friendly region.

ENFORCEMENT & EVALUATION

According to the Alliance for Biking and Walking, North Carolina ranks 41st out of the 50 states for pedestrian safety and 44th for bicycling safety. Enforcement and evaluation initiatives are critical to ensure that both motorists and bicyclists are obeying the laws and that facilities are consistently monitored and maintained. Both initiatives serve as a means to educate and protect all users. The goal of enforcement is for bicyclists and motorists to recognize and respect each other's rights on the roadway. In many cases, officers and citizens do not fully understand state and local laws for motorists and bicyclists, making targeted education an important component of every enforcement effort. Enforcement programs improve bicyclists' safety and perceptions of safety.

PROGRAM RECOMMENDATIONS

Each program recommendation presented in this section includes the following information:

- the “E” categories (Education, Enforcement, Encouragement, and Evaluation) that the program supports,
- the purpose of the program,
- a description of the basic approach, and
- key partners for implementation.

SAFE ROUTES TO SCHOOL

“E” Categories: Education, Encouragement

Purpose: Promote physical fitness and health by helping children walk and bicycle to school; improve school traffic safety through physical improvements and programs.

Audience: School-aged children and their parents; school administrators, faculty, and staff

Partners: School districts, parent-teacher associations, municipalities, health partners (Gates Partners for Health, Three Rivers Healthy Carolinians, Albemarle Regional Health Services), community members, local Eat Smart Move More Coalitions, Albemarle Rural Planning Organization (RPO)

Safe Routes to School programs use a “5 Es” approach (Engineering, Education, Encouragement,

Enforcement, and Evaluation) to improve safety and encourage children to walk and bicycle to school. The programs are usually run by a partnership of city government, teachers, school officials, parents, students, and neighbors.

In a rural environment, a majority of school trips are too long for students to make the entire trip by bicycling. In these areas, the focus should be on creative efforts to help schoolchildren increase their physical activity in other ways. This focus lends itself ideally to working with public health partners, who also see increasing youth physical activity as a major goal.

For example, in a Park and Bike campaign, children are dropped off at a pre-determined location near the school, such as a park, and then bicycle the remaining distance with parent volunteers or school staff. Park and Bike campaigns can reduce congestion and improve traffic safety near schools while increasing youth physical activity. Teachers also report that children who bike to school arrive awake and “ready to learn.” Likewise, a Safe Routes to Bus Stops program can help children safely access bus transportation by bicycling.

International Walk to School Day in October is an excellent annual event that offers all families and



Safe Routes To School
International Walk to School Day



children the opportunity to participate in healthy school transportation. Greenville, NC's Walk to School Day has one of the highest participation rates in the state and could be looked at as a model Walk to School Day event that promotes year-round physical activity. Walk to School Day does not have to be limited to encouraging children to walk; children who wish to bicycle to school can be encouraged to bike, and resources like bicycle-train chaperones can be made available. The campaign is led by an ongoing partnership between public health nonprofits, county school districts, PTAs, and other agencies.

A major next step towards creating safer active travel opportunities for schoolchildren is to create a Safe Routes to School Plan for every elementary school in the Albemarle region. This will necessarily be a coalition effort that may be eligible for grant funding through the North Carolina Department of Transportation's (NCDOT) Safe Routes to School program. (Note: Because of the uncertain outlook for this federally-funded program, it is recommended that other regional and local funding sources be considered as well. For a full list of potential funding sources, see Appendix E.)

Sample Programs:

- Partners for Active Living Walk to School Day

Program (Spartanburg, SC): <http://www.active-living.org/Walk-to-School-Day.html>

- Atlanta Charter Middle School Safe Routes Travel Plan (Atlanta, GA): <http://www.atlantachartermiddle.com/content/safe-routes-school.php>
- Marin County National Model Program: <http://www.saferoutestoschools.org/index.shtml>
- Walking School Bus and Park and Walk Programs (Windsor, VT): <http://www.saferoutesinfo.org/data-central/success-stories/windsor-vermont-parent-volunteers-lead-walking-school-buses-forward>
- Ira B. Jones School Walking to School Program (Asheville, NC): <http://www.saferoutesinfo.org/data-central/success-stories/asheville-north-carolina-encouraging-walking-and-wheeling-school-wide>

OPEN STREETS EVENTS (CICLOVIAS)

"E" Category: Encouragement

Purpose: Encourage bicycling in a community by periodically closing a street to automobile traffic and creating a safe and inviting place for cyclists of all abilities to bike.

Audience: General public, tourists, local communities

Partners: Municipal and County Parks and Recreation Departments, Police Departments, Cycle Speedway,

Photos from Safe Routes To School Program - Marin County, CA



River City Cycling Club, other cycling clubs, tourism and business groups (Currituck County Visitors Center, Greater Tyrrell County Chamber of Commerce, Outer Banks Visitors Bureau, Tyrrell County Ecotourism Committee), local merchants/business leaders

Open street events have many names: Sunday Parkways, Ciclovias, Summer Streets, and Sunday Streets. The events are periodic street “openings” (i.e., “open” to users besides cars), usually on Sundays, that create a temporary park open to the public for walking, bicycling, dancing, hula-hooping, roller-skating, and other non-motorized activities. They have been very successful internationally and are rapidly becoming popular in the United States. Open street events promote health by creating a safe and attractive space for physical activity and social contact, are cost-effective compared to new parks for the same purpose, and are generally well-attended. Events can be held in all communities in the Albemarle region as weekly events or one-time occasions.

Resources:

- The Open Streets Project <http://openstreetsproject.org/>
- Portland Sunday Parkways: <http://www.portlandonline.com/Transportation/index.cfm?c=46103>
 - » <http://www.streetfilms.org/portlands-sunday-parkways/> (video)

BICYCLING TOURS AND MAPS

“E” Category: Encouragement

Purpose: Encourage biking by highlighting bicycling routes and destinations.

Audience: General public, tourists

Partners: County and municipal planners and GIS technicians, businesses, local advocates and tourism agencies (Tyrrell County Ecotourism Committee), Chambers of Commerce (Greater Tyrrell County Chamber of Commerce, Outer Banks Visitors Bureau, Currituck County Visitors Center), Albemarle RPO, Cycle Speedway, River City Cycling Club, other cycling groups

One of the most effective ways of encouraging people to bike is through the use of guided tours, marked tour routes, or brochure guides describing enjoyable routes and destinations for bicycling. One regional map should be developed for each of the subregions studied in the Albemarle Regional Bicycle Plan to show the location of existing safe and enjoyable routes for bicycling. Ideally, each community subregion would collaborate to help the RPO develop the subregional maps, which would be supplemented by more detailed local maps of communities in the region. Maps should be printed as needed and actively distributed to residents and visitors; they should also be updated on a regular basis as new facilities are



Open Streets event
- New York City

form of “Complete Streets” checklists, and there is an opportunity for incorporating a bicycle needs checklist into the review process for new development or redevelopment projects in each community.

Elements from the example checklists below should be considered by each community in the region:

- http://www.seattle.gov/transportation/compSt_how.htm
- http://www.mtc.ca.gov/planning/bicyclespedestrians/routine_accommodations.htm
- www.state.nj.us/transportation/capital/pd/documents/CompleteStreetsChecklist.doc

RURAL BICYCLE TOURISM OPPORTUNITY ANALYSIS

“E” Categories: Education, Encouragement

Purpose: Create and promote opportunities for bicycle-oriented tourism; support communities as they seek to define themselves as a good place for bicycle tourism.

Audience: Bicycle tourists, visitors who enjoy recreational cycling

Partners: Municipalities, tourism agencies (Tyrrell County Ecotourism Committee), Chambers of Commerce (Greater Tyrrell County Chamber of Commerce, Outer Banks Visitors Bureau, Currituck

County Visitors Center), other business groups

More and more rural communities are looking to tourism as a priority within their economic development plans, and cycle tourism is a popular and growing niche. Rural communities often have unique assets to offer visitors as bicyclists seek open spaces, lightly traveled roads, and the intimate experience that only small towns can provide. Efficiently identifying opportunities and creating targeted marketing plans can help a rural town or county become a bicycling destination and reap the benefits of this low-impact, sustainable tourism segment.

Interested communities and organizations in the Albemarle region should convene a working group to complete an opportunity analysis and action plan for fostering cycle tourism. The working group should start by educating themselves about the market sector (what cycle tourists want; submarkets within the overall niche and how they differ; demographics of cycle tourists) and develop a shared understanding of the benefits of bicycle tourism to communities. Next, the group should analyze current assets, current challenges, potential improvements, and current and potential partners. The presence of inns or bed and breakfasts could be an asset to the development of this program as connections between lodging and destinations would be important to the success of this program.



Rural Tourism
- Bike/Run Central Texas

An action plan should be created to prioritize efforts that will make the biggest difference, followed by a media outreach strategy to market the region to potential bicycle tourists.

Sample program: Copperas Cove (TX) Bike/Run Central Texas: <http://copperascove.com/bike-run/>

PROFESSIONAL DEVELOPMENT COURSES

“E” Categories: Education, Enforcement, Evaluation

Purpose: Educate and train planners and engineers on bicycle facility design and policy issues.

Audience: Professionals in planning, engineering, landscape architecture, etc.

Partners: Albemarle RPO, municipal and county staff, NCDOT division offices, NCDOT Division of Bicycle and Pedestrian Transportation (DBPT)

Professional development courses provide training to transportation and other professionals who may not have extensive experience or training in bicycle facilities. This can be a successful way to institutionalize knowledge of bicycle facility design

and create an agency culture that values bicycling. Potential topics include the following:

- Pedestrian and bicycle facilities standards – Manual on Uniform Traffic Control Devices (MUTCD), American Association of State Highway and Transportation Officials' (AASHTO) Guide for the Development of Bicycle Facilities, and National Association of City Transportation Officials' (NACTO) Urban Bikeways Design Guide;
- Americans with Disabilities Act (ADA) compliance for transportation facilities – Public Right of Way Accessibility Guidelines (PROWAG), ADA Transition Plans, liability issues, etc.;
- Complete intersections, including operations, lighting, planning, accessibility, etc.;
- Complete Streets – Implementing the policy;
- Greenway and path crossings;
- Pedestrian facilities – Planning, design, and implementation; and
- Working with law enforcement on traffic safety campaigns.

Sample program: Institute for Bicycle and Pedestrian Innovation: <http://www.ibpi.usp.pdx.edu/>

FACILITY INSPECTION AND MAINTENANCE

“E” Categories: Enforcement/Evaluation

Purpose: Promote the importance of maintaining safe facilities for all users.

Partners: RPO staff, county staff, municipal staff, engineering departments



Historic Walking Tours
- Austin, TX

Setting and maintaining minimum condition standards for acceptable bicycle facility conditions will enable all users to use the facilities safely. The communities in the Albemarle region should meet and collaborate to establish a minimum set of standards for maintenance of bikeways, including replacing worn pavement markings and damaged signs, sweeping away debris, repaving streets, and repairing potholes. Each community should set up a hotline to efficiently collect information regarding problematic facilities. In the short term, facility inspection and hotline response should be incorporated into the duties of existing Code Enforcement staff, but additional staff may be necessary to adequately perform these duties in the future.

Resource:

- http://www.bicyclinginfo.org/bikesafe/case_studies/casestudy.cfm?CS_NUM=403

CONSISTENT WAYFINDING SIGNAGE PROGRAM

“E” Categories: Education, Encouragement

Purpose: Encourage bicycling to popular destinations; educate residents and visitors on the locations of key destinations in each community.

Audience: General public

Partners: Albemarle RPO, State and local parks and recreation agencies and departments, municipalities,

OBX Pedestrian and Bicycle Safety Coalition, River City Cycling club, Cycle Speedway, other cycling clubs, local merchants

The Albemarle region should develop and install standardized, branded wayfinding signs to support the circulation of cyclists within each community, and cyclists making connections between communities in the region.

Wayfinding signage enhances resident and visitor orientation. A clear wayfinding system should support the character of the region and contribute to economic development by indicating key destinations, restaurants, and entertainment venues. Directional signage targeted for use by motor vehicle drivers, pedestrians, and cyclists will complete a multimodal legibility package.

Materials for signage should reflect the character of the entire region with local customization as desired, be designed through collaboration with all communities, and be selected for longevity and ease of maintenance.

CYCLING SKILLS TRAINING

“E” Categories: Education, Encouragement

Purpose: Educate children, teenagers and adults on safe bicycling skills; encourage bicycling.

Audience: General public



Wayfinding in Delaware

Partners: Municipal and County Parks and Recreation departments, OBX Pedestrian and Bicycle Safety Coalition, River City Cycling club, Cycle Speedway, other cycling clubs

Most bicyclists do not receive any training on safe bicycling practices, the rules of the road, and bicycle handling skills. Cycling skills courses can address this education gap. The most common program is the League of American Bicyclist's course series (including Traffic Skills 101, Traffic Skills 201, and Commuting), taught by League Certified Instructors (LCIs). There are currently over 50 LCIs in North Carolina (the updated list can be found here: <http://www.bikeleague.org/programs/education/>).

Courses cover bicycle safety checks, fixing a flat, on-bike skills, crash avoidance techniques, and traffic negotiation. **At least one course per year in each county in the Albemarle region would be an excellent starting place.**

Materials for the League of American Bicyclists courses must be purchased and courses often require a fee for participation in order to cover costs. However, Albemarle RPO and its partners may choose to seek sponsorships to defer costs and offer courses at no expense to the student. Communities could also choose to offer scholarships to a select number of participants. This may reduce barriers to participation and increase the diversity of the audience.

Bicycle education courses can be supplemented with a media campaign describing the rights and responsibilities of bicyclists. Palmetto Cycling Coalition, located in South Carolina, showcases a "Safe Streets Save Lives" campaign that offers free resources for communities seeking to educate residents about safe bicycling practices, including professionally developed Public Service Announcements.

Sample programs:

- CAN-bike, Canada: <http://www.toronto.ca/cycling/canbike/canbike.htm>
- League of American Bicyclists, USA: <http://bikeleague.org/programs/education/courses.php>
- Safe Streets Save Lives: www.safestreetssavelives.org

WALK AND BIKE FOR HEALTH CAMPAIGN

"E" Category: Encouragement

Purpose: Increase physical activity.

Audience: General public

Partners: Public health agencies and departments (North Carolina Department of Health and Human Services, Albemarle Regional Health Services, Gates Partners for Health, Healthy Carolinians of the Albemarle, Three Rivers Healthy Carolinians), Eat Smart Move More Coalition, Municipal Parks and



League of American Bicyclists training course

Recreation departments, hospitals and private health professionals

Bicycling for transportation is still challenging in many parts of the Albemarle region, as described in Chapter 3: Needs Assessment. For that reason, encouraging people to bicycle for health and recreation may be a more realistic starting place for communities, rather than directly encouraging non-motorized commuting. Numerous regional partners, particularly in the health arena, could assist with developing and implementing a Walk and Bike for Health campaign.

Sample programs:

- Find Thirty. It's Not a Big Exercise® is an Australian marketing campaign aimed at increasing the amount of moderate-intensity physical activity that is incorporated into the daily lives of Australians. The program targets adults and health professionals to receive information on the benefits of a healthy lifestyle. The Find Thirty campaign uses a professional and regularly updated website, television advertisements, and events to promote their cause of increasing daily exercise. More information: <http://www.find30.com.au/>
- Let's Move® is an U.S. marketing campaign aimed at improving national rates of obesity by providing common sense programs and resources for parents, children, schools, and others. Launched by the first lady, the program includes

a “Get Active” campaign to promote healthier lifestyles through fun, exciting, and challenging opportunities for increased physical activity. More information: <http://www.letsmove.gov/get-active>

POLICE OFFICER BICYCLE TRAINING

“E” Categories: Education, Encouragement, Enforcement

Purpose: Educate law enforcement officers on bicycle laws and safety. Encourage officers to pursue bicycle training and encourage officers to issue citations to motorists and non-motorists for violations of bicycle laws, increasing the enforcement of laws pertaining to bicyclists.

Audience: Police officers

Partners: Municipalities and counties, police and sheriff's departments, OBX Pedestrian and Bicycle Safety Coalition

Most law enforcement professionals do not receive training specific to bicycle laws or safety. Police education courses can help officers improve public safety and enforce existing laws more effectively by providing them with the training they need. These courses should include comprehensive information about laws and statutes pertaining to bicycling; information about common crash types and causes; prevention and enforcement techniques against the

most serious offenses; and options for enforcement and education (e.g., when a citation vs. warning should be issued, diversion class options, and safety materials that can be handed out during a traffic stop or public event).

It is suggested that the first training be hosted by the Nags Head Police Department, with support from the OBX Pedestrian and Bicycle Safety Coalition, but invitations should be extended to all law enforcement professionals in the Albemarle region. After the first program, the training should be offered annually, hosted in different communities each year. OBX Pedestrian and Bicycle Safety Coalition and local bicycle clubs may serve as key partners in providing clarification of North Carolina laws as they relates to bicyclists.

Sample program:

- The Wisconsin Pedestrian and Bicycle Law Enforcement Training Course includes curriculum on how bicycle and pedestrian crashes happen, laws relating to walking and bicycling, effective enforcement, crash reporting, best practices, etc. The course is open to all law enforcement entities for a fee, which covers instruction and materials. More information: <http://www.bicyclinginfo.org/enforcement/training.cfm>

BICYCLE LAW CITATION AND WAIVER PROGRAM

“E” Categories: Education, Encouragement, Enforcement

Purpose: Encourage officers to issue citations to bicyclists in violation of bicycle laws, enforce bicycle laws, educate bicyclists on bicycle laws, and encourage safe bicycling practices with the appropriate equipment and accessories.

Audience: Bicyclists, police officers

Partners: Municipalities and counties, police and sheriff's departments, OBX Pedestrian and Bicycle Safety Coalition

A “first time offense citation waiver program” should be considered for a pilot program by Police Departments on the Outer Banks. If a bicyclist is observed without the legal equipment and accessories for bicycling, a citation should be issued to the offending cyclist. The cyclist would purchase the necessary equipment or accessory (helmet, reflector, light, etc.) and present the item, a receipt of sale, and the citation to the Dare County Clerk of Courts Office. The Clerk's Office would waive the citation fee if it was the first violation by the cyclist.

This program could be expanded to include violations of “rules of the road” for safe bicycling. If a bicyclist is observed bicycling on sidewalks or not bicycling



Image from Wisconsin Pedestrian and Bicycle Law Enforcement Training website

properly with the flow of automobile traffic, a citation should be issued to the offending cyclist. The cyclist would have an option to participate in a bicycling safety education course to have the citation fee waived. Once they have completed a bicycling safety education course, the cyclist would present their citation, along with their certificate of course completion to the Dare County Clerk of Courts Office. The Clerk's Office would waive the citation fee if it was the first violation by the cyclist.

If the pilot program is successful in the Outer Banks communities, other municipalities and counties in the Albemarle region should adopt the program.

"WATCH FOR ME NC" CAMPAIGN

"E" Categories: Education, Encouragement, Enforcement

Purpose: To improve pedestrian safety by influencing the behaviors of drivers and pedestrians through safety messaging and enforcement.

Audience: Pedestrians, cyclists, motorists, law enforcement officers

Partners: NCDOT, Albemarle RPO, municipalities and counties

The "Watch For Me NC" campaign is intended to improve pedestrian safety by influencing the behaviors of drivers and pedestrians through safety

messaging and enforcement. The program first targeted the Triangle region of North Carolina. The effort was launched in 2012 through Transportation Enhancement funding provided by the NCDOT and federal funds from the NHTSA. The bicycle component was funded and expanded in 2013.

A pilot version of this program occurred on the Outer Banks in May, 2013 in partnership with the OBX Pedestrian and Bicycle Safety Coalition. It is recommended that the pilot be expanded into a regional program similar to the Triangle's campaign. The Albemarle RPO should request that NCDOT hosts an informational workshop for local officials and staff, and provides a "toolkit" of materials for implementing the program locally across the entire region. Each municipality and county in the Albemarle region should request funding for program development and guidance for utilizing local staff and resources to bolster the program. Bicyclists' safety, rights and etiquette, along with street crossing rules, traffic signal messages and meanings, and how to follow and obey pavement markings should be taught to children and adolescents to increase their safety and reduce automobile-bicycle crashes in the region.

Resource:

- NCDOT Watch for Me NC: <http://www.watchformenc.org/about/>



Watch For Me NC Campaign

REGIONAL WALK BIKE WEBSITE

“E” Category: Education

Purpose: Make walking and bicycling information easier to find by providing resources, maps, safety information, events, group listings, and more in one central place.

Audience: General public

Partners: Albemarle RPO, municipalities and counties, local advisory committees (BPACs), Cycle Speedway, River City Cycling Club, other cycling clubs

Many current and potential bicyclists do not know where to turn to find out about bicycling laws, events, maps, tips, and groups. The Albemarle RPO should launch a regional walking and bicycling “one-stop shopping” website that includes:

- A list of all walking and bicycling groups, including clubs, racing teams, and advocacy groups;
- Information about the specific committees that discuss walking, bicycling, and trail issues (including how to get involved, meeting times and dates, agendas and minutes, etc.);
- Information about current projects and how to get involved (e.g., public meetings, comment

periods);

- Maps and brochures (e.g., links to online maps and brochures, where to find in person, and how to request mailed materials);
- Links to laws and statutes relating to bicycling;
- Information about bicycling events (e.g., rides, classes, volunteer opportunities) and an events calendar;
- A list of local bike shops, including phone numbers and addresses; and
- Relevant contact information for the public.

A one-stop bike website will not be difficult to set up, but it will only be successful if the site is both easy to use and updated regularly. All website content should be reviewed regularly for accuracy. If a Regional Bicycle and Pedestrian Advisory Committee is formed, the RPO should consider adding a standing agenda item for BPAC meetings to discuss the website in order to hear about new content that should be added or out-of-date content that should be updated or removed.

Sample website: Bike Long Beach (CA): <http://www.bikelongbeach.org/>

Long Beach area bike website



ACHIEVE BICYCLE-FRIENDLY COMMUNITY STATUS

“E” Categories: Education, Encouragement, Enforcement

Purpose: Recognize accomplishments towards improving bicycling conditions.

Audience: Elected officials, media

Partners: Albemarle RPO, municipalities and counties, Cycle Speedway, River City Cycling Club, other cycling clubs, advisory committees (BPACs)

The League of American Bicyclists has a well-respected Bicycle-Friendly Communities (BFC) award program. The League recognizes four tiers of bicycle-friendly communities: bronze, silver, gold, and platinum. Communities fill out a detailed application that covers bike-related facilities, plans, education efforts, promotion initiatives, and evaluation work that has been completed by the jurisdiction. The award is designed to recognize progress that has been made, as well as assist communities in identifying priority projects to improve bicycling conditions. Receiving the award is a media-worthy event, and may give elected officials the opportunity to receive media coverage for the positive work they are doing. The Pedestrian and Bicycle Information Center recently launched a sister program for Walk Friendly Communities (WFC) that has recognized 11 communities around the

nation.

The RPO should work with towns and cities in the region to assess their readiness to apply for WFC and/or BFC designation, and encourage them to apply. The application can be completed by local agency staff with the support of the RPO, particularly if a Bicycle and Pedestrian Advisory Committee is formed.

More information:

- Bicycle Friendly Communities Program: <http://www.bicyclefriendlycommunities.org>
- Walk Friendly Communities Program: <http://www.walkfriendly.org/>

COMMUNICATE MAINTENANCE SCHEDULES

“E” Categories: Enforcement/Evaluation

Purpose: Integrate bicycle facilities into future roadway projects.

Audience: NCDOT, municipal and county planning and engineering staff

Partners: NCDOT, RPO staff, municipal and county staff

Municipalities in the Albemarle region should each request that their NCDOT Division office provide early notification to planning and engineering staff of maintenance and restriping schedules. Local planning



Bicycle Friendly Communities Program

and engineering staff should facilitate annual meetings to be held when updated maintenance and restriping schedules are released to allow for face to face conversations between local staff and NCDOT Division staff. This information would allow the municipalities an opportunity to provide input regarding their bicycle facility needs and support accommodation measures, such as restriping to include bicycle lanes and other relevant markings.

AUTOMATED SPEED ENFORCEMENT DEVICES AND SYSTEMS

“E” Category: Enforcement

Purpose: Create safer roadways for all user groups.

Audience: Motorists and law enforcement officers

Partners: RPO staff, municipal and county staff, police departments

Automated speed enforcement devices and systems can be an effective tool for managing speed and reducing speed related crashes. Some devices record and visibly display vehicle speed, and other devices capture a real-time photo of traffic. Most devices use radar and motorists with a radar detector in their vehicle will be alerted of the presence of the radar. This program would change motorists' behavior by encouraging safe, responsible driving, staying alert, and obeying the posted speed limit.

The Albemarle RPO should encourage each municipality in the region to install permanent, fixed photo speed enforcement devices. If these are too expensive to consider, mobile photo speed units may be a more viable option.

Resource:

- FHWA resource: http://safety.fhwa.dot.gov/ped_bike/legis_guide/rpts_cnsgs/pedrpt_0808/chap_4.cfm

POSITIVE MEDIA CAMPAIGN

“E” Categories: Education, Encouragement

Purpose: Normalize/humanize the image of bicycling in the region.

Audience: General public

Partners: OBX Pedestrian and Bicycle Safety Coalition, Cycle Speedway, River City Cycling Club, other cycling clubs, local merchants/business leaders, municipal and county staff

Often the general public thinks of negative stereotypes when they hear about “cyclists.” A media campaign that shows a wide range of ordinary residents using their bicycles for a variety of purposes will help break down those stereotypes and raise awareness of bicycling and geniality towards people who ride bicycles. One excellent example is the “I Ride” campaign from the

Community Cycling Center in Portland, Oregon. They have created well-photographed posters showing people in a wide variety of ages, races, body types, and with a wide variety of bicycle types, and each person has been invited to complete the sentence “I ride ____.” The images are being distributed as bus stop and bus bench ads, as well as online.

In the Albemarle region, the “I ride” slogan may be considered, or another equally humanizing slogan could be created. The effort could be spearheaded by a variety of groups, from public agencies to nonprofits to volunteers. Health partners may be interested in funding and/or implementing this campaign. Donated media placement should be sought for print media and other public installations (such as benches, transit media options, billboards, or other locations).

A good photographer should be engaged, and opportunities for people to be photographed should be created (such as at public bicycling events). Key community members should be invited to participate as well, particularly if they are well-known.

More information on the Portland “I Ride” Campaign can be found at: <http://www.communitycyclingcenter.org/index.php/introducing-the-i-ride-bicycling-campaign/>

OTHER KEY PARTNERS TO CONSIDER FOR IMPLEMENTATION OF BICYCLE PROGRAMS

- *Incorporated towns and cities in the Albemarle region* – Towns and cities are important parties in initiating and supporting programmatic efforts.
- *Any local walking/bicycling/trails committees* – Communities with existing Bicycle, Pedestrian, or Trails/Greenways Committees can help coordinate efforts and may be able to connect needs with interested volunteers.
- *Public health agencies and nonprofits* – Public health professionals can help to implement and evaluate recommendations that will help residents increase daily physical activity.
- *Major employers and universities* – The Albemarle region has several employers who are very engaged in bicycle-related issues.
- *Local police departments and county sheriff's offices* – Law enforcement professionals can help support safety campaigns through strategic enforcement and educational events.
- *School districts* – School districts and schools are natural partners for Safe Routes to School efforts as well as for education programs related to student safety.
- *Parent Teacher Associations (PTAs)* – PTAs can be effective partners in implementing Safe Routes to School efforts and other school-oriented traffic safety initiatives.

- *Parks and Recreation* – Parks and Recreation departments are natural partners for public events and classes such as organized walks.
- *YMCA, Boys and Girls Clubs, and other youth-oriented service providers* – These groups can partner on programs that benefit children.
- *Cycling clubs* – Clubs may be able to provide volunteer support for bicycling programs.
- *Chambers of commerce, business improvement districts, downtown development associations* – These groups may be interested in supporting initiatives that bring residents and visitors to the downtowns and business districts.
- *Economic and tourism development organizations* – These groups may be interested in supporting initiatives that bring visitors to the region.
- *Senior centers and retirement communities* – More

- and more organizations that work with seniors are interested in projects that help their clients live active, healthy lives.
- *Hospitals and private health professionals* – Private sector partners with an interest in promoting health and wellness can serve as local champions and funders of education and awareness campaigns.



Cycle North Carolina is a well-attended event each Spring and Fall, often coming through the region. This presents a great programmatic and economic opportunity for the Albemarle Region.



POLICIES

Bicycling needs must be considered within the context of the transportation and land use system. Based upon the region's numerous local and county land use and transportation plans, it's clear that enhancing quality of life and preserving community character is an important issue for many of the region's stakeholders. To do so requires paying attention not only to the design of the region's thoroughfares, but also to the quality of development in a manner that preserves the region's great asset: natural beauty.

Widening roadways to accommodate high volumes of motor vehicle traffic within settled areas negatively impacts local livability. As a response to peak hour congestion, the widening of roadways is typically an exercise in futility because drivers who previously avoided the congestion typically absorb the excess capacity very quickly. This phenomenon is known as "induced traffic" and it underscores that widening is too often an ineffective, expensive, and unsustainable approach to transportation planning. It also makes cycling and walking less safe.

To reduce congestion and to improve safety and community character requires investment in public transit, bikeways, sidewalks and land use patterns that put a variety of destinations and services within close proximity. Through the statewide adoption of a Complete Streets Policy, and by working to advance

Context-Sensitive Solutions (CSS), the North Carolina Department of Transportation is becoming a willing partner to those communities desiring a transportation system that reinforces community character, rather than eroding it. With this in mind, the following policy objectives and associated strategies aim to improve the underlying land use and transportation conditions that fundamentally promote bicycle use at the regional and local level. Such policies:

- Recognize the interrelationship between land use decisions (planning and development) and transportation decisions.
- Reinforce basic urban design principles that result in development of visually pleasing districts, neighborhoods, and corridors supportive of bicycling and walking.
- Improve the balance of protected rural areas and vibrant village, town, and city environments that make the Albemarle region special.

Policy recommendations are organized in tabular form and calibrated to the 10-county's regional Settlement Types, as defined in Chapter 2. Following this table is example guidance for a specific ordinance document, the Camden County, North Carolina Unified Development Ordinance



Natural



Farmland



Hamlet



Village



Town



City



Beach District

Transportation Network

Objective: Accommodate bicyclists through the ongoing development of a context-sensitive regional and local transportation infrastructure network.

Ensure that the region's thoroughfare system is compatible with adjacent land uses and natural/built character.	●	●	●	●	●	●	●
Promote positive health, recreation, transportation, economic, and environmental benefits.	●	●	●	●	●	●	●
Coordinate with NCDOT Context Sensitive Solutions and the Complete Streets Policy along and across state roadways.	●	●	●	●	●	●	●
Require new development to minimize driveway access in order to reduce conflict points.				●	●	●	●
Partner with State and local entities to explore alternative funding sources that support transportation options throughout the region, including integrating bicycle and pedestrian facilities.	●	●	●	●	●	●	●
Encourage local jurisdictions to require development to fund proportional share of transportation infrastructure costs.			●	●	●	●	●
Work with all jurisdictions to reduce motor vehicle speeds by implementing proven traffic-calming measures.				●	●	●	●
Consider adding bicycle racks to Inter-County Public Transit Authority's bus service.				●	●	●	●
Supplement subdivision regulations with context-appropriate block size and thoroughfare connectivity standards.			●	●	●	●	●



Natural



Farmland



Hamlet



Village



Town



City



Beach District

Bikeway Infrastructure

Objective: Accommodate bicyclists through the ongoing development of context-appropriate bikeways, bicycle parking, and bikeway signing and wayfinding.

Ensure that the maintenance/expansion of the regional thoroughfare system serves bicyclists and pedestrians.	•	•	•	•	•	•	•
Coordinate planning, design, and implementation of context-sensitive bicycle improvements with the Facility Continuum.	•	•	•	•	•	•	•
Use this Albemarle Regional Bikeways Plan to guide future planning, design, and implementation of bicycle infrastructure in conjunction with other local and regional planning and development projects.	•	•	•	•	•	•	•
Utilize additional bikeway and countermeasure treatment types as appropriate to enhance safe cycling.			•	•	•	•	•
Encourage county/municipal parking requirements to include bicycle parking at areas of regional and local significance, such as schools, government offices, churches etc.			•	•	•	•	•
Encourage county/municipal parking requirements to follow the Association for Pedestrian and Bicycle Professional's (APBP) bicycle parking design and location guidelines, including provisions for short- and long-term parking.			•	•	•	•	•
Work with state, county, local entities to enhance the safety and visibility of the regional bicycle network by implementing appropriate safety and wayfinding signage improvements.	•	•	•	•	•	•	•



Natural



Farmland



Hamlet



Village



Town



City



Beach District

Environmental Protection

Objective: Protect natural land by directing public infrastructure spending and private development to areas where they will have the greatest social and economic benefit and the least environmental impact and transportation cost.

Establish a regional Transfer of Development Rights (TDR) program and/or support existing or new conservation easement, land trusts, and other tools to preserve the region's rural and working landscapes.	●	●							
Protect regional wetlands, wetland buffers, floodways, floodplains, aquifer recharge areas, woodland, productive farmland, wildlife habitat and important scenic views by disallowing new development along certain scenic roadways.	●	●							
Help property owners maintain the agricultural use of their land through a regional tax relief or land valuation mechanisms calibrated to agricultural production value, as opposed to its commercial or residential real estate value.		●							
Avoid the location of public facilities (schools, government offices etc.) within Natural or Farmland areas.	●	●							



Natural



Farmland



Hamlet



Village



Town



City



Beach District

Environmental Protection Continued

To protect regional open space, enhance environmental health, and increase recreational opportunities, establish Hamlet, Village, Town, City, and Beach District areas as regional (TDR) "receiving areas."

Encourage local municipalities to identify and maintain a permanent rural "green" preserve around the Hamlet, Village, Town, and City areas with a focus on improving and protecting ecological areas.

Encourage the protection, preservation and enhancement of riparian corridors within new development and the redevelopment of existing, underutilized parcels to maximize public access, connectivity, and recreational bicycling.

	Natural	Farmland	Hamlet	Village	Town	City	Beach District
To protect regional open space, enhance environmental health, and increase recreational opportunities, establish Hamlet, Village, Town, City, and Beach District areas as regional (TDR) "receiving areas."			•	•	•	•	•
Encourage local municipalities to identify and maintain a permanent rural "green" preserve around the Hamlet, Village, Town, and City areas with a focus on improving and protecting ecological areas.			•	•	•	•	
Encourage the protection, preservation and enhancement of riparian corridors within new development and the redevelopment of existing, underutilized parcels to maximize public access, connectivity, and recreational bicycling.			•	•	•	•	•



Natural



Farmland



Hamlet



Village



Town



City



Beach District

Regional Growth Continued							
Wherever practical, incentivize land devoted to surface parking lots to be developed into more productive uses.					●	●	●
Encourage and support the evolution of auto-oriented, strip-style commercial development into mixed-use activity centers that support a more walkable and bicycle-friendly environment.				●	●	●	●
Encourage Albemarle region counties and local municipalities to evaluate the strength of proposed development projects through the creation of a Smart Growth Scorecard, as developed in Camden County.	●	●	●	●	●	●	●

ORDINANCE REVIEW

Given the large number of jurisdictions in the Albemarle region, policy recommendations for ordinances are provided through an evaluation of a specific ordinance within the region. Camden County, North Carolina's Unified Development Ordinance was selected because of its current support of bicycle-friendly land use and transportation patterns. The following review of this ordinance serves as an example that can be applied to other jurisdictions in the region.

CAMDEN COUNTY, NORTH CAROLINA UNIFIED DEVELOPMENT ORDINANCE REVIEW

In 2003, mounting residential growth pressure inspired Camden County to enact a moratorium on new subdivisions. This temporary hold on development provided an opportunity for the County's leadership and citizens to create a needed unified governance structure (2006) to handle the issues of growth comprehensively. Shortly thereafter, the County began to adopt "smart growth" land use and transportation policies, including the development of a Smart Growth Scorecard (2007 checklist tool to evaluate development proposals in Camden County).

Today, Camden County has become a leader within the Albemarle region for developing plans

and policies seeking to accommodate new growth, support multi-modal transportation options, create a better jobs-housing balance, and protect the area's largely rural character. A road map to meeting these goals is laid out in the County's recently completed 2035 Comprehensive Plan.

However, an analysis of the Camden County's Chapter 151 Unified Development Ordinance reveals a clear disconnect between the aspirations of the 2035 Plan and existing land use and transportation policies. The following section briefly summarizes the strengths and weaknesses of Chapter 151 and offers additional land use, transportation, and village design policy recommendations to support the County's goals, including the improvement of bicycling conditions.

KEY STRENGTHS

The intent of Chapter 151 is to strengthen village and country settings, including allowing rural roads to keep their character and village streets to more easily accommodate pedestrians and bicyclists.

Land Use

- The Community Core District (CCD) District zone encourages slightly more dense, mixed-use development to occur in strategic areas (Shiloh, Camden Courthouse, South Mills) with the intent of creating clustered, walkable places similar in scale and pattern to the classic "American village."

- Natural and farmland preservation is a key part of Chapter 151; Camden County recently created Voluntary Agricultural Districts, which allow property owners to opt-in to a system valuing land at current value, rather than its speculative residential or commercial value. This helps protect the farming, horticulture, and forestry land that comprises a majority of Camden County and gives the area its unique character.

Transportation

- Chapter 151 mandates sidewalks, curbs, and gutter on both sides of the street in the CCD District and allows on-street parking, which facilitates pedestrian-oriented village design.
- Chapter 151 includes street connectivity, block size, or complete street design provisions. These components are particularly important in the Neighborhood Commercial District (NCD),
- Chapter 151 includes the provision of bikeway facilities.
- Chapter 151 includes the provision of bicycle parking facilities.

KEY WEAKNESSES

Chapter 151 contains numerous land use and transportation provisions that will ultimately limit the achievement of the County's vision for growth, as developed in the 2035 Comprehensive Plan.

Land Use/ Urban Design

- Existing FAR/lot coverage requirements (0.5) in the CCD district are too low and will make it difficult to achieve the desired "American village" feel.
- 25' minimum setback distance for CCD is inappropriate for a village center. The desired pedestrian and bicycle-friendly "feeling" of a vibrant mixed-use village, as discussed in the 2035 Plan, will not be created as desired.
- Planned Unit Development (PUD) zoning category offers the County flexibility at the outset for larger commercial or residential projects, but ultimately yield unpredictable results between each application. The proposed Plantation project, a PUD example, offers an appropriate mix of density of uses but falls short with a poor urban design pattern that is less a walkable village and more suburban sprawl. Also, when market conditions continue to change, the conditions of PUDs make it difficult to meet new transportation and land use demands.

Transportation

- Despite the goal to increase access – by all modes – Chapter 151's street standards generally prioritize driving and limit access to new development. The result is a still further disconnected land use pattern and subdivision arrangement that does not enable the smart growth goals espoused in the 2035 Comprehensive Plan. To the extent

practicable, driveway access to collector streets shall be minimized to facilitate the free flow of traffic and avoid traffic hazards.

- Chapter 151 does not provide shared parking allowances among complementary adjacent uses, which would reduce the expense, environmental impacts, and bicycle and pedestrian un-friendly characteristics inherent to surface parking.

KEY RECOMMENDATIONS

The following key recommendations are intended to prioritize land use, transportation, and village design patterns that reinforce smart growth and transportation choices, especially within intended growth areas (Shiloh, Camden Courthouse, South Mills). The coordination of these elements plays a critical role in supporting active transportation and should be considered critical to the long-term success of making bicycling safe and pleasurable in not just Camden, but the whole Albemarle region.

Land Use

- To more effectively meet the land use and transportation goals set forth in the Camden County 2035 Comprehensive Plan, a form-based code that manages the coordination of zoning, subdivision regulations, village design, basic architectural standards, and transportation design should be considered, especially in areas

currently zoned RCD-1, RCD-2, CCD, and NCD.

- Planned Unit Development (PUD) zoning should be removed and replaced with a form-based code that is equally as flexible while also offering more predictability from application to application and can respond more easily to changing market conditions.
- In conjunction with Voluntary Agricultural Districts, the County might also consider creating a regional Transfer-of-Development Rights (TDR) program to further incentivize the development of priority investment areas where growth and services can be concentrated (Shiloh, Camden Courthouse, South Mills).
- Replace 25' minimum setback distance for CCD District with a 10' maximum; encourage zero lot line setbacks at the most pedestrian-oriented locations.
- Increase existing FAR/lot coverage requirements in the CCD district to better achieve the desired mixed-use "New England" or classic "American village" character.
- Fast-track the permitting and approval process for those projects that score above a certain Smart Growth Checklist threshold. Density bonuses and other incentives should also be considered.
- Ensure public investment and civic life anchors like schools, municipal buildings, courthouses,

and the like are located within core village areas and not removed from priority investment areas (Shiloh, Camden Courthouse, South Mills).

Transportation

- Work with the County departments and the NCDOT to utilize multimodal level of service analysis when conducting traffic volume/demand studies for future development and population growth.
- Work with County departments and the NCDOT to integrate “Complete Streets” design standards into transportation/public works standards and/or requirements.
- Develop street connectivity standards that promote small blocks within larger mixed-use developments or within established village areas.
- Streamline automobile parking requirements so that spaces may be shared amongst complementary uses (daytime vs. nighttime)
- Consider implementing parking maximum requirements within CCD/NCD/PUD areas so that the cost of new development is reduced and other modes of transportation in village centers is encouraged.
- Require non-motorized transportation facilities and connectivity standards within subdivision, requirements for CCD, NCD, PUD, R-1, and R-2

areas.

- Develop bicycle parking requirements and standards for all areas zoned as CCD, NCD, and at all civic sites (schools, churches, hospitals, municipal facilities, etc.).



North end of NC 12, Corolla



Chapter Seven

Implementation

OVERVIEW

This plan's infrastructure, program, and policy recommendations provide the framework for making the Albemarle region "a Bicycle Destination for the World." Successful implementation of these recommendations will require a consistent, coordinated effort by the Albemarle RPO, NCDOT, counties, municipalities, private partners, stakeholders, and advocates in the region. In order to monitor implementation success, an evaluation component is essential. Measuring performance over time will allow the region to gauge success in providing quality bicycle transportation and recreation choices. It will also provide a mechanism for making informed decisions and efficient investments in the future.

This chapter details priority action steps for the region. The actions steps presented do not cover every individual infrastructure, policy, and program recommendation of this plan. Rather, they call out priority items within each of these categories in order to provide guidance for moving forward on the most important items. For each action step, a lead agency, potential support agencies, and time frame for completion are suggested.

KEY FIRST STEPS

The first step toward implementation is the **adoption of this plan**. All member counties and municipalities should adopt this plan as the guiding document for improving bicycle transportation and recreation in the region. Having an adopted plan is helpful in securing funding from federal, state, and private agencies.

The second step is the **formation of a BPAC (Bicycle and Pedestrian Advisory Committee)**. The BPAC could start largely with the members of the Bicycle Plan Steering Committee. The BPAC should also have representation from active pedestrians and commuting and recreational cyclists, and should champion the recommendations of this Plan. The BPAC should continue to provide a communications link between the citizens of the community, local governments, and the Albemarle Commission. They should meet at least quarterly, and be tasked with assisting in community outreach, marketing, and educational activities recommended by this Plan. Due to the size of the region, the BPAC may choose to divide into three subgroups to match the subregions of this study.

Chapter Contents

Overview

Key First Steps

Administrative Structure

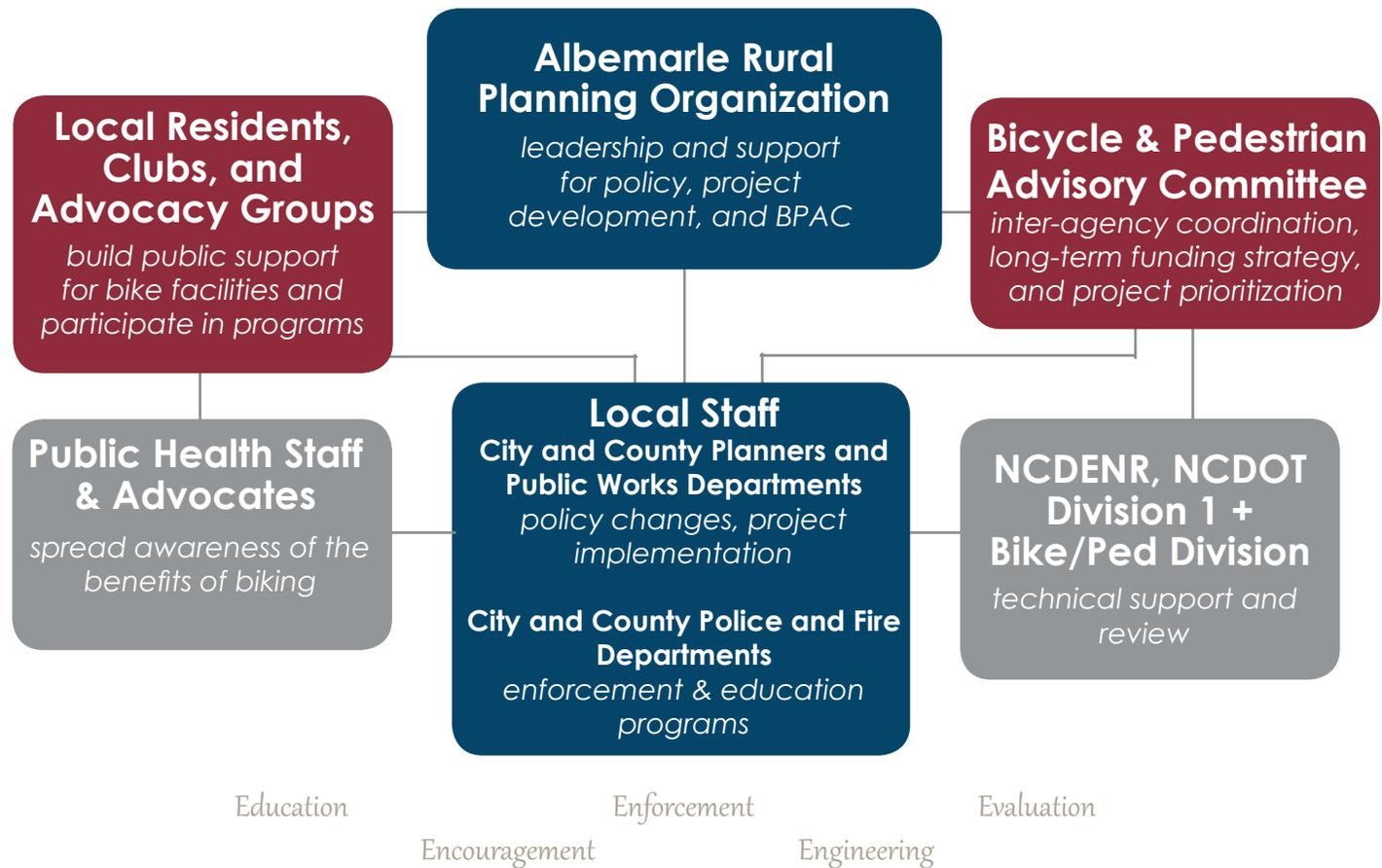
Action Steps

Performance Measures

Funding Strategy

ADMINISTRATIVE STRUCTURE

The figure below presents an organizational structure for plan implementation. All of the groups and agencies shown in this figure will be necessary to successfully implement the extensive program, policy, and infrastructure recommendations of the Plan.



ACTION STEPS

Task	Lead Agency	Support	Details	Phase
<i>PRESENTATIONS AND ADOPTIONS</i>				
Present plan to Albemarle Commission	Albemarle Rural Planning Organization (ARPO)	Project Consultant	Present the plan to the Albemarle Commission for approval and adoption.	Short Term (2013)
Approve and adopt this plan - Municipalities	Municipal Planners	ARPO/Project Consultant	Through adoption, the plan becomes a legitimate planning document of each municipality. Adoption shows that the city or town has been part of a successful, supported planning process and is a partner in implementation. It is key to securing funding from NCDOT and other state and federal agencies.	Short Term (2013)
Approve and adopt this plan - Counties	County Planners	ARPO/Project Consultant	Through adoption, the plan becomes a legitimate planning document of each County. Adoption shows that the County has been part of a successful, supported planning process and are partners in implementation. It is key to securing funding from NCDOT and other state and federal agencies.	Short Term (2013)
Involve media to spread word to public and elected officials.	ARPO	Municipal and County Planners; Advocates	ARPO should utilize the media to announce the adoption of the bicycle plan. Media includes local newspapers, websites, and local television. When significant trails and facilities are constructed, the media should be notified in order to spread the word to the public. This will help build upon successes.	Short Term (2013)
<i>LOCAL AND REGIONAL COORDINATION</i>				
Establish Albemarle Bicycle and Pedestrian Advisory Committee (BPAC)	Regional Bicycle Plan Committee	ARPO	An ongoing regional entity focused on bicycle issues will be instrumental to the implementation of this plan and promotion of biking in the Albemarle region. This group should initially be formed of interested members of this plan's committee, and meet semi-annually to share implementation successes and challenges and track progress. The group can be divided into meaningful subcommittees such as policy, program, infrastructure, and evaluation groups.	Short Term (2013)
Set up regional Walk Bike website	BPAC	ARPO	Set up a website providing information to residents and tourists on bicycling in the region. To begin, the website can include this plan and the brochure map produced by it.	Short Term (2013-2014)
Add information on the location of amenities to the Walk Bike website	BPAC	ARPO, Municipal and County Planners	Gather the locations of bike parking, restrooms, and water fountains along bike routes and communicate it on the regional website. A public input form could help to crowdsource this data.	Continuous/Ongoing

ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Schedule semi-annual project development meetings with NCDOT	ARPO	NCDOT Division 1; Municipal and County Planners	Many projects recommended in this plan could be developed as part of a roadway reconstruction, widening, or resurfacing project. ARPO should work with NCDOT to ensure that upcoming roadway reconstruction projects, including TIP projects, incorporate the bicycle improvements recommended in this plan. Further, this plan's recommendations should become an input into the development of the resurfacing schedule - roadways with bicycle recommendations should become higher relative priorities for resurfacing or widening than other roadways.	Short Term (2013-2014)
Discuss bridge policy application with NCDOT	ARPO	NCDOT Division 1, Municipal and County Planners	During one of the project meetings above, confirm that all bridges along roadways that permit bicycles will be accommodated with bike facilities in any bridge replacement or repair project (where feasible during repair projects). Identify bridges along the proposed network with insufficient handrails and work to install bicycle-safe handrails on those bridges in accordance with NCDOT's bridge policy.	Short Term (2013-2014)
<i>EVALUATION AND DATABASES</i>				
Establish central holding place for bicycle facility database	ARPO	Municipal and County Planners	Each municipality and county should continue to update a GIS bicycle database as new facilities come online and new crash data is published. This data should periodically be shared with the ARPO for maintenance of a central database. This central database can also serve communities of the region without the resources to maintain GIS data.	Continuous/Ongoing
Publish Annual Performance Report	BPAC	ARPO, Municipal and County Planners	Publish an annual report to provide an update on progress made during that year to advance bicycle transportation in the Albemarle region. ARPO should lead this effort, with support and content development provided by local staff. This report will provide an objective measurement of progress.	Annually
Develop bicycle count program	ARPO	Municipal and County Planners	A key method to evaluate bicycle activity and needs is to conduct professional counts. Counts should be recorded in the annual performance report and coordinated with NCDOT's Division of Bicycle & Pedestrian Transportation.	Annually
Online form for bicycle facility request	ARPO	Municipal and County Planners	Provide a web-based service that allows residents to report hazards, such as debris in a shoulder or trail, and request new bicycle facilities and connections. Requests should be collected and communicated to planners within the relevant jurisdiction, and used to update this plan in the future. The website should be linked to municipal and county websites.	Short Term (2013-2014)

ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Update this plan	ARPO	BPAC	Update this plan after five years to reflect implementation progress, unexpected challenges, and changes to the regional landscape.	Mid-Term (2018)

INFRASTRUCTURE IMPROVEMENTS

Identify and secure funding sources for priority project implementation	Municipal and County Planners	ARPO, BPAC	Multiple funding sources should be sought. Appendix E contains a wide variety of funding opportunities.	Short Term (2013-2014)
Complete priority projects	Municipal and County Planners, ARPO	NCDOT, NCDENR, NCD-PR, NPS	Build priority projects identified in this plan (Submit bicycle projects to State TIP, add bicycle projects to local CIP lists)	Mid-Term (2015 - 2018)
Develop a long term funding strategy	Municipal and County Planners	ARPO, NCDOT, BPAC	To allow continued development of the overall system, capital funds for bicycle and pedestrian facility construction should be set aside every year, even if only for a small amount (small amounts of local funding can be matched to outside funding sources). Funding for an ongoing maintenance program should also be included in the county and town operating budgets. Multiple funding sources should be sought from federal, state, and health sources.	Short Term (2011-2012)

PROGRAMS

Establish Safe Routes to School Program in Towns and Cities	School Districts	ARPO, BPAC, SRTS Program	Apply for Safe Routes to School funding for planning and implementation.	Short Term (2013-2014)
Apply for "Bicycle Friendly Community" designation by League of American Bicyclists	Municipalities	BPAC	Complete an application for the Bicycle Friendly Community designation.	Short Term (2013)
Hold first Police Officer Bicycle Training	Nags Head Police Department	Outer Banks Pedestrian and Bicycle Safety Coalition	Arrange initial training and invite police departments from around the region.	Short Term (2013)
Educate internal staff on bicycle and pedestrian-related issues.	Municipal and County Planners	ARPO, BPAC	Train relevant local government staff who play roles in implementation, design, construction, enforcement, and maintenance of roadways and bike facilities. Local staff should be familiar with the Regional Bicycle Plan.	Short Term (2013-2014)

ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Develop local hard copy and online bicycle maps and brochures	Municipal and County Planners	BPAC, Health staff and advocates	A hardcopy and online map displaying bicycle facilities, suggested bike routes, destinations, and educational materials will be useful for tourists and residents. Maps for individual communities can provide the level of detail needed for navigation and supplement the regional brochure that was developed along with this plan. These maps should be updated every 3-5 years.	Mid-Term (2015-2018)
Establish maintenance standards	BPAC	Municipal and County Staff	Establish minimum standards for maintenance of bikeways (replacement of pavement markings, sweeping of debris, etc) and encourage local staff to follow these standards and set up hotlines for reporting of issues.	Mid-Term (2015-2018)
Hold WatchForMe NC workshop in the region	NCDOT	RPO, Municipal and County Staff	Present the campaign to interested municipalities and counties with information on how to implement it locally.	Short Term (2013-2014)
Celebrate and promote Bike Month	BPAC	Municipal and County Planners, Health staff and advocates	Bike Month provides an opportunity to encourage new bicyclists in a group setting with entertainment, prizes, and media attention. Promote and expand Bike Month in May of 2014 and continue annually. Consider programs such as Ciclovias to generate interest (See Chapter 6 for more information).	Short Term (2013-2014)
<i>POLICIES</i>				
Incorporate this Regional Bicycle Plan's recommendations into long-range transportation and land use planning documents and local comprehensive plans.	ARPO	NCDOT, City and County Planners	Recommendations from this plan should become the starting point for the accommodation of bicycle facilities in future transportation and land use planning documents around the region	Ongoing
Revise Municipal and County Codes of Ordinances.	Municipal and County Planners	ARPO	Revise ordinances to better accommodate bicycle infrastructure and considerations. Use the policy recommendations and sample ordinance review in Chapter 6 as a guide for revisions.	Short Term (2013-2014)
Initiate regional Transfer of Development Rights program	ARPO	Municipal and County Planners	Establish a regional program to protect natural and working landscapes while encouraging appropriate development in population centers that supports bicycle transportation.	Long-Term (2019-2033)
Adopt form-based codes	Municipal Planners		Replace use-based zoning codes with form-based zoning in growing municipalities to support growth that will encourage and enable bicycle transportation.	Mid-Term (2015-2018)

ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Generate a model smart growth scorecard and bicycle needs checklist for use around the region	BPAC	ARPO, Municipal and County Planners	Develop these tools based on best practices and market to local staff for use in development review. Chapter 6 provides a sample bicycle needs checklist and Camden County's smart growth scorecard can act as a model.	Mid-Term (2015-2018)
Consider Complete Streets Policy	Municipal Planners	ARPO	The municipalities of the ARPO should consider Complete Streets policy guidance language to ensure commitment to developing roadways that accommodate all users.	Mid-Term (2015-2018)
<i>BICYCLE TOURISM ECONOMY</i>				
Create a bicycle tourism committee	ARPO, BPAC, Chambers of Commerce	Municipalities, Businesses, etc.	The cultivation of relationships among businesses, cycling groups, government agencies, NCDOT, local chambers of commerce, etc. is essential for creating and marketing a bicycle-friendly region. This group should prioritize steps to grow the bicycle tourism economy. See resource on 6-8.	Short Term (2013-2014)
Track return-on-investment measures	Department of Commerce, Chambers of Commerce	Municipalities, ARPO	Like the 2004 Outer Banks report, further measurement is needed to quantify the many economic benefits of bicycling and evaluate its success in the region.	Mid-Term (2015-2018)
<i>FURTHER STUDIES</i>				
Wayfinding signage program	BPAC	ARPO, Municipal and County Planners	Develop a cohesive wayfinding strategy for the region, incorporating the wayfinding recommendations of this plan, and seek funding sources for implementation across the region.	Mid-Term (2015-2018)
Ehringhaus Street	Elizabeth City	ARPO	Complete a combined transportation and land use study of the Ehringhaus Street corridor to address broad safety issues and improve the road for cycling.	Mid-Term (2015-2018)
US 158	Southern Shores, Nags Head, Kill Devil Hills, Kitty Hawk	ARPO	Complete a corridor study of US 158 to identify design solutions that work for all users of the corridor and improve its aesthetic.	Mid-Term (2015-2018)
Hatteras Island to Ocracoke Island Ferry	Dare County	ARPO, BPAC	Complete a study examining bicycle and pedestrian access to this ferry.	Mid-Term (2015-2018)

ACTION STEPS CONTINUED

Task	Lead Agency	Support	Details	Phase
Jennette's Pier/Whalebone Junction	Nags Head	DBPT, ARPO	Complete a study of the NC 12 sidepath's termination at this location. Consider a reduction in driveway access to reduce conflict locations and improve safety.	Mid-Term (2015-2018)
Speed Limit Reduction	Municipalities and Counties	DBPT, ARPO	Further study should be conducted locally to determine appropriate speed limit reduction locations.	Mid-Term (2015-2018)



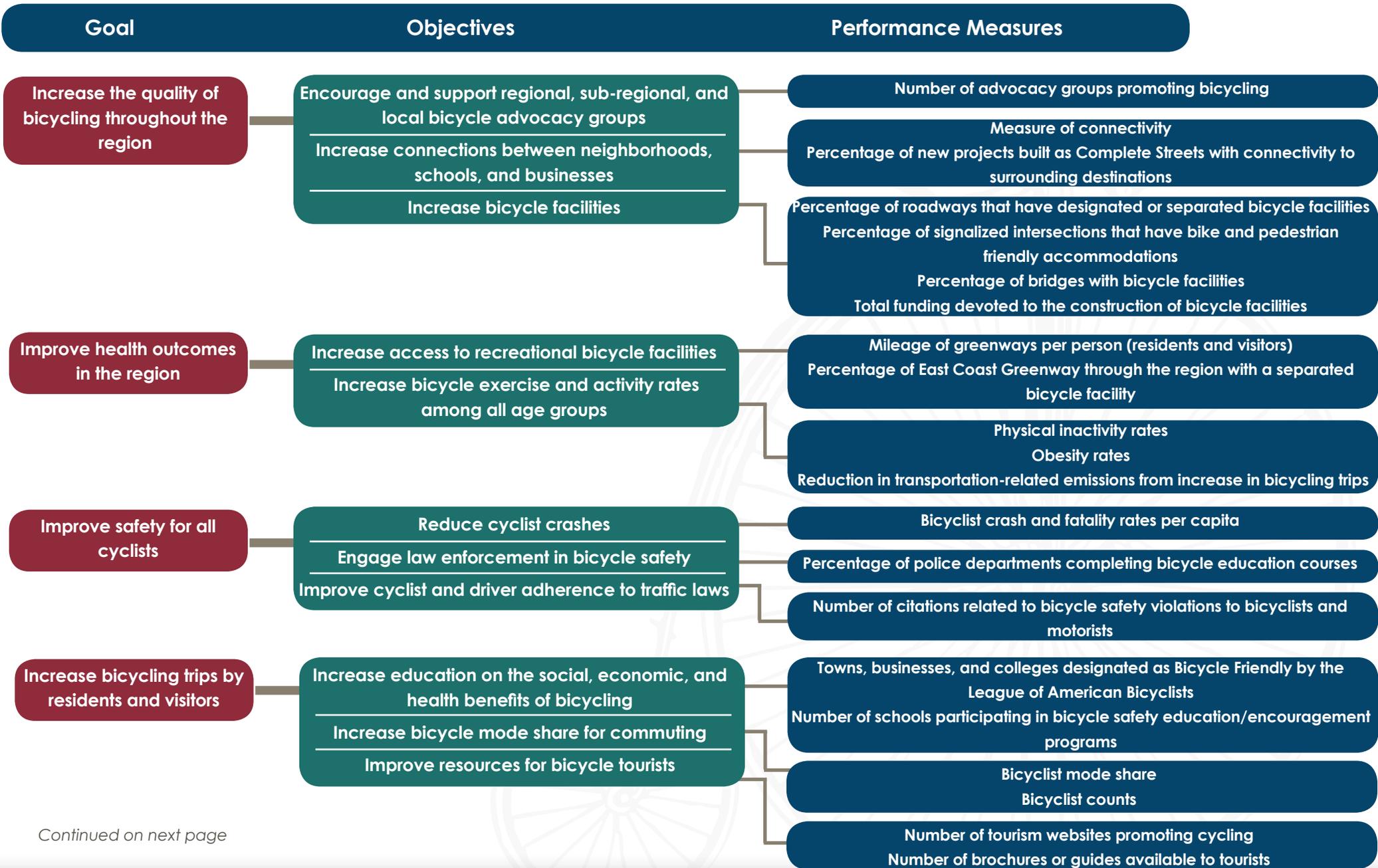
PERFORMANCE MEASURES

As stated above, measuring performance over time is essential to implementation. Tracking performance measures within communities and across the region will allow implementing agencies to understand progress, communicate successes and challenges, and motivate leaders to take further actions. The

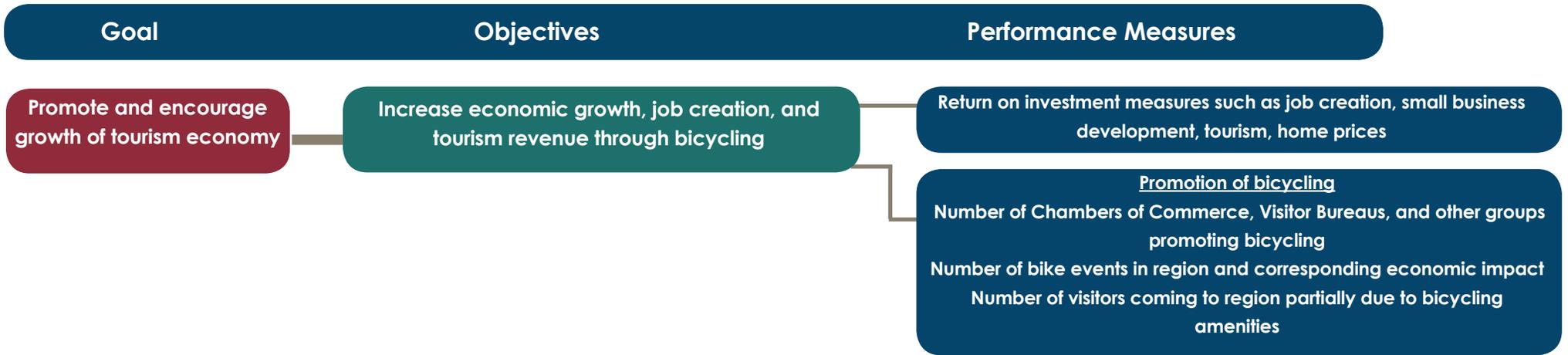
following performance measures were selected to track progress toward the goals of this plan. The BPAC and RPO should together monitor progress against these measures and report that progress in an Annual Performance Report. Individual counties or municipalities may also be interested in tracking and reporting progress independently. The RPO or these individual entities may choose to set specific goals for each measure.

Automated and manual counts are effective ways to measure bicyclist use, characteristics, and behaviors.





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BICYCLE TOURISM

Bicycle tourism for economic development has been a priority of many regions in the United States for the past few decades. North Carolina developed the first statewide bicycle route system in 1974 geared towards scenic riding and created maps for those routes providing information on camping, lodging, and other destinations. At the time of this Albemarle Regional Bike Plan study, NCDOT was considering re-routing and re-branding the state bike route system as part of the WalkBikeNC Plan.

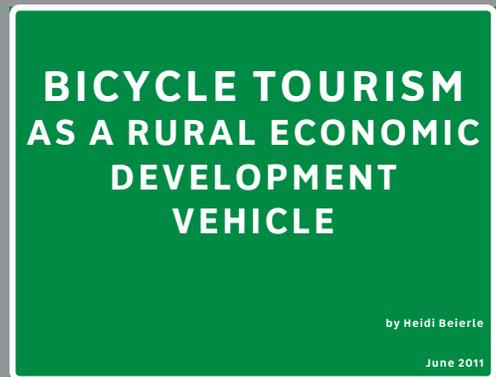
The 2011 Oregon-based report *Bicycle Tourism As a Rural Economic Development Vehicle* is a tremendous resource and provides unique insights into touring bicyclist needs, the economic benefits of bicycle tourism, and key steps for making a region more bicycle-friendly. Increasing bicycle tourism requires cooperation between businesses, cycling clubs, government

agencies, advocates, and local chambers of commerce. The report defines the steps towards bicycle tourism development and provides a menu of action steps at the state, regional, and local level.

The Albemarle Region is unique in its beautiful landscapes, villages, historic towns, waterfronts, and flat terrain, making it a prime candidate for bicycle tourism. Key marketing recommendations that are applicable to the Albemarle Region include:

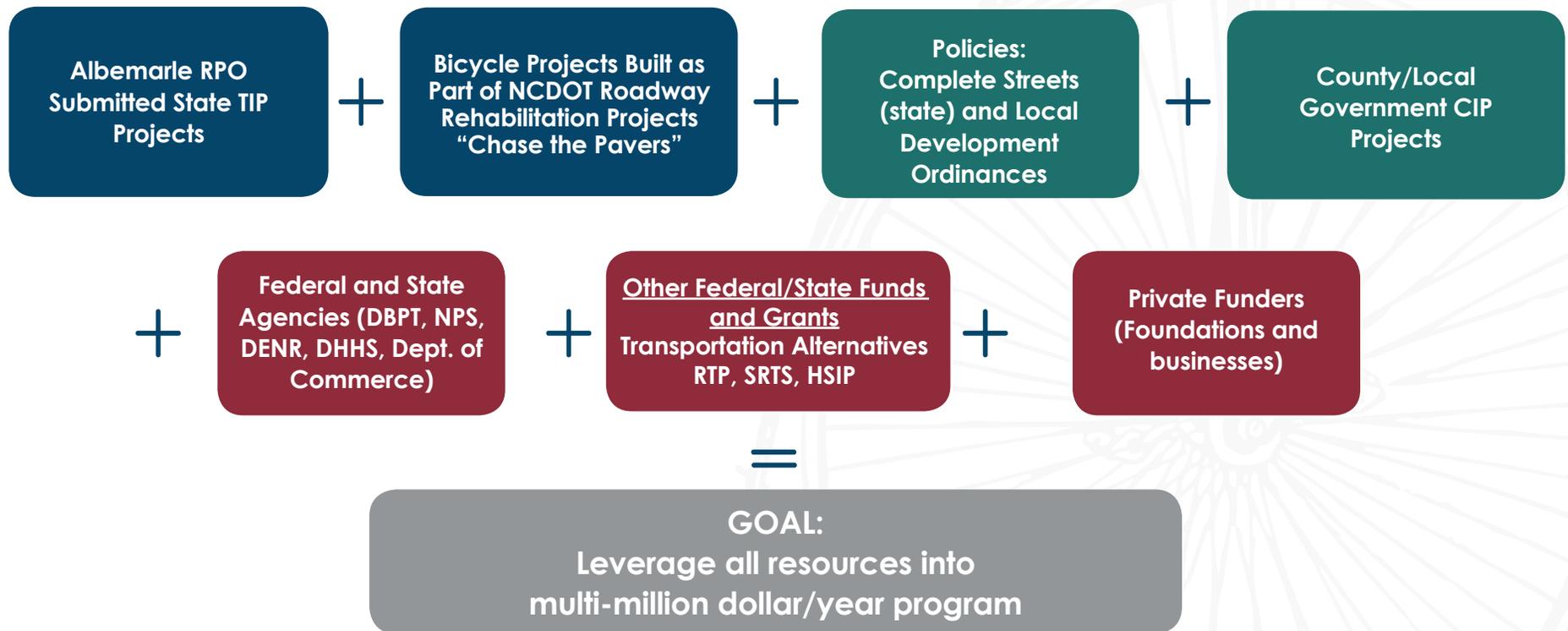
- Market bicycle destinations and activities.
- Develop welcome signs for cycle tourists at gateways.
- Launch a Bed & Bike program for hotels to market themselves to cycle tourists.
- Organize a signature event for recreational cyclists (e.g. Cycle NC).
- Make bike maps, and distribute through tourism groups (Chambers of Commerce, visitor's centers, etc.).

- Organize one or more historic bike rides, then make a brochure to distribute.
- Develop Websites (e.g. <http://www.routeverte.com/rv/index.php?page=home>).
- Enhance regional bike routes and wayfinding.
- Develop strategic bike parking and shelters.



FUNDING STRATEGY

A combination of funding using federal, state, local, and private sources will be necessary to fully implement this plan. The figure below illustrates this combined funding strategy. Detailed information on specific funding options and their applicability to projects and geographies are provided in Appendix E: Funding.



CMAQ - Congestion Mitigation and Air Quality
 RTP - Recreational Trails Program

SRTS - Safe Routes to School
 CIP - Capital Improvement Program

HSIP - Highway Safety Improvement Program
 DBPT - Division of Bicycle and Pedestrian Transportation