TOWN OF BEAUFORT, NC

COMPREHENSIVE BICYCLE PLAN

August 2009

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Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

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EXECUTIVE SUMMARY

OVERALL GOALS:

GOAL: AESTHETICS
To provide aesthetically pleasing bicycle facilities and places to bike that compliment Beaufort's scenic environment.

GOAL: EDUCATION & AWARENESS
To educate the community on the wide-range of benefits of a bike-friendly community, as well as to increase bicyclists', pedestrians', and motorists' awareness of traffic laws and safety measures.

GOAL: ENFORCEMENT
To develop and implement policies and programs to educate both motorists and bicyclists and to enforce those laws relating to both motorists and bicyclists which support a safe bicycling atmosphere.

GOAL: DIVERSITY IN CONSTRUCTION
To develop, construct and improve diverse bicycle-friendly facilities throughout the community.

GOAL: CONNECTIVITY
To develop a well-designed continuous bicycle network that will provide residents and visitors with convenient and pleasant access to popular destinations and points of interest.

GOAL: SUPPORT FACILITIES
To provide bicycle-related facilities for a full range of users and abilities.

GOAL: BIKE-FRIENDLY POLICIES
To pursue bicycle-friendly policies and maintenance procedures to continuously improve bicycling in Beaufort.

GOAL: ENCOURAGE OPPORTUNITIES
To encourage and seek opportunities throughout the community to develop and improve bicycle facilities.

The Town of Beaufort Comprehensive Bicycle Plan is the first plan of its kind for the Town. The Comprehensive Bicycle Plan is funded in part by a grant from the North Carolina Department of Transportation Bicycle and Pedestrian Transportation Division. The development of a Comprehensive Bicycle Plan will support the Town's ongoing efforts to maintain development while making it more convenient and safer for people who bicycle. The Town of Beaufort desires to improve bicycle transportation throughout the Town in order to link tourism and recreation attractions to residential neighborhoods, schools, and commercial districts.

The Town of Beaufort submitted a North Carolina Department of Transportation (NCDOT) Application for Bicycle and Pedestrian Planning Grant Funds for the 2008 grant year. The Town was awarded $28,000 of NCDOT Planning Funds to develop a Comprehensive Bicycle Plan. Accompanied by a local match, the Town of Beaufort hired Rivers & Associates, Inc. to assist with the development of a Comprehensive Bicycle Plan. The Town will use the Bicycle Plan as a guide for developing a bike-friendly community and will assist when making budget decisions and applying for grant funds from regional, state, federal, and private funding sources.

The local government, the County of Carteret, the Carteret County Tourism Development Bureau, the Carteret County Economic Development Council, Carteret County Parks and Recreation and many other organizations throughout the Town and County supports improving Beaufort's bicycle transportation to provide a multi-modal transportation system.

The Town's Land Use Plan, Waterfront Access Plan, and the Carteret County Parks and Recreation Master Plan all support the vision of developing a comprehensive bicycle transportation-planning document that will provide direction in achieving safe bicycle transportation and connectivity in Beaufort.

Beaufort's vision is to ***develop a bike-friendly environment that accommodates all ages and abilities.*** Identified goals and objectives to achieve this vision are discussed in further in **Section 1.**

The current conditions of the Town of Beaufort have been inventoried and evaluated as part of the development of the Comprehensive Bicycle Plan. **Section 2** includes an overview of the Town, current usage/user demographics, an inventory and assessment of existing bicycle facilities and bike compatibility of the

local transportation system. The information obtained regarding Beaufort's current conditions provides the framework for planning bicycle facilities, programs, and policies based on the community's wants and needs.

In addition to analyzing existing conditions, existing plans, programs, and policies at the Local, Regional, and State level were reviewed. Plans and policies determine the type of development that is encouraged and allowed in a community while programs offer methods to promote, encourage, and educate the public on bicycling. Therefore, these tools (plans, policies, and programs) are a key component to ensure an environment that is supportive of bicycling. Existing plans, programs, and policies are highlighted in **Section 3**.

Existing Plans, Programs, & Policies considered in developing Section 3:

- Bicycling in Beaufort Bike Route
- Town of Beaufort CAMA Land Use Plan (2005)
- Beaufort's Greenway Concept Plan
- Carteret County Parks and Recreation Master Plan and Shoreline Access Update Plan (2006)
- Morehead City 2007 Comprehensive Bicycle Plan
- Corridor Management Plan for the Outer Banks Scenic Byway (Draft 2008)
- East Coast Greenway
- Mountain-to-Sea Trail
- Bicycling and Walking in North Carolina: A Long-Range Transportation Plan
- 2009-2015 State Transportation Improvement Program (TIP)
- State Programs and Initiatives
- NC DOT Transportation Improvement Program (TIP)
- Town of Beaufort Code of Ordinances

During plan development, several potential projects were identified that would improve the existing bicycling network. These potential bicycle facilities projects have been broken down into three categories: On-Road Projects and Preferred Treatments, Off-Road Projects & Preferred Treatments, and Ancillary Facilities. **Section 4** describes the Strategic Bicycle Plan, which includes many potential project opportunities that were based upon:

- Steering Committee Meetings
- Public survey & Open House #1 comments
- Bicycle-motor vehicle crash data
- Planned, proposed projects mentioned in existing plans
- Field Inventory and Assessment
- Ability to provided connectivity & improve safety.

Section 5 will provide guidance to the Town of Beaufort on design standards and guidelines for new bicycle facilities. These standards and guidelines are a critical component of this Plan and for all facility construction and development. The design standards and guidelines mentioned in this section are derived from North Carolina Department of Transportation (NCDOT) *Bicycle Facilities Planning and Design Guidelines*, the American Association of State Highway and Transportation Officials (AASHTO) *Guidelines for the Development of Bicycle Facilities*, and the Federal Highway Association (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*, Part 9- Traffic Controls for Bicycle Facilities.

Recommended Programs for Beaufort include:

- Spot Improvement Program
- Infrastructure Maintenance Program
- Education Programs
- Safe Routes to School Program
- Enforcement Programs
- Encouragement Programs & Initiatives

Section 6 outlines recommendations for ancillary facilities, programs, and policies to make the Town of Beaufort a bicycle-friendly community. These recommendations address the Education, Encouragement, and Enforcement categories of a bicycle-friendly community. The implementation of various programs not only encourages bicycling, but also provides education, enforcement, and maintenance opportunities to ensure Beaufort has a comprehensive bicycle network where its users feel comfortable to bike in the community.

Section 7 contains the Recommended Projects. The initial list of potential project locations was developed based on input from the Steering Committee meetings, Town staff, Public Open House #1 and the public survey, and the results of the roadway inventory. One of the most important considerations in implementing the recommendations of this Plan is the planned future construction of the US Highway 70 Beaufort Bypass. All resurfacing, repaving and improvement projects should be evaluated to determine whether it is possible to provide the bicycle facility recommended in this Plan as part of those projects. Bicycle considerations should be included as part of all, Local and NCDOT, scheduled road maintenance and improvement processes.

A wide range of construction projects were identified and recommended to make the Town more bicycle-friendly, such as on-road projects (bike lanes, paved shoulders, Sharrows) to off-road projects (multi-use trails). Thirty-seven (37) construction projects are recommended including four (4) bike lanes, six (6) paved shoulders, eight (8) sharrows, one (1) signed shared roadway, nine (9) multi-use trails, six (6) intersection improvements, two (2) signage improvements, and an overall hazard/spot improvements project. A comprehensive description of all construction projects are found in Table 7.0.

Projects were rated on key characteristics. A project cost analysis was compared to the list of projects organized by project rating. Projects which were estimated to be low cost and also received high ratings were placed in the short-term project category. Short-term opportunities are those that may be completed or implemented in a period of zero to five years (0-5 yrs.). Mid-term projects included those projects with low costs and low ratings as well as projects with high costs and high ratings. Mid-term opportunities are those that may be completed or implemented in a period of six to ten years (6-10 yrs). Projects with high costs and low ratings were placed in the long-term project category. Long-term opportunities are those that may be completed or implemented in a timeframe beyond ten years. However, mid and long term project should be expedited if financing becomes available or a critical need has occurred.

The following table outlines all recommended projects listed in order of priority.

(Note: *The Beaufort East Village project (Map Ref. #13) is subject to further study. A majority of property crossed by this project is currently under development proposal. The planned community is designed with bicycle and pedestrian friendly elements. The exact type of bike project will be subject to final approved development plan.*)

Table ES.0: Recommended Projects by Priority									
Priority Rank	Map Ref. #	Road Class.	Type of Project	At / On	From	To	Approx Length (ft)	Preliminary Opinion of Probable Costs	Implementation Phase
1	18	Town & NCDOT	Sharrow	Turner Street	West Beaufort Road	Front Street	3,800	$17,000	Short-Term
2	15	NCDOT	Signage	Front Street	Fulford Street	Lennoxville Road	N/A	$1,000	Short-Term
3	N/A	Town & NCDOT	Hazard / Spot Improvements	Along Entire Bicycling in Beaufort Route	*N/A*	*N/A*	0	$500-$5000	Short-Term
4	17	Town	Sharrow	Front Street	Sunset Lane	Fulford Street	4,600	$17,000	Short-Term
5	2	NCDOT	Paved Shoulder	West Beaufort Road	NC Hwy 101	Aqua 10 Road	6,600	$396,000	Mid-Term
6	36	NCDOT	Multi-Use Trail	Hwy 101	Live Oak Street / US Hwy 70 East	Copeland	5,800	$270,000	Mid-Term
7	35	Town	Multi-Use Trail	Campen Drive & Lockhart	Carraway Drive	Steep Point Road	3,400	$52,000	Short-Term
8	31	NCDOT	Intersection Improvement	West Beaufort Road & NC Hwy 101	*N/A*	*N/A*	0	$2,000	Short-Term
9	30	NCDOT	Intersection Improvement	Turner Street & US Hwy 70 West	*N/A*	*N/A*	0	$32,000	Short-Term
10	29	NCDOT	Intersection Improvement	Carraway Drive & NC Hwy 101	*N/A*	*N/A*	0	$240,000	Mid-Term
11	25	Town & NCDOT	Sharrow	Live Oak Street	Front Street	NC Hwy 101	5,500	$41,000 to $55,000	Short-Term
12	34	NCDOT	Bike Lane	Cedar Street (US Hwy 70 West)	Moore Street	Live Oak Street (US Hwy 70 East)	3,100	$37,000	Mid-Term
13	27	Town & NCDOT	Intersection Improvement	Campen Drive & Live Oak Street (US Hwy 70 E)	*N/A*	*N/A*	0	$45,000	Short-Term
14	12	NCDOT	Paved Shoulder	Live Oak Street / (US Hwy 70 East)	NC Highway 101 connection	Cedar Avenue (ETJ limits)	11,200	$634,000	Mid-Term
15	7	NCDOT	Multi-Use Trail	Carraway Drive	NC Hwy 101	Professional Park Drive Extension / Campen Road	3,200	$78,000	Short-Term

Table ES.0: Recommended Projects by Priority, Continue									
Priority Rank	Map Ref. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft)	Preliminary Opinion of Probable Costs	Implementation Phase
16	22	NCDOT	Sharrow	US Hwy 70 West	Moore Street	Pivers Island Road	2,500	$3,000	Short-Term
17	6	NCDOT	Paved Shoulder	Lennoxville Road	Live Oak Street / US Hwy 70 East	end of road	11,800	$666,000	Mid-Term
18	14	NCDOT	Paved Shoulder	NC Hwy 101	Copeland	Lake Road	3,300	$377,000	Mid-Term
19	10	NCDOT	Multi-Use Trail	US Hwy 70 West	Pivers Island	Morehead City	6,400	$520,000	Mid-Term
20	26	Town & NCDOT	Intersection Improvement	Professional Park Drive & Live Oak Street (US Hwy 70 E)	*N/A*	*N/A*	0	$1,000	Mid-Term
21	24	Private & NCDOT	Sharrow	Pivers Island Road	US Hwy 70 West	Duke Marine Lab	1,800	$2,000	Mid-Term
22	32	Town	Bike Lane	Broad Street	Queen Street	Yaupon Street	2,600	$11,000	Short-Term
23	4	Town	Sharrow	Broad Street	Turner Street	Queen Street	800	$1,000	Mid-Term
24	19	Town	Signed S,hared Roadway	Moore Street	Cedar Street / US Hwy 70 West	Front Street	1,600	$5,000	Mid-Term
25	28	Town & NCDOT	Intersection Improvement	Live Oak St / US Hwy 70 and Mulberry / Lennoxville	*N/A*	*N/A*	0	$11,000	Mid-Term
26	8	Town & NCDOT	Multi-Use Trail	Abandoned Railroad	Stanton Road	Live Oak Street	2,300	$339,000	Mid-Term
27	16	NCDOT	Paved Shoulder	Pinners Point Road	US Highway 70 East	Howland Parkway	2700	$897,000	Long-Term
28	20	Town	Sharrow	Crescent Drive	Live Oak Street / US Hwy 70 East	Campen Road	1,800	$1,000	Short-Term
29	1	Town	Bike Lane	Professional Park Drive	Live Oak Street / US Hwy 70 East	Campen Road	4,400	$16,000	Mid-Term
30	33	Town	Bike Lane	Broad Street	Moore Street	Turner Street	900	$48,000	Mid-Term
31	9	Town & NCDOT & Private	Multi-Use Trail	Michael J. Smith Airport Property	Aqua-10 Road	NC Highway 101 / Copeland Road	9,400	$391,000	Long-Term

Table ES.0: Recommended Projects by Priority, Continue									
Priority Rank	Map Ref. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft)	Preliminary Opinion of Probable Costs	Implementation Phase
32	13*	Town	Multi-Use Trail	Utility Easement	Leondra Drive	Fairview Drive	4,500	$113,000	Mid-Term
33	23	NCDOT	Multi-Use Trail	Steep Point Road	US Hwy 70 West	end of street - with a connection to Howland Parkway	5,600	$248,000	Long-Term
34	21	Town	Signage	Wellons Drive & Glenda Drive	Campen Road	Pinners Point Road	N/A	$8,000	Mid-Term
35	11	Town	Multi-Use Trail	Easement	Legare Court	Taylor Farm Road with connection to North River Club	5,400	$260,000	Long-Term
36	5	NCDOT	Paved Shoulder	Aqua 10 Road	West Beaufort Road	end of road	800	$58,000	Long-Term
37	3	Town	Sharrow	Mulberry Street	Live Oak Street / US Hwy 70	Craven Street	1,800	$1,000	Mid-Term

** A majority of property crossed by this project is currently under development proposal. The exact type of bike project will be subject to final approved development plan.*

Section 8 describes how the recommendations for improving Beaufort's bicycling conditions will be implemented. This section outlines priorities for projects, programs, and policies as well as potential partners and funding sources. Implementation of this Plan will be a collaborative effort between a variety of Town departments and external agencies. The Town's various departments should be aware of the Plan recommendations and seek to implement them as part of their regular work. The NCDOT Division of Bicycle and Pedestrian Transportation may provide technical expertise on issues related to bicycling and financial assistance to ensure that implementation of the Plan moves forward. Progress on improving the Plan should be monitored on no less than an annual basis. Almost every transportation project offers an opportunity to implement a piece of this Plan.

SECTION 1 – INTRODUCTION

1.0 BICYCLE PLAN INITIATIVE

Section Outline:

1.0 Bicycle Plan Initiative

1.1 Public Involvement

1.2 Vision Statement

1.3 Overall Goals & Objectives

1.4 Purpose of Plan

1.5 Planning Process

1.6 Benefits of Bicycling

The Town of Beaufort Comprehensive Bicycle Plan is the first plan of its kind for the Town. The Comprehensive Bicycle Plan was funded in part by a grant from the North Carolina Department of Transportation, Bicycle and Pedestrian Transportation Division. The development of a Comprehensive Bicycle Plan will support the Town's ongoing efforts to maintain development, while making it more convenient and safer for people who bicycle. The Town of Beaufort desires to improve transportation throughout the Town in order to link tourism and recreation attractions to residential neighborhoods, schools and commercial districts.

The Town of Beaufort submitted a North Carolina Department of Transportation (NCDOT) Application for Bicycle and Pedestrian Planning Grant Funds for the 2008 grant year. The Town was awarded $28,000 of NCDOT Planning Funds to develop a Comprehensive Bicycle Plan. Accompanied by a local match, the Town of Beaufort hired Rivers & Associates, Inc. to assist with the development of a Comprehensive Bicycle Plan. The Town will use the Bicycle Plan as a guide for developing a bike-friendly community and will assist when making budget decisions and applying for grant funds from regional, state, federal, and private funding sources.

The local government, the County of Carteret, the Carteret County Tourism Development Bureau, the Carteret County Economic Development Council, Carteret County Parks and Recreation and many other organizations throughout the Town and County supports improving Beaufort's bicycle transportation to provide a multi-modal transportation system.

The Town's Land Use Plan, Waterfront Access Plan, and the Carteret County Parks and Recreation Master Plan all support the vision of developing a comprehensive bicycle transportation planning document that will provide direction in achieving safe transportation and connectivity in Beaufort.

1.1 PUBLIC INVOLVEMENT

Public input played an important role in the development of the Town of Beaufort Comprehensive Bicycle Plan. The public involvement strategy involved several components including four Steering Committee meetings, two Public Open Houses, and public hearings at the Town's Planning Board and Board of Commissioners. Media outreach was utilized with press releases, public notices, and invitations to all meetings

and open houses to announce the project. The project was also marketed during Beaufort's 300th Birthday events during 2009.

A 17-Member Steering Committee, comprised of Beaufort citizens and Town staff, and the consultant team, met four times throughout the planning process to discuss goals and objectives, priorities, existing conditions, identify potential bicycle corridors and destinations, identify recommendations for projects and programs, and to identify project prioritization. See Appendix A for further information regarding Steering Committee meetings.

In addition to the Steering Committee, pubic input was solicited through an online-survey available through the project website and hard copies of the survey available at Town Hall. Beaufort citizens were notified of the survey through local media outlets, "business card" announcements distributed by the Steering Committee Members, the town's website and monthly Newsletter. Two Public Open Houses were held during development of the Comprehensive Bicycle Plan. The first Public Open House was held on February 19, 2009 at the North Carolina Maritime Museum in Downtown Beaufort. During the first Public Open House, participants were provided the opportunity to express needs and concerns and to identify additional potential corridors. The second Public Open House was held on May 19, 2009 at the Beaufort Elementary School. During the second Public Open House, participants were presented the draft Comprehensive Bicycle Plan and were provided the opportunity to ask questions and provide any further input. Additional information regarding these Public Open Houses can be found in Appendix A.

1.2 VISION STATEMENT

At the Project Kick-Off Meeting, Steering Committee members discussed their vision for the Bicycle Plan. That discussion formulated the final vision for the Plan:

> Beaufort's vision is to ***develop a bike-friendly environment that accommodates all ages and abilities***

1.3 OVERALL GOALS & OBJECTIVES

The overall goals were generated by the Steering Committee at the November 18, 2008 Project Kick-Off Meeting. The following goals and objectives were developed for the Town of Beaufort Comprehensive Bicycle Plan based on input from the Steering Committee.

GOAL: AESTHETICS

To provide aesthetically pleasing bicycle facilities and places to ride that compliment Beaufort's scenic environment.

Objectives:

- To design a variety of routes for all ages and abilities.
- To provide attractive bicycle-related facilities and routes.

GOAL: EDUCATION & AWARENESS

To educate the community on the wide-range of benefits of a bike-friendly community, as well as to increase bicyclists', pedestrians', and motorists' awareness of traffic laws and safety measures.

Objectives:

- Provide brochures, pamphlets, and educational devices to the pubic and private organizations.
- Improve the safety of bicyclists.
- Educate bicyclists, pedestrians, motorists, law enforcement, and others regarding traffic laws and safety measures.
- Encourage the public to support bicycling in the community.
- Develop a helmet program.

GOAL: ENFORCEMENT

To develop and implement policies and programs to educate both motorists and bicyclists and to enforce those laws relating to both motorists and bicyclists which support a safe bicycling atmosphere.

Objectives:

- Increase programming opportunities to educate the public.
- Effectively enforce the rules of the road to both motorists and bicyclists.
- Develop a program for bicycle registration.

GOAL: DIVERSITY IN CONSTRUCTION

To develop, construct and improve diverse bicycle-friendly facilities throughout the community.

Objectives:

- Develop a variety of bicycle facilities to accommodate all persons and abilities.
- Implement traffic calming devices.
- Implement bicycle facilities that are consistent with NCDOT standards of design.
- Encourage the public to report safety issues to the Town.

- Provide signage and pavement markings for roads and other infrastructure that facilitate bicycling.

GOAL: CONNECTIVITY

To develop a well-designed continuous bicycle network that will provide residents and visitors with convenient and pleasant access to popular destinations and points of interest.

Objectives:

- Create safe and accessible access points to popular destinations and points of interest through designed bicycle routes.
- Identify routes to destinations, such as grocery stores, shopping centers, places of work.
- Create or improve safe access to schools.
- Increase connectivity of neighborhoods.
- Create safe access to Morehead City.
- Create safe access to Pivers Island (NOAA and Duke Marine Laboratory).

GOAL: SUPPORT FACILITIES

To provide bicycle-related facilities for a full range of users and abilities.

Objectives:

- Promote the improvement of travel and tourism, as well as business opportunities along bicycle infrastructure.
- Provide funding for bike racks and signage.
- Amend necessary ordinances to allow bike support facilities in all areas.

GOAL: BIKE-FRIENDLY POLICIES

To pursue bicycle-friendly policies and maintenance procedures to continuously improve bicycling in Beaufort.

Objectives:

- Develop ordinances to require bicycle facilities in new and re-development projects.
- Develop a program to re-use confiscated or abandoned bicycles.

GOAL: ENCOURAGE OPPORTUNITIES

To encourage and seek opportunities throughout the community to develop and improve bicycle facilities.

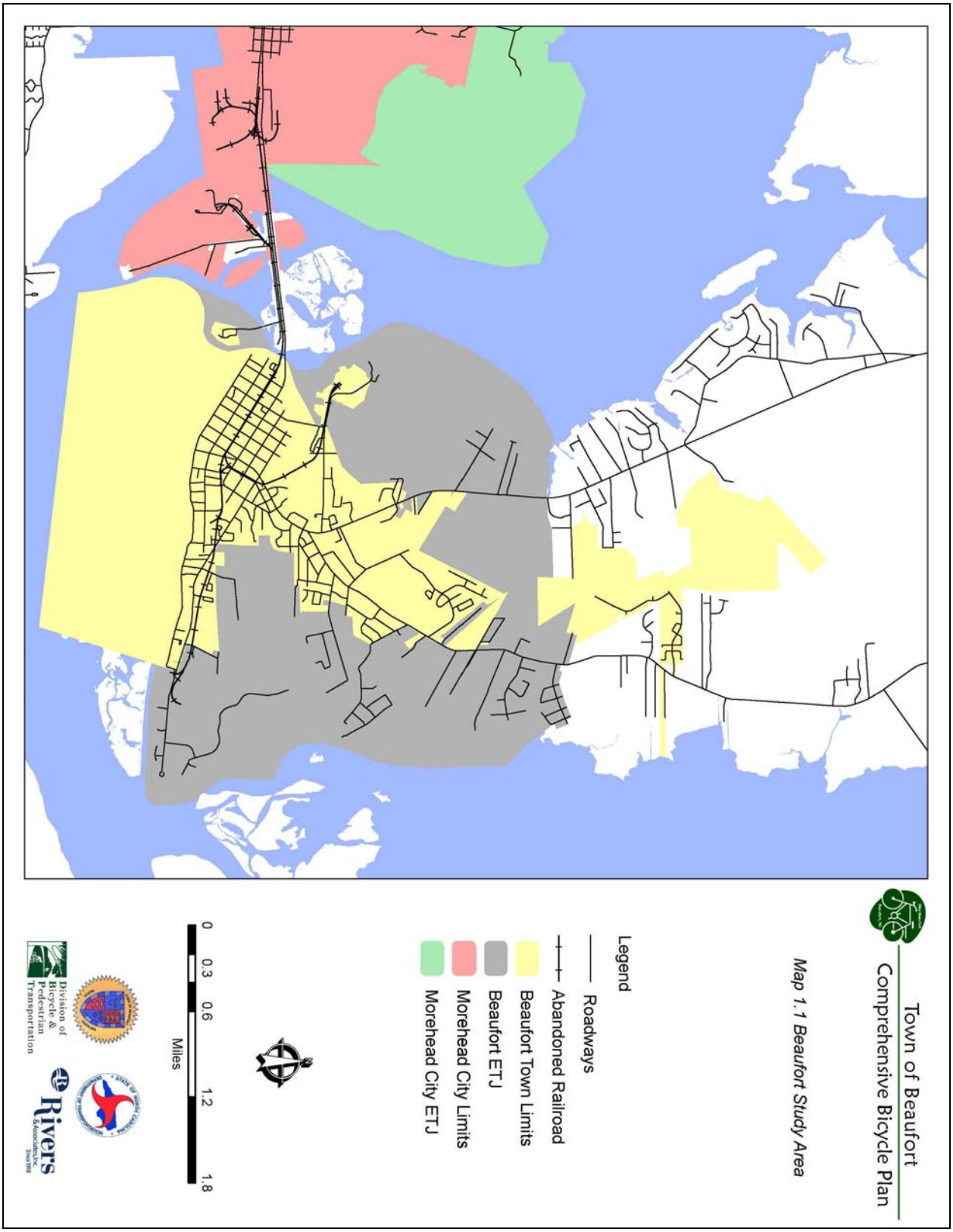
Objectives:

- Encourage the use of bicycling as a legitimate mode of transportation.
- Encourage planners and public officials to develop bicycle routes.
- Coordinate Town, County, and private-sector efforts to improve bicycling facilities and routes.
- Increase bicycle use and trips.
- Use the Bicycle Plan as a marketing tool for the Town.

1.4 PURPOSE OF PLAN

The Comprehensive Bicycle Plan provides a comprehensive, affordable approach to bicycle planning that maximizes Beaufort's existing infrastructure, identifies new opportunities, and creates an opportunity for a more bicycle-friendly community through planning, design, and regulations, in addition to addressing bicycle safety and encouragement.

The Plan Study area includes Beaufort's town limits and extra-territorial jurisdiction. Map 1.1 illustrates the project study area.


Town of Beaufort
Comprehensive Bicycle Plan
Map 1.1 Beaufort Study Area
Legend
Roadways
Abandoned Railroad
Beaufort Town Limits
Beaufort ETJ
Morehead City Limits
Morehead City ETJ
0 0.3 0.6 1.2 1.8
Miles
Division of Bicycle & Pedestrian Transportation
Rivers

1.5 PLANNING PROCESS

The process used for plan development involved four phases: 1) Data Collection, Research and Inventory; 2) Preliminary Recommendation Development; 3) Development and Review of Draft Bicycle Plan; and 4) Final Plan Development and Approval.

PHASE I – DATA COLLECTION, RESEARCH AND INVENTORY

This phase involved data collection, research, and inventory of existing infrastructure and data. Phase 1 contained the following tasks or steps:

- Developed a Public Involvement Strategy;
- Surveyed Beaufort citizens by way of an on-line survey available on the project website and hardcopies of the survey were also available at Town Hall;
- Analyzed survey results;
- Compiled existing data (relevant plans and ordinances, U.S. Census, and crash data);
- Conducted interviews with stakeholders to discuss issues, plans and goals as they related to stakeholder groups and to identify existing plans for infrastructure improvement;
- Analyzed demographics, social and physical threats in the Town;
- Conducted an on-site assessment of current conditions and constraints;
- Summarized existing ordinances, programs, and initiatives;
- Held two Steering Committee meetings;
- Held the first Pubic Open House to provide public with Plan status and direction as well as to identify additional potential corridors, receive public needs and concerns.

PHASE 2 – PRELIMINARY RECOMMENDATION DEVELOPMENT

Based upon Phase 1, preliminary recommendations were developed. Phase 2 contained the following tasks or steps:

- Developed preliminary recommendations for bicycle projects, programs, and policies;
- Conducted an inventory for the roadways where bike facilities are recommended;
- Developed preliminary cost options for recommended improvements;
- Held a third Steering Committee meeting to present preliminary improvements recommendations and to discuss project prioritization;
- Met with NCDOT representatives to discuss preliminary recommendations.

PHASE 3 – DEVELOPMENT AND REVIEW OF DRAFT BICYCLE PLAN

Based upon Phase 1 and Phase 2, a draft plan was developed. Phase 3 contained the following tasks or steps:

- Developed a draft Comprehensive Bicycle Plan based upon the findings of the previous tasks according to the NCDOT's expanded template;
- Held a fourth Steering Committee meeting to present the draft Comprehensive Bicycle Plan for committee feedback and to discuss implementation;
- Held a second Public Open House to present the draft Comprehensive Bicycle Plan containing priorities and funding sources;
- Submitted a draft Comprehensive Bicycle Plan to the Town and NCDOT for review.

PHASE 4 – FINAL PLAN DEVELOPMENT AND APPROVAL

Based upon comments from the NCDOT and Beaufort Planning Board review, the Plan was revised and resubmitted to the NCDOT for approval and to the Board of Commissioners for review and approval. Phase 4 contained the following tasks or steps:

- Developed a revised draft Comprehensive Bicycle Plan based upon the feedback from the NCDOT and Beaufort Planning Board;
- Resubmitted revised plan to the Town for resubmission to the NCDOT for review and approval;
- Final plan with NCDOT and Planning Board revisions submitted to Town for Planning Board and Board of Commissioner's Review;
- Developed a revised final Comprehensive Bicycle Plan based upon feedback from the Town's Planning Board and the Town's Board of Commissioners;
- Submitted final plan to Town for approval and adoption by the Board of Commissioners.

1.6 BENEFITS OF BICYCLING

Bicycling provides a variety of complementary benefits essential for a healthy, livable, and economically thriving community. These benefits include health, transportation, environmental and economic, all of which contribute to a high quality of life.

HEALTH BENEFITS

Having a bicycle-friendly community will increase physical activity and promote better health among all citizens of Beaufort. Some of the health benefits associated with bicycling includes reduced risk of heart disease, stroke, and other chronic life-threatening illnesses. Older adults can also benefit from bicycling. Regular exercise provides myriad health benefits

for senior adults including a stronger heart, a positive mental outlook, and an increased chance of remaining indefinitely independent-a benefit that will become increasingly important as our population ages in the coming years.[I] Bicycling as a form of exercise can help bikers regulate their blood pressure. Regular exercise boosts high-density lipoprotein (HDL), or "good," cholesterol while decreasing low-density lipoprotein (LDL), or "bad," cholesterol.[II] Bicycling can help to improve your mood, combat chronic diseases, manage your weight, strengthen your heart and lungs, promote better sleep and can be fun.

TRANSPORTATION BENEFITS

There are areas of Beaufort that are conducive to bicycle travel because the roads are wide and there is relatively low motorist traffic. However, there are areas throughout Town that experience high traffic volume and the roadways are not bicycle-friendly. The development of a bicycle-friendly community may alleviate roadway congestion and reduce associated driver frustration. Since the natural environment bounds the Town's limits, many of the community's goods, services, and recreational facilities are located within driving distance of residential areas. The 1995 National Personal Transportation Survey (NPTS) found that approximately 40 percent of all trips are less than two miles in length, which represents about a 10-minute bike ride.[III] Implementation of the bicycle plan will assist in installing bicycle infrastructure to provide linkages to the town's destination points as well as increase bicycling trips.

ENVIRONMENTAL BENEFITS

Bicycling is an easy way to reduce energy needs and pollution emissions. A short, four-mile round trip by bicycle keeps about 15 pounds of pollutants out of the air we breathe.[IV] If traffic volumes continue to grow, then the overall air quality will deteriorate with more motor vehicles polluting the air. Providing a safe, alternative method of transportation will increase the number of bicycles on the road; therefore reducing the number of motor vehicles leading to a decrease in emissions.

ECONOMIC BENEFITS

Bicycling is an affordable mode of transportation. Implementation of the plan will create a sense of connectivity in Beaufort that will increase opportunities for further economic development within the Town, such as increased tourism and off-season boaters. Bicycling facilities will make visiting bicyclists feel safer in an unfamiliar area. In 2007, the American Automobile Association (AAA) determined that the average cost per mile to operate a motor vehicle is 62.1 cents (based on traveling 10,000 miles in a year).[V] Bicycling costs less than driving; therefore, people will save money on fuel costs and have more money to spend on other things.

Since Beaufort's economy benefits from tourism, visitors who bike are more likely to stay longer and return to the area if bicycling facilities are available and they have a good experience. Providing bicycling facilities in Beaufort may increase sales at local restaurants and retail stores. Other economic benefits of bicycling include reduced health care costs and reduced dependency on auto ownership.

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[i] Pedestrian and Bicycle Information Center, www.bicyclinginfo.org

[ii] Mayo Clinic, http://www.mayoclinic.com/print/exercise/HQ01676/METHOD=print

[iii] Pedestrian and Bicycle Information Center, www.bicyclinginfo.org

[iv] World Watch Institute, www.worldwatch.org

[v] American Automobile Association, "Your Driving Costs" (2007 Edition)
http://www.aaanewsroom.net

SECTION 2 – CURRENT CONDITIONS

Section Outline:

2.0 Town of Beaufort Overview

2.1 Current Usage / User Demographics

2.2 Inventory & Assessment of Existing Bicycle Facilities

2.3 Bike Compatibility of Local Transportation System

The current conditions of the Town of Beaufort have been inventoried and evaluated as part of the development of the Comprehensive Bicycle Plan. This section includes an overview of the Town, current usage/user demographics, an inventory & assessment of existing bicycle facilities and the bike compatibility of the local transportation system. The information obtained about the Town's current conditions provides the framework for planning bicycle facilities and programs based on the community's wants and needs.

2.0 TOWN OF BEAUFORT OVERVIEW

The Town of Beaufort was founded in 1709 and is the third oldest town in North Carolina with origins as a fishing village. Beaufort is rich in maritime history and served as a port-of-entry to harboring ships from the Atlantic Ocean. During the summer of 1718, the Town was laid out in the grid format that exists today with streets named after royalty and executive officials. Front Street was developed in the early 1800s along Beaufort's waterfront and has since remained a part of the Town's scenic destination. Many of the original homes and roadways are still present in this historic area called Downtown Beaufort. In 2009, the Town will be celebrating its 300th Birthday with festivities planned during the first two weeks of September.[I]

Today, Beaufort is a tourist destination and transient residence, experiencing a permanent and seasonal population. According to the 2005 Beaufort CAMA Land Use Plan, the year 2000 seasonal population was 2,041in addition to a permanent population of 3,771. The peak population in 2000 was estimated to be 5,812.[II] Seasonal and permanent populations are projected to increase as more people move to the coast. Transient boaters traveling the Atlantic coast affect Beaufort's seasonal population. Local marinas and Town docks provide slips for vessels and many of these visitors become bicyclists during their stay in Beaufort.

The Town of Beaufort is one of eleven incorporated municipalities within Carteret County. Carteret County is located in the eastern portion of North Carolina and is naturally bounded by the Atlantic Ocean, Bogue Sound, Core Sound, and Pamlico Sound, including many rivers, creeks and streams. The geography of the County includes relatively flat terrain, sandy soils, and adequate drainage. The location and topography of Carteret County have shaped the development of the County's

municipalities, subdivisions, and economy. The current conditions of Beaufort encourage an active lifestyle, including efforts to develop an alternative transportation system for bicycling.

2.1 CURRENT USAGE / USER DEMOGRAPHICS

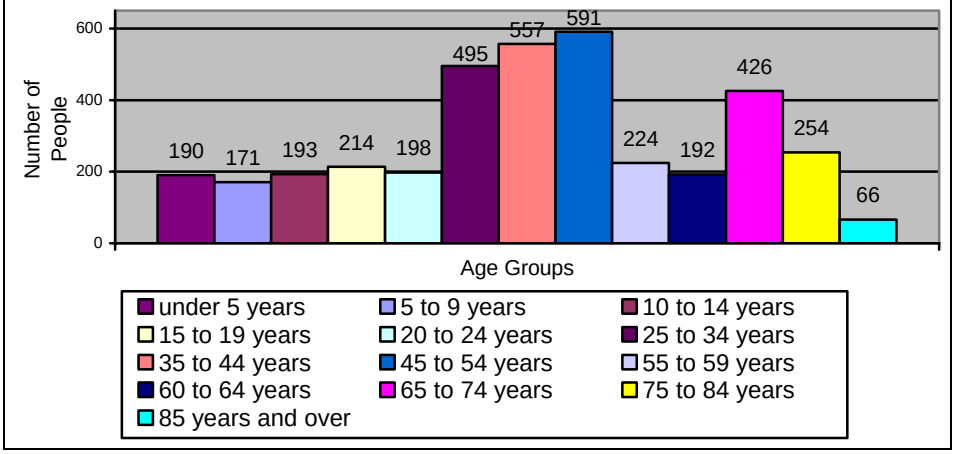
In planning a bicycle network, the demographic makeup of the community is important to know in determining the preferences and travel behaviors of the Town's residents. Information regarding the current usage and user demographics was obtained from the US Census Bureau, the NCDOT Bicycle and Pedestrian Division, and from a public bicycling survey. Analysis of the data received is described in this sub-section.

DEMOGRAPHIC ANALYSIS

A demographic analysis was completed based on data obtained from the US Census Bureau. As of the year 2000, the total population for the Town of Beaufort was 3,771, of which 1,755 were males and 2,016 were females with a median age of 42.7 years. In the same census year, the estimated North Carolina population was 8,046,500 and the US population was 281,424,602. The median age was 35.3 years for both North Carolina and the United States.

In the year 2000, the town's population was distributed with 18.3% under the age of 18 and 19.8% who were 65 years of age or older. In 2000, the percent of persons under the age of 18 in North Carolina was 27.2% and in the US was 28.6%. The population 65 years of age or older in North Carolina was 12% and in the US was 12.4%. In comparison, Beaufort's population is older than the state and national averages. Figure 2.0 reflects the age demographics for the Town of Beaufort in the year 2000.

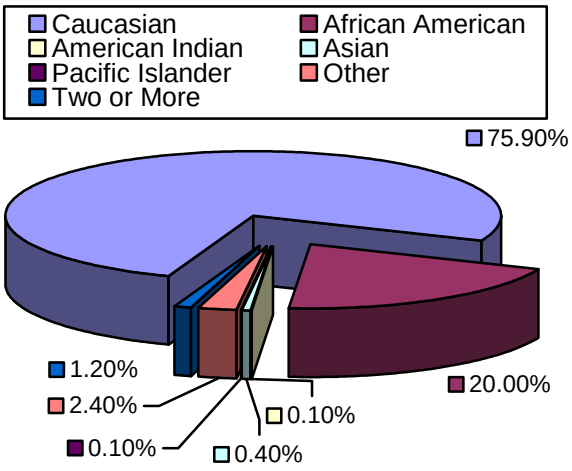
Figure 2.0: Age Demographics, 2000



Source: U.S. Census Data

The racial breakdown of the population of the Town of Beaufort in 2000 was as follows: 75.9% Caucasian, 20.0% African American, 0.1% American Indian, 0.4% Asian, 0.1% Pacific Islander, and 2.4% from other races and 1.2% from two or more races. The racial breakdown of North Carolina's population in 2000 included 73.1% Caucasian and 22.1% African American, which is similar to the racial breakdown of Beaufort's population. The racial breakdown of the US population included 75.1% Caucasian and 12.3% African American, which indicates that North Carolina and the Town of Beaufort have a greater minority population than the national average. Figure 2.1 reflects the racial breakdown of the population of the Town of Beaufort.

Figure 2.1: Population by Race, 2000

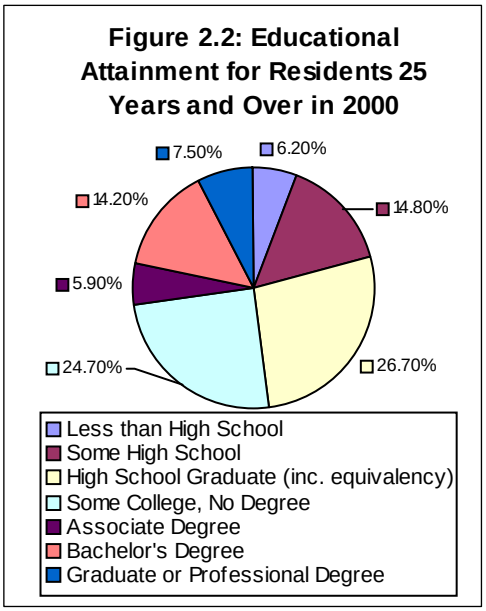


Source: U.S. Census Data

Education

The educational attainment for residents 25 years and over in 2000 was as follows: 6.2% with less than high school, 14.8% with some high school, 26.7% were high school graduates (includes equivalency), 24.7% with some college, no degree, 5.9% with an associate degree, 14.2% with a bachelor's degree, and 7.5% with a graduate or professional degree. Therefore, 78.9% of the 2000 population earned an education of high school graduate or higher. Figure 2.2 reflects the educational attainment for Beaufort's residents 25 years and over in the year 2000.

Figure 2.2: Educational Attainment for Residents 25 Years and Over in 2000



Source: U.S. Census Data

The educational attainment of Beaufort's population is comparable to the state and national levels. In 2000, 28.4% of North Carolina's population 25 years and over were high school graduates (including equivalency) and 78.1% of the state's population attained high school graduation or higher. The US population included 28.6% high school graduates (including equivalency) and 80.4% attained high school graduation or higher.

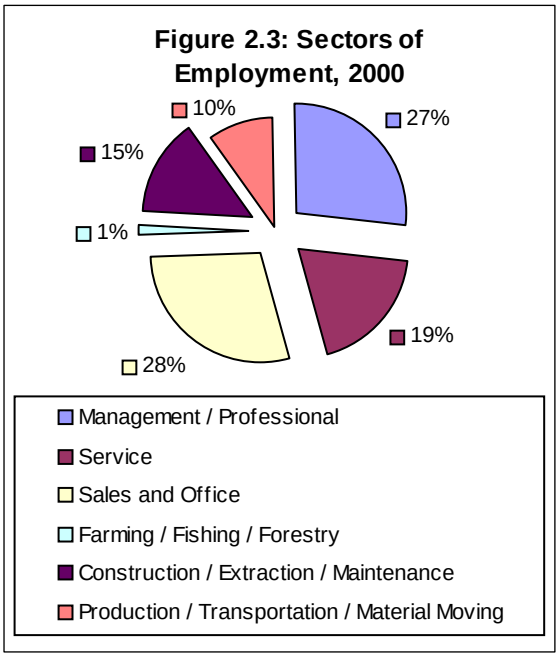
Employment

Beaufort's labor force (population 16 years and over) in 2000 was 1,737 people or 56.3% of the working population. The civilian labor force includes 1,717 people of which 81 people area unemployed and 871 are employed females 16 years and over. Of those in the labor force, 20 people were part of the armed forces. The mean travel time to work was 18.5 minutes.

Figure 2.3 illustrates Beaufort's sectors of employment. Employment can be further broken down into sectors of employment, based on the 1,636 employed civilian population 16 years and over.

The employment industry for the population of Beaufort is focused around urban needs and services. The majority of employment opportunities are in arts, entertainment, recreation, accommodation and food services; in Beaufort, 18% of the employed population works in this industry. Beaufort exceeds the North Carolina and US averages in the industry of arts, entertainment, recreation, accommodation and food services having employed populations of 6.9% and 7.9% respectively. Beaufort is a coastal town and experiences a high seasonal population. Figure 2.4 illustrates Beaufort's employment industry by population.

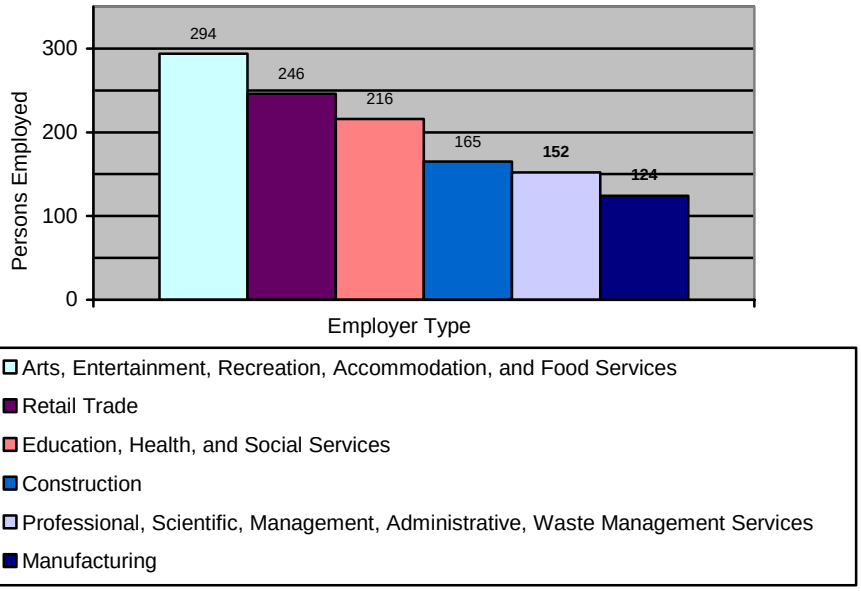
Figure 2.3: Sectors of Employment, 2000



Source: U.S. Census Data

In 2000, the estimated seasonal population of Beaufort was 2,041. Therefore, Beaufort's peak population is approximately 150% of its permanent population, which indicates the need to provide for services in Town.

Figure 2.4: Employment Industry Population, 2000



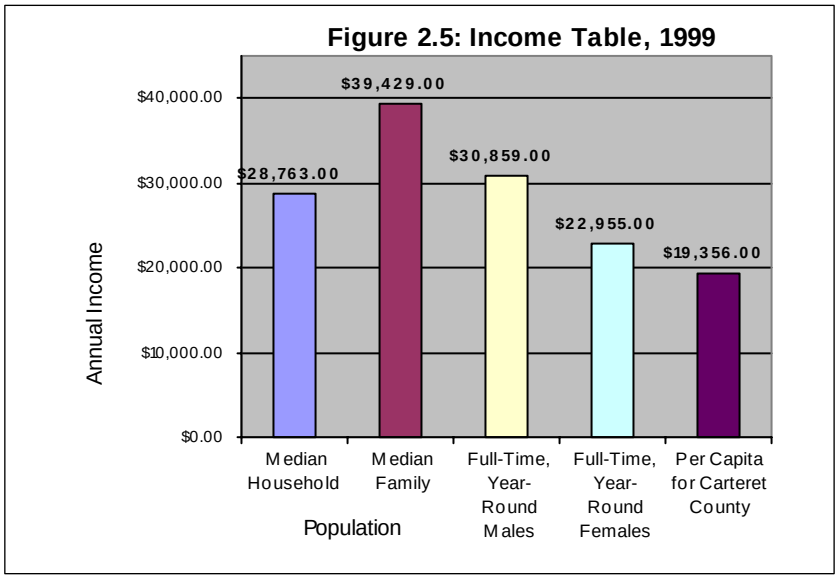
Source: U.S. Census Data

Income

According to the 2000 Census, in the year 1999 Beaufort's median household income was $28,763 and the median family income was $39,429. Beaufort's incomes are significantly less than the state and national averages. In 1999, North Carolina's median household income was $39,184 and the median family income was $46,335. During the same year, the US median household income was $41,994 and the median family income was $50,046.

Beaufort's full-time, year-round workers earned the following median incomes: Males $30,859, females $22,955. The per capita income for Carteret County in 1999 was $19,356. The County's per capita income was comparable to the state and national amounts. In 1999, the per capita income in North Carolina was $20,307 and in the US was $21,587. In 1999, 13.3% of Beaufort's families were below the poverty line, including 38.5% of those with related children under age 18 years. The population below the poverty line of the state and nation is similar to that of Beaufort with 14.3% in North Carolina and 13.0% in the United States.

From this data, there were approximately 1,780 households listed in the town with a median annual household income of $28,763. Figure 2.5 illustrates incomes for the employed population of Beaufort.

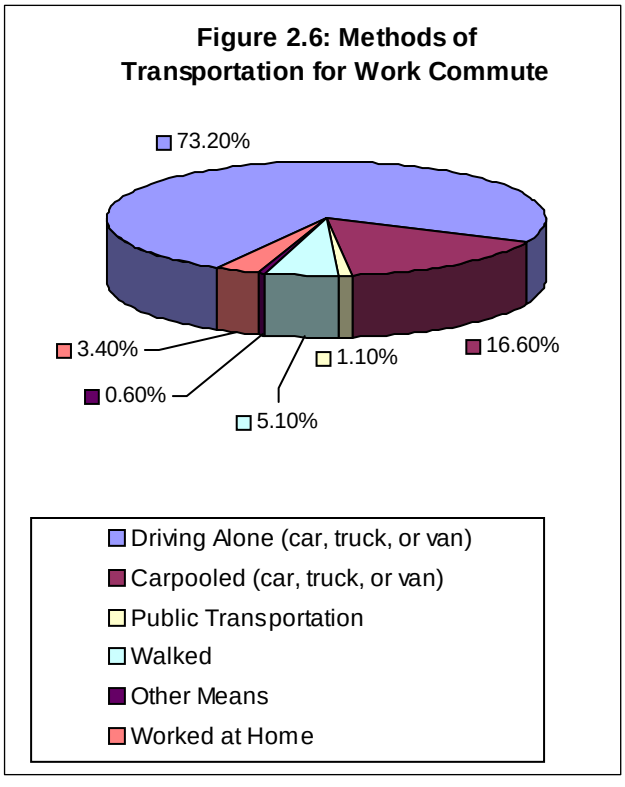


Source: U.S. Census Data

Vehicles

Approximately ninety percent (90%) of Beaufort's households have at least one motor vehicle. Of the occupied housing units (total 1,751), 10.3% have no vehicle, 46.8% have one vehicle, 34.4% have two vehicles, and 8.5% have three or more vehicles. Beaufort's population does not rely on mass public transportation.

Figure 2.6 illustrates the methods of transportation for working residents (16 years and over) of Beaufort. The majority of employed residents drive alone to work in their own vehicle.



Source: U.S. Census Data

PUBLIC SURVEY SUMMARY

The bicycle survey was conducted as one part of the public participation effort for the Bicycle Plan. Respondents could choose from either an online version or hard copy of the survey. The online version was accessible through the project website (www.bikebeaufort.com) and hard copies were available at the Beaufort Town Hall.

The survey was advertized in the Beaufort Newsletter, which is enclosed in the monthly utility bills distributed by the Town. The local newspaper published a story about the Project and public survey. Additionally, members of the Steering Committee and Town staff received informative marketing cards to distribute to the public as a reminder to visit the project website and take the public survey.

The survey period began on November 18, 2008 and continued to accept responses until February 9, 2009 (nearly a 3-month period) during which time 195 responses were received for tabulation by the consultant. **For a copy of the survey questions and complete results, please see Appendix A.**

Of those 195 respondents, 62.1% were female, and the majority of respondents were between the ages of 40 and 54 (30.2%).

The survey found that 62.6% of respondents had ridden a bicycle in the last week. Preferences to biking on weekends, when the weather conditions are warm and dry were the most common responses selected.

While physical exercise was the top reason to ride a bike, having a 91.8% response rate, the survey found that 38.7% of respondents ride their bicycles as a means of transportation to work. The survey also found that 79.4% of respondents bike for recreation, 66.0% of respondents bike to visit a neighbor/family/friend, and 49.5% of respondents ride their bikes to run errands.

Top bicycling destinations include biking in the neighborhood, downtown, into town, to work and to the library. Therefore, recommendations should be geared towards improving cycling to recreation destinations, neighborhoods, and commercial areas.

About half of the survey respondents (52.1%) wear helmets when they ride their bike. Of those respondents that do not wear helmets, 47.7% indicated it is because they do not own one. This information reveals that a program is needed in Beaufort to encourage the benefits of wearing a helmet.

Nearly 100% of respondents indicated that they would like to bike more often. Given the opportunity to select more than one answer, the survey found that respondents would bike more if:

1. There were designated bike lanes on busy street (92.6%);
2. They felt safer amongst traffic (89.6%);
3. There were more clearly marked trails (84.7%);
4. There were better places to ride (77.0%);
5. They felt motorist respected cyclists and better understood cyclists' rights and responsibilities (74.9%).

Survey respondents were asked questions about their perceptions of bicycling and bicycling facilities in the community.

Respondents were given the opportunity to fill-in answers in response to a question regarding roads needing improvements for bicycling. In general, US Hwy 70 received an overwhelming response because US Hwy 70 is a major thoroughfare through Beaufort, including the bridges to the Morehead City area. The following were the most commonly suggested by survey respondents for roadway improvements:

1. US Hwy 70 (in general)
2. NC Hwy 101
3. US Hwy 70 (Bridges to Morehead City)
4. Front Street
5. Lennoxville Road
6. US Hwy 70 (Live Oak St.)
7. (3-way TIE) Anne Street, West Beaufort Road and US Hwy 70 (Cedar St)
8. Merrimon Road
9. Turner Street

Respondents suggested facilities or types of places that bicycle routes should connect. The following are the top ranked places identified for potential connectivity:

1. Shopping Centers/Stores/Local Businesses/Retail
2. US Hwy 70 West (to Morehead City, Piver's Island, Duke Marine Lab)
3. Downtown Beaufort
4. Grocery Stores (including Piggly Wiggly & Food Lion)
5. Schools
6. Neighborhoods (inc. NC Hwy 101)
7. Parks
8. Library (current and future)
9. Eastern Athletic Club
10. Post Offices

The following responses were perceived to be the top major barriers to bicycle transportation in Beaufort:

1. No bike lanes on major roads and thoroughfares
2. Motorist behavior
3. Narrow Roads
4. Cyclist insecurity/dangerous situations
5. US Hwy 70
6. (TIE) Traffic/Congestion and Lack of off-street routes/connectivity

7. (TIE) Bridges and Lack of Shoulders
8. (TIE) NC Hwy 101 and Road Surface/Debris Conditions

Nearly 100% of respondents (99.5%) support change in bicycle facilities and policies to make Beaufort a more bicycle-friendly community.

Only 10.3% of respondents rated the bicycle conditions in Beaufort to be "good." The majority of respondents provided a lesser rating, 46.2% rated the conditions as "fair" and 42.9% rated conditions as "poor."

More than half of all survey respondents (67.8%) live within the Town limits of Beaufort. Of the 32.3% of respondents that do not live within Town limits, the following areas were the most commonly indicated area of residence:

1. Morehead City
2. NC Hwy 101
3. Deerfield (NC Hwy 101)
4. Merriman
5. East Creek Subdivision (101)
6. Havelock

LOCAL BICYCLE CRASH DATA

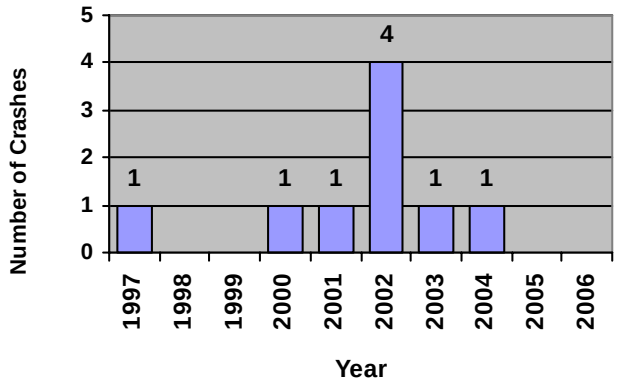
The Town of Beaufort's bicycle crash data was analyzed using the NCDOT's web-based bicycle crash database. This data was created by the UNC Highway Safety Research Center from all reported bicycle-motor vehicle crashes within Beaufort from 1997 to 2006.[III] The data was analyzed to determine trends and to identify the high-risk areas of Beaufort. This information does not include instances involving only bicycles, like a fall, where medical attention may have been sought.

During the nine-year period, the Town of Beaufort experienced nine (9) reported bicycle-motor vehicle crashes. There were four (4) crashes reported during 2002, which was the highest year of bicycle-motor vehicle crashes. The following figure shows the distribution of crashes from 1997 to 2006.

Characteristics of the crash data were reviewed to determine location, injuries and results of the crashes.

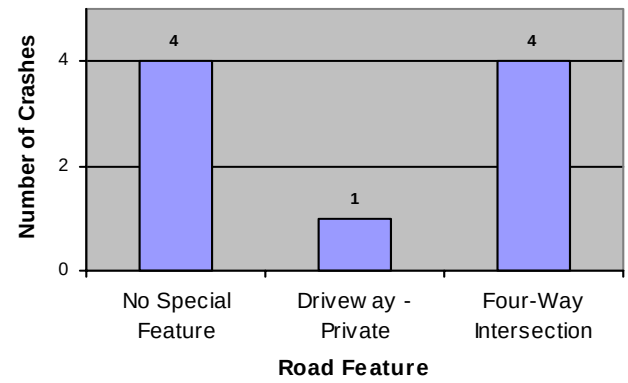
Figure 2.8 illustrates road characteristics of each crash. Four (4) of the nine (9) bicycle-motor vehicle crashes occurred at four-way intersection locations. Four (4) of the (9) bicycle-motor vehicle crashes occurred at locations that had "no special features." Improving roadway conditions and intersections will aid in reducing crashes within these areas.

Figure 2.7: Total Number of Bicyclists Involved in Crashes by Year



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data

Figure 2.8: Crashes Depending Upon Road Feature - 1997-2006



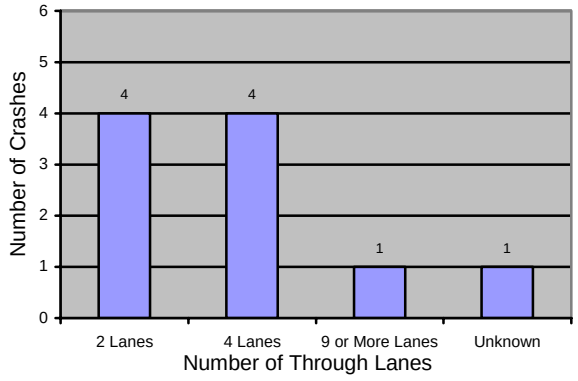
Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicvcle Crash Data

One hundred percent (100%) of the reported bicycle-motor vehicle crashes occurred on a local town street. This indicates the need for additional safety measures such as bicycle visibility, enforcement, additional signage, marked routes, driveway improvements.

Figure 2.9 shows the distribution of crashes according to road configurations. The majority of bicycle-motor vehicle crashes (5) occurred on two-lane roads within the Town of Beaufort. The Town's four-lane roads also experienced two (2) crashes. The number of crashes on multiple-lane roads indicates a possible need for reduction of vehicle speeds, bike lane or shoulder installation, road narrowing, intersection improvements, off-road trails/paths, improvement of surface quality, enforcement/compliance of traffic laws, access management and lighting.

RECOMMENDATION: Install high-visibility warning signs to alert drivers to the presence of bicyclists.

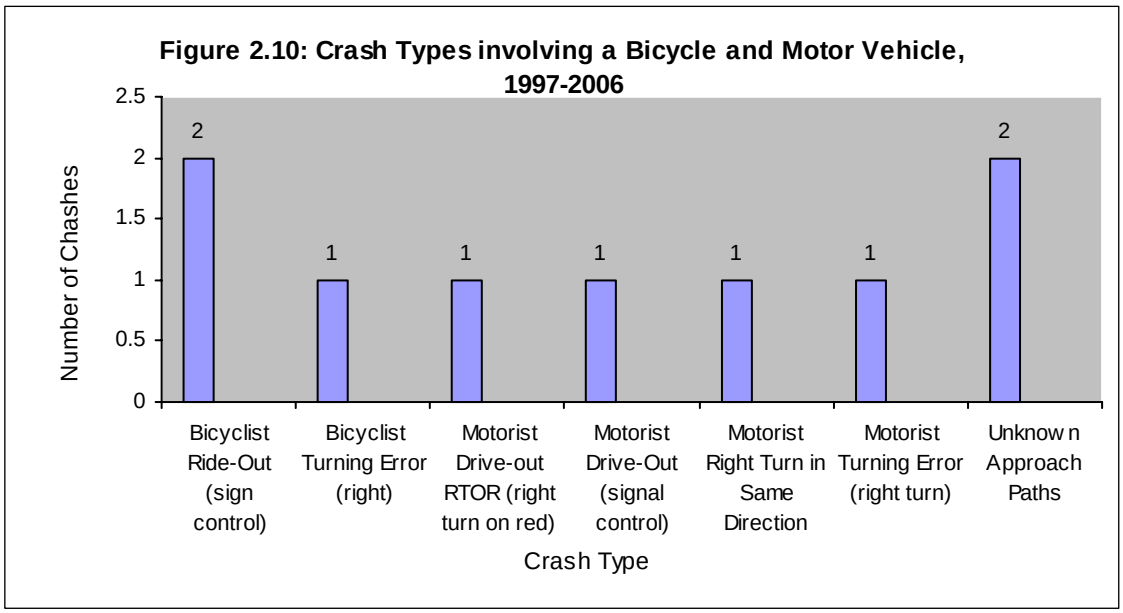
Figure 2.9: Road Configuration, 1997-2006, Crashes Involving at least one bicyclist



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data (NCDOT Data indicates a recorded bicycle crash on a road with 9 or more lanes. However, no such roads exist in Beaufort.)

The bicyclists' compliance with the rules of the roadway is indicated by the direction the bicyclist is traveling. According to the data, two (2) crashes occurred when bicyclists were facing traffic and two (2) crashes occurred when cyclist were following traffic. The bicyclists direction is unknown for the four (4) other crashes in Beaufort and one (1) is not available. It appears that outreach may be needed to educate bicyclists in proper riding with traffic.

Figure 2.10 indicates the types of bicycle-motor vehicle crashes that occurred in Beaufort. The crash data indicates a need for increased safety education for bicyclists and motorists alike.

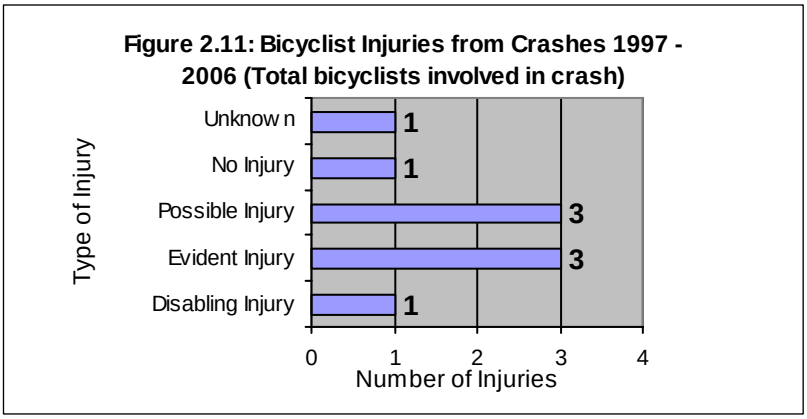


Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data

The likelihood of bicycle injuries increases with higher speed limits. According to a report (BIKESAFE) by the NC Highway Safety Research Center, "…faster speeds increase the likelihood of bicyclists being struck and seriously injured. At higher speeds, motorists are less likely to stop in time to avoid a crash." The report indicated a driver traveling at 31 miles per hour needs approximately 200 feet to stop, which usually exceeds the available sign and distance; whereas, a driver traveling at 19 miles per hour is able to stop completely within100 feet. While the posted speed limit of one (1) of the crashes is unknown, four (4) bicycle-motor vehicle crashes occurred at 25 mph and four (4) crashes occurred at 35 mph. **Therefore, the Town should consider traffic-calming measures and/or speed reductions on streets with bicycle facilities.**

RECOMMENDATION: Install traffic-calming measures and/or speed reductions on streets with bicycle facilities

The degree of injuries obtained in bicycle crashes is illustrated in the Figure 2.11. According to the data reported to the NC Division of Motor Vehicles by investigating officers, fifty-five percent (55%) of Beaufort's bicycle-motor vehicle crashes involved an ambulance request and no crashes were reported as a hit and run.

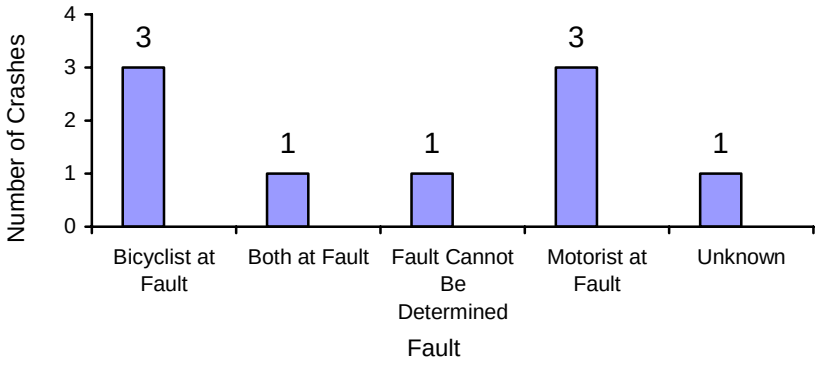


Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data

Figure 2.12 indicates the need for motorist and bicyclist education regarding safety. The data shows that bicyclists are equally at fault as motorists with respect to bicycle crashes.

RECOMMENDATION: Install street level lighting to improve visibility of bicyclists and improve overall security along roadways.

Figure 2.12: Fault for Crash, 1997-2006 (where at least one was a bicyclist)

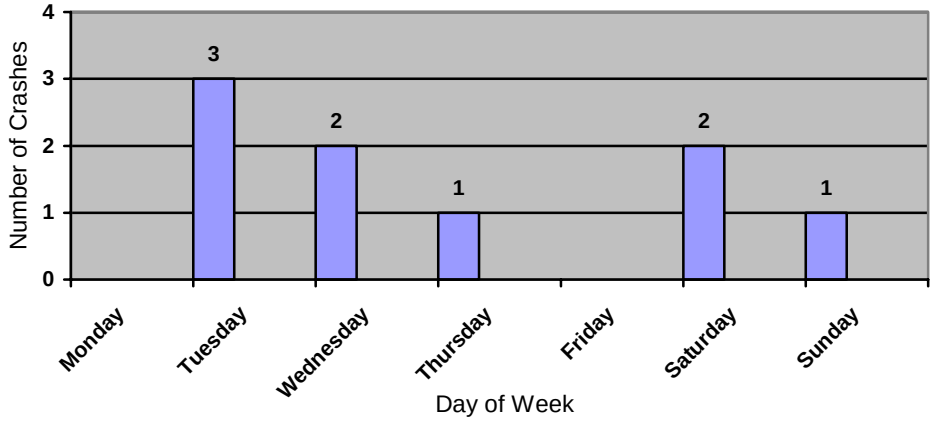


Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data

Figure 2.13 illustrates the day of the week when the bicycle-motor vehicle crashes occurred. Crashes occurred throughout the week with three (3) crashes on Tuesday and two (2) crashes on both Wednesday and Saturday. One (1) crash occurred on both a Sunday and a Thursday. Weekday crashes could be the result of commuters to and from work. Weekend crashes could be the result of adults and children spending time outdoors or of increased tourist traffic to the Beaufort area.

RECOMMENDATION: Education programs to inform riders that lights or reflectors are required on bicycles.

Figure 2.13: Day of Week Crash, 1997-2006



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data

The time of day when the bicycle-motor vehicle crashes took place indicate rider preferences. All nine of the crashes in Beaufort occurred between 2:00 p.m. and 9:59 p.m. Five (5) of the crashes occurred between 2:00 p.m. and 5:59 p.m. This timeframe suggests that people may be riding bicycles when schools let out for the day, when persons are commuting to or from work, or during days of longer daylight. Four (4) of the crashes occurred before between 6:00 p.m. and 9:59 p.m. during times of the day when bicycle visibility is diminishing. **Therefore, the Town should consider installing high-visibility warning signs to alert drivers to the presence of bicyclists, providing additional street and pedestrian-level lighting to improve bicyclist visibility at night, and offering education programs to inform riders that lights are required on bicycles after dark.**

Crash data also indicates that the majority of bicyclists ride during the daytime (not graphed). Seventy-eight percent (78%) or seven (7) of Beaufort's bicycle-motor vehicle crashes occurred during the daylight. Twenty-two percent (22%) of bicycle-motor vehicle crashes occurred after dark. One crash occurred at dark on a lighted roadway and one crash occurred at dark on an unlighted roadway.

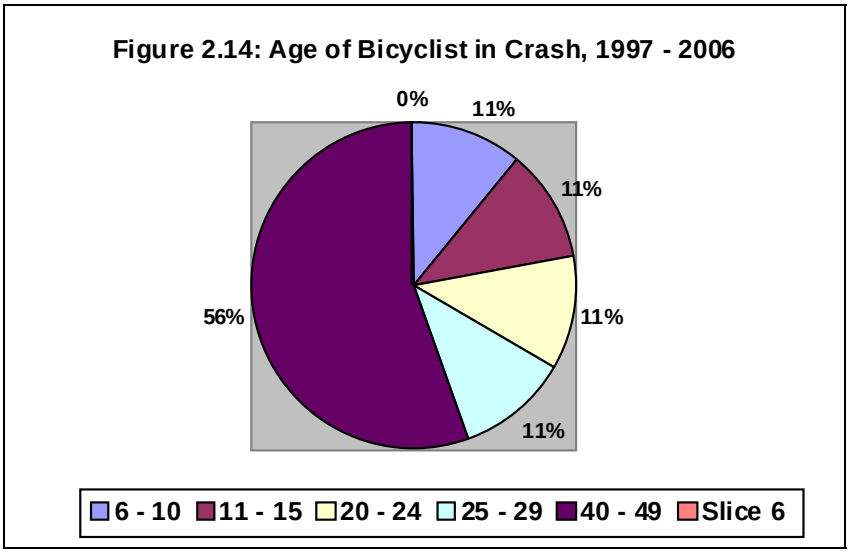
The months of moderate – warm weather saw the majority of bicycle-motor vehicle crashes with seven of nine crashes occurring from April through September. The weather conditions reported in Beaufort's bicycle-motor vehicle crash data indicate an even distribution of crashes four (4) on a clear day as opposed to five (5) crashes on a cloudy day. These numbers indicate that there is a higher level of bicycle activity during the months with warm weather.

According to crash data, the majority of bicyclists in bicycle-motor vehicle crashes were males (6) compared to two (2) females. The gender of one bicyclist is unknown.

Of the nine reported bicycle-motor vehicle crashes, the race of the bicyclists included four (4) whites, four (4) blacks and one (1) is unknown.

Figure 2.14 shows that bicycle-motor vehicle accidents affect all age groups, however, the 40-49 age group accounted for five (5) of the nine (9) crashes.

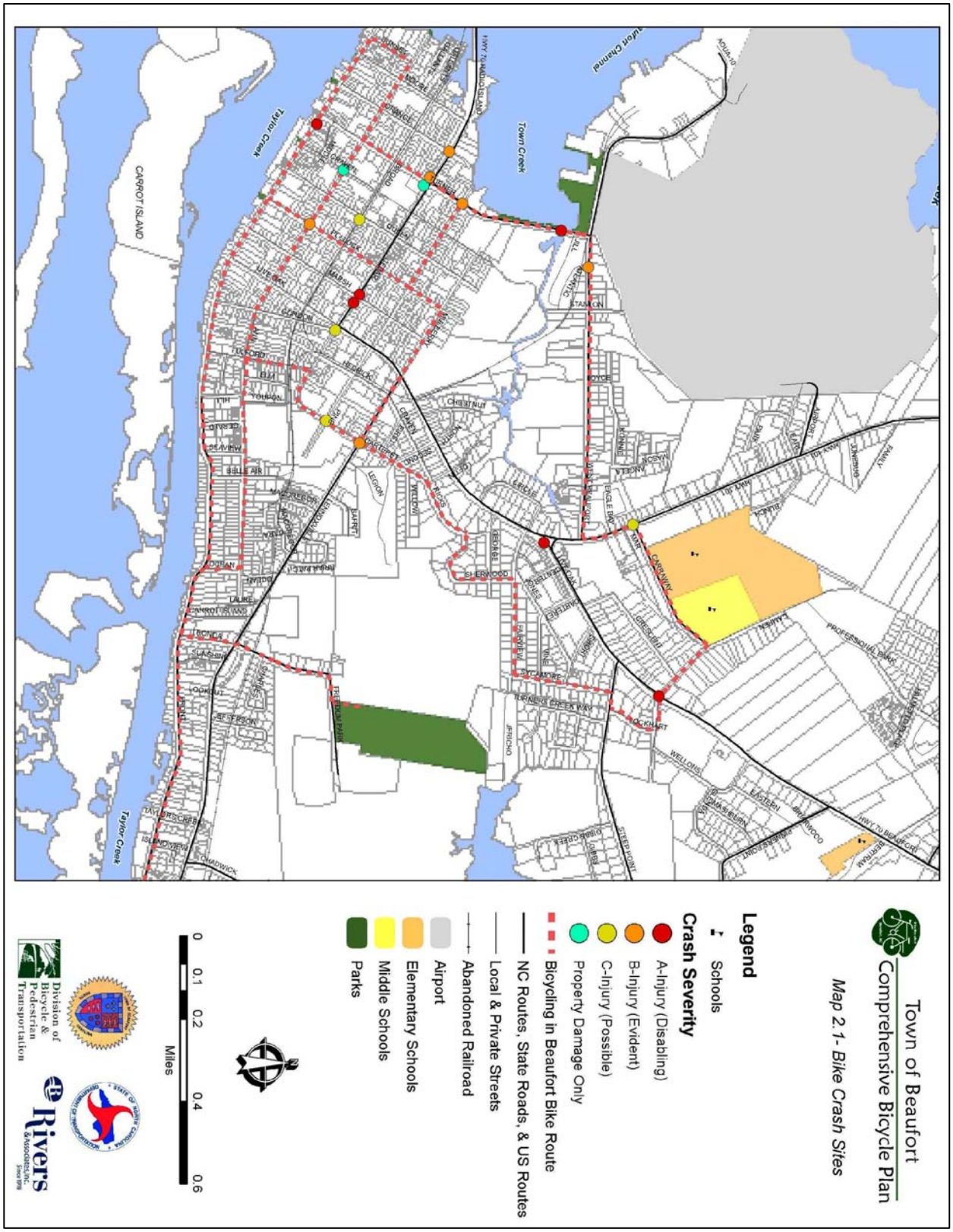
Figure 2.14: Age of Bicyclist in Crash, 1997 - 2006



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data

Analysis of Beaufort's crash data indicates a need for additional bicycle safety education, traffic and bicycle enforcement, bicycle-friendly development standards, and improved bicyclist visibility along roadways and intersections. The Town had nine (9) bicycle-motor vehicle crashes from 1997 – 2006. A helmet was not used by any rider, thus indicating a need for possible helmet giveaways, and bike safety outreach to all age groups.

Map 2.1 illustrates the documented bicycle and motorist crash sites.


Town of Beaufort
Comprehensive Bicycle Plan
Map 2.1- Bike Crash Sites
Legend
Schools
Crash Severity
A-Injury (Disabling)
B-Injury (Evident)
C-Injury (Possible)
Property Damage Only
Bicycling in Beaufort Bike Route
NC Routes, State Roads, & US Routes
Local & Private Streets
Abandoned Railroad
Airport
Elementary Schools
Middle Schools
Parks
0 0.1 0.2 0.4 0.6
Miles
Division of Bicycle & Pedestrian Transportation
Rivers & Associates, Inc.
Taylor Creek
Town Creek
CARROT ISLAND

2.2 INVENTORY & ASSESSMENT OF EXISTING BICYCLE FACILITIES

As part of the planning process, it was important to inventory and assess the existing bicycle facilities and roadways in Beaufort. During the Steering Committee meetings and Public Open House, bike routes and destinations were identified by the residents. In addition to current routes and destinations, residents provided comments concerning barriers to bicycle transportation and potential opportunities for future development of bicycle facilities. This part of the public participation process provided significant information on the current conditions of Beaufort's bicycle network and bicycling preferences throughout the community.

Beaufort Town staff and the consultant conducted an inventory of the existing conditions of the existing designated Beaufort Bicycle Route on November 25, 2008. The information collected included street widths, presence and width of curbs and gutters, speed limits, condition of surface, and identification of constraints. Currently, there are no existing bike lanes, multi-use paths, or paved shoulders (of 4-foot width) in Beaufort. Analysis of this data allows recommendations to be made as part of the Town of Beaufort Comprehensive Bicycle Plan.

Existing Bike Route Sign in Beaufort

BICYCLING IN BEAUFORT BIKE ROUTE

The Town of Beaufort currently has one designated bicycle route that was developed as part of the 1988 Transportation Improvement Program by the NC DOT. "The Beaufort Bicycle Route points the way with green and white bike route signs which mark a six-mile loop around town."[IV] The brochure, *Bicycling in Beaufort*, is displayed in Town Hall and copies are available to the public; it includes a map of the signed bicycle route and delineates the locations of points of interest, schools, parks, and shopping areas. Additionally, connector routes are indicated on the map for access to the signed route.

The following are the most common observations that were recorded during the inventory assessment of the Beaufort Bicycle Route:

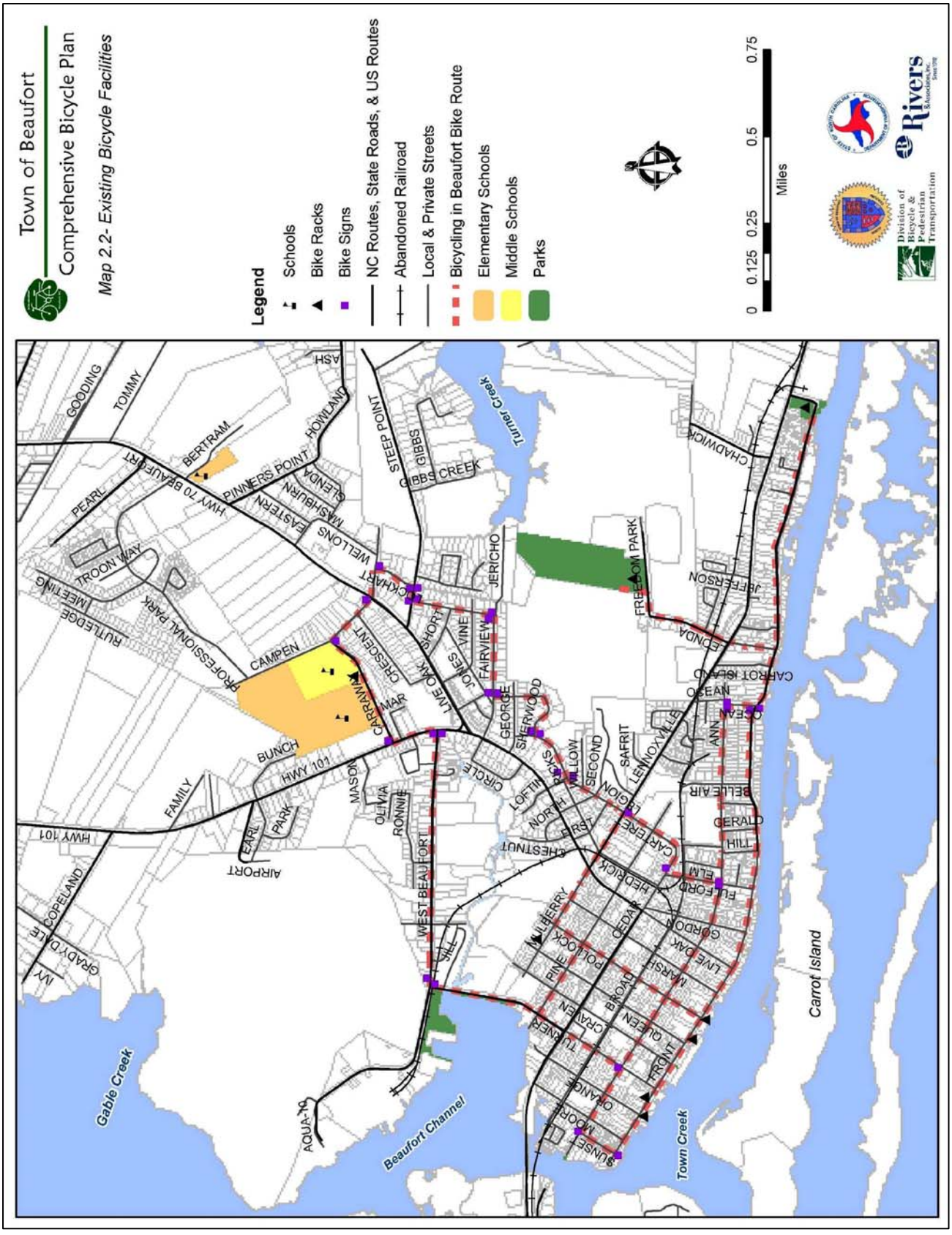
1. Undivided roadways
2. On-street parking (marked/signed)
3. On-street parking (unmarked/signed)
4. Narrow to no shoulders
5. Lack of signage
6. No curbs and/or gutters
7. Eroded shoulders and turn aprons
8. Ditches along roadways
9. Narrow roadways
10. Hazardous drainage grates
11. High-traffic intersections
12. One-way streets

The roadway inventory of the existing Bicycle Route was used in the development of the project recommendations found in Section 7. **For a detailed roadway inventory, refer to Appendix C.**

BIKE RACKS

Existing Bike Rack on Front St. In Beaufort

Bicycle parking racks are located throughout Town in areas such as at the public library, the Maritime Museum, Grayden Paul Park, Carteret County Boys and Girls Club, and several other locations along Front Street in Beaufort's waterfront district. According to Police Chief Steven C. Lewis, some key areas for potential addition of bike racks include the County Courthouse and throughout the downtown district. Since the courthouse is a County property, a partnership with the county may provide an opportunity to provide such facility. Other suggested areas for bicycle racks include shopping centers (such as Beaufort Square), Duke Marine Lab and Freedom Park. Map 2.2 shows the location of existing bicycle facilities available in Beaufort.


Town of Beaufort
Comprehensive Bicycle Plan
Map 2.2- Existing Bicycle Facilities
Legend
Schools
Bike Racks
Bike Signs
NC Routes, State Roads, & US Routes
Abandoned Railroad
Local & Private Streets
Bicycling in Beaufort Bike Route
Elementary Schools
Middle Schools
Parks
0 0.125 0.25 0.5 0.75
Miles
Division of Bicycle & Pedestrian Transportation
Rivers
Gable Creek
Beaufort Channel
Town Creek
Carrot Island
Turner Creek
HWY 101
HWY 70 BEAUFORT
GOODING
TOMMY
PEARL
BERTRAM
ASH
HOWLAND
PINNERS POINT
GLENDA
EASTERN
MASHBURN
WELLONS
TROON WAY
RUTLEDGE MEETING
PROFESSIONAL PARK
CAMPEN
CRESCENT
CARRAWAY
MAR
BUNCH
FAMILY
MASON
OLIVIA
RONNIE
PARK
EARL
AIRPORT
COPELAND
GRADY DALE
IVY
AQUA-TEX
WEST BEAUFORT
STEEP POINT
GIBBS
GIBBS CREEK
JERICHO
SHORT
VINE
JONES
FAIRVIEW
LIVE OAK
CIRCLE
GEORGE
SHERWOOD
LOFTIN
WILLOW
SECOND
NORTH
FIRST
CHESTNUT
SAFRIT
LEMNOXVILLE
LEGION
CARTERET
HEDRICK
ELM
FULFORD
GORDON
LIVE OAK
MARSH
BROAD
QUEEN
FRONT
TURNER
CRAVEN
POLLOCK
PINE
MULBERRY
CEDAR
OLIVE
MOORE
ORANGE
SUNSET
FREEDOM PARK
JEFFERSON
EDNA
CHADWICK
OCEAN
ANN
BELLE AIR
GERALD
HILL

2.3 BIKE COMPATIBILITY OF LOCAL TRANSPORTATION SYSTEM

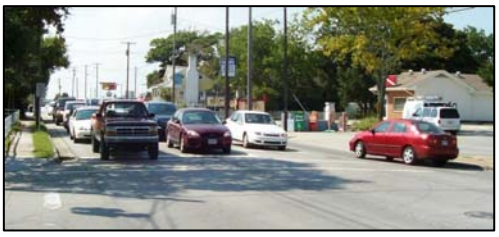
In order to have a local transportation system that is bike compatible, the needs of the community need to be in the forefront of everyone's mind. To ensure Beaufort's transportation system is compatible with these user groups, the following information must be identified:

- Roadways
- Intersections
- Bridges
- Transition Areas
- Deficiencies/Barriers
- Hazards

An inventory of the roadways identified during the public participation process and Steering Committee meetings was conducted for additional bike routes on Friday, February 13, 2009. During this inventory process, data was gathered on the existing transportation system to assist with project recommendations and to determine existing conditions of these transportation components. **For a detailed inventory of select roadways, refer to Appendix C.**

ROADS

The Town's two primary thoroughfares influence transportation in Beaufort: US Highway 70 and NC Highway 101. These two roads affect the development of bicycle facilities because many of the Town's destination points are located on or near these corridors and at some point, a bicycle route will need to cross the thoroughfares. Careful planning will be needed to improve the safety of bicycling on US Highway 70 and NC Highway 101. Beaufort's downtown area and its surrounding neighborhood are ideal for riding a bicycle because it was originally constructed in a grid pattern, which allows opportunities for various connector routes. In general, Beaufort has low-posted speed limits; however, some areas may benefit from traffic calming devices.



US Hwy 70 West towards Morehead City

Campen Road & US Hwy 70 East Intersection

INTERSECTIONS

Almost half of all recorded bicycle-motor vehicle crashes in Beaufort have occurred at a four-way intersection. Currently, there are only four (4) intersections in Beaufort that have traffic signals. It is necessary to design intersections to increase awareness of bicyclists and improve connectivity between destinations to achieve safe crossing of intersections. The intersections could be improved with warning signage indicating bicycle crossing and bicycle-activated detector loops.

Gallant's Channel Bridge towards Morehead City

BRIDGES

Access to and from Beaufort involves traveling along US Highway 70 across existing bridges. The bridges have high traffic volumes with little usable shoulders for bicyclists. Therefore, bicyclists must use at least part of the roadway travel lane to cross the bridges. Improving visibility and safety of bicyclists and pedestrians on the bridges should be a priority. The only identified improvement to the bridges is NCDOT TIP project number R-3307, which involves the removal of the Gallant's Channel Draw Bridge and the construction of a new hi-rise bridge and bypass facility. The new bypass facility will reconnect in Beaufort with a new intersection of US Highway 70 and West Beaufort Road. Bicycle facilities have not been addressed as part of this bridge project. Bike lanes should be implemented with the project in addition to advance warning signs to alert drivers and bicyclists to use caution when approaching and crossing the bridges.

Transition area on NC Hwy 101 passed West Beaufort Road Intersection

TRANSITION AREAS

Beaufort has several transition areas that are impacted by the development of bicycle facilities. The presence of drainage culverts found along and on the roadways become transition areas along routes and often provide potentially hazardous situations for bikers and motorists sharing the roadway. Drainage culverts are used in Beaufort to mitigate water runoff, and reduce flooding by directing the flow of water through a series of ditches. Drainage culverts are also designed as an alternative to bridge construction to aid in stream crossing. Drainage culverts over streams are located on Turner Street, NC Highway 101 and Lennoxville Road. Drainage culverts over ditches are located adjacent to many of Beaufort's streets, roadways and intersections. The presence of existing culverts should be considered in the development of bicycle facilities.

DEFICIENCIES / BARRIERS

Barriers to bicycling were identified by Town staff, the consultant and the public. Some of the barriers are geographical or caused by the natural environment, while others are man-made hazards or safety hazards. In order to develop a safe bicycle network in Beaufort, some of these barriers will need to be removed or redesigned to improve safety and connectivity.

Town Creek along Turner Street in Beaufort

Natural Environment

The natural environment of Beaufort may provide constraints for development of bicycle facilities. The Town of Beaufort is surrounded by water on approximately three sides. This environmental feature limits vehicular access into and out of Town. Neighborhoods and transportation corridors have been developed around these water features. Additionally, the Town is located within the floodplain; therefore, low-lying areas along streams and creeks are subject or prone to flooding. These barriers influence long-distance bicycling because of the limited access into and out of Beaufort.

The topography of Beaufort is relatively flat; therefore, the safety hazards are low with respect to grade and incline.

Man-Made Hazards

The lack of bicycle facilities during the development of the Town's roads and thoroughfares is a man-made barrier to bicycling. The historic waterfront district was developed in a grid pattern having short blocks, narrow streets, and limited sidewalks. When originally developed, the Town was centered on the waterfront port and its boating facilities. Motor vehicle parking facilities were not a need until more recent decades. Today, many of the neighborhood streets within the waterfront district are safe for bicycling due to lack of thru traffic and low speed limits. However, there are some areas where bicycle visibility may be low due to the vehicular parking and one-way streets. The waterfront district has several areas of on-street angled parking and off-street parking areas. The angled on-street parking is potentially hazardous to cyclists when vehicles back out of the parking space into the bike route.

On-street parking along Pollock Street in Beaufort

Recently, commercial and residential development in Beaufort has been along the Town's primary thoroughfares: US Highway 70 and NC Highway 101. These roads experience heavy traffic volumes and are potentially hazardous to bicyclists. A short section of the existing Bicycle Route is located along NC Highway 101, between Caraway Drive and West Beaufort Road. The high volume of vehicular traffic in this area of the existing Route is a barrier to bicyclists, especially to school-aged children attending the nearby elementary and middle schools.

Many of the roads within Beaufort lack shoulders so there is inadequate separation between motor vehicles and bicyclists. This is a man-made barrier to bicyclists particularly on roads with higher speed and heavier traffic. Barriers to bicycling may be reduced through traffic calming devices, reduction of speed limits, widening of curbs and shoulders, and installation of bicycle signage.

A road without adequate shoulders for safe bicycling in Beaufort

SAFETY HAZARDS

A number of potential safety hazards were identified as barriers to bicycling along the existing Beaufort Bicycle Route. The safety hazards include the condition of the roads, drainage grates, a lack of signage, and major intersections. Barriers caused by safety hazards offer areas of short-term improvement to the existing Route.

An eroded turn along Beaufort's existing bike route

The condition of the roadways is a potential barrier to bicyclists. Safety hazards include settled or cracked pavement, eroded shoulders, eroded turning aprons, and sways along the roadway. Such barriers along the existing Bicycle Route were identified during the inventory assessment. Removal of these barriers should be incorporated through a spot improvement program or routine maintenance procedures.

Potentially hazardous drainage grates along Front Street in Beaufort

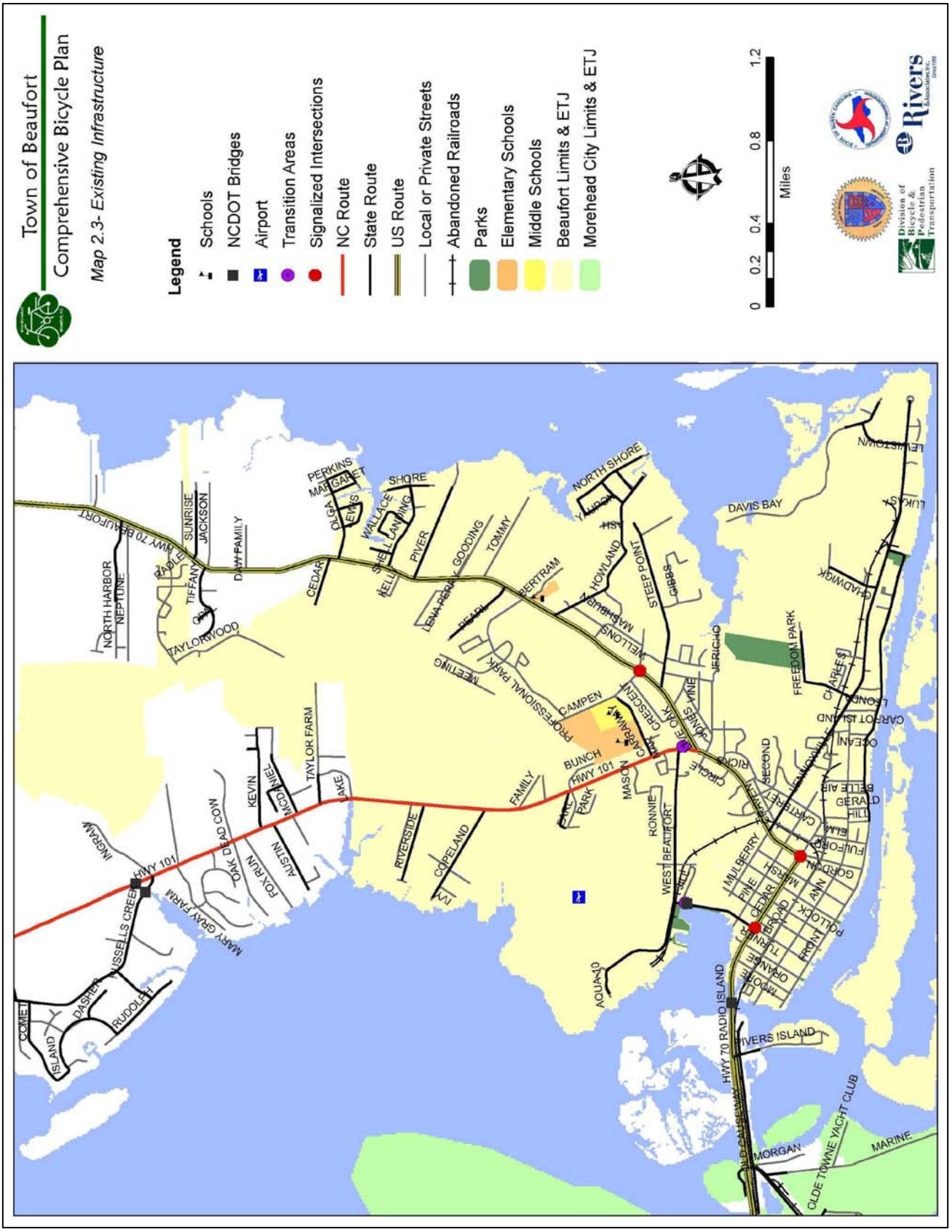
Another safety hazard involves drainage grates in the roadway. Along the existing Bicycle Route, many drainage grates were identified during the inventory assessment. Grate styles and condition may cause bicycles to catch their wheels in the grooves, or gaps, of the grates. Unsafe drainage grates should be replaced with grates that are consistent with NCDOT's standard grate design. Multiple re-surfacing of streets has left many grates depressed several inches below the pavement surface. Uneven pavements surrounding grates should be corrected.

A lack of signage is a possible safety hazard to bicyclists. Signs indicate the existing Bicycle Route at roadway turns, but no additional road signals or signs are included directed towards bicyclists. In addition to increased directional signage, signage could be used to indicate, "Narrow Road" or "Share the Road" to educate motorists and bicyclists of potentially hazardous situations.

Share the Road signage on West Beaufort Road

Major intersections can potentially be a hazardous area for bicyclists sharing the road with motorists. Many of the intersections within Beaufort need improvement. While there are only four (4) signaled intersections within the Town, there are no special provisions for bicyclists at the intersections. For example, the existing Bicycle Route crosses the signaled intersection at Campen Road and Live Oak Street. Currently, the intersection with a posted speed limit of 25 mph has no

crosswalks, curbs nor gutters. Intersections may be improved through the addition of striped crosswalks, bike detectors and signage, which could increase the awareness of bicyclists in the roadway. Map 2.3 illustrates the existing transportation infrastructure within the study area.


Town of Beaufort
Comprehensive Bicycle Plan
Map 2.3- Existing Infrastructure
Legend
Schools
NCDOT Bridges
Airport
Transition Areas
Signalized Intersections
NC Route
State Route
US Route
Local or Private Streets
Abandoned Railroads
Parks
Elementary Schools
Middle Schools
Beaufort Limits & ETJ
Morehead City Limits & ETJ
0
0.2
0.4
0.8
1.2
Miles
Division of Bicycle & Pedestrian Transportation
Rivers & Associates, Inc.
HWY 70 BEAUFORT
NORTH HARBOR
NEPTUNE
RADLEY
SUNRISE
JACKSON
TIFFANY
DAWN
FAMILY
TAYLORWOOD
PERKINS
MARGARET
OLGA
EMMS
CEDAR
WALLACE
SHORE
KELLY
LANDING
PIVER
LENA PEARL
GOODING
TOMMY
PEARL
BERTRAM
NORTH SHORE
HOWLAND
MARSHBURN
WELLONS
STEEP POINT
GIBBS
DAVIS BAY
LEWISTOWN
LUKAS
CHADWICK
FREEDOM PARK
JERICHO
MEETING
PROFESSIONAL PARK
CAMPEN
CRESCENT
CARAWAY
PINE
SPARKS
CIRCLE
RIDGE
SECOND
CHARLES
CARROT ISLAND
OCEANI
BELLE AIR
GERALD
FULFORD
GORDON
MULBERRY
PINE
CEDAR
ROAD
FRONT
POLLOCK
OCEAN
MOORE
TURNER
HWY 101
BUNCH
FAMILY
MASON
RONNIE
WEST BEAUFORT
PARK
RIVERSIDE
COPELAND
IVY
TAYLOR FARM
LAKE
KEVIN
MOODY NEIL
AUSTIN
FOX RUN
OAK DEAD COW
MARY GRAY FARM
INGRAM
HWY 101
ISSELLS CREEK
COMET
ISLAND
DASHER
RUDOLPH
AQUA 10
HWY 70 RADIO ISLAND
RIVERS ISLAND
OLDE TOWNE YACHT CLUB
MARINE
MORGAN

[I] Beaufort-by-the-Sea's 300th Anniversary Celebration, "History of Beaufort," Available online: http://www.beaufortbythesea300.org/history.php

[II] Town of Beaufort, North Carolina, "Land Use Plan Update" (draft March 2005)

[III] NCDOT, Division of Bicycle and Pedestrian Transportation – Bicycle Crash Data. November 2008, http://www.pedbikeinfo.org/pbcat/bike_main.htm

[IV] *Bicycling in Beaufort* Brochure

SECTION 3 – EXISTING PLANS, PROGRAMS & POLICIES

Section Outline:

3.0 Relevant Plans

3.1 Relevant Programs & Initiatives

3.2 Relevant Policies & Institutional Framework

3.3 Relevant Bicycle Statutes & Ordinances

In addition to analyzing existing conditions, reviewing existing plans, programs, and policies at the Local, Regional, and State level is also important. Plans and policies determine the type of development that is encouraged and allowed in a community while programs offer methods to promote, encourage, and educate the public on bicycling. Therefore, these tools (plans, policies, and programs) are a key component to ensure an environment that is supportive of bicycling.

The following plans, programs, and policies were reviewed in this section:

- Bicycling in Beaufort Bike Route
- Town of Beaufort CAMA Land Use Plan (2005)
- Beaufort's Greenway Concept Plan
- Carteret County Parks and Recreation Master Plan and Shoreline Access Update Plan (2006)
- Morehead City 2007 Comprehensive Bicycle Plan
- Corridor Management Plan for the Outer Banks Scenic Byway (Draft 2008)
- East Coast Greenway
- Mountain-to-Sea Trail
- Bicycling and Walking in North Carolina: A Long-Range Transportation Plan
- 2009-2015 State Transportation Improvement Program (TIP)
- State Programs and Initiatives
- NC DOT Transportation Improvement Program (TIP)
- Town of Beaufort Code of Ordinances

3.0 RELEVANT PLANS

LOCAL PLANS

Bicycling In Beaufort Bike Route

The Town of Beaufort has one designated bicycle route that was developed as part of the 1988 Transportation Improvement Program by the NC DOT. "The Beaufort Bicycle Route points the way with green and white bike route signs which mark a six-mile loop around town." (Source: *Bicycling in Beaufort* brochure). The brochure, *Bicycling in Beaufort*, is displayed in Town Hall and copies are available to the public; it includes a map of the signed bicycle route and delineates the locations of points of interest, schools, parks, and shopping areas. Additionally, connector routes are indicated on the map for access to the signed route.[1]

BICYCLING in BEAUFORT

The leisurely pace of life and the flat topography of the area make Beaufort an ideal place for getting around by bicycle. Businesses, schools, shopping areas and recreation facilities are all easily accessible by bike. The Beaufort Bicycle Route points the way with green and white bike route signs which mark a six-mile loop around town. Residents and visitors alike will enjoy riding along quiet neighborhood streets to their destinations, avoiding the bustle of the busy thoroughfares through town.

The map inside outlines the route, highlighting the locations of points of interest, schools and shopping areas. A short loop along the waterfront and through the historic district is shown as are spur routes to Freedom Park and Jaycee Park. Connectors between the main route and residential areas are also shown.

Give it a try. You'll soon find that riding a bicycle is the only way to go.

BEAUFORT SIGHTS

Founded in 1709, Beaufort is a town immersed in history. A bicycle ride along the quiet streets of the Historic District provides a glimpse into the past. Visits to the points of interest listed below paint a vivid picture of life in Beaufort during centuries past.

1 NC Maritime Museum
Bounded on three sides by water, Beaufort's history is inextricably tied to the sea. The museum is filled with lively exhibits which document this maritime history as well as the natural history of the coastal region. Hours are Monday-Friday 9-5, Saturday 10-5 and Sunday 2-5. Admission is free.

2 Historic District and Restoration Grounds
More than 100 historic homes line streets named for important figures of the day such as Queen Anne, the Earl of Craven and the Prince of Orange. In the heart of this area is the Restoration Grounds, where costumed hostesses guide visitors through a complex of period buildings. Tours are offered Monday–Saturday from 9:30-4:30. A modest fee is charged.

3 Beaufort Waterfront
Visions of stately 18th century schooners are evoked along the renovated waterfront where sailors once attended to their business at the ships chandlery, customs house and trading establishments.

4 Rachel Carson National Estuarine Sanctuary
Wild descendents of shipwrecked horses still graze on the marsh grasses of the islands across Taylor Creek. Established to protect the fragile ecology of the area, over 160 species of birds have been sighted here.

BICYCLE LAWS and SAFETY TIPS

The bicycle has been legally considered a vehicle in North Carolina since 1937. Thus bicyclists have full rights and responsibilities on the roadway and are subject to the regulations governing the operation of a motor vehicle, where applicable. North Carolina traffic laws require the rider of a bicycle to:

- ride on the right, in the same direction as other moving traffic;
- obey all traffic signs and signals;
- use signals to communicate intended movements;
- equip the bicycle with a front lamp visible from 300 feet and a rear reflector or lamp which is visible from a distance of 200 feet for riding at night.

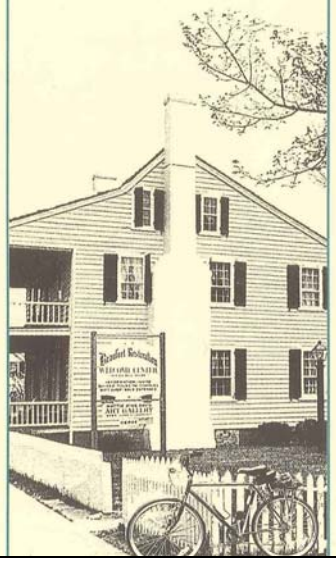
Remember, the bicyclist always loses in a conflict with a motor vehicle. Ride defensively and in a predictable manner to avoid accidents. Be courteous to other drivers. To help enhance your safety, the following precautions are recommended:

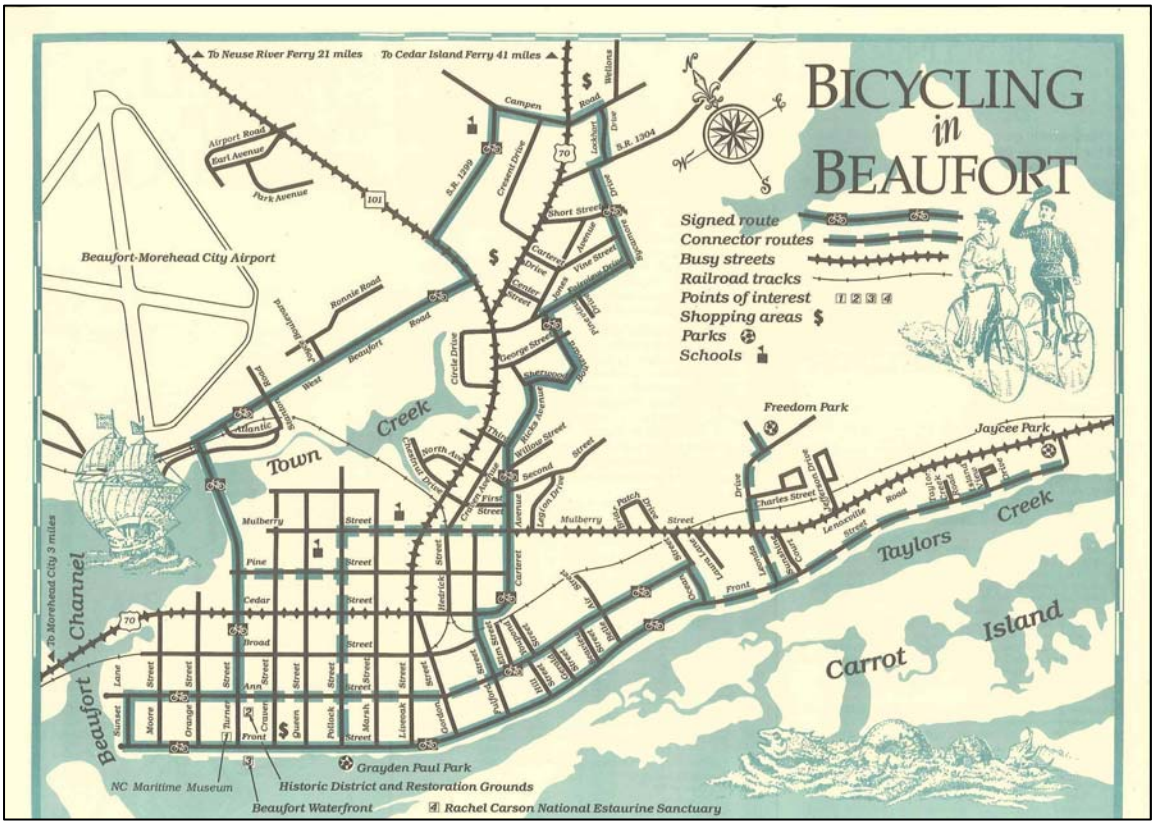
- always wear a bicycle helmet;
- use a backpack or bicycle bag to carry goods;
- avoid biking at night;
- when riding with a group, ride single file;
- wear bright clothing to increase visibility;
- be sure your bicycle is the right size and keep it in good repair.

Funding for this publication was provided by the Federal Highway Administration through the North Carolina Department of Transportation Bicycle Program. This project was undertaken as a part of the 1988 Transportation Improvement Program. Additional copies of the brochure are available from:

Town of Beaufort
P.O. Drawer 390
215 Pollock St.
Beaufort, NC 28516

BICYCLING in BEAUFORT





Town of Beaufort CAMA Land Use Plan (2005)

The Town of Beaufort CAMA Land Use Plan serves as a guide to the local government in making short-term and long-term land use decisions. The following policies are identified in the Plan.

Table 3.0: Town of Beaufort CAMA Land Use Plan Policies Supporting Bicycle Facilities

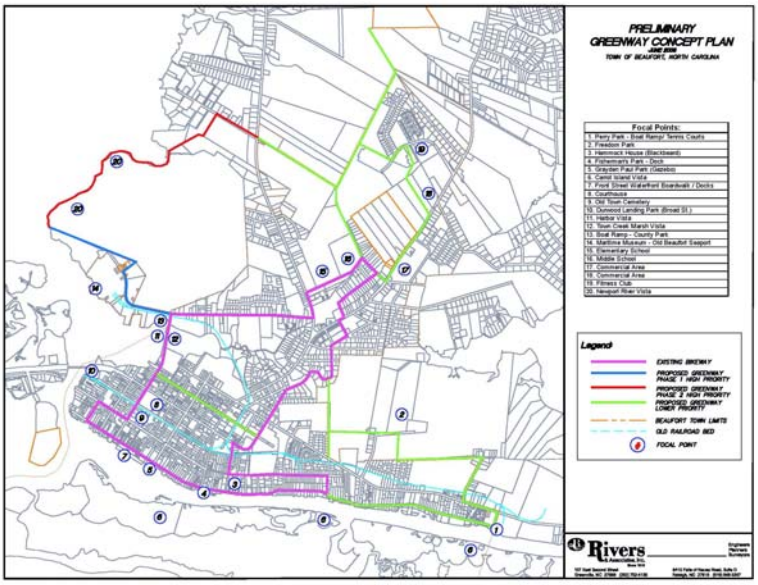
Management Topic	Beaufort Land Use and Development Policies
4.2.2 Land Use Compatibility	**Policy 1.** It is the policy of the Town of Beaufort to ensure that land use and development activities provide a balance between economic development needs and protection of natural resources and fragile environments.
4.2.3 Infrastructure Carrying Capacity	**Policy 5.** Beaufort will work cooperatively with Carteret County to provide a year-round recreation program. **Policy 13.** Beaufort supports implementation of the following land transportation improvements: • Replacement of the drawbridge between Morehead City and Beaufort. • Improvements to US 70. • A connector between NC 101 and US 70 (the corridor for this road has not yet been determined). • Utilize Orange and Turner Streets as a one-way pair providing access to the waterfront. • Elimination of the 'Y' intersection with NC 101 and US 70. • A minor thoroughfare to connect Steep Point Road just east of US 70 and Mulberry Street at its intersection with Ocean Street. • Addition of a turn lane to facilitate traffic flow and safety at the US Highway 70 intersection and Tiller School.
4.2.7 Areas of Local Concern	**Policy 9.** Beaufort will support projects that will increase pubic access to shoreline areas.

Source: Town of Beaufort CAMA Land Use Plan (2005)

Beaufort's Greenway Concept Plan

In 2006, Beaufort developed a city-wide preliminary Greenways Concept Plan based upon a design Charrette conducted with the Town of Beaufort Bikeway Committee members. The Concept Plan was completed for use primarily in securing funding assistance for performance of a complete greenways master plan study and secondarily for use in securing funding for pedestrian/bike trail planning and improvements.

Beaufort's Greenway Concept Plan identified several potential greenway corridors, including Perry Park (boat ramp/tennis courts), Freedom Park, West Beaufort Water Access, Commercial Areas, Fitness Club, and Newport River Vista.



Beaufort's Greenway Concept Plan

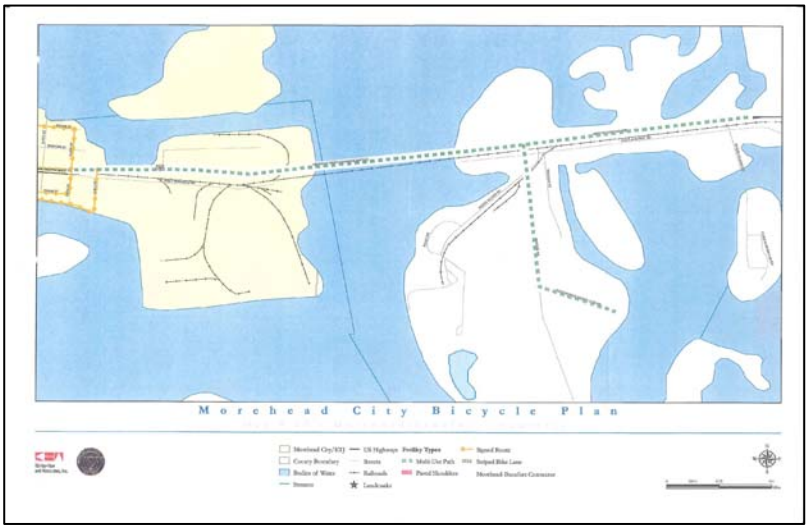
REGIONAL PLANS

Carteret County Parks and Recreation Master Plan and Shoreline Access Plan Update (2006)

In July 2006, Carteret County completed a Parks and Recreation Master Plan and Shoreline Access Plan Update, which was a revision to the foundation established by the 1999 Comprehensive Master Plan and Shoreline Access Plan. Carteret County's Plan is beneficial to the development of Beaufort's Comprehensive Bicycle Plan for several reasons. The County's Plan contains an inventory of existing county-owned parks located in Beaufort, provides recommendations for the identification, and plans for trails and open space. In 2005, Carteret County citizens responded to a public recreation survey and Bicycling was the third most popular activity; however, additional trail corridors for multi-modal transportation were an identified need. Therefore, the Town of Beaufort should consider a partnership opportunity with Carteret County to identify and preserve trail areas.

Morehead City 2007 Comprehensive Bicycle Plan

The Town of Morehead City, North Carolina developed a Comprehensive Bicycle Plan in September 2007. One of the goals of the plan was to provide a bicycle route linking Morehead City to Beaufort. This represents a partnership opportunity between Morehead City and Beaufort to provide connectivity between the two towns. Currently, the only way to access Morehead City is via US Hwy 70 by the use of Gallants Bridge, which does not have bicycle accommodations.



Provided courtesy of Morehead City Bicycle Plan

Corridor Management Plan for the Outer Banks Scenic Byway (Draft 2008)

The Outer Banks Scenic Byway was designated in the early 1990s and is currently in the process of being updated. The Outer Banks Scenic Byway begins in Dare County, North Carolina, follows NC 12 down the coast for over 100 miles, and ends in Beaufort, North Carolina. The "Down East" region of the Byway is characterized with high speed and limited pavement widths accompanied by very wide, well-watered and steep ditches. The Plan states that the most critical need for enhancement along this section of the Byway is the provision of safe, enjoyable bicycle and pedestrian facilities. The Byway Advisory Committee recommends consideration of widening the paved surface of US Highway 70 as major maintenance projects are undertaken.[II] The Town of Beaufort should consider reaching out to the Outer Banks Scenic Byway Advisory Committee as bicycle facilities are planned in the Byway project area.

East Coast Greenway

The East Coast Greenway is a route for non-motorists providing a link between east coast cities from Florida to Maine. The alternate route of the "spine route" is located near Beaufort.[III] The location of this route may increase the number of cyclists and overnight guests in the Beaufort area. The development of a bicycle-friendly community will encourage visitors to return to Beaufort and become bicyclists during their stay.

Provided courtesy of East Coast Greenway
www.greenway.org

Mountain-to-Sea Trail

The North Carolina Mountains-to-Sea Trail (MST) contains 900 miles of trails from the Smokey Mountains to Cedar Island and the Outer Banks. Currently, over 400 miles of the MST is complete including trails across National Park Service and U.S. Forest Service lands. The MST project area is divided into three regions. The Town of Beaufort, located in Carteret County, is part of Region 3 of the MST Eastern Region. The MST seeks to provide connections to additional trail systems that link communities and destinations not immediately on the MST route. The MST primary route extends across Carteret County to Cedar Island. While the MST was developed as a land-based trail intended for hiking, multi-use trails have been the more desirable option as the trail corridor extends through towns. Paddle trails through eastern counties of North Carolina are also being developed as part of the MST system.[IV]

STATE PLANS

The State of North Carolina has many planning documents that support bicycling. A few of those planning documents are listed below.

- **Bicycling and Walking in North Carolina: A Long-Range Transportation Plan**. This Plan identifies five goals and corresponding focus areas, which represent strategies for achieving each goal, relating to facilities, safety education and enforcement, institutionalization, research, and needs assessment, and encouragement. The overall intent of the plan is to reduce the number of pedestrian and bicycle crashes, injuries and fatalities.

- **2009-2015 State Transportation Improvement Program (TIP)**. This program funds transportation projects including new construction, maintenance and safety of existing infrastructure. Each transportation project within the State is described and its status is listed.

3.1 RELEVANT PROGRAMS & INITIATIVES

STATE PROGRAMS AND INITIATIVES

The State of North Carolina has many programs and initiatives that support bicycling throughout the State. These programs are listed below.

- Bicycle and Pedestrian Planning Grant Initiative
- Bicycle Helmet Initiatives
- Safe Routes to Schools
- Share the Road Initiative
- Bikes on Public Transportation

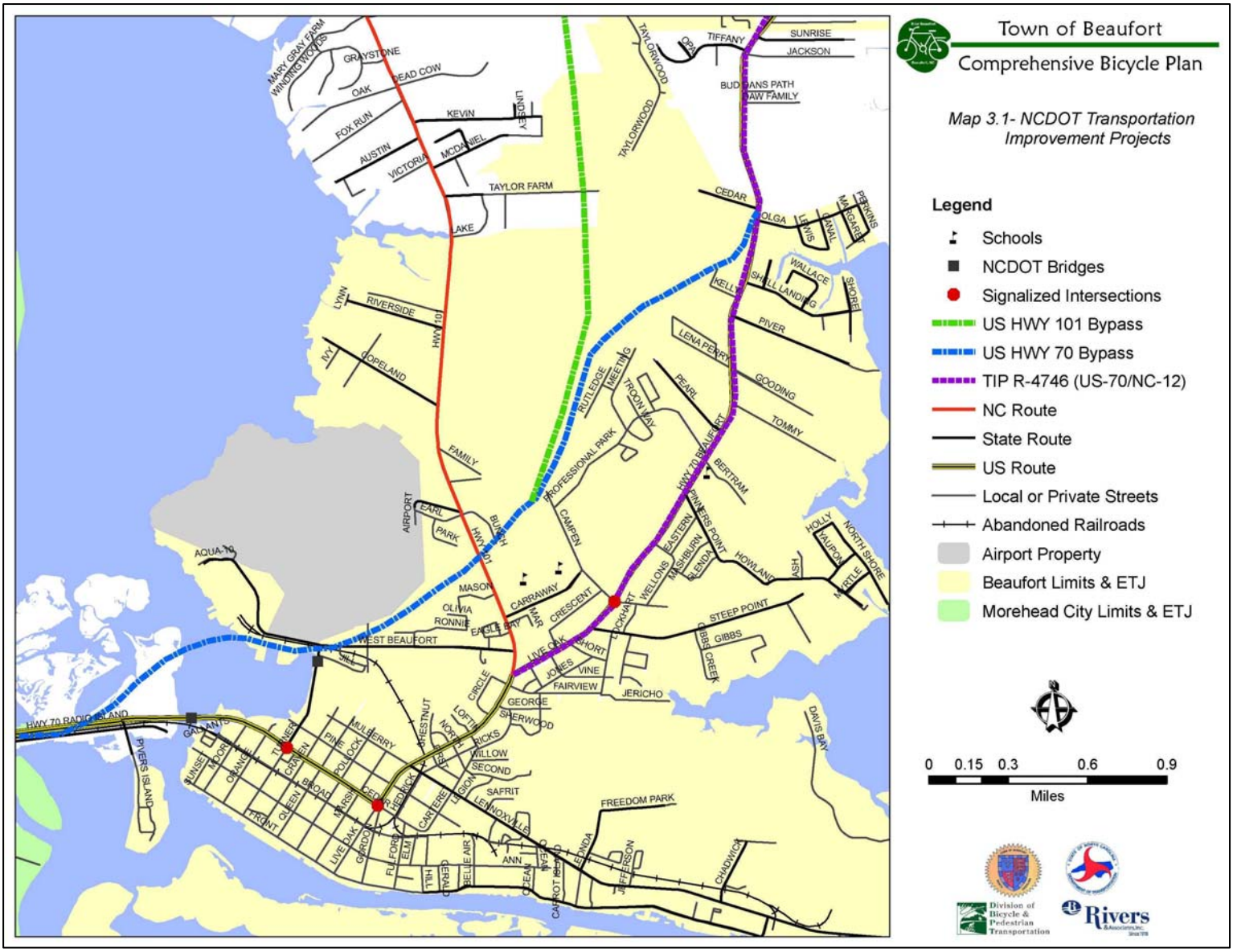
NC DOT Transportation Improvement Program (TIP)

As part of the transportation improvement of US Hwy 70 corridors from Raleigh to Morehead City, the following TIP Projects have been identified as they relate to the Town of Beaufort. These projects could incorporate bicycle safety components.[v] Map 3.1 shows these projects.

- *Beaufort Bypass (R-3307)* - Four Lanes at Radio Island to US 70 North of Beaufort near SR 1303 (Pinners Point); Construct multi-lane facility, part on new Location. The planning and design for this project are currently in progress. Acquisition of right-of-way began in early 2008.

- *Northern Carteret Bypass (R-4431)* - Havelock Bypass to Beaufort; Construct multi-lane facility. This project is unfunded.

- *US Highway 70 – NC 12 (R-4746)* - Upgrade existing roadway from NC 101 in Beaufort to Cedar Island measuring approximately 30.7 miles. This project is unfunded. Bike accommodations should be provided to any improvements to this road since it connects Beaufort to State Bike Route 7, Ocracoke Option.



Down East Rural Transportation Planning Organization

The Down East Rural Transportation Planning Organization (RPO) drafted a TIP Priority List for the State Transportation Improvement Program 2011 – 2017. Within this document of project priorities, a list of unidentified projects was included. Improvements to NC Highway 101 were included in the unidentified project list to "widen and resurface" NC 101 from Laurel Road in Carteret County to Beaufort. This project received a priority rank of 22 out of 26 unidentified projects. The widening and resurfacing of NC Highway 101 from the County Line to Beaufort is an opportunity for bicycle elements to be included into the project.

LOCAL PROGRAMS AND INITIATIVES

Law Enforcement

According to Police Chief Steven C. Lewis, there are two groups of cyclists in Beaufort: long distance and short distance, recreational cyclists. Currently, there are not many school-aged children that ride bikes to school due to a lack of connectivity between the neighborhoods and the new school. While there are not many bicycle-vehicle accidents, there are a lot of "near misses."

RECOMMENDATION: Install Street Lights along Major Thoroughfares.

Beaufort has a limited number of current bicycle programs that help promote awareness in the community. The existing programs conducted or sponsored in partnership by the Police Department are bicycle rodeos, National Night Out, and an occasional helmet give-away event. National Night Out is an annual community event where the police department collaborates with the community to encourage safety and crime/drug prevention with various programs and activities available to all ages. The helmet give-away events are not scheduled on a regular basis. There is no set schedule of programs or events that the Police Department offers, other than National Night Out. A goal for the Police Department is to improve its educational outreach of bicycle safety and to provide programs on a more consistent basis.

The Police would like to see more connectivity when new development takes place so that cyclists can avoid the major roadways.

The Police Department has a large inventory of abandoned bicycles; however, the Town has no policies regarding bicycle abatement. Currently, the abandoned bikes are confiscated and stored by the Town. The Police Department intends to donate the bicycles to a non-profit or charitable organization. A goal of this department would be to establish a protocol for the abandonment of bicycles within town limits.

From the Police Department's perspective, it would like to see an off-road bicycle trail.

In North Carolina, a bicycle is considered a vehicle; however, the Beaufort Police Department limits enforcement of the rules of the roadway with bicyclists. Occasionally, a police officer may talk with cyclists who are not riding appropriately; however, recordation of such contacts is not maintained, but the officers may mention contact with a cyclist in the daily log. Police officers generally limit bicycling enforcement to verbal notification due to time resource limitations. Because Beaufort is a small

town with a small police force limited personnel is a concern for enforcement. With additional staff, there is potential for greater enforcement efforts from the department. With respect to enforcement, no tickets or citations have been issued in the past year to cyclists that do not comply with traffic laws. Overall, a lower priority is placed on the enforcement of bicyclists' behavior towards traffic regulations.

The Police Department is concerned for cyclists who ride at night without proper visibility.

Another observation and concern by police officers is roadway **intersections. Roadway intersections present a challenge to bicyclists** because motorists entering or crossing the roadway often will not notice cyclists. Since there are only four stoplights within Beaufort's limits, cyclists need to be aggressive and assertive to make them visible, especially at intersections. An issue that currently exists is that cars will try to "race" a cyclist to the intersection to make a turn, which causes risk to bicyclists. Streets within Beaufort that were identified as higher hazard areas to ride were US Highway 70 and NC Highway 101, West Beaufort Road and Lennoxville Road. West Beaufort Road was described to be a narrow road in which the shoulders are in disrepair and it is not well lit. Cyclists should ride on the road where they can be seen.

The Police Department attempts to lead by example through use of bicycles for patrol (Police-on-Bikes) on days where the weather/environment allows for favorable riding conditions.

The Police Department's website currently has two links related to public safety while riding bicycles: Top 10 Bicycle Safety Rules and Bicycle Safety Tips (UNC Highway Research Safety Center). The website also has links to the 2007 Traffic Statistics and Traffic Report. For more news and information, visit Beaufort Police Department's website http://beaufortnc.portal.acrosonic.com/Town+Departments/Police/default.aspx.

From a planning perspective, the Town would like to provide a safe avenue for a bicycle route with some multi-use capabilities that would also provide multiple access points throughout the town.

An off-road trail could be incorporated by conversion of the abandoned railroad system to bicycle or multi-use trails. A particular section of interest exists from behind Beaufort Elementary School extending to US Highway 70; however, it crosses over an area of marshland, which could be a constraint. This may present an opportunity to incorporate environmental education as a component of a trail system. Note: This opportunity for an off-road trail is a project recommendation identified as "Live Oak & West Beaufort Rails to Trails Route" and is discussed in Section 7, Table 7.0: Preliminary Construction Project Recommendations.

Streets and Sanitation Department

The Streets and Sanitation Department actively utilizes its website to post public notices regarding street activities and hazards. The Town does not have a consistent maintenance schedule established for bicycle facilities. However, the Town's streets are maintained by a street sweeper truck that operates weekly on Thursday mornings to remove any debris from the roadways. Additionally, the Town's website has a "Please

Fix It" section that allows someone to electronically report concerns observed such as a pot hole or other street damage, trash to be picked up, missing or damaged signs, dead animal to be removed, and construction- illegal or unpermitted. The reporting process currently in place would allow a bicyclist to report potentially hazardous conditions to the Town.

In addition to the website, the Town publishes a monthly newsletter to educate its citizens on current events and projects. The newsletter is posted on the town's website and a copy is mailed with each water bill. The monthly newsletter could be used to educate Beaufort's residents of the programs and policies regarding bicycling.

RECOMMENDATION: Development of Additional Bicycle Routes & Multi-Use Trails

Pavement Management Study

In February 2009, an ITRE (Institute for Transportation Research and Education at North Carolina State University) Pavement Management Study was completed for Beaufort. The results of the ITRE study include a survey and an evaluation of the pavement for each street and sidewalk within the town. Each street was given a rating and a recommended maintenance schedule. The results of the study may be used by the Town as a tool for prioritizing its routine street maintenance and resurfacing efforts. (*More information about ITRE can be found online at* http://itre.ncsu.edu/)

3.2 RELEVANT POLICIES & INSTITUTIONAL FRAMEWORK

FEDERAL & STATE POLICIES

There are several State and Federal policies for the development of pedestrian facilities. Through updating these guidelines, NCDOT has shown they are committed to improving bicycling and pedestrian conditions and recognizes these facilities are "critical elements of the local, state and federal transportation system".[VI] These guidelines provide communities with information regarding NCDOT funding for replacement of existing sidewalks as a part of street widening projects.

RECOMMENDATION: Update and/or Develop Bicycle-Friendly Policies & Ordinances

Complete Streets and the "Safe and Complete Streets Act of 2009"

Complete Streets is a policy requiring that new roads be built to accommodate all users, including bicyclists, pedestrians, and transit riders, of all ages and abilities. The policy is intended to improve safety, reduce congestion and air pollution and create a stronger sense of community. Complete Streets elements in projects include ADA-compliant curb cuts, sidewalk improvements, new bicycle lanes, roadside improvements for public transportation, landscape features, and other elements that improve transportation for all users. The "Safe and Complete Streets Act of 2009" is a bill that has been introduced in the

House and Senate that would ensure that future transportation investments made by state Departments of Transportation and Metropolitan Planning Organizations create appropriate and safe transportation facilities for all those using the road, including all ages and abilities. The Act builds on existing successful state and local policies to define effective complete streets policies and apply them to federally funded transportation projects. Additionally, the Act authorizes needed research and dissemation of complete streets best practices. [VII]

Bicycling and Pedestrian Policy

A United States Department of Transportation (US DOT) policy statement regarding the integration of bicycle and walking into transportation infrastructure recommends that, "bicycling and walking facilities will be incorporated into all transportation projects" unless exceptional circumstances exist.[VIII]

FHWA Memorandum on Mainstreaming Bicycle and Pedestrian Projects

In October 2008, the Federal Highway Administration (FHWA) updated the *Policy for Mainstreaming Nonmotorized Transportation (FHWA Guidance – Bicycling and Pedestrian Provision of Federal Transportation Legislation)* and can be found at: http://www.fhwa.dot.gov/environment/bikeped/bp-guid.htm

NCDOT Bicycle Policy

The NCDOT Bicycle Policy offers guidelines to provide bicycle accommodations on state highways and specifies standards for planning, design, construction, maintenance, and operations relevant to bicycle facilities.[IX]

NCDOT Pedestrian Policy Guidelines

In 2000, the North Carolina Department of Transportation (NCDOT) updated the *1993 Pedestrian Policy Guidelines*. The NCDOT pedestrian policy guidelines can be found at: http://www.ncdot.org/transit/bicycle/laws/laws_pedpolicy.html

NCDOT Administrative Greenway Guidelines

The NCDOT's administrative guidelines were established to consider greenways and greenway crossings during the highway planning process. The Administrative Greenway Guidelines preserves identified corridors for future greenways from highway construction. The NCDOT will incorporate locally adopted plans for greenways into the ongoing planning process within the Statewide Planning and project plans. Localities work in conjunction with the State, place a priority for their

greenway construction activities, and justify the transportation nature of each greenway segment.[x]

NCDOT Traditional Neighborhood Development Street Design Guidelines

The NCDOT's Traditional Neighborhood Development (TND) Street Design Guidelines are available for proposed developments. These guidelines delineate permit locations and encourage developers to design roadways according to TND guidelines rather than conventional subdivision standards. These guidelines promote the use of multi-mode/shared street that allows for pedestrians and bicyclists and encourages mixed use development. The link to this guideline can be found at: http://www.ncdot.org/doh/preconstruct/alturn/value/manuals/tnd.pdf

NCDOT Resolution for Bicycling and Walking

On September 8, 2000, the N.C. Board of Transportation adopted a *Resolution for Bicycling and Walking* to make bicycling and walking a critical part in the state's long-range transportation system. Additional information can be found at: http://www.ncdot.org/transit/bicycle/laws/laws_resolution.html

LOCAL POLICIES

According to Town Planner Kyle Garner, there are no current policies or ordinances regarding bicycle safety or facilities. However, the Town Code prohibits bicycles on sidewalks. There are also no policies or ordinances related to bicycle routes and related signage. The Town currently maintains visibility at corners and intersections through enforcement of a line-of-sight ordinance.

The Town acknowledges **the need for policies and ordinances** to ensure bicycle or multi-use trail facilities when new development or substantial improvement occurs. While these types of recreational facilities can be recommended during the planning and permit approval phases, the Town would prefer an ordinance to require such facilities. The Town **would like increased trail or route connectivity** and feels that installation of facilities during development will provide greater opportunities for more facilities. The Town should consider a fee-in-lieu of dedication as an installation option.

3.3 RELEVANT BICYCLE STATUTES & ORDINANCES

There are a few existing policies related to bicycle(s) at the local, as well as at the state and federal level.

STATE STATUTES & LAWS

State of North Carolina laws impact bicycling in Beaufort. State laws regulate a range of safety and operational issues. State of North Carolina Laws cover the following areas pertaining to bicycling:

- Helmets (required for all bicyclists 16 years of age and younger)
- Bicycle lighting
- Requirements for riding on the right-side of the road
- Impaired driving
- Reckless operation
- Compliance with signs and signals
- One-way streets
- Yielding right-of-way to pedestrians
- Passing another vehicle
- Being passed by another vehicle
- Crashes[XI]

State statutes and laws may be viewed online at the following websites: http://ncdot.org/transit/bicycle/laws/laws_bikeways.html and http://www.ncdot.org/transit/bicycle/laws/resources/BikePedLawsGuidebook-Full.pdf.

LOCAL ORDINANCES

The Town of Beaufort Code of Ordinances has few provisions related to bicycles. Currently, the Town's ordinances do not address requirements for bicycle facilities, such as bike lanes, wide outside lanes, or greenways. The Town should consider implementing these requirements to make it safer for bicyclists to access destination points safely. The Town's Code does acknowledge that bicycles are a legal street vehicle. Additionally, the Town code prohibits riding bicycles on sidewalks. Sections of The Town of Beaufort's Code of Ordinances that influence bicycling are outlined in Table 3.1.

Table 3.1: Town of Beaufort Local Ordinances Related to Bicycling	
Section and Title	**Ordinance Text**
§ 70.03 PERSONS PROPELLING PUSHCARTS, RIDING BICYCLES OR ANIMALS TO OBEY TRAFFIC REGULATIONS.	Every person propelling any pushcart or riding a bicycle or an animal upon a roadway, and every person driving any animal-drawn vehicle, shall be subject to the provisions of this chapter applicable to the driver of any vehicle, except those provisions of this chapter, which by their very nature can have no application.
§ 90.11 PROHIBITED DEVICES AND VEHICLES. *(C) Exemption.*	Nothing in this section shall prohibit the operation of a bicycle on the travel portion of the public streets within the above-described area.
§ 94.20 CERTAIN ACTS DECLARED PUBLIC NUISANCE. *(B)*	Any animal, which chases, snaps at or attacks pedestrians, bicycle riders or vehicles.

Source: Town of Beaufort Code of Ordinances

[i] *Bicycling in Beaufort* brochure

[ii] NC Outer Banks Scenic Byway (2008 Draft)

[iii] Greenway.org retrieved on 01/08/2009

[iv] A Concept Plan for North Carolina's Mountains-to-Sea Trail

[v] North Carolina Department of Transportation, www.ncdot.org/doh/preconstruct/tpb/SHC/studies/US70/Projects/#carteret retrieved November 25, 2008

[vi] North Carolina Department of Transportation, *The Department of Transportation Pedestrian Policy Guidelines,* Effective October 1, 2000.

[vii] Complete the Streets, www.completestreets.org

[viii] US Department of Transportation, Federal Highway Administration, http://www.fhwa .dot.gov/environment/bikeped/design.htm

[ix] North Carolina Department of Transportation, *Bicycle Policy*, http://www.ncdot.org/transit/bicycle/laws/laws_bikepolicy2.html

[x] North Carolina Department of Transportation, *Greenways Administrative Process*, http://www.ncdot.org/transit/bicycle/laws/laws_greenway_admin.html

[xi] North Carolina General Statutes, Chapter 20: Motor Vehicles, http://www.ncleg.net/gascripts/statutes/StatutesTOC.pl?Chapter=0020

SECTION 4 – STRATEGIC BICYCLE PLAN

Section Outline:

4.0 System Overview

4.1 Corridor Identification

4.2 Opportunities / Potential Projects

In order to develop a strategic bicycle plan to make Beaufort a bicycle-friendly community, the "5 E's" must be addressed. These "5 E's" are Engineering, Education, Encouragement, Enforcement, and Evaluation and Planning.

According to a 1994 report by the Federal Highway Administration[1], there are three types of bicycle users: Advanced or experienced, Basic or less confident, and Children. Advanced users are generally riding for convenience and speed and want a direct route to destinations with a minimum delay or disruption. They are comfortable with high traffic volumes as long as there is significant operating room for themselves and motorists to eliminate their need to slow down. Basic or less confident users may ride their bicycles for basic transportation purposes (i.e., go to the store, visit friends, etc.) but prefer indirect route to avoid heavy traffic such as residential streets, multi-use trails, and designated bike lanes or wide shoulder lanes. Children, whether riding by themselves or with adults, require access to key destinations in their community (schools, fast food restaurants, parks, convenient stores, etc.). These users typically travel residential streets with low speed limits, linked with multi-use trails and sometimes streets with well-defined pavement markings.

Therefore, developing bicycle facilities for Beaufort requires consideration of the following:

- Skill level of users
- Motor vehicle parking
- Barriers
- Crash Reduction
- Direct and convenient alignment to serve origins and destinations
- Access to and from bicycle faculties
- Aesthetics along facility
- Safety
- Continuity – avoiding abrupt facility discontinuity and stops
- Grade – avoiding steep grades, if possible
- Adequate lighting and sight lines
- Convenient bicycle parking at destinations
- Adequate maintenance commitment
- Pavement surface quality
- Truck and bus traffic
- Traffic volumes and speed
- Transition areas
- Intersection conditions
- Costs
- Policies

This section identifies the overall transportation system, desired corridors of bicycle travel, special focus areas, and potential projects.

4.0 SYSTEM OVERVIEW

Image of Downtown Beaufort

The overall transportation system in Beaufort is automobile dependent. As a result, intersections and thoroughfares were designed to accommodate automobile travel only. While the downtown area has many bicycle-friendly elements, the elements are limited the further you travel from downtown. The Town's recent commercial growth has evolved around the US Highway 70 corridor on the north side of Beaufort that includes shopping centers with grocery stores, restaurants, and retail establishments. While Beaufort's "urban sprawl" is limited to date, the pattern of commercial development along the existing thoroughfare is intimidating for bicyclists due to intersections that are unsafe to cross, limited access and lack of provisions to accommodate bicycle travel. Special signage used to identify bicyclists in the roadway is rare.

Beaufort's downtown waterfront commercial area and its adjacent historic residential neighborhoods also house public service buildings for the Town as well as the County. These areas of Beaufort are the most bicycle and pedestrian accessible districts of the Town due to low traffic speeds, short blocks, and sidewalks.

An inventory and assessment of existing bicycle facilities is discussed in Section 2 and Appendix C of the Plan.

4.1 CORRIDOR IDENTIFICATION

Beaufort's Waterfront Boardwalk

The identification of bicycling corridors, origins, and destination points provides an idea on available access to desired routes and bicycling facilities. The assessment of the conditions of existing bicycling corridors and desired routes will assist in developing recommendations for bicycle facility treatments and facilities. This subsection will discuss the analysis of the existing conditions for the following in Beaufort: destinations, origins, and desired corridors of bicycle travel.

DOWNTOWN/FRONT STREET/BEAUFORT WATERFRONT

Front Street is an on-road unmarked scenic route along Taylor's Creek in the waterfront district of Beaufort that traverses both the downtown commercial district and residential neighborhoods. The Town's functioning historic waterfront district includes restaurants, specialty shops, banks, the North Carolina Maritime Museum, Grayden Paul Park, and scenic views of the waterways including cruising boats and barrier islands as well as adjacent historic residential neighborhoods. Beaufort

attracts vacationers from around the country who become bicyclists or pedestrians while visiting coastal North Carolina. The waterfront district is a bicycle-friendly area because the blocks are short, the roadways are narrow with low traffic speeds, and the vendors are numerous. Vehicular parking is limited to a few small parking lots and on-street parking which encourages walking and biking. However, effort must be made to revitalize the existing bicycle facilities and enhance the existing bicycle route through the waterfront district to maintain it as an attractive and inviting place.

Bike Rack at Beaufort Middle School

SCHOOLS

When preparing a bicycle plan, it is important to inventory and evaluate bicycle provisions and obstacles at schools. Schools attract many people on a daily basis; therefore, access to schools should be safe. Beaufort Elementary School and Beaufort Middle School are located adjacent to each other on Carraway Drive near NC Highway 101. Crossing US Highway 70 and NC Highway 101 are identified barriers between residential areas and the schools due to the high level of motor vehicle traffic along both highways. Improvements should be made to the existing Bike Route in order to make it more convenient and safer for students who ride their bikes to school.

Since the Elementary and Middle School, students are not yet, of driving age, there could potentially be a large number of students who would bike to school. Currently, there is only one (1) bicycle rack available for shared use between the schools. Bicycle parking racks should be clearly visible, accessible, and easy to use. The bike racks at the schools should be located closer to the main entrance and should not interfere with pedestrians or bus boarding patterns. Providing adequate bicycle parking and safe routes to these schools should be considered to increase bicycling trips. **See Section 5 for more detail concerning "Bicycle Parking Facilities."**

Water Access Site in Beaufort

East Carteret High School is located along US Highway 70 approximately three miles north of Beaufort's corporate limits. This school is not located within the project limits; however, bicycle facilities should be considered for all schools.

PARKS AND WATER ACCESS SITES

Carteret County Parks and Recreation owns and maintains two pubic recreation facilities located in Beaufort: Freedom Park and West Beaufort Water Access. Freedom Park is a 26-acre park that offers both passive and active recreation opportunities. It is part of a connector route to the existing bicycle route. The surrounding area is currently wooded, but a new residential community is planned and approved for development. Currently, there are no bicycle racks available at Freedom Park. An opportunity to incorporate bicycle trails to Freedom Park is desired. West

Beaufort Water Access, located at the intersection of West Beaufort Road and Turner Street, provides water access to the Newport River, Taylor's Creek and Beaufort Inlet. This site is located along the existing bicycle route.

The Town of Beaufort maintains public recreation facilities including Grayden Paul Park, Front Street Park, and Randolph Johnson Park. Grayden Paul Park and Front Street Park are located along the historic waterfront district. Bicycle racks are available at these park facilities; however, the racks are regularly overcrowded.

US Highway 70 in Beaufort, NC

COMMERCIAL ESTABLISHMENTS ALONG US HIGHWAY 70

Several commercial establishments along US Highway 70 are desirable bicycling destinations, such as shopping centers, restaurants, and convenience stores. Providing safe routes to these locations is a priority of this plan. Additionally, bikers need a safe place to park their bicycles while visiting the commercial establishments.

RESIDENTIAL AREAS

Beaufort is surrounded by water on three sides; therefore, many residential areas have been developed around these natural resources of the Town. The Town's primary thoroughfares access residential areas: US Highway 70, NC Highway 101 and Lennoxville Road. The conditions of the highways have become barriers to bicycle travel by limiting residents to biking in their neighborhoods. The residents desire safe routes to other destinations outside of their immediate area, such as to downtown, shopping centers, or schools.

North River Club is a residential golfing community that is currently under development in north Beaufort between US Highway 70 and NC Highway 101. The community is planned to include pedestrian and bicycle friendly elements to serve approximately 1,600 proposed residential units. Connectivity to destinations outside that community is desirable.

A new residential community, Beaufort East Village, is planned north of Lennoxville Road near Freedom Park. The community is proposed to include bicycle-friendly elements and connections to existing roadways adjacent to it. The new community is planned to include over 600 new residences and a commercial component to include restaurants, retail shops, and a civic center. Opportunity exists to provide defined connectivity to other areas of Beaufort.

Front Street Village is a redevelopment project located on Lennoxville Road and Taylor Creek at the east end of Front Street. Historically, the property served the commercial fishing industry and is now planned for

redevelopment as a 300 (approximate) residential unit development. The development is being planned with elements friendly to pedestrians and bicyclists. Connectivity to destinations outside of the development is desirable.

The potential for continued development and redevelopment of Beaufort reveals the Town's need for new policies and ordinances requiring bicycle elements and facilities within future projects.

ACCESS TO MOREHEAD CITY

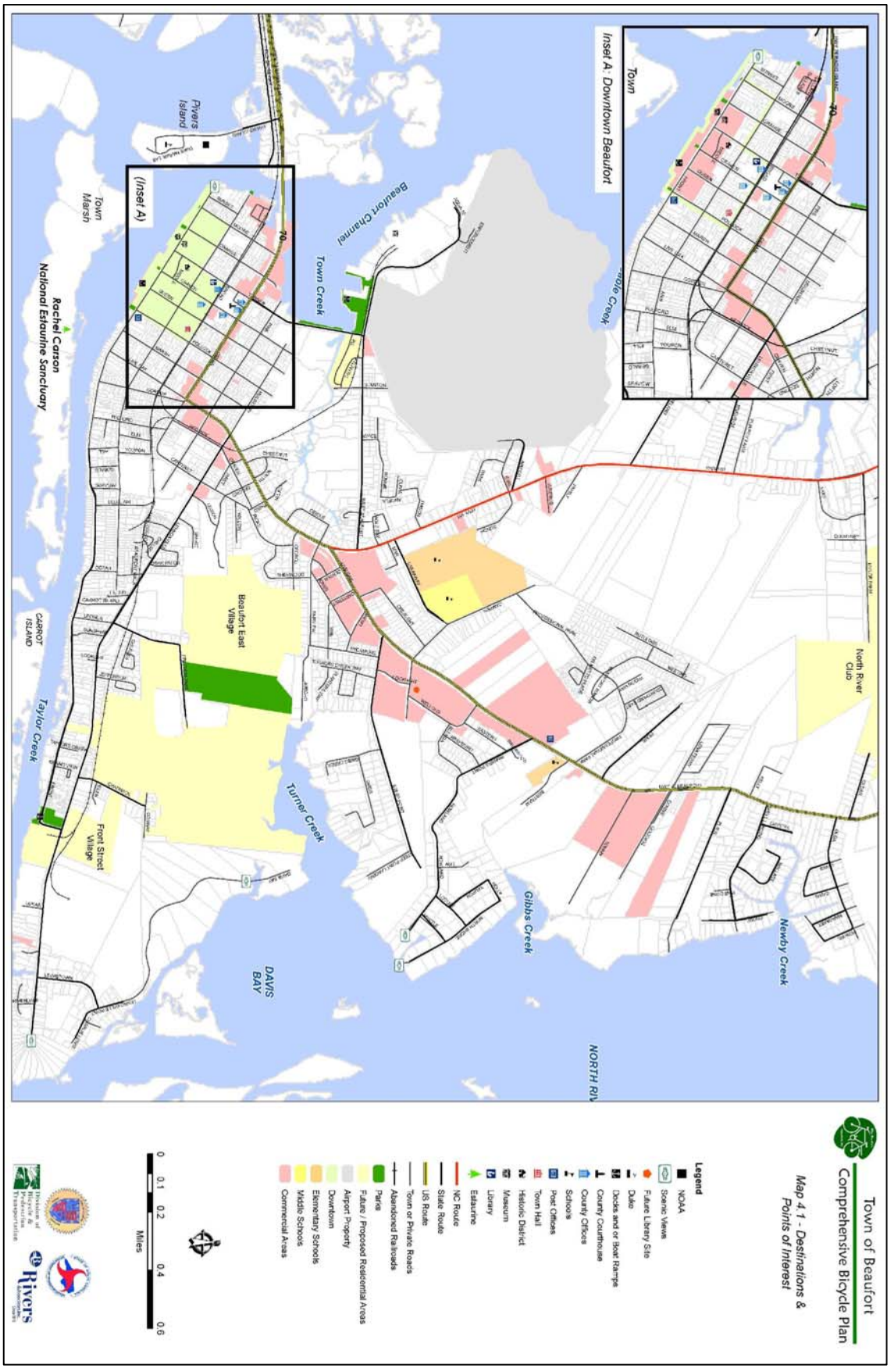
Traffic crossing Gallant's Channel Bridge

Comments received from the Steering Committee and the public indicate that a large population of cyclists frequently rides from Beaufort to Morehead City. The only way to access this route is to travel along US Highway 70 across the existing bridges. Improving the safety of bicyclists traveling in both directions along US Highway 70 is included in the recommendations of the Plan.

DUKE UNIVERSITY MARINE LABORATORY

Located on Pivers Island in Beaufort, Duke University Marine Laboratory is a satellite campus of Duke University and provides year-round educational, training, and research opportunities to about 3,500 people annually. Bicycling is encouraged by the University through a program named Duke Bikes. Duke Bikes is a no-cost bicycle rental program offered to university students in an effort to promote alternative transportation and good health. Many university students bicycle to and from Beaufort and surrounding areas making Duke University Marine Laboratory a destination point.[II]

Map 4.1 illustrates all identified destinations and points of interest throughout the Town of Beaufort project area.


Town of Beaufort
Comprehensive Bicycle Plan
Map 4.1 - Destinations & Points of Interest
Inset A: Downtown Beaufort
(Inset A)
Legend
NOAA
Scenic Views
Future Library Site
Duke
Docks and or Boat Ramps
County Courthouse
County Offices
Schools
Post Offices
Town Hall
Historic District
Museum
Library
Estuarine
NC Route
State Route
US Route
Town or Private Roads
Abandoned Railroads
Parks
Future / Proposed Residential Areas
Airport Property
Downtown
Elementary Schools
Middle Schools
Commercial Areas
0 0.1 0.2 0.4 0.6
Miles
Beaufort Channel
Town Creek
Taylor Creek
Turner Creek
Gibbs Creek
Newby Creek
DAVIS BAY
NORTH RIV
Rachel Carson National Estuarine Sanctuary
Town Marsh
Pivers Island
CARROT ISLAND
Beaufort East Village
Front Street Village
North River Club

4.2 OPPORTUNITIES / POTENTIAL PROJECTS

Beaufort's Land Use Plan Goals & Objectives:

- **Identify and analyze new and emerging land use issues and concerns**
- **Re-examine existing land use policies to determine their effectiveness**
- **Revise existing land use policies and develop new policies that address current land use and land development issues and concerns**
- **Re-examine the existing land use maps to determine what revisions are necessary to address new land use issues and concerns, as well as revised and newly developed policy statements**
- **Further develop implementation strategies and an implementation schedule**
- **Promote a better understanding of the land use planning process**
- **Promote citizen involvement in the process of preparing the updated land use plan**

Potential projects to improve the existing bicycling network in Beaufort were developed from public input activities, Steering Committee meetings, and community evaluation. Thirty-seven (37) preliminary recommendations or potential projects have been identified. **Refer to Appendix B for a complete description of all preliminary recommendations.**

During plan development, several potential projects were identified that would improve the existing bicycling network. These potential bicycle facilities projects have been broken down into three categories: On-Road Projects & Preferred Treatments, Off-Road Projects & Preferred Treatments, and Ancillary Facilities. Some projects may require further review and approval by the NCDOT Division 2 Office located in Greenville, NC.

The potential projects were based upon:

- Steering Committee Meetings
- Public survey & Open House #1 comments
- Bicycle-motor vehicle crash data
- Planned, proposed projects mentioned in existing plans
- Field Inventory and Assessment
- Ability to provided connectivity & improve safety

During the December 18, 2008 Steering Committee meeting, members participated in an exercise to identify opportunities related to the development of a Comprehensive Bicycle Plan. Members identified a list of general opportunities related to connectivity, education and awareness, increasing visibility, and providing additional bicycle elements and facilities. **Refer to the Steering Committee Meeting Minutes located in Appendix A and the table in Appendix B for a complete list of identified opportunities.**

Other opportunities that have been offered by Town staff include the use of abandoned railroad rights-of-way/corridors and conversion of existing sidewalks to multi-use lanes to create off-road bicycle facilities. The Town should also consider its utility easements as opportunities for bicycling corridors. Low-volume and extra wide streets have been identified as potential bicycle corridors. Opportunities to provide connector routes to schools, regional bicycle routes, parks, residential areas, and other bicycling destinations were recommended during plan development.

Infrastructure improvements are identified in the Beaufort's CAMA Land Use Plan. When possible, bicycle facilities should be implemented into the development plans of these facilities. The following identified infrastructure improvements represent opportunities to incorporate bicycling elements into the planning and design of such facilities:

- Replacement of the drawbridge between Morehead City and Beaufort.
- Improvements to US 70.
- A connector between NC 101 and US 70 (the corridor for this road has not yet been determined).
- Utilize Orange and Turner Streets as a one-way pair providing access to the waterfront. During the planning and design of this project, further study will be needed to determine appropriate bicycle facilities on one-way streets.
- Elimination of the 'Y' intersection with NC 101 and US 70.
- A minor thoroughfare to connect Steep Point Road just east of US 70 and Lennoxville Road at its intersection with Ocean Street. This improvement was identified in the CAMA Land Use Plan and currently conflicts with future development in this area. A majority of property crossed by this project is currently under development proposal. The Beaufort East Village project (Map Ref. #13) recommended in this Plan is subject to further study. The planned community is designed with bicycle and pedestrian friendly elements. The exact type of bike project will be subject to the final approved development plan.
- Addition of a turn lane to facilitate traffic flow and safety at the US Highway 70 intersection and Tiller School.

ON-ROAD PROJECTS & PREFERRED TREATMENTS

On-road projects and preferred treatments include bike lanes, shared roadways, wide outside lanes and paved shoulders according to specifications and standards outlined by NCDOT.

Bike Lanes

Professional Park Drive Route

A bike lane, measuring approximately 0.83 miles, is proposed along Professional Park Drive extending from Live Oak Street (US 70) to Campen Road. Completion of this project will provide a connection between residential and commercial areas and the Elementary and Middle Schools. This residential area was recently developed and includes a nearby grocery store, fitness facility, post office and bank. The roadway section connecting Campen Road and Professional Park Drive is currently under construction and is anticipated to be completed by January 2010.

Broad Street Route
A bike lane extending from Moore Street to Yaupon Street was initially proposed along Broad Street. However, due to the varying conditions that currently exist along Broad Street, a bike lane may only be appropriate for certain blocks. Broad Street is used as an alternate route to US Highway 70 and provides connection to County offices, Beaufort Town Hall, residential areas, the library, and downtown. The pavement widths and mixed parking situations (diagonal and parallel) exist along the entire Broad Street Route. Further consideration is needed to address the bicycling facilities along this route.

Paved Shoulder

West Beaufort Road Bike Route Improvements
West Beaufort Road is currently part of the existing Bicycle Route in Beaufort; however, the existing pavement is deteriorated and needs improvements. A paved shoulder is recommended along West Beaufort Road from NC Highway 101 to Aqua-10 Road to improve the bicycling network along this section of the bike route. West Beaufort Road is surrounded by residential areas and experiences a high volume of daily traffic because it is currently used as an alternate route through Town. With the completion of the US Highway 70 Bypass in the future, it is anticipated that traffic conditions will improve along West Beaufort Road. A paved shoulder will improve the current and future bicycling conditions for bikers traveling the existing route, riding to school, and to other recreation areas.

Aqua-10 Route
The Aqua-10 Route is recommended in this plan to increase connectivity to the future location of the Maritime Museum and surrounding scenic area. Aqua-10 Road, measuring approximately 0.14 miles, is currently unimproved with a dirt and gravel surface. As a part of a future project to improve this roadway, a paved shoulder is recommended as the preferred bicycling element along this route. According to Town staff, the developer of the museum property and private property owners are willing to accommodate bicycle elements into the plans for the development of the new facility and its access road.

Lennoxville Route
A paved shoulder is recommended along Lennoxville Road beginning at Live Oak Street and extending approximately two (2) miles eastwardly to the end of the road. The Lennoxville Route currently experiences a high volume of motor vehicle and bicycle traffic and increases are expected with the development of the new planned communities located off Lennoxville Road (Beaufort East Village, Front Street Village). The Town has requested an impact study be completed to address potential traffic issues along Lennoxville Road as a result of the planned developments. Therefore, the analysis and results of the study should be considered during the planning of bicycle facilities along this route. A paved

shoulder will increase the area for bicyclists to ride on the current roadway that connects residential, recreational and industrial areas.

US Highway 70 East Route

US Highway 70 is a primary thoroughfare through Beaufort that experiences a high volume of daily motor vehicle traffic. The community has demanded improved bikeability along this route because it serves the commercial areas and is also used by long-distance bikers. While there are some alternate routes to US Highway 70, there are areas that US Highway 70 cannot be avoided. A paved shoulder is recommended along US Highway 70 from its intersection with NC Highway 101 to Beaufort's ETJ limits (Cedar Avenue area) to serve as an east-west connection into Beaufort and provide connection to commercial and residential areas. This section of the route measures approximately two (2) miles and will be impacted by the future US Highway 70 Beaufort Bypass. Further study is recommended to accommodate bike lanes on the roadway after completion of the bypass project.

NC Highway 101 Route (Copeland Road to Lake Road)

NC Highway 101 serves as a primary thoroughfare to Beaufort's Elementary and Middle Schools, commercial areas, and residential subdivisions. The NC Highway 101 Route (Copeland Road to Lake Road) measures approximately 0.62 miles and extends to the north from Copeland Road to Lake Road. Currently, the daily motor vehicle volume is high, the roadway pavement is narrow and provides little to no shoulder for bicycling. There are increases in posted speed limits along NC Highway 101 as motor vehicles travel north out of Beaufort. Paved shoulders are recommended to provide areas for bicyclists to ride along this Route. A multi-use trail is recommended along NC Highway 101 from US Highway 70 to Copeland Road and is discussed in this section on page 4-14.

Pinners Point Route

A paved shoulder is recommended along Pinners Point Road extending from Live Oak Street (US Highway 70) to Howland Parkway. This road provides an alternative route to new commercial areas along US Highway 70 from surrounding residential subdivisions. The recommended paved shoulder length measures approximately 0.848 miles and is proposed along both sides of Pinners Point Road. There are some ditches and curves along the road that may need to be addressed during project planning.

Shared Lane Markings or Sharrows

Note: The update of the MUTCD and AASHTO Bike Guide have not yet been finalized, although it will include guidance for sharrow and shared lane markings. Approval of sharrows on NCDOT maintained roads will occur with adoption of these documents. These documents are anticipated to be finalized in 2010.

Mulberry Street Route

Cyclists in Beaufort are currently using Mulberry Street as an alternate route to US Highway 70 through Town. The Mulberry Street Route measures approximately 0.50 miles extending from Live Oak Street (US Hwy 70) to Craven Street. This Route provides a connection to the Boys & Girls Club, downtown, and residential areas. Curbs, gutters, and the presence of on-street parking limit Mulberry Street; therefore, shared lane markings or "sharrows" are recommended as the preferred treatment for the Route.

Broad Street Route

Broad Street is a parallel route to US Highway 70 serving the County offices, Beaufort Town Hall, residential areas, the library and the downtown district. Due to the existing on-street parking and roadway conditions, shared lane markings or sharrows are recommended as the preferred treatment along parts of the Broad Street Route. While there are some areas that may be able to accommodate a bike lane, indication of a shared lane is necessary in areas with diagonal parking and sections of narrow pavement with curbs and gutters. Sharrows are not recommended with pull-in diagonal parking; however, sharrows may be a possibility with back-in diagonal parking permitted that there is sufficient roadways space. Back-in diagonal parking is an option to reduce conflict between motorists and cyclists.

Front Street Bike Route Improvements

Front Street is one of Beaufort's most desired destinations for residents and visitors alike because of its scenic vistas and retail shops. The Beaufort Bike Route currently follows Front Street, which has a mixture of on-street parking and high volume of seasonal traffic (motorist, pedestrian, and bicycle). Shared lane markings or sharrows are recommended along Front Street from Sunset Lane to Fulford Street, measuring approximately one (1) mile. It is anticipated that painted Sharrows along the roadway and appropriate signage will increase the visibility of bikers in the roadway and reduce the number of near-miss collisions. Sharrows are not recommended with pull-in diagonal parking; however, sharrows may be a possibility with back-in diagonal parking permitted that there is sufficient roadways space. A signage project is recommended along Front Street from Fulford Street to Lennoxville Road to increase the awareness of bicyclists in the roadway along the scenic route.

Turner Street Bike Route Improvements

Turner Street is an important part of the existing bicycle route because it provides a north-south connection through Town. The Turner Street Bike Route measures approximately one (1) mile extending from West Beaufort Road to Front Street. At its northern end, narrow pavement and limited shoulders crossing the Town Creek causeway limit bicycling improvements to shared lane markings. In the downtown district, the curbs and gutters and on-street parking limit bicycling improvements to shared lane markings or sharrows. Turner Street has been the scene of four bicycle-motor vehicle crashes and experiences a high volume of motor vehicle traffic; therefore, improving the visibility of bicyclists in the roadway is a priority along this Route. The preferred treatment is to paint Sharrows, install signage, and improve the street lighting so that bicyclists and motor vehicles may effectively share the road. Further study will be needed with the anticipated completion of the US Highway 70 Gallants Channel Bridge and Beaufort Bypass and the role of Turner Street within the project plans.

Crescent Drive Route

Shared lane markings are recommended for Crescent Drive, which serves as an alternate route to US Highway 70 since it provides access to adjacent commercial shopping centers, and is located within the school zones. Currently, Crescent Drive is a narrow roadway with drainage ditches along the sides. A designated shared roadway with painted Sharrows and signage is anticipated to increase the visibility of bicyclists in the roadway.

US Highway 70 West Route

The section of US Highway 70 extending from Moore Street to Pivers Island Road measures approximately 0.5 miles and experiences a high daily volume of motor vehicle traffic. Travel along this route includes crossing the Gallant's Channel Drawbridge, which is very narrow and is proposed to be demolished in future with the completion of the US Highway 70 Beaufort Bypass. Until completion of the proposed bridge/bypass project, this Route will continue to serve as a primary gateway to Beaufort and bicycling improvements are a high priority for the public. The US Highway 70 West Route is recommended for shared lane markings because of the limitations along the drawbridge. Shared roadway signage and sharrows are the preferred treatment to improve visibility of bikers on the bridge and along the Route.

Live Oak Street Route

Shared lane markings recommended along Live Oak Street from Front Street to its intersection with NC Highway 101 until further study is completed associated with the US Highway 70 Beaufort Bypass project. The one (1) mile (approx.) roadway serves as a primary thoroughfare through Town, which is often used by experienced cyclists. Improvements to the roadway are demanded by the public to improve bikeability. The preferred treatment of this shared roadway is to install signage and paint Sharrows as a short-term treatment until US Highway

70 is redirected in the future. Upon completion of the bypass project, bike lanes are the preferred treatment along a redefined Live Oak Street Route.

Pivers Island Route
Shared lane markings are recommended along Pivers Island Road extending from US Highway 70 to Duke Marine Lab. The Pivers Island Route is proposed due to public demand for improved bicycling facilities between Beaufort and Pivers Island.

Intersection Improvements

NC Highway 101 and West Beaufort Road Intersection
This intersection is located along the existing Bicycle Route and experiences high daily traffic volumes. Traffic at this intersection is managed by a stop sign on West Beaufort Road. Pavement improvements are recommended at this intersection to address erosion at the turn aprons.

NC Highway 101 and Carraway Drive Intersection
This intersection is located along the existing Bicycle Route and serves as an access to Beaufort's Elementary and Middle Schools. This intersection is the location of a bicycle-motor vehicle crash and is located within a route to schools. Traffic at this intersection is managed by a stop sign on Carraway Drive. During school days, a police officer directs traffic at the intersection to ensure safety of those traveling on and off NC Highway 101. The installation of signage and a signal is preferred to alert both motorists and cyclists of the approaching intersection. Improving visibility of bikers in this intersection is a priority.

Turner Street and US Highway 70 West Intersection
This intersection is the site of a bicycle-motor vehicle crash and is located along the existing Bicycle Route. Improving visibility of bikers in the roadway is a priority. The preferred treatment recommended for this intersection is to install bicycle-activated detector loops and signage.

Live Oak Street (US Highway70) and Mulberry Street/Lennoxville Road Intersection
This intersection was originally installed because Beaufort's Elementary School previously occupied the property on the north-west corner. This intersection provides a connection between the east and west sides of Beaufort including residential areas, parks, commercial areas, and the Boys & Girls Club. The installation of bicycle-activated detector loops is recommended with appropriate signage.

Campen Drive and Live Oak Street (US Highway 70) Intersection
This intersection is the site of a bicycle-motor vehicle crash and serves as an access to the Elementary and Middle Schools. This intersection is primarily bordered by commercial properties including the site of the new public library. According to NCDOT, a project is proposed to add turn

lanes at the intersection to facilitate traffic turning towards the schools. The installation of a bicycle-activated detector loop is recommended along with appropriate signage. It is also recommended that the stop bar on US Highway 70 heading westbound be pulled back to improve the intersection for pedestrians and bicyclists.

OFF-ROAD PROJECTS & PREFERRED TREATMENTS

Off-road projects and preferred treatments include multi-use trails and rail-to-trail projects. The multi-use trails are typically 10 feet wide and are located along easements and other open tracts of land. The following off-road projects have been recommended and are described below. **For a complete description of the off-road projects, see Appendix B.**

Live Oak & West Beaufort Rails-to-Trails Route

A multi-use trail is recommended through conversion of the abandoned railroad bed that diagonally connects Live Oak Street to West Beaufort Road. This will provide an improved connection across Town Creek for bicyclists and pedestrians alike traveling between residential areas, the West Beaufort Water Access, the Maritime Museum (future), the commercial establishments along US Highway 70, and Freedom Park. The proposed project measures approximately 0.5 miles beginning at Live Oak Street and terminating near the intersection of West Beaufort Road and Stanton Road. Currently, the abandoned railroad bed crosses Town Creek; therefore, environmental constraints will need to be addressed in addition to easement identification and ownership.

Airport Loop Route

A multi-use trail is recommended along the waterside perimeter of the Michael J. Smith Airport property. Beginning near the intersection of Aqua-10 Road and West Beaufort Road the Airport Loop is proposed to follow the banks of the Newport River and end at the intersection of Copeland Road and NC Highway 101. The proposed project measures approximately two (2) miles and will need to be constructed to meet the state standards for development along the waterfront. Further study and review is needed to establish an agreement with the property owner(s), determine presence of wetlands and waterfront buffers, and to determine route alignment. The Airport Loop route would increase the bicycling network for residents in the NC Highway 101 area. During preliminary project development, a paved shoulder was recommended along Copeland Road; however, this recommendation was combined with the Airport Loop Route to provide a continuous multi-use trail extending to NC Highway 101.

NC Highway 101 Route (US Highway 70 to Copeland Road)

NC Highway 101 serves as a primary thoroughfare to Beaufort's Elementary and Middle Schools, commercial areas, and residential subdivisions. The NC Highway 101 Route (US Highway 70 to Copeland Road) measures approximately one (1) mile and extends to the north

from US Highway 70 to Copeland Road. Currently, the daily motor vehicle volume is high, the roadway pavement is narrow and provides little to no shoulder for bicycling. There are increases in posted speed limits along NC Highway 101 as motor vehicles travel north out of Beaufort. A multi-use trail is recommended to provide areas for bicyclists to ride along this Route. The NC Highway 101 Route (US Highway 70 to Copeland Road) will provide a Safe Route to School from nearby residential areas to the Elementary and Middle Schools located along this Route. Additionally, this multi-use trail is intended to have a connection to the Airport Loop Route described in the paragraph above. Paved shoulders are recommended along NC Highway 101 from Copeland Road to Lake Road, which discussed in this section on page 4-10.

Carraway Drive Route

Carraway Drive serves Beaufort's Elementary and Middle schools and is located along the Town's existing Bicycle Route. An opportunity to provide a multi-use trail serving both bicyclists and pedestrians is desired to serve alternative student transportation needs as a safe route to school. Currently, incomplete sections of sidewalk exist along Carraway Drive. This Plan proposes to convert the existing sidewalk along Carraway Drive to a multi-use trail, located from NC Highway 101 to Campen Road, and extend the trail along the perimeter of school property to accommodate school bike riders. The residential areas surrounding the school property have school aged children living within a bikeable distance. There are some ditches that will need to be considered during planning and development for the Carraway Drive Route.

Old Tram Route

The Old Tram Route was identified as an opportunity for a multi-use route because of its former use as a logging road. The proposed route follows traditional farm boundaries and will provide bicycle access between satellite residential areas (i.e. North River Club) and other destinations in Beaufort. This route could be used as an alternate to US Highway 70 and NC Highway 101 for residents in the areas of the North River Club. The proposed route measures approximately one (1) mile extending from Meeting Street (off of Professional Park Drive) to the Taylor Farm Road area. Easement access across private properties and crossing of the proposed US Highway 70 Beaufort Bypass needs to be studied further in addition to route alignment.

Steep Point Road Route

A multi-use trail along Steep Point Road is recommended to provide connection between residential and commercial areas. Currently, the residents in the area use Steep Point Road for bicycling, running, and walking. Improvements to this route have been demanded to improve the safety for existing multi-modal transportation options, and provide connectivity. Additionally, there is vacant land in the immediate area with future uses that have yet to be determined, but should be considered. The recommended project is proposed along Steep Point Road from

Lockhart Street to the end of the road and would provide a multi-use path measuring approximately one (1) mile.

Beaufort – Morehead City Causeway Route
A multi-use trail route was demanded by the public and steering committee members to provide a safe route for bicyclists riding between Beaufort and Morehead City. Although this route is not within the project area, this recommendation is included for consideration in future roadway improvements by the local governments, state, and NCDOT. This route is intended to reciprocate the planning effort with Morehead City's Bicycle Plan. A multi-use trail is recommended along the causeway between the bridges accessing the towns.

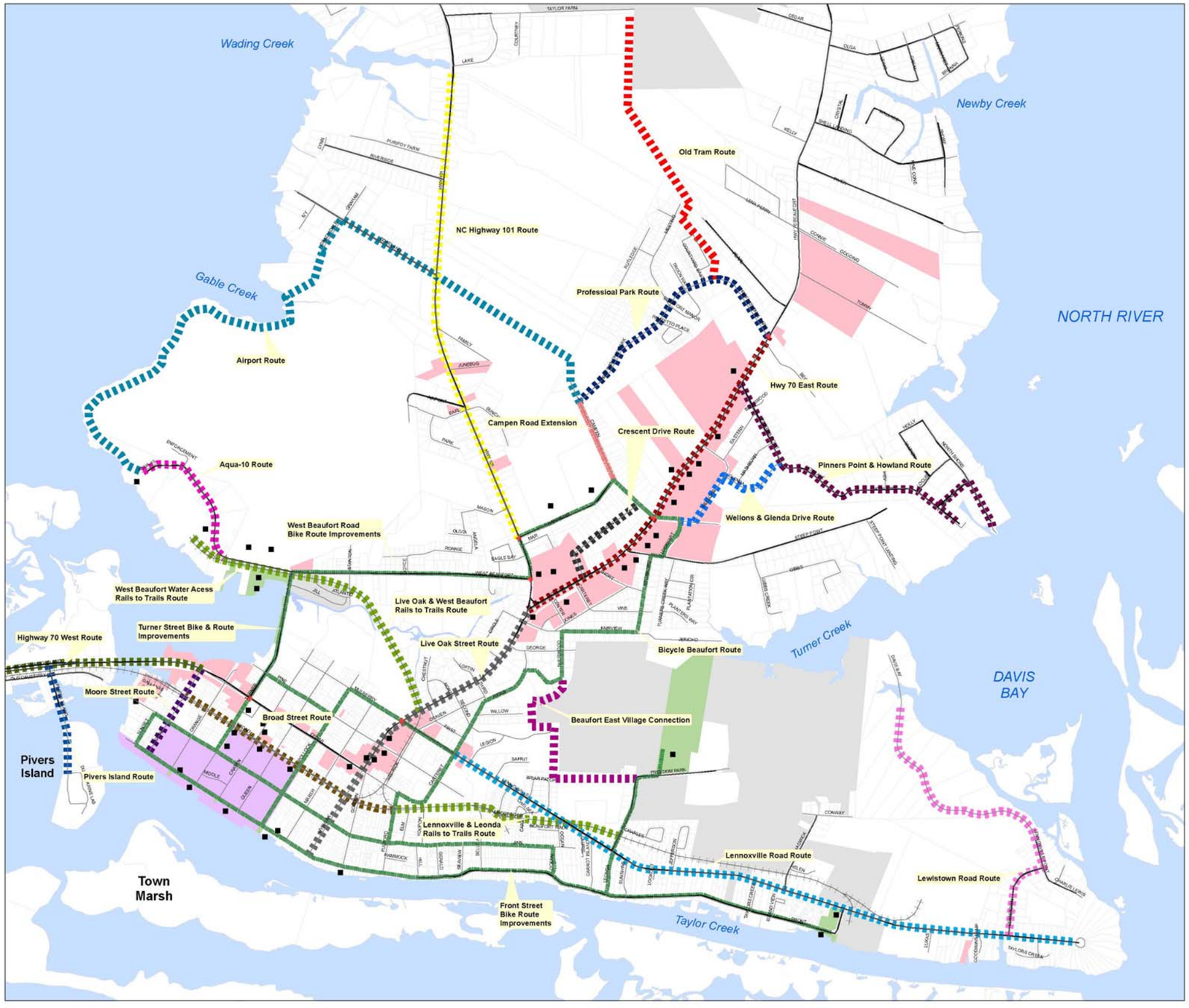
ANCILLARY FACILITIES

Ancillary facilities are support amenities located at destination points and at intermediate points throughout the bicycling network. These facilities directly contribute to the overall success of the bikeways as they provide a convenience to cyclists. Ancillary facilities include bike parking racks, route signage/markings, pedestrian crossings, water fountains, rest areas, benches and information boards (for maps, etc.).

Bicycle racks are needed at destination locations while additional racks are needed at current bike parking locations in Beaufort due to overcrowding and long-term use. A lack of secure bicycle parking may keep people from biking for transportation. Unattended bikes may result in theft, even when left for short time periods. Adequate capacity bicycle parking racks should be provided at all major destinations identified in the comprehensive bicycle plan including parks, schools, libraries, recreation centers, public buildings, museums, and shopping centers.

Rest areas should be included along bicycle routes that involve longer distances or isolation from public facilities. For example, the recommended *Airport Loop* should include benches for people to rest and enjoy the scenic vista across the Newport River. Rest areas encourage bicycling for people of all ages and abilities as it allows them adequate opportunity to stop biking and recover from travel so that they may continue for longer distances.

Map 4.2 shows these potential opportunities.



Town of Beaufort
Comprehensive Bicycle Plan

Map 4.2: Proposed Opportunities

Legend

- Intersection Improvements
- Local or Private Streets
- NC Routes, State Roads, & US Routes
- Abandoned Railroad
- Proposed Bike Racks
- Bicycling in Beaufort Bike Route
- Campen Road Extension
- Pinners Point Road and Howland Parkway Route
- Wellons Drive & Glenda Drive Route
- US Highway 70 Connection
- Pivers Island Road
- Lewistown Road Route
- Professional Park Drive
- Lennoxville Road
- Highway 70 West
- Live Oak Street
- Old Tram Road
- Moore Street
- Rails to Trails
- Hwy 101 Connection
- Highway 70 East
- Crescent Drive
- Broad Street
- Beaufort East Village Development Connection
- Aqua-10 Road
- Airport Loop
- Parks & Open Space
- Future Residential Areas
- Downtown
- Commercial Areas

0.4 0.2 0 0.4
Miles

Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

[i] Selecting Roadway Design Treatments to Accommodate Bicycles (Publication No. FHWA-RD-92-073), Federal Highway Administration, January 1994

[ii] Duke Marine Lab http://www.nicholas.duke.edu/marinelab/about/thelab.html, retrieved January 2, 2009

SECTION 5 – BICYCLE FACILITY STANDARDS & GUIDELINES

This section will provide guidance to the Town of Beaufort on design standards and guidelines for new bicycle facilities. These standards and guidelines are a critical component of this bicycle plan and for all facility construction and development.

Section Outline:

5.0 General Bicycle Planning & Design Guidelines

5.1 Roadway Improvements

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5.0 GENERAL BICYCLE PLANNING & DESIGN GUIDELINES

The design standards and guidelines mentioned in this section are derived from North Carolina Department of Transportation (NCDOT) *Bicycle Facilities Planning and Design Guidelines*, the American Association of State Highway and Transportation Officials (AASHTO) *Guidelines for the Development of Bicycle Facilities*, and the Federal Highway Association (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD*), Part 9- Traffic Controls for Bicycle Facilities.

In addition to NCDOT, AASHTO and MUTCD, the following documents also serve as bicycle facilities guides:

- *Bicycle Parking Guidelines*, A Set of Recommendations from the Association of Pedestrian & Bicycle Professionals (APBP) (available at: www.apbp.org)
- *Bikesafe: Bicycle Countermeasure Selection System* (available at: www.bicyclinginfo.org/bikesafe/)
- *Designing Sidewalks and Trails for Access, Part I and II* (available at: http://www.fhwa.dot.gov/environment/sidewalks/index.htm and http://www.fhwa.dot.gov/environment/sidewalk2/)

5.1 ROADWAY IMPROVEMENTS

All roadways that allow bicyclists should be designed and constructed for safe use by cyclist; therefore, bicycle-safe design practices should be implemented to avoid costly retrofit improvements in the future. Roadway improvements include safe drainage grates, railroad crossings, bridges, smooth and level pavement surfaces, and traffic signals responsive to bicycles.

DRAINAGE GRATES

Drainage grates and utility covers can be a serious safety hazard for bicyclists. Unsafe grates can divert or catch a bicyclist's front wheel, causing a crash, as well as a raised or depressed utility cover. According to the above mentioned guides, parallel bar drainage grates are the most

hazardous because they can trap a bike's front wheel causing loss of steering control and the bar spacing can allow narrow wheels to drop into the grates, resulting in not just property damage but possible injury to the bicyclist.

Unsafe drainage grate covers should be replaced with either "Type E, F, or G standard grate covers"[i] as shown in the image to the right. Due to their high risk of property and personal injury, parallel grate covers should be replaced immediately.

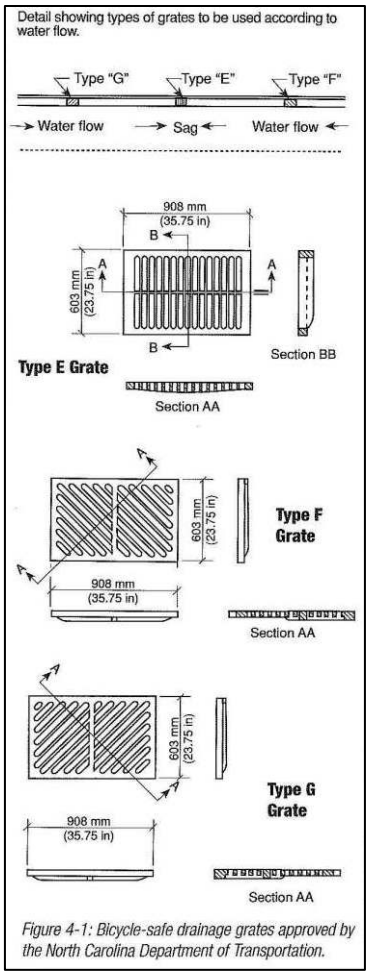


Figure 4-1: Bicycle-safe drainage grates approved by the North Carolina Department of Transportation.

Courtesy of: NCDOT Bicycle Facilities Planning & Design Guidelines

Due to bicyclists' being more sensitive to a roadway surface and projections along it, roadway-resurfacing projects should not leave appurtenances projecting above the pavement surface. Repeated resurfacing a roadway without adjusting drainage grates or utility covers can result in these features being below the road surface, a hazardous tripping condition to bicycle traffic. Therefore, when a roadway is being resurfaced, all manholes, inlets, lampholes, and water valve boxes should be either raised or lowered to be level with the new roadway surface.

RAILROAD CROSSINGS

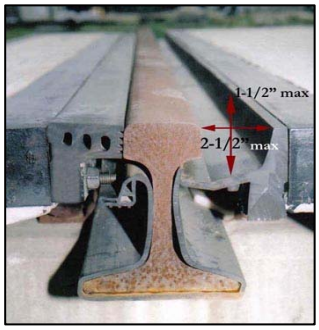
Railroad crossings can pose a problem for bicyclists at at-grade railroad crossings. Uneven or rough crossings can cause property and possible personal injury for bicyclists. Regular maintenance and replacement of railroad crossings should be done to avoid any potential problems.

In locations where railroad tracks cross a roadway at less than 45 degrees, the front wheel may be diverted by the rail or trapped in the flangeway, resulting in a loss of steering control. In addition, regardless of the angle, if the transition surface between the roadway and the tracks is rough, wheel damage and physical injury is possible.

Railroad tracks that cross roadways and/or bikeways at-grade should do so "as close to a right angle as possible."[ii] If not feasible, design and construction consideration should be given as follows:

- Widening the approach of roadway, bike lane, or shoulder to allow cyclist to cross at approximately 90 degrees without veering into traffic. The minimum widening should be 6-feet; however, 8-feet is desirable, depending on the amount of available right-of-way.

- On low-speed, lightly travelled railroad tracks, commercially available flangeway fillers can be applied to eliminate the gap next to the rail (see image to the right).



ADA Flangeway Filler

BRIDGES

According to North Carolina's Bicycle Facilities Planning and Design Guidelines, improving a bridge to accommodate bicycle traffic involves analyzing four major areas of concern:

- **Static Obstructions**
  Bicycle-safe bridge railings need to be used on bridges designed for bicycle traffic and on bridges where bicycle protection is warranted. Bicycle rails on bridges should conform to the latest *AASHTO Standards and Specifications for Highway Bridges Guidelines*. The minimum height of the rail should be 54-inches from the top of riding surface to top of rail.

  Guardrails on bridge approaches should also be designed for bicycles. A roadside barrier should be placed as far from the travel way as conditions permit. The minimum offset from the traffic lane or paved shoulder edge is 4-feet. However, when the slope on the exterior side of the guardrail is excessive or the hazard is severe, or the outside lanes are narrow, a bicycle-safe railing should be installed on top of the guardrail to provide additional protection, increasing the total height to 54-inches.

- **Surface Conditions**
  The bridge surface should have smooth expansion joints and the deck should be clear of potential hazards for bicyclists. The bridge should use bicycle-safe drainage grates and drains. Due to potential steering problems, drawbridges and swing bridges with steel decking should not be designated as bicycle routes without determining the deck's effect on bicycle handling.

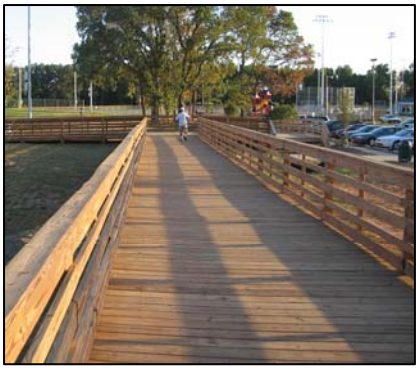
  A bridge's surface should be clear of debris that could cause problems for bicyclists, forcing them to maneuver into traffic lanes or closer to the bridge edge.

- **Bridge Deck Width**
  To accommodate bicycles on bridges 4-foot shoulders should be applied in shoulder sections and 4-foot bike lanes or 14-foot wide outside lanes should be applied in curb and gutter sections. Determining the best option is dependent on traffic speed and volume.

- **Bridge Approaches.**
  Either paved shoulders or wide outside lanes should be continued for at least 100-feet on either side of a bridge in order to ensure a safe transition for bicycles. Additional bridge approach treatments can be found in the *North Carolina Bicycle Facilities Planning and Design Guidelines*.

BOARDWALKS

If a boardwalk is used as a portion of the multi-use segment (for instance, in an environmentally sensitive area), it should be designed to be bicycle and pedestrian friendly. The width of the boardwalk should be a minimum of 10-feet wide or 12-feet wide for bi-directional. If the boardwalk height exceeds 30-inches, railings are required. If required, the railings should be bicycle-safe and a minimum of 54-inches in height, to provide protection along the boardwalk.



A 10-foot boardwalk in Warren County, NC / Rivers

The boardwalk surface should be clear of debris and have a smooth and level riding surface. When a boardwalk has to cross a large open area, thus becoming a bridge, *AASHTO Standard Specifications for Highway Bridges* should be reviewed to ensure appropriate load bearing capacity.

PAVEMENT QUALITY

The pavement quality of a roadway can cause an unpleasant bicycling experience. Pavement irregularities, potholes, and depressions from heavy traffic may not be as noticeable or a concern to motorists, but bicycles with their narrow wheels and lack of suspension cannot handle these hazard spots. Therefore, whenever practical pavement surfaces on all roadways, especially those with bike facilities should be free of these hazards.

The paving over gutter pans to achieve the minimum requirements for a bicycle facility (i.e., bike lane) is not generally supported. However, if other treatment options are limited then this treatment may occur as long as continuous and consistent maintenance is conducted to prevent the potential break-up of the asphalt applied over the top of the gutter pan.

ON-STREET VEHICLE PARKING

In some instances, the removal, narrowing or reconfiguration of on-street parking will have to be conducted in order to accommodate and/or improve safety for bike lanes or shared lane markings along a particular roadway. Generally, when on-street parking is removed, in whole or in part, the safety of motorists, pedestrians, and bicyclists is improved. However, there are alternatives to complete removal of on-street parking.

Bike lane combined with on-street parking in Arlington, VA / Rivers

To reduce potential conflicts and public and private outcry, careful research is needed prior to making a proposal to change on-street parking in a community. A community needs to compile and analyze the following information before proceeding with on-street parking changes for a particular section of roadway:

- Types of land uses along section of roadway in question
- Availability of both on- and off-street parking
- Whether both or one side of roadway will be modified

- Supporting regulations
- Alternatives (narrowing existing parallel parking spaces, back-in/head out diagonal parking verses head-in/back out diagonal parking, parking garage or lot, shared parking spaces, etc.)

Parallel Parking

The use of parallel parking is the standard amongst communities along narrow roadways. A typical parking space is 8 to 10-feet wide and 22-feet long. However, spaces can be narrowed to 7-feet on local streets to allow the necessary room for bike facilities. In some instances, parallel parking may be applied to one side of roadway to accommodate the existing land uses in order to free up roadway space for bike facilities.

Parallel parking advantages include: 1) provides a buffer between travel lanes and sidewalks and 2) requires less pavement width than diagonal parking. However, some motorists tend to have difficulty maneuvering into the space, it is an inefficient use of street space since it accommodates fewer parking spaces than diagonal, and can pose a safety hazard for bicyclists riding along roadway and for the pedestrian exiting the vehicle.

Diagonal Parking

Diagonal parking has been an alternative to parallel parking in communities to gain additional spaces in areas of high parking demand. However, diagonal parking spaces typically require a length of 17.5 feet and a width of 8.5 feet of space on a road and can cause conflicts with safe bicycle travel, such as poor visibility of on-coming bicyclists.

There are two types of diagonal parking: pull-in/back-out and back-in/head-out. Both types have the same dimensions of 17.5 feet in length and 8.5 feet in width. Their advantages and disadvantages are discussed below. Diagonal parking, when possible, should be placed on one-way road, preferably on the left side to avoid conflict with bicycles. However, if diagonal parking is planned for a two-way road with existing or planned bike lanes or other on-road bike facilities, the following suggestions should be taken into consideration to decrease potential conflicts:

- Parking spaces should be long enough to accommodate large vehicles
- A 8-inch stripe should be placed between parking area and bike lane to increase a visible separation
- Possible enforcement of vehicles encroaching on bike lane
- A possible median to reduce the ability of motorists to pull into a diagonal parking space in the opposite direction it is designed for

- Appropriate warning and informational signs to inform motorists of bicycle presence

Pull-In/Back-Out Diagonal Parking

The more traditional diagonal parking method, this type requires the motorist to drive head-first into the parking space. Advantages of pull-in diagonal parking are: 1) provides a buffer between travel lanes and sidewalks, 2) is a traffic calming measures (reduces traffic speed, 3) makes it easier to park a vehicle, and 4) accommodates more vehicles along a section of roadway than parallel parking.

The disadvantages of this type of on-street parking are: 1) preferred on one-way roads, 2) preferred on roadways with lower posted speeds and traffic volumes, 3) obstructs sidewalks, 4) decreases visibility when backing out of space, and 5) not compatible with bike routes.

Back-In/Head-Out Diagonal Parking

An alternative diagonal parking method is back-in or head-out diagonal parking. This type requires the motorist to back into the parking space. The use of back-in diagonal parking provides better visibility when the driver is leaving a parking space, thus improving safety for the motorists, pedestrians exiting vehicles, and bicyclists traveling along the roadway as compared to standard diagonal parking.

Back-in parking advantages include: 1) better loading and unloading of materials into back of vehicle, 2) improves visibility when pulling out of space (actually safer than pull-in parking), 3) provides buffers between streets and sidewalks, 4) is a traffic calming measure (reduces traffic speeds), 5) accommodates more vehicles along a roadway, and 6) can be used along bike routes.

Disadvantages to this type of parking are: 1) preferred on one-way roads, 2) preferred with medians on two-way streets, 3) preferred on roads with lower traffic and post speed limits, and 4) additional educational signage is necessary.

Back-In Diagonal Parking Informational Sign in Olympia, WA
Courtesy of www.pedbikeimages.org / Dan Burden

5.2 ON-ROAD BICYCLE FACILITIES

On-road bicycle facilities are treatments applied to the existing roadway system, which offers a variety of opportunities for bicycle travel and provides many connections to key destinations needed to support a successful bicycle network. Experienced riders who travel at a speed of 15-30 mph and are comfortable riding with vehicular traffic typically utilize these types of facilities. Selecting the appropriate facility for a given roadway is important and depends on numerous factors such as, traffic volumes, travel speeds, outside lane width, total pavement width, and percentage of heavy vehicle traffic. The following are various types

of on-road applications for bicycle facilities. Table 5.1 summarizes on-road bicycle facilities.

BIKE LANES

Bike lane
Courtesy of:
www.pedbikeimages.org / Dan Burden

Bike lanes are incorporated into a roadway that has available space where delineation is desirable for bicyclists and motorists, in order to provide a designated space for each and provide more predictable movements by each. Bike lanes can increase a bicyclist's confidence in safety by knowing motorists will not pass them too closely and motorists know they do not have to swerve out of their lane to pass a bicyclist.

Two-lane and four-lane divided roadways are the best environment for bike lanes. Bike lanes along roadways with numerous commercial driveways should be avoided. Bike lanes are meant to be one-way facilities, which carry bike traffic in the same direction as adjacent motor vehicle traffic. Therefore, two-way bike lanes on one side of the roadway are not recommended. On one-way streets, bike lanes should be placed on the right side of the street in the direction of travel.

According to AASHTO, there are four different width standards for bike lanes depending on the type of roadway it will be installed on. For roadways with no curb and gutter, the minimum width is 4 feet. On streets with curb and gutter, NCDOT supports 4-foot bike lanes measured from the edge of the gutter pan. It is typical of bicyclists to ride approximately 32-40 inches from a curb face; therefore, it is important that the pavement surface is smooth and free of obstructions. If a roadway has a wider gutter pan with storm drains or utility covers within them, additional space should be given for the bike lane to avoid bicyclists from swerving.

Where on-street parking is permitted and the parking stall is marked, the distance between the curb face and outer marking of the bike lane must be 13 to 15-feet to allow a 5-feet minimum width for a bike lane and 8 to 10-feet for the parking stall.

If on-street parking is permitted but the parking stall or area is not marked, the shared area should be a minimum of 11 feet without a curb face and 12 feet adjacent to a curb face. If the parking area has a high turnover rate, an additional 1-2 feet is preferred. To avoid obstacles, poor visibility, and hazards bike lanes should never be placed between parking area and curb line.

On rural roadways without curb and gutter and infrequent parking, bike lanes should be located within the limits of the paved shoulder at the outsider edge. These bike lanes should have a minimum width of 4 feet, where the area beyond the paved shoulder can provide additional maneuvering room. If heavy truck traffic is present or the speed limit is over 50 mph, a width of 5 feet or more should be provided.

Bike lanes should be marked with a 6-inch solid white line, and an additional 4-inch solid white line can be placed between the parking area and the bike lane for more clarification. As mentioned previously, improper drainage grates can pose a hazard for bicyclists; therefore, immediate replacement or retrofitting is necessary to provide a safe riding area for bicyclists.

WIDE OUTSIDE LANES

The desirable width of a travel lane is 12 feet, but on roadways with bicycle traffic, widening the outside lane can benefit both bicyclists and motorists. A wide outside lane refers to a wider outside travel lane shared by bicyclists and motorists. Wide outside lanes have no stripes to delineate a separate lane for bicyclists.

The minimum width for an outside lane is 14 feet of usable and clear (from obstructions) riding area. Generally, an extra 1-foot is added for flush or depressed obstructions, such as a joint or soft shoulder. An additional 2 feet should be added to accommodate raised obstructions like curb and gutter. On existing roadways where extending the pavement to widen the outside lane is not feasible, the lane striping can be shifted to narrow the inside lane(s) while widening the outside lane. If this is done, the inside lane(s) should not be narrower than 11-feet; however, the volume of truck traffic should be taken into account and if truck volumes are greater than 5% of the total traffic volume narrow lanes of 11-feet should not be used.[iii]

Due to no defining markings, wide outside lanes require bicyclists and motorists to be more aware of and attentive to each other. This on-road treatment was not recommended in this Plan.

D11-1

D1-1

M1-8

M7-6

Examples of Bike Route Signs
Courtesy of: MUTCD

WIDE PAVED SHOULDERS

Wide paved shoulders are often used in rural areas or on roads with relatively few driveways and intersections. Smoothly paved shoulders are a preferred bicycle facility by cyclists and motorists. Paved shoulders can also provide an emergency pull-off area for vehicles, eliminate rutting and drop-off adjacent to travel lane edge, provide adequate cross slope for drainage, reduce maintenance, and provide lateral support for roadway base and surface course.

For a paved shoulder to accommodate bicyclist, the paved shoulder must be a minimum of 4-feet wide and be a smooth and level surface. Additional width is desirable if the speed limit exceeds 35 mph, if the vehicular traffic percentage for truck, bus and recreation vehicles is high, or if static obstructions exist at the right side.

A minimum 2-foot clearance should be provided from the edge of pavement to the top of the foreslope of a ditch; however, if the slope is greater than 2:1, the clearance should be 3-feet. If a guardrail is provided adjacent to the paved shoulder, a 4-foot clearance is preferred. All road signs and other vertical obstructions should be offset a minimum of 6-feet from pavement edge.

UNSIGNED SHARED ROADWAY (NO BIKEWAY DESIGNATION OR TREATMENT)

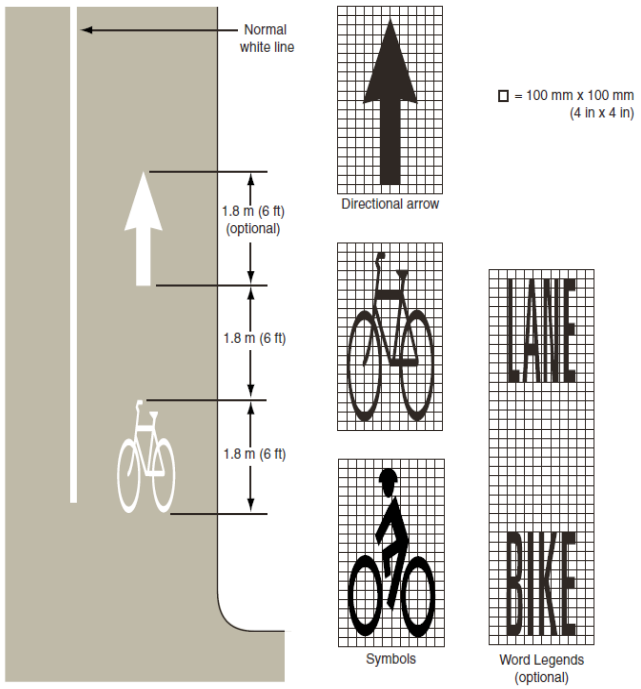
The majority of bicyclists travel on streets without bikeway designation or signage. This trend will probably continue to happen since portions of a community's existing roadway system has low traffic volumes and additional treatments are not necessary (i.e., minor residential streets). In addition, some roadways in a community may be unsafe or would be unsuitable for bicycle travel; therefore, it would be inappropriate to encourage bicycle traffic by designating them as bicycle routes with signage or on-street treatments.

SIGNED SHARED ROADWAYS (DESIGNATED BIKE ROUTES)

A signed shared roadway is a designated bike route with appropriate signage. Signed shared roadways serve either to provide continuity to other bicycle facilities or designate preferred routes through high-demand corridors.

By designating a roadway as a bike route, a community is stating there are advantages to using these routes compared to alternative routes (i.e., wider travel lanes, smoother road surface, avoidance of high vehicular traffic, ease of use by bicyclists, low speed limits, etc.).

Figure 9C-6. Example of Optional Word and Symbol Pavement Markings for Bicycle Lanes



From Guide for Development of Bicycle Facilities, 1999, by the American Association of State Highway and Transportation Officials, Washington, DC. Used by permission.

A signed shared roadway should be maintained in a matter consistent with the needs of bicyclists and have appropriate signage along the designated route. The placement and spacing of signs should be based on Part 9 of the MUTCD (Traffic Controls for Bicycle Facilities). For signed bike routes to be functional and successful, supplemental signs should be placed beneath the main sign when located along routes leading to high demand destinations (Downtown, Schools, Parks, etc.). All directional changes should be signed with appropriate arrow signs and signage should not end at a barrier, instead information directing a bicyclist around the barrier is preferred.

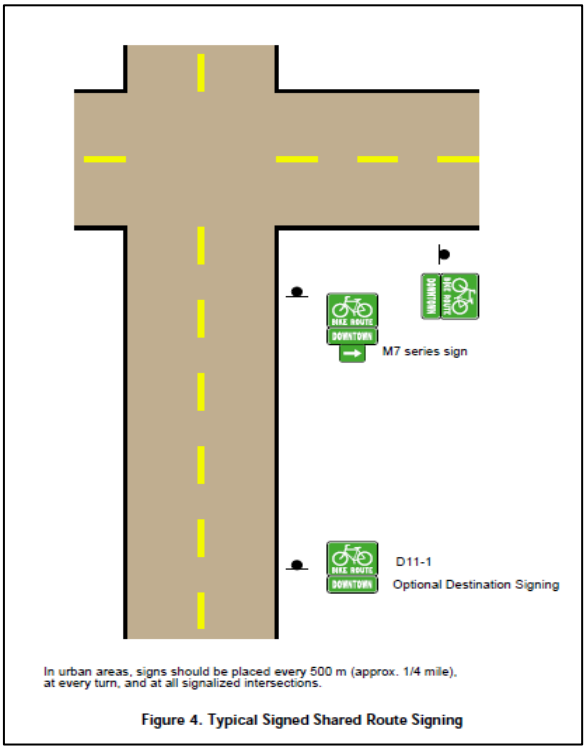


Figure 4. Typical Signed Shared Route Signing

From AASHTO Guide for Development of Bicycle Facilities, Copyright 1999, by the American Association of State Highway and Transportation Officials, Washington, DC. Used by permission.

Just as placement of signs is important, care should be given to avoid installing too many signs.[iv] The overuse of signs can result in lose of effectiveness to bicyclists and motorists; therefore, a community should be conservative on the use of regulatory and warning signs along bike routes.

SHARROWS

Recommended by the North Carolina Committee on Uniform Traffic Control Devices (NCUTCD) in January 2007 (yet not supported currently by MUTCD until their anticipated 2010 update), the use of shared lane markings (bike-with-chevron) to identify where on a roadway bicyclists should ride has provided another option for improving awareness of bicycles on shared roadways.

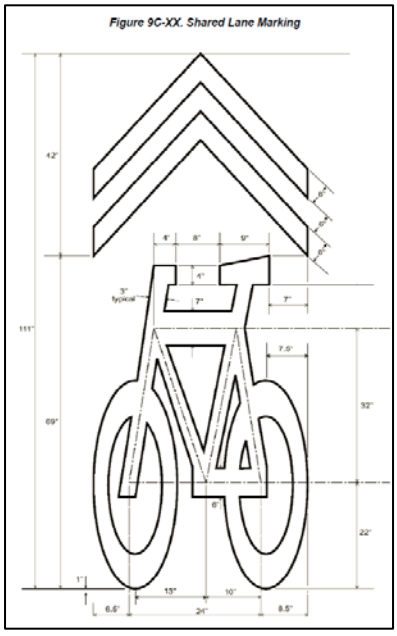


Illustration of Shared Lane Marking Courtesy of: NCUTCD

The benefits of using the 'bike-with chevron', sharrow, or shared lane marking are:

- Assists bicyclists on indentifying the appropriate and legal line of travel;
- Encourages motorists to pass bicyclists safely and with adequate clearance;
- Reduces the likelihood of a cyclist getting hit by a parked car door;
- Alerts motorists of the lateral location bicyclists may occupy; and
- Reduces wrong-way bicycling.

On roadways with on-street parking, the shared lane marking must be placed a minimum of 11-feet from curb face, or from pavement edge when there is no curb. Roadways with no on-street parking, the marking must be placed 4-feet from curb face or edge of pavement. This marking should not be used on shoulders or in designated bicycle lanes, and on roadways with speed limits above 35 mph. When used along a roadway, the shared lane marking should be placed immediately

after an intersection and spaced at intervals no greater than 250-feet. Further guidance will be provided in the anticipated 2010 update of the MUTCD and AASHTO Guide.

5.3 OFF-ROAD FACILITIES

Off-road facilities provide an alternative for those less experienced bicyclists, children, and a variety of other non-motorized users, such as pedestrians, skaters, and joggers, with a safe and potentially scenic travel route. These types of facilities appeal to families with children of varying skills and abilities and have been successful in reintroducing the public and communities to bicycling as a form of recreation and transportation. Long stretches of continuous roadway right-of-way, utility easements, railroad easements, shorelines, and parks are excellent locations for these facilities.

Depending on facility location, additional safety measures may be needed due to their potentially secluded nature or terrain. Table 5.1 summarizes off-road facilities.

SIDE PATHS / BICYCLE PATHS

Side Paths or Bicycle Paths are trails alongside a roadway and should not be mistaken for sidewalks or multi-use trails. Unlike sidewalks, side paths are a non-motorized extension of the road intended for the exclusive or preferential use of bicycles. A designating feature of side paths compared to multi-use trials is that they do not have their own right-of-way; instead, they share the roadway right-of-way. However, this closeness to the roadway and their intended purpose results in diligence with planning and design of these facilities to reduce conflicts with driveways, side streets, and turning traffic. Side paths should only be used where there are few or no conflicts, to connect other bicycle system components, when there is a demand for various users, and not at the expense of on-road bicycle facilities.

Per AASHTO, side paths should be designed as a two-way facility with a minimum width of ten (10) feet (prefer 12 feet for high bicycle use areas or for probable shared use by pedestrians or joggers) to allow for the necessary operating and maneuvering of multiple bicycles with a minimum 5 feet (prefer 6 feet) of acceptable separation between it and the roadway to demonstrate its use is for bicycles not motor vehicles. If a five (5) feet buffer is not available due to space constraints, a suitable barrier must be provided, such as vegetation and/or a 54-inch high fence or railing. The path should also have a two (2) foot graded buffer along both sides of the pavement to allow clearance between it and any obstructions.

In some instances and upon further study, engineering, and additional signage, side paths may be narrower due to limited space, such as passing between buildings or utility poles that cannot be moved or across bridges that cannot be modified. These narrow segments of a path may be acceptable or necessary for a short distance, but should be handled on a case-by-case basis and should not be given a blank approval by a community.

Side paths should be adequately signed and all intersections or road crosses should be handled according to AASHTO and MUTCD standards.

MULTI-USE TRAILS

Multi-use trails and greenways are developed to serve bicyclists, runners, walkers, and wheelchairs. Multi-use trails are installed in many locations, such as a connection through residential neighborhoods, along rivers, on abandoned railroad beds, in parks to provide additional recreation, and along utility rights-of-way or within their own right-of-way. Pavement for multi-use trails can range from various conventional pavements to pervious pavements to compacted screenings. AASHTO and FHWA recommend multi-use trails meet the following[v]:

An asphalt multi-use trail in Greenville, NC / Rivers

- A minimum width of ten (10) feet and encourages twelve (12) feet or more where heavy user traffic is anticipated for bi-directional trails
- A minimum width of six (6) feet for single direction trails
- A two (2) foot graded area adjacent to both sides of the trail with a maximum 1:6 slope
- Cleared of vertical obstructions, such as tree limbs lower than eight (8) feet to allow for safe under-passage
- On sloped landscapes, have grades that do not exceed 5% with a graduated scale up to 11% or more for short distances
- A cross slope of less than 2%
- Ninety (90) degree angles should be avoided for safety reasons
- A separation of at least five (5) feet from roadways or a forty-two (42) inch high physical barrier
- Additional horizontal clearance width is needed for curved trails, trails with steep slopes, and trails with high posted speeds to ensure user safety

A multi-use trail with access from a street in Williamston, NC / Rivers

Accessibility should be a top consideration for developing these trails; therefore, as many barriers as possible need to be removed.

Informational signs at trail access points indicating steep grades, excessive cross slopes, uneven surfaces, and narrow widths will help users determine if the trail is appropriate for their use. Trails should be

built within the land contour and be designed with environmental sensitivity.

When adjacent to canals, ditches or slopes steeper than 1:3, a separation of five (5) feet from the edge of the path pavement to the top of slope is desirable. The vertical clearance should be a minimum of 8 feet; it may be greater (10 feet) if needed to provide for maintenance and access of emergency vehicles.

The trail design needs to take into consideration user experience, serious bicyclist speeds and environmental conditions; however, the design minimum speed should be 20 mph.

For further guidance on multi-use trails, see North Carolina Division of Bicycle and Pedestrian Transportation website at the following: http://www.ncdot.org/transit/bicycle/projects/project_types/Multi_Use_Pathways2.pdf

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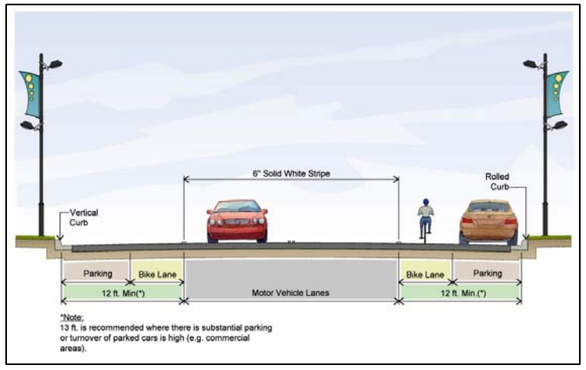
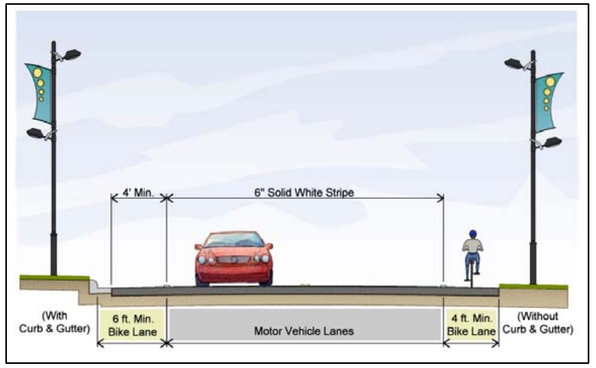
TABLE 5.1: SUMMARY OF TYPES OF BICYCLE FACILITIES
~ SOURCE: WWW.BICYCLEINFO.ORG AND NCDOT BICYCLE FACILITIES PLANNING & DESIGN GUIDELINES

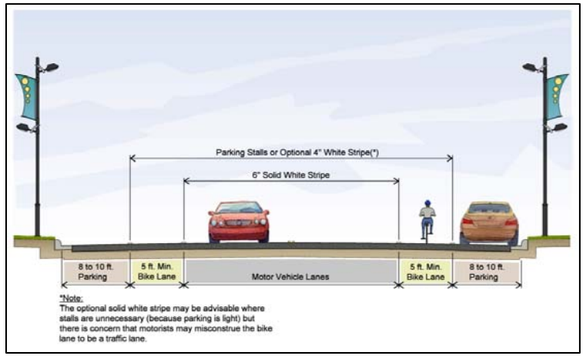
FACILITY TYPE	APPLICATION	TREATMENT	PURPOSE	IMAGE EXAMPLE	CROSS-SECTION EXAMPLE
Bike Lane	Applied to the right side of roadways (one-way only), to carry cyclists in the same direction of motorists. Located between on-street parking and the travel lane (if parking is allowed).	• 4-feet minimum width of bike lane on roadways with no curb and gutter • When curb and gutter is present, the minimum 4-foot width is measured from edge of gutter pan. • Where on-street parking is allowed and the parking stall is marked, the distance between curb face and outer marking of the bike lane must be 13 to 15-feet to allow a 5-feet minimum width for a bike lane and 8 to 10-feet for a parking stall. • 11-feet total width for shared bike lane and parking area, no curb face. • 12-feet shared bike lane and parking with curb face. • 6-inch sold white line stripe separating bike lane from vehicle lane – can increase to 8-inches where needed. • 4-inch optional solid white line stripe separating bike lane and parking spaces.	Provides on-road designation for a portion of the roadway to bicycle traffic by striping, signing, and pavement marking, which creates more predictable movement by cyclists and motorists.	 Bike Lane application in Chapel Hill, NC *Courtesy of: www.pedbikeimages.org / Libby Thomas*	See cross-sections below



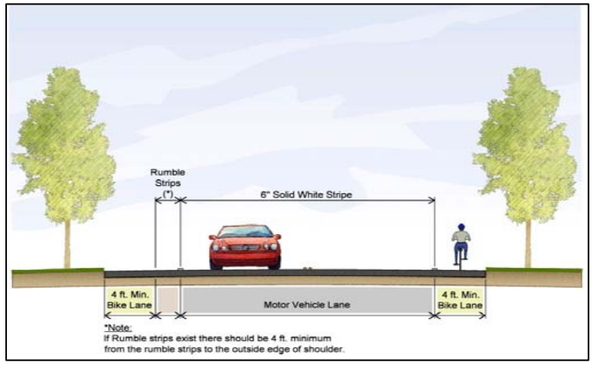
Bike Lane with On-Street Parking Permitted Without Parking Stripe



Bike Lane Where On-Street Parking is Prohibited



Bike Lane with On-Street Parking Permitted & Delineated



Bike Lane in Outlying Areas where Parking is Prohibited

TABLE 5.1: SUMMARY OF TYPES OF BICYCLE FACILITIES, CONTINUE
~ SOURCE: WWW.BICYCLEINFO.ORG AND NCDOT BICYCLE FACILITIES PLANNING & DESIGN GUIDELINES

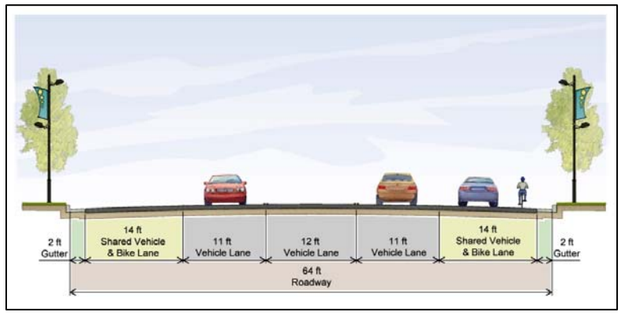
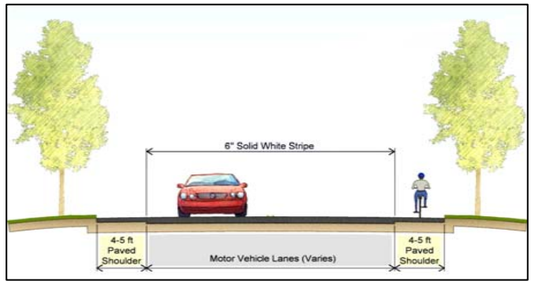
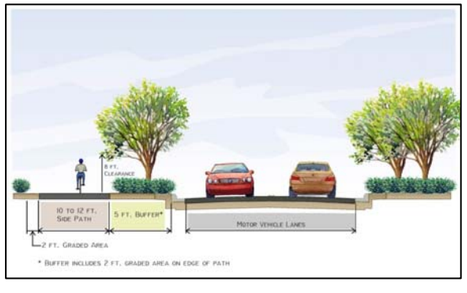
FACILITY TYPE	APPLICATION	TREATMENT	PURPOSE	IMAGE EXAMPLE	CROSS-SECTION EXAMPLE(S)
Wide Outside Lane (WOL)	Most appropriate on high-speed rural highways or high volume arterials when there is insufficient room for a bike lane. Used on streets where designating bike facilities is not advisable but due to directness of route or lack of alternative, road is used by bicyclists.	• 14-feet minimum width for WOL measured from edge line or joint of gutter pan to lane line. • 15-feet to 16-feet minimum is preferred where extra space is needed for maneuvering or to keep clear of on-street parking or other obstacles. • Not signed as a bike route. • Does not have separation striping.	Provide additional space for bicyclists while maintaining vehicular capacity of right lane when a bicycle is present.	 Wide Outside Lane in Chapel Hill, NC *Courtesy of www.pedbikeimages.org / Libby Thomas*	 Wide Outside Lane on a Typical 5-Lane Roadway with Curb & Gutter.
Wide Paved Shoulder	On roads with no curb and gutter. Usually on high speed, rural arterials that serve a high number of experienced bicyclists when wide curb lines are not practical. Shoulder must be continued through intersections and should not be used as a right-turn lane.	• 4-feet wide shoulder surface that is paved and maintained equal to surface standard of roadway. • No rumble strips or gutter pan within this 4-foot area. • 5-feet minimum width recommended from face of guardrail, curb or other barrier. • Widths should be increased if there is a high level of bicycle usage, vehicle speeds are above 50 mph, or there is a higher percentage of truck or bus traffic.	Provide better accommodations for both bicyclists and motorists in rural and developing areas.	 Paved Shoulder in the United States *Courtesy of www.pedbikeimages.org / Dan Burden*	 Paved Shoulder on 2-way Roadway with Separation
Side Path	Works best along corridors with limited driveway / intersection crossings and where there are more desirable destinations along one side of roadway, or where a bike lane is not provided due to limited roadway space.	• 10-feet minimum width (prefer 12-feet) with a 3 to 5-feet (prefer 6-feet) of vegetated buffer between path and travel lanes.	Provide a safe multi-use path along a limited access roadway to popular destinations.	 Side Path application in Morehead City, NC *Courtesy of Rivers*	 Side Path along one side of a two-lane roadway

TABLE 5.1: SUMMARY OF TYPES OF BICYCLE FACILITIES, CONTINUE
~ SOURCE: WWW.BICYCLEINFO.ORG AND NCDOT BICYCLE FACILITIES PLANNING & DESIGN GUIDELINES

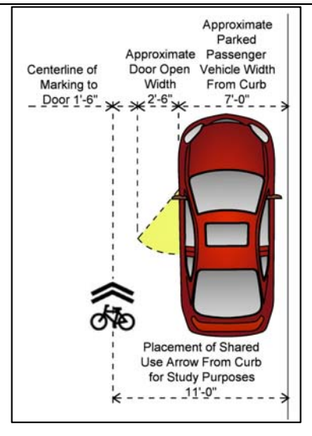
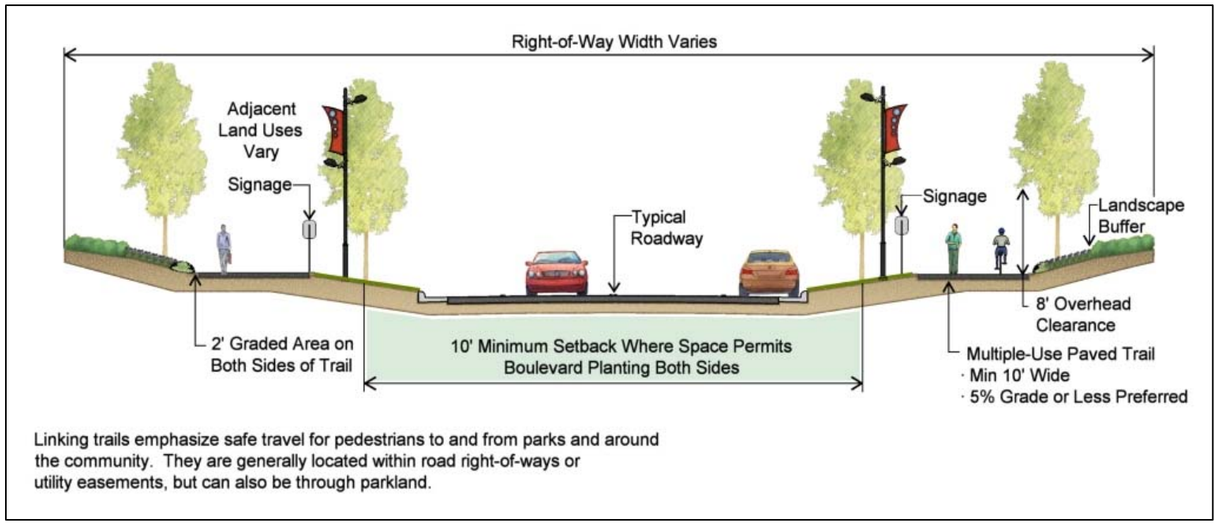
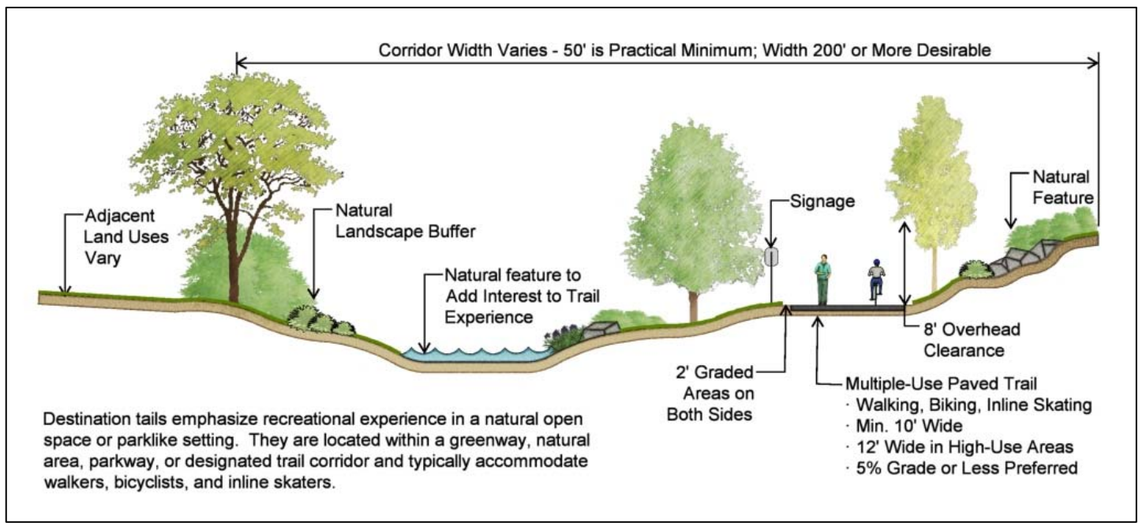
FACILITY TYPE	APPLICATION	TREATMENT	PURPOSE	IMAGE EXAMPLE	CROSS-SECTION EXAMPLE
Un-Signed Shared Roadway	On local streets in residential areas with low speed and volume, used when local streets are needed to be a part of the designated route system to provide connectivity and linkage throughout the community.	• Typical roadway width of 12 feet with or without shoulders.	Provide access to the many origins and destinations dispersed throughout the community. Allow bicycle access to all street and roadways, regardless of whether or not designed bicycle facilities are provided.	Un-Signed Shared Roadway in Beaufort, NC *Courtesy of Rivers*	N/A
Signed Shared Roadway	Signed shared roadways are those roadways signed as preferred bike routes. A signed shared roadway should not terminate at a dead-end street or a barrier (i.e., major intersection, narrow transition areas, waterways, etc.).	• Route provides through and direct travel. • Connects discontinuous segments of shared use trails or bike lanes. • Street parking is prohibited or limited to provide more street width. • Smooth roadway surface free of debris. • Wider curb lanes are provided compared to parallel roads. • Shoulders are at least 4-feet wide • Signage tend to include route distance, direction, and destination information	Provides continuity between bike lanes, trails or other bike facilities; marking a common route for cyclists through a high traffic corridor; directing cyclists to low volume roads or those with a paved shoulder; and directing cyclists to destinations.	Signed Shared Roadway in Beaufort, NC *Courtesy of Rivers*	N/A
Sharrows	On-road application of a "bike-with-chevron" marking on shared roadways. The chevron can be applied to two or four lane roadways. This marking should not be used on wide shoulders or designated bike lanes, on roadways with a speed limit above 35 mph. When used, the marking should be placed immediately after an intersection.	• Paint the "sharrow" or "shared lane marking" on the right-hand lane (outer lane). • 10-feet minimum width for lane is necessary for placement of "sharrow" marking. • Placement of the center of "sharrow" marking should be approximately 1.5 feet from outside lane marking line if on-street parking is prohibited. • Center of "sharrow" marking should be placed 11-feet (minimum) from curb face, or from the pavement edge if on-street parking is allowed. • Spacing of markings at intervals no greater than 250 feet. • When there is no on-street parking, then "sharrow" marking should be placed 4-feet from curb face or edge of pavement. • More specific guidance for the dimensions and application of sharrows will be available in the anticipated 2010 MUTCD and AASHTO Guide updates.	Provides visual notice of the presence of bicycles on the roadway, an indication of where the preferred bicycle position in the lane, encourages safe passing of bicyclists by motorists, reduces the likelihood of a bicyclist getting hit with a car door, and reduce the possibility of bicyclists riding in the wrong direction.	Sharrow along a street with back-in/head out diagonal parking in Seattle, WA *Courtesy of www.pedbikeimages.org / Carl Sundstrom*	

TABLE 5.1: SUMMARY OF TYPES OF BICYCLE FACILITIES, CONTINUE ~ SOURCE: WWW.BICYCLEINFO.ORG					
FACILITY TYPE	**APPLICATION**	**TREATMENT**	**PURPOSE**	**IMAGE EXAMPLE**	**CROSS-SECTION EXAMPLE**
Multi-Use Trail / Path	Off-road application along former railroad corridors, easements, canals to supplement a bicycle network of on-road bicycle facilities. Intersection treatment of off- and on-road applications have to be done with great care.	• 10-feet minimum width for two-way path/trail on a separate right-of-way. • 8-feet may be used where bicycle traffic is expected to be low at all times, pedestrian use is only occasional, sightlines are good, passing opportunities are provided, and maintenance vehicles will not destroy trail edge. • 12-feet is recommended for trails with high use by bicyclists, joggers, skaters, and pedestrians, and where grades are steep – Refer to AASHTO for additional information on grade and slope of trail. • 2-feet of graded area should be maintained adjacent to both sides of trail. • 3-feet of lateral clearance between trail edge and trees, poles or other obstacles. • 8-feet of vertical clearance. • Appropriate signage, marking, and lighting will be needed. • Use of bollards at entrances to prevent motor vehicles use on trail	Provides alternative transportation links for pedestrians and bicyclists between destinations, habitat corridors, economic development attractors, and outdoor fitness centers.	 Multi-Use Trail application in Chapel Hill, NC *Courtesy of Rivers*	See cross-sections below.



Linking Trail



Destination Trail

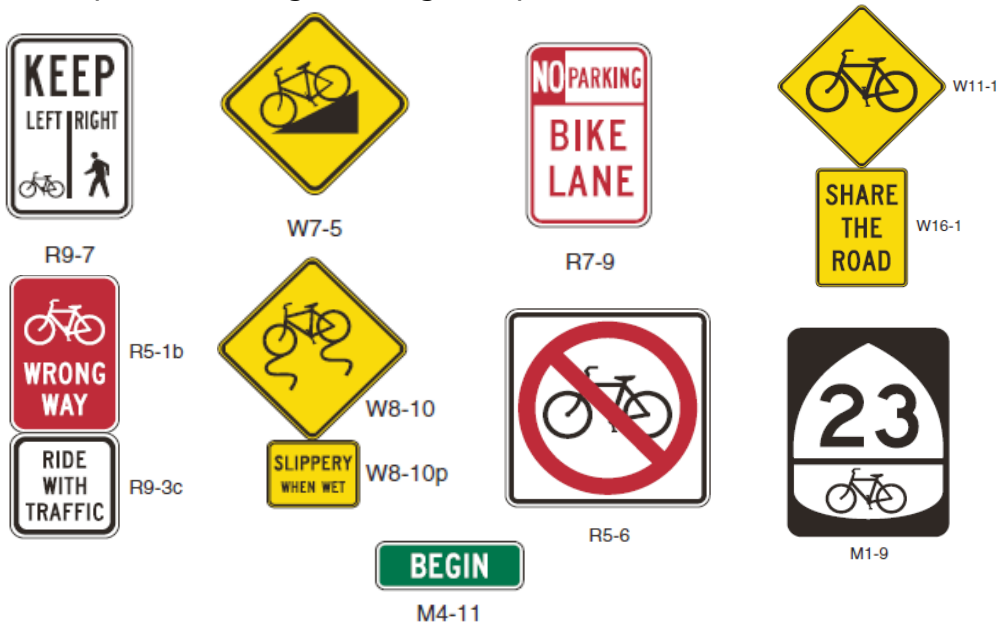
5.4 BICYCLE SIGNAGE

The use of bicycle signage is an important and basic treatment for improving a community's bicycle network. The installation of informational, regulatory, and warning signs must comply with the Federal Highway Administration *Manual for Uniform Traffic Control Devices (MUTCD), Part 9 (Traffic Controls for Bicycle Facilities).* However, overuse of signs not only provides visual clutter to motorists, they can foster noncompliance and disregard that could lead to crashes.

Regulatory and warning signs provide helpful information to motorists and bicyclists unfamiliar with an area, notify motorists of the presence of bicyclists, and give bicyclists the ability use a roadway safely. The use of regulatory and warning signs within school zones can be extremely useful for bicyclist and pedestrian safety, in addition to slowing traffic speeds. There are several different regulatory and warning signs to assist in warning or prohibiting actions by motorists and bicyclists, and they all must comply with MUTCD[vi].

The installation of signage on shared roadways is beneficial to bicyclists and motorists by raising awareness of the potential presence of bicyclists on a road, and by informing or identifying a designated route for bicyclists. The most common bicycle sign seen on roadways is the "Share the Road" sign; however, as mentioned earlier the overuse of this sign can reduce the effectiveness. Additional information on "Share the Road" initiative can be found at:
http://ncdot.org/transit/bicycle/safety/programs_initiatives/share.html

All available signs assist with ensuring traffic flows safely and efficiently whether you are driving or riding a bicycle.



Examples of Regulatory, Warning, and Informational Bicycle Signs
Courtesy of: MUTCD, Part 9

5.5 BICYCLE PARKING FACILITIES

The selection and placement of appropriate bicycle racks are an important component to a comprehensive bicycle plan. The lack of parking facilities for bicycles tends to keep people from using their bikes for basic transportation, due to the risk of theft or possible damage. Therefore, the following guidelines should be considered when selecting and placing bicycle parking facilities in Beaufort to promote bicycling and discourage the use of trees, railings, sign posts, and other appurtenances.

When deciding on the type of bicycle parking device to use, the following components should be considered:

1. Level of Security Needed.
   The level of bicycle security is dependent upon the type of parking needed, short-term or long-term. Short-term parking is generally located in the front of a store or destination, which does not need so much security as long-term parking (i.e., employee parking). The use of racks can be used for short-term parking; whereas, bicycle lockers, locked enclosures, or locked rooms within buildings would provide better security for long-term parking needs. All parking facilities should be permanently anchored to prevent moving by bicycle users or vandals.

2. The Type of Rack or Device and How it Works.
   A rack should support a bicycle upright by its frame in two places, prevent the bicycle wheel from tipping over, enable the frame and either one or two wheels to be locked to the rack, support all types of bicycles, and allow front-in and back-in parking. Racks that do not support the bicycle frame should not be used, since rims can easily become bent if a rack only supports one wheel. Examples of racks not recommended are Comb, Toast, School-Yard, and other wheel-bending racks.

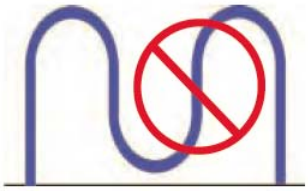
3. Number of Spaces Needed.
   Assessing the appropriate number of bicycle parking spaces for different destinations can be done by rough estimates of current users and potential users. Generally, allow roughly 2' by 6' for each bicycle space to allow accessibility. It is recommended that a few racks or parking units be available at first and when demand increases, expand.

The placement of the bicycle parking can be as important or more important to the potential user. For instance, a rack placed in the wrong location will not be used. Therefore, the following elements should be used to determine the best possible location:

INVERTED "U"
One rack element supports two bikes.

"A"
One rack element supports two bikes.

POST AND LOOP
One rack element supports two bikes.


WAVE
One rack element is a vertical segment of the rack.
(see additional discussion on page 3)

COMB
One rack element is a vertical segment of the rack.

TOAST
One rack element holds one wheel of a bike.

Courtesy of: APBP Bicycle Parking Guidelines

D4-3

Image of Bicycle Parking Sign
Courtesy of: MUTCD

1. Long-Term and Short-Term Parking Needs.
   As mentioned previously, long-term and short-term parking needs differ in the type of parking facility needed, in addition to, location of those facilities. Short-term parking is needed at popular destinations such as retail stores, libraries, parks, banks, post offices, and other places where there is a high turnover rate of users during the day. Short-term parking should be conveniently located, near building entrances. If a bicyclist has to walk out of their way to use the facility, they will find somewhere closer to park. The best location for a rack is immediately adjacent (within a minimum of 50' of main entrance) to the building entrance it serves. If more than one building will be served by the facility or a building has more than one main entrance, the parking facility should be distributed to serve all buildings or main entrances. The rack should not impede the pedestrian flow into and out of that entrance.

   Long-term parking is needed at schools, employment centers, and other places where daily user turnover rates are low. Unlike short-term parking, convenience is slightly less important than security for long-term parking.

2. Relationship to Automobile Parking and Traffic Lanes.
   If a bicycle facility is placed near a parking lot or traffic lanes, a protection barrier is needed to allow potential damage to the bicycle and rack.

3. Relationship to Pedestrian Space.
   Bicycle parking facilities should not impede into the pedestrian space. It is very easy for pedestrians to become distracted and walk into a rack or parked bicycle potentially resulting in personal injury. Therefore, parking facilities should have a minimum clearance of 48" from a parked bicycle to the edge of the pedestrian path. If this distance is not available, the parking facility should be very noticeable and free of projections.

4. Visibility and Protection.
   A parking facility should be placed in a location that is highly visible to the surrounding buildings and pedestrian areas, such locations will mitigate possible vandalism, theft, and reduce fears of bike users. All parking facilities should have a bicycle parking guide sign (D4-3) to inform potential users of the parking areas. The placement of parking facilities under roof overhangs (not under the drip line) or other elements will shelter bikes from the weather.

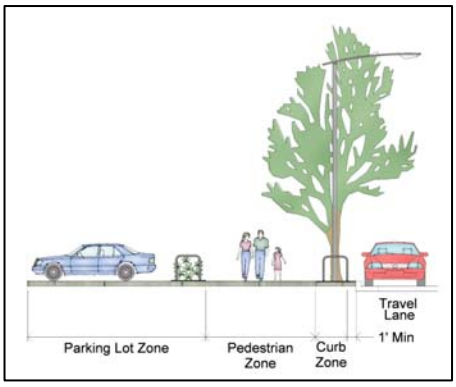


Illustration of Bike Rack Placement

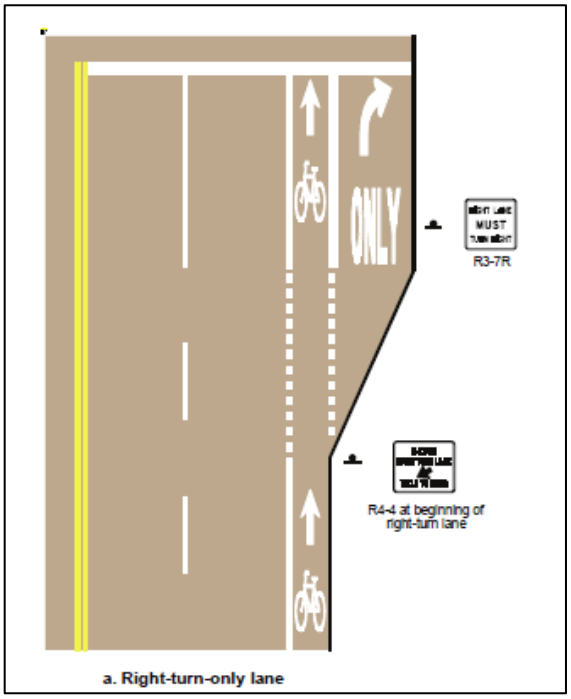
5.6 INTERSECTION TREATMENTS

Designing a smooth transition at intersections for bicyclists and motorists can be difficult, especially handling right-turn lanes. However, there are many different methods to improve intersection conditions for bicyclists and motorists at various intersections. To provide a safe environment for easy turning movements for both bicycles and motor vehicles, on-road applications should be made to ensure: 1) Motorists make right turns as close to the right-hand curb as possible, 2) Bicyclists going straight should be to the left of right turning traffic, and 3) Bicyclists turning left should turn from left lane or as close to the centerline or the left side lane as possible.

INTERSECTIONS WITH RIGHT-TURN LANES

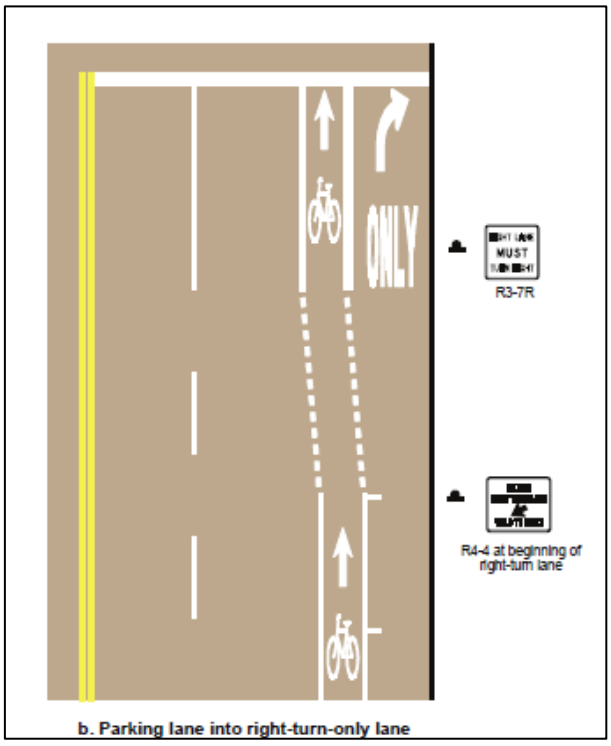
Intersections with bicycle lanes tend to confuse both cyclists and motorists when it comes to turning movements. Bike lanes are designed to keep bicyclists to the right side of the roadway; however, without additional signage or markings bicyclists and motorists have a hard time determining how to conduct right-hand turns.

The best option to clarify how bicyclists and motorists should handle a right-turn lane is shown in the illustration to the right for streets that do not have on-street parking. For those roadways with on-street parking, the best option for marking appropriate travel paths for bicyclists and motorists is shown in the illustration below.



a. Right-turn-only lane

From AASHTO Guide for Development of Bicycle Facilities, Copyright 1999, by the American Association of State Highway and Transportation Officials, Washington, DC. Used by permission.



b. Parking lane into right-turn-only lane

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SIGNALIZED INTERSECTIONS

Detection of bicyclists at traffic-actuated signals is crucial for bicyclists' safety and encourages proper crossings of the intersection. Improving an existing signalized intersection with bicycle-activated detector loops (see illustration to the left) can make them friendlier to bicyclists. The purpose of these loops to allow the bicyclist to trigger change in the traffic signal, since the majority of vehicular detector loops are too large or do not carry the small area a bicycle would occupy in a travel lane.

The loop should be located in the bicyclist's expected path, including left-turn lanes and shoulders. It is also helpful to provide a pavement marking to identify the location where a bicyclist has to be to activate the signal (see illustration below).

However, in some situations, the use of pedestrian or bicyclist-activated buttons may be an acceptable alternative to the use of detectors provided a bicyclist does not have to demount or make unsafe leaning movements to use them.

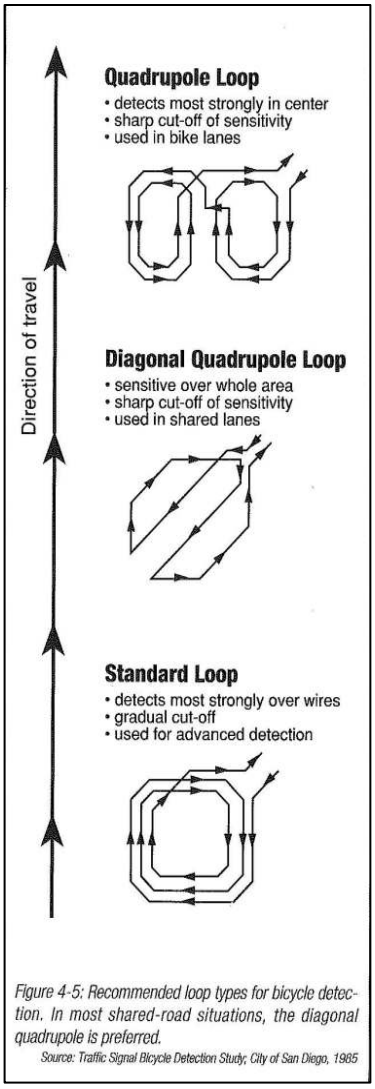

Figure 4-5: Recommended loop types for bicycle detection. In most shared-road situations, the diagonal quadrupole is preferred.
Source: Traffic Signal Bicycle Detection Study; City of San Diego, 1985

Courtesy of: NCDOT Bicycle Facilities Planning & Design Guidelines

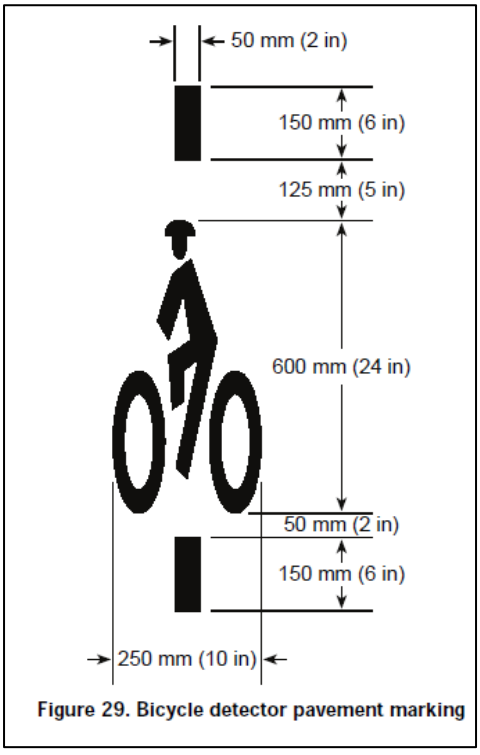

Figure 29. Bicycle detector pavement marking

From AASHTO Guide for Development of Bicycle Facilities, Copyright 1999, by the American Association of State Highway and Transportation Officials, Washington, DC. Used by permission.

PATH-ROADWAY INTERSECTIONS

The intersection of a path or trail and a roadway should be at a logical and visible location. Motorists should be warned ahead of time of the approaching trail crossing and the potential trail users should be alerted of the upcoming intersection. Maintaining visibility between trail users and motorists is extremely important for the safety of trail users.

The path-roadway intersection approach should be made at a relatively flat grade so bicyclists are not traveling downhill into the oncoming traffic at the intersection. If the intersection is more than 75-feet from curb to curb, it is desirable for a center median refuge area be provided for safe crossing of travel lanes.

A striped crosswalk and trail crossing in Williamston, NC / Rivers

Bollards and signage are typically placed at the path-roadway intersection to limit entrance onto the trail to pedestrians and bicyclists.

Use of signage and traffic calming features such as speed tables or crosswalks will aid to alert motoring traffic of the potential existence of crossing pedestrian or bike traffic.

Considerations for carefully planned path-roadway intersections should include the following:

- Crossings should be a safe enough distance from neighboring intersections to not interfere (or be interfered) with traffic flow.
- A roadway with flat topography is desirable to increase motorist visibility of the path crossing.
- Motorists and trail users should be warned, such as with signage (including trail stop signs), changes in pavement texture, flashing beacons, raised crossings, striping, etc.
- A refuge is needed where crossing distance is excessive and in conditions exhibiting high volumes/speeds and where the primary user group crossing the roadway requires additional time, such as schoolchildren and the elderly.
- The crossing should occur as close to perpendicular (90 degrees) to the roadway as possible.
- If possible, it may be desirable to bring the path crossing up to a nearby signalized crossing in situations with high speeds/ADT and design and/or physical constraints.
- Signalized crossings may be necessary on trails with significant usage when intersecting with demanding roadways, but MUTCD warrants must be met for the installation of a signalized crossing.

A raised speed table and trail crossing in Williamston, NC / Rivers

5.7 INNOVATIVE DESIGN TREATMENTS

There are several situations or transition areas where innovative design treatments may be used to provide accommodations for bicyclists. The following paragraphs briefly describe those transition areas and offer design and construction guidance.

Image of colored bike lane
Courtesy of: Streetprint

COLORED BIKE LANES

The color bike lane treatment involves using colored pavement or paint within the boundaries of a bike lane to help visually elevate the prominence of the bike lane on the road; thus, increasing safety, comfort, and awareness of bicyclists. This treatment is not currently in the MUTCD nor is it expected in the 2010 update; however, a municipality can request state and federal permission to experiment with this treatment.

BICYCLE BOULEVARDS

Image of a bike boulevard
Courtesy of: www.SRTS.org

A bicycle boulevard is a shared roadway that has been optimized for bicycle traffic on low-traffic streets that are too narrow to install a bike lane or have a low level of vehicular traffic making a bike lane unnecessary. Bicycle boulevards are generally adjacent to a nearby arterial road with high or potentially high bicycle traffic, and provide a direct, cross-town route. However, in contrast with other shared roadways, bicycle boulevards discourage cut-through motor vehicle traffic with various traffic calming devices, but typically allow local motor vehicle traffic. They are designed to give priority to bicyclists on through-going traffic rather than vehicular.[vii]

Stop signs and traffic signals are limited on bicycle boulevards to make the route more attractive to cyclists.[viii]

BIKE BOXES

Bike boxes or advanced stop lines are generally used on busy streets to bring bicyclists to the front of traffic at intersections with priority crossing and turning. The box reduces the possibility of right-hook conflict with motorists. A bike box can be filled with color to provide increased visibility or just striped.[ix]

This treatment is not currently in the MUTCD nor is it expected in the 2010 update; however, a municipality can request state and federal permission to experiment with this treatment.

M4-9a

M4-9c

Detour Signs
Courtesy of: MUTCD, Chapter 6

BICYCLE ACCOMMODATIONS DURING CONSTRUCTION

Bicycle and pedestrian accommodations should be provided during roadway construction regardless of the project scale. To assist in identifying the appropriate accommodations, AASHTO, MUTCD (Chapter

6) and NCDOT Work Zone Traffic Control Unit have published guidelines and procedures.

Some accommodations for bicyclists during roadway construction projects include:

- **Advance Signage** to alert bicyclists of approaching restrictions or closures of bicyclist facilities. Signs usually include "Bike Lane Closed Ahead" or "Bikes Seek Alternative Routes."

- **Detour Routes** as alternatives to the main bicycle route. Providing a detour route with adequate signage will assist a bicyclist in maneuvering around a construction project.

SCHOOL ZONES

According to the Safe Routes to School Guide, "ideally, the school zone starts at the front door and encompasses the campus and as many blocks as possible that surround the school and have a high concentration of school-generated traffic."[x] Normally, the school zone includes the school campus, the streets along the campus, and two blocks around the campus perimeter. The school zone should be well marked with signage (school crossing signs, speed limit signs, etc.), pavement markings, and other traffic calming devices to alert drivers of the high concentration of children.

The MUTCD, Part 7 sets forth principles and standards for controlling traffic in school zones. The manual provides information on appropriate design, application, and maintenance of traffic control devices (signage, pavement markings, signals) and other controls (crossing guards, student patrols, crossings, etc.) required for the special conditions in school areas. Therefore, Part 7 of the MUTCD should be reviewed and followed when improving school zones.

COMMERCIAL DEVELOPMENT

Commercial establishments generate a high volume of vehicle traffic, which in turn can generate opportunities for pedestrian and vehicle crashes. Uncontrolled access points from the roadways into the parking area of a commercial building, parking lots, and access from parking lot to the building can all be potential accident areas. It is important that the Town maintain a policy of access management to limit the number of commercial and residential crossings of any sidepath and on roadways with bike lanes.

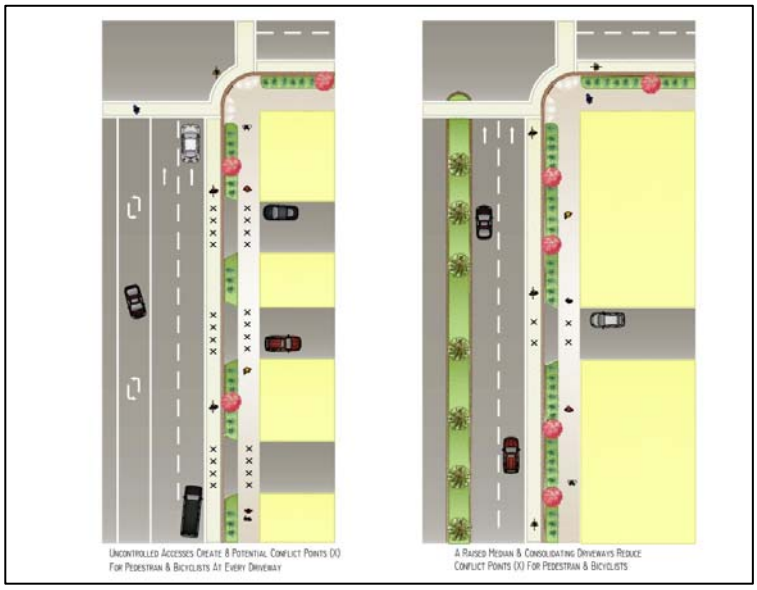

Illustration of uncontrolled and controlled driveway access.

The driveway ramp design for commercial land uses, the number of vehicle access points, and the distance between existing driveways all have a direct effect on the overall bicycle and pedestrian environment.

Limiting and consolidating vehicle driveways into a commercial site reduces conflict points. The illustration on the previous page shows how access management can be done. This method can also reduce the number of vehicle-vehicle crashes if the driveways are located near traffic control devices.

RESIDENTIAL DEVELOPMENT

Since an overwhelming number of bicycle trips are generated from residential development, applying the above driveway design components will assist in reducing possible conflict points within newer residential areas. In addition, existing or future cul-de-sacs should be connected to the closest local collector street or to other cul-de-sacs in adjoining subdivisions via multi-use paths. This connection will improve connectivity and accessibility to surrounding land uses.

5.8 STREETSCAPE IMPROVEMENTS (GENERAL)

The use of street lighting, landscaping, and pedestrian furniture enhances a street environment and provides increased comfort and safety for bicyclists and pedestrians. These elements also turn the street into a pedestrian designation.

STREET LIGHTING

Good placement and quality of lighting can enhance an environment, as well as provide increased bicyclist and pedestrian comfort and safety. Street lighting also improves the motorist ability to see bicyclists and pedestrians at night. Streetlights and building lights within commercial areas can enhance the ambiance of the area, in addition to increased visibility of bicyclists and pedestrians by motorists within parking lots. All intersections should be provided with street lighting to ensure safety of all users. For further guidance on street design lighting, refer to the *AASHTO Informational Guide for Roadway Lighting.*

Street level lighting in Downtown and along bicycle corridors will improve the atmosphere by providing comfort, security, and safety. The use of uniform lighting levels along all bicycle corridors should be considered in all bicycle facility improvements.

The typical cost of installing street lighting varies by type of fixture used and the utility providers.

STREET TREES AND VEGETATION

The use of landscaping along a street can provide several benefits, such as providing a separation between motorists and pedestrians, reducing the visual width of the roadway and thus producing a traffic calming effect, and providing a more pleasant street environment. Landscaping can include a variety of trees, bushes, and flower beds that can be planted in the buffer area between the sidewalk and roadway or in the street median.

Choosing appropriate plants for the local climate and surrounding area, providing adequate space for growth, and preparing the ground can help ensure they survive with minimal maintenance and do not buckle the sidewalks as they mature. The use of rain gardens and other plant alternatives should also be considered to reduce installation and continuous cost of irrigation. All shrubs should be low-growing and trees should be kept trimmed to at least eight (8) to ten (10) feet to ensure sight distance, vertical clearance, and security[xi].

Landscaping costs vary depending upon the size of planting, plant selection, and additional elements (irrigation and maintenance). However, multiple entities, such neighborhoods, businesses, Town, and Non-Profits can share the costs.

5.9 ROAD DIET TREATMENTS

A roadway narrowing application in Arlington, VA
Courtesy of Rivers

A road diet is an effective method of improving bicycle-friendliness, safety, and calm traffic along streets. The street is physically narrowed or the street is given the perception of being narrowed. There are several different methods of physically narrowing the roadway:

- Lane widths can be reduced and excess asphalt striped with a bicycle lane or paved shoulders.
- Travel lanes are removed.
- Sidewalks and landscaped areas are extended or on-street parking is added within the former curb lines.

The physical reduction of street widths is usually done along residential streets; however, if a traffic analysis is conducted and lane reduction is determined to be appropriate then the use can be applied on any street.

A nonphysical method of street narrowing is planting trees along the street, resulting in a sense of spatial enclosure what will promote reduced vehicle speeds. The use of curb extensions, on-street parking, separated

walkways with planting strips, and bike lanes also make the street appear narrower.

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[i] *North Carolina Bicycle Facilities Planning and Design Guidelines,* January 1994, page 17

[ii] *North Carolina Bicycle Facilities Planning and Design Guidelines*, January 1994, page 18

[iii] *North Carolina Bicycle Facilities Planning and Design Guidelines*, January 1994, page 27

[iv] US Department of Transportation, Federal Highway Administration, *Manual on Uniform Traffic Control Devices (MUTCD), Part 2A-6*.

[v] BIcyleinginfo.org, Pedestrian and Bicycle Information Center, Design Details for Shared Use Paths, http://www.bicyclinginfo.org/engineering/paths-details.cfm

[vi] Federal Highway Administration (FHWA) Bicycle Safety, *Signs and Signals – Add/Modify Signing,* October 2007, http://safety.fhwa.dot.gov/saferjourney/library/countermeasures/46.htm

[vii] Bicycle Transportation Alliance, Bicycle Boulevards, March 2009, http://www.bta4bikes.org/at_work/bikeboulevards.php

[viii] *Safe Routes to School Guide – Engineering*, February 2007, http://www.saferoutesinfo.org/guide/engineering/index.cfm

[ix] San Francisco Bicycle Coalition, Bike Boxes, March 2009, http://www.sfbike.org/?bikeplan_design#bikeBoxes

[x] *Safe Routes to School Guide – Engineering*, February 2007, page 13, http://www.saferoutesinfo.org/guide/engineering/index.cfm

[xi] Walkinginfo.org - Pedestrian and Bicycle Information Center, *Traffic Calming - Landscaping*, October 2007, http://www.walkinginfo.org/engineering/calming-landscaping.cfm

SECTION 6 –RECOMMENDATIONS FOR ANCILLARY FACILITIES, PROGRAMS & POLICIES

Section Outline:

6.0 Ancillary Facilities

6.1 Programs

6.2 Policies

This section outlines recommendations for ancillary facilities, programs, and policies to assist in making the Town of Beaufort a bicycle-friendly community. These recommendations satisfy Education, Encouragement, and Enforcement categories of a bicycle-friendly community.

The recommendations for programs and policies have been prioritized based on ease with which they can be implemented. The lower cost, already established programs, such as Safe Routes to Schools and Bicycle Rodeos are prioritized for the short-term, or within five years of the Plan's completion. Mid-term priorities are those that should be addressed within 6 – 10 years and long-term priorities are those that should be addressed beyond ten years from the completion of the Plan. Table 6.0 includes the implementation phases of all recommended programs and policies. Implementation phases of projects are discussed in Section 7.

The implementation of various programs not only encourages bicycling, but also provides education, enforcement, and maintenance opportunities to ensure Beaufort has a comprehensive bicycle network where its users feel comfortable to bike in the community. The recommended programs for Beaufort include:

- Spot Improvement Program
- Infrastructure Maintenance Program
- Education Programs
- Safe Routes to School Program
- Enforcement Programs
- Encouragement Programs & Initiatives

6.0 ANCILLARY FACILITIES

Ancillary facilities are those supporting amenities located at specific destinations and intermediate points throughout the bicycle network. They are an important component to encouraging biking in Beaufort. Ancillary facilities include:

- Mapping & Signage
- Traffic Calming Initiatives
- Transit Interface
- Bicycle Parking Facilities
- Multi-Use Trailheads and Support Facilities
- Bicycle Repair Stations
- Raised Boardwalks

MAPPING & SIGNAGE

Similar to the existing *Bicycling in Beaufort* map, the Town should consider developing a Bicycle Network Map that identifies the types of road features, destinations, bicycle facilities, and identified routes. The map should be posted in destination areas and available to the public. A Bicycle Network Map would benefit the seasonal population and tourists who become cyclists when they visit Beaufort.

The Town should consider signing identified new routes with informative, way-finding signage that can help visitors and residents alike to determine appropriate bicycle routes to various destinations.

TRAFFIC CALMING INITIATIVES

The following traffic calming initiatives will help to make the Town more bikeable:

Reduce Speeds

While many areas of Beaufort already have relatively low posted speed limits, the thoroughfare roads should be examined to see if any biking areas would benefit from reduced speeds. Calming the arterial streets and the connector streets, such as Lennoxville Road, West Beaufort Road, N. Turner Street, Broad Street, Live Oak Street, Cedar Street, and residential areas of Front Street may improve bicycling routes by increasing bicycling awareness and security.

If the Town determines the need to lower speed limits, then it should contact NCDOT. The authority to lower speeds is set out in NC General Statute 20-141(f) and states that "*Whenever local authorities within their respective jurisdictions determine upon the basis of an engineering and traffic investigation that a higher maximum speed than those set forth in subsection (b) is reasonable and safe, or that any speed hereinbefore set forth is greater than is reasonable and safe, under the conditions found to exist upon any part of a street within the corporate limits of a municipality and which street is a part of the State highway system (except those highways designated as part of the interstate highway system or other controlled-access highway) said local authorities shall determine and declare a safe and reasonable speed limit. A speed limit set pursuant to this subsection may not exceed 55 miles per hour. Limits set pursuant to this subsection shall become effective when the Department of Transportation has passed a concurring ordinance and signs are erected giving notice of the authorized speed limit.*"

Use Bicycle Friendly Devices

Traffic calming devices are intended to create safer roadway conditions for bicyclists and slow motor vehicle speeds. The following bicycle-friendly devices will aid in calming traffic and provide bicycling facilities:

- **Raised crosswalks and curb extensions.** Raised crosswalks are flat-topped speed humps placed in intersections or specific pedestrian crossing areas to slow motor vehicle speed and raise awareness of pedestrians in the roadway. Curb extensions may slow motor vehicle speed by creating shape to a roadway. Installation of curb extensions works well when placed on alternating sides of the road to form S-shaped curves.
- **Speed cushions with wheel cut-outs, or gaps, for bicyclists.** Speed humps and cushions change the level of the road to slow the speed of motor vehicles, yet they can be inconvenient and potentially dangerous for cyclists. Installation of wheel cut-outs, or gaps, in the speed cushions provides a bike-friendly element to the roadway to avoid the full impact of the traffic calming device.
- **Bypass lanes for bicyclists at narrow parts of the road.** When roadways narrow, motorists tend to slow their speed as they travel. However, when cyclists are traveling along a narrow roadway, motorists drive closer to cyclists in order to pass them. Installation of bypass lanes for bicyclists at narrow parts of the roadway will provide a safer condition for cyclists to travel.

For new or reconstructed streets, *implement guidelines* that call for traffic calming:

- **Lane diet: reduce the width of traffic lanes and lower the speed.** Since motorists tend to slow their speed on narrow roads, reducing the width of traffic lanes and lowering the speed limit will aid in traffic calming. During planning phases, a roadway should be evaluated to consider the addition of bike lanes as a result of reducing the width of traffic lanes.
- **Add or widen medians, which will limit turning locations.** The addition of medians along the centerline of the roadways will limit cross traffic to designated intersections, or breaks in the medians.
- **Stripe marked bicycle lanes to improve bicycle access.** Bike lanes provide an area of exclusive-use for cyclists and when appropriately striped and signed they increase motorist awareness of bicyclists in the roadway.

TRANSIT INTERFACE

Long-term bicycle parking at transit areas supports bicycling opportunities. Since Beaufort is surrounded by water on three sides, the downtown waterfront and boat access areas may benefit from the installation of new or additional bicycle parking racks. Long-term motor vehicle parking is limited in Beaufort; therefore, boaters who bicycle may choose to ride their bike to the docking facility. Also, Beaufort experiences a transient population of boaters who bring their bikes to Town when visiting. Currently, the bike racks located along the downtown waterfront are overcrowded. This indicates the need for additional racks to park and secure bicycles.

During a Steering Committee Meeting charrette exercise, one group identified the Airport as an opportunity for a bicycle parking rack.

Existing bicycle parking rack on Front Street in Beaufort, NC /Rivers

Bikes on Buses Program

Beaufort does not currently have a mass transit vehicle, or bus system, in Town. A "Bike on Bus" program would allow bicyclists to bring their bikes on board buses in order to use them when they disembark at their destination. This program encourages the use of bike racks on the front of buses. If bus transit becomes a transportation mode in Beaufort, then the Bikes on Buses Program should be incorporated into the transportation planning.

Trail information sign in Williamston, NC / Rivers

BICYCLE PARKING FACILITIES

Providing appropriate bicycling facilities in Beaufort will encourage bicycling by increasing bicycling trips and reducing vehicular traffic. Bicycle parking racks are an in-demand facility in many areas of Beaufort due to limited vehicular parking availability. Parking racks should be located in popular destinations such as downtown, shopping centers, parks, boat access facilities, schools, and public buildings to facilitate the parking needs of cyclists. See Section 5 for bicycle parking guidelines and standards.

Trailhead parking facility& picnic pavilion in Kitty Hawk, NC / Rivers

MULTI-USE TRAILHEADS AND SUPPORT FACILITIES

Entrances into multi-use trails are an excellent location for posting safety and general bicycle education material; in addition to information on the trail route. The trailhead could also include various support facilities such as vehicular

parking, restrooms, drinking fountains, picnic pavilions, benches, bicycle racks, trash receptacles, and other types of amenities to ensure the trail is an inviting and pleasurable destination.

Restroom & shower facility in Williamston, NC / Rivers

BICYCLE SERVICE STATIONS

Bicycle service stations are beneficial to the bicycling network because of the variety of services that may be incorporated into the facility. Bicycle service stations may include air pumps for tire repair, tools, parking racks, water fountains, benches and more. While the services may vary, the facility may become a place to meet or be incorporated into existing destinations.

RAISED BOARDWALKS

Due to Beaufort's location amongst several water bodies, wetlands, and marshes, there will most likely be a need for elevated boardwalks across environmentally sensitive areas along segments of certain bike facilities. The use of boardwalks may function as small bridges over an area; therefore, special design and construction may be required to ensure adequate clearance and safety is addressed for bicyclists and pedestrians alike. Please refer to Section 5 for specific design guidelines.

6.1 PROGRAMS

The implementation of various programs not only encourages bicycling, but also provides education, enforcement, and maintenance opportunities to ensure Beaufort has a comprehensive bicycle network where its users feel comfortable to bike in the community. The recommended programs for Beaufort include:

- Spot Improvement Program
- Infrastructure Maintenance Program
- Education Programs
- Safe Routes to School Program
- Enforcement Programs
- Encouragement Programs & Initiatives

SPOT IMPROVEMENT PROGRAM

The Town should consider implementing a "Spot Improvement Program" to identify, report, and correct potential issues on the roadways. The potential issues may include, but are not limited to pothole repair, grate repair/replacement, bridge rails, or cracked pavements. Currently, the Public Works Department webpage includes a "Please Fix It" page through the Town of Beaufort's website. This allows residents to report needed repairs online. This program is recommended as a short-term priority to build on the Town's existing online maintenance reporting method.

INFRASTRUCTURE MAINTENANCE PROGRAM

Infrastructure maintenance of bicycle facilities may include involvement of the community through creative programs such as "Adopt-a-Trail" or donation of bicycle parking racks. Involving the community would increase awareness of the bicycling network in Beaufort and promote local businesses and vendors. An infrastructure maintenance program is recommended as a short-term priority to maintain existing bicycle facilities. As new bicycle projects are implemented, the program will need to be expanded to maintain additional bicycle facilities.

EDUCATION PROGRAMS

The importance of educational programs must be addressed with the issue of bicycle safety. Bicycle crash data indicates that collisions involve improper actions on the part of bicyclists, motorists, or both. Efforts to reduce bicycle-motor vehicle crashes need to include educational programs to increase awareness of improper actions and promote correct actions. Safety education programs must include components for bicyclists and motorists. Education programs are a short-term and ongoing priority to provide instruction to bicyclists, pedestrians, and motorists.

Bicycle Rodeo Program

The Town of Beaufort offers Bicycle Rodeo programs to educate children and parents about safe bicycling skills. The rodeos offer potential partnerships among the Police Department, Parks and Recreation Department, Planning Department and local bike shops and businesses. The Town should continue those programs including activities such as an obstacle course, hand signal instruction, bike safety prizes (helmets, lights, vests) and bike maintenance courses. This program is recommended as a short-term priority because it is already established in Beaufort.

Smart Cycling Program

The American League of Bicyclists offers courses to adults and children to teach bicyclist and motorists how to ride safely and share the road. The American League of Bicyclists offers rider education based on curricula set forth in the Smart Cycling Program. Smart Cycling courses are taught throughout the United States by certified instructors.[1] The Smart Cycling Program is recommended as a mid-term priority in order to allow the Town time to implement additional bicycle facilities in effort to create a more bike-friendly environment.

SAFE ROUTES TO SCHOOL PROGRAM

The Safe Routes to School (SRTS) program is recommended as a short-term priority because the Town's schools have begun implementation of this program to provide bicycling facilities at the Elementary and Middle School property. The Town should continue to encourage a SRTS Program to educate students, teachers, and staff to walk or bicycle to school while creating a safer climate in which to do so. SRTS involves cooperation from parents, students, and the community to "benefit the environment and a community's quality of life by reducing traffic congestion and motor vehicle emissions."[ii] A successful SRTS program may include potential partnerships with Carteret County Schools, Carteret County Parks and Recreation Department, and Beaufort's Police Department. SRTS activities may include a bike/walk to school day (www.walktoschool.org), creation of a bike/walking bus (http://www.saferoutesinfo.org/guide/encouragement/walking_schoo_bus_or_bicycle _train.cfm), or a biking group, led by an adult leader, distribution of fliers to solicit parental involvement, and/or education and encouragement activities. Encouragement activities work hand-in-hand with educational opportunities because they create excitement and interest in the program. Participants are rewarded by having fun and learning life-long skills regarding bicycle safety and awareness. For information about the state SRTS program, visit the website http://ncdot.org/transit/bicycle/saferoutes/SafeRoutes.html.

ENFORCEMENT PROGRAMS

Public Relations & Awareness Program

A public relations & awareness program is recommended as a short-term priority and should be evaluated and expanded as bicycle facilities are implemented throughout Town.

The Town should consider developing pamphlets to educate motorists and bicyclists of the rules of the road. The pamphlets could be distributed by the Town's Police Department during enforcement patrol.

To raise awareness that Beaufort is a bicycle-friendly community, the Town should consider installing bicycle friendly signs, or "Share the Road" signs at "gateways" into the Town, at major thoroughfares and at locations of high traffic volume. Signage helps to create an understanding that bicyclist and motorists shall share the road.

Police-on-Bikes Program

Currently, the Beaufort Police Department patrols the Town on bicycles when the weather conditions are favorable. The Town should consider increasing the presence of police on bikes to enforce bicycle rules and motorist behavior, encourage bicycling, and lead by example in

demonstrating compliance with laws and safety measures. The Police-on-Bikes program is recommended as a short-term and ongoing priority.

Bicycle Registration Program

A bicycle registration program administered by the Beaufort Police Department is recommended as a short-term priority. Bicycle registration programs have been effective in returning lost or stolen bikes to their owners by matching serial numbers. Serial numbers are a set of characters that uniquely identify an object and can be used for traceability and warranty purposes. Bike serial numbers can be used in national record systems and increase the chances of returning a bicycle to its registered owner. When bikes are registered, the owner submits, to the police department, the serial number and identifying features, such as color and size, in addition to the owner's contact information. The owner will receive a registration sticker to apply to the bike. The police department may consider a processing fee for bike registration.

Bicycle Helmet Give-Away Program

To enforce bicycling rules and encourage compliance, the Town should consider promotional programs that include donating helmets and/or night-lights to cyclists that lack proper equipment. The Police Department could give away helmets or vouchers for helmets when riders without helmets are noticed. The bicycle helmet give-away program is recommended as a short-term priority to increase the safety of bicyclists in Town.

Bicycle Abatement Program

A Bicycle Abatement Program would allow for the removal of abandoned bicycles from racks in order to maintain an adequate number of secure parking spaces and discourage bicycle theft. Bicycles identified for removal may be posted with a notice to remove within a certain time period, such as 14 days, or the bicycle will be impounded. If the bicycle is removed by the owner within the notice time period, then the Town will know that the owner has not abandoned the bicycle. Impounded bicycles may be held for a designated time period, such as 90-days, before being donated to local charities. A Bicycle Abatement Program is recommended as a short-term priority so that the Town may implement a procedure for currently abandoned bicycles.

ENCOURAGEMENT PROGRAMS & INITIATIVES

General promotion of bicycling in Beaufort can be accomplished by enhancing the Town's website (www.beaufortnc.org). Currently, Beaufort's Police Department's website includes a link to Bicycle Safety Tips produced by the UNC Highway Safety Research Center. This program is recommended as a short-term priority and the Town should

continue to use its website for general promotion of safe bicycling. Additionally, the Town should consider posting on its website the benefits of bicycling, rules, bicycle routes, recommendations, and project updates.

Bicycle Parking Installation Program

The development of a bicycle parking rack installation program would benefit the community by providing bicycle parking at major private and public destinations in Beaufort. Bicycle parking racks encourage bicycling by providing a secure location for cyclists to store their bikes while visiting a destination. A bicycle parking installation program is recommended as a short-term priority due to the current lack of bicycle parking facilities.

Bike to Work

Bicycling in Beaufort may be encouraged through the community promotion of a "Bike to Work Week" event. The purpose of this type of event is to encourage employees and employers to bicycle to work. A "Bike to Work Week" event provides the opportunity for partnership between Town staff, local business, elected officials, and community schools. Bicycling to work may be encouraged by offering incentives and/or prizes for employers and employees who bike to work. A "Bike to Work Week" program is recommended as a short-term priority to promote bicycling, reduce motor vehicle air pollution, congestion and stress for other commuters.

Bicycle and Pedestrian Advisory Committee

As a short-term priority, the Town should consider establishing a standing Bicycle and Pedestrian Advisory Committee to advocate for bicycle and pedestrian-friendly Town policies and actions. The Beaufort Board of Commissioners would appoint Town citizens to serve as committee members and Town staff would facilitate committee meetings. A Bicycle and Pedestrian Advisory Committee would meet regularly to discuss issues, provide recommendations and/or advise town staff regarding bicycle and pedestrian related concerns and actions. Additionally, the committee may consider coordinating an annual event, generating brochures or marketing materials, and/or reviewing development plans for bicycle and pedestrian friendliness.

Bicycle Rental Program

A bicycle rental program would encourage bicycling in Beaufort by providing short-term rentals for cyclists. Bicycle rental programs have been successful in many cities and at universities. Currently, Duke Marine Lab on Pivers Island offers a bicycle rental program to its students. The students often utilize this program to ride to Beaufort and other surrounding areas. A bicycle rental program is recommended as a

mid-term priority because it would involve higher costs to establish, yet provide benefits to Beaufort's visitors and transient residents.

6.2 POLICIES

Bicycle-friendly policies are an efficient way to improve bicycling in Beaufort because they require bicycle facilities at the onset of development rather than a retroactive approach. Beaufort is expected to experience development in the near future, and thus, any policy which addresses development should be implemented in the short-term to capitalize on the development that may occur. Beaufort should consider modifying its local ordinances and policies to provide a balanced approach to both on and off-street bicycling and support facilities, including a more detailed guideline for bicycle parking and amenities.

ZONING ORDINANCE & SUBDIVISION REGULATIONS

Currently, the Town can recommend that bicycle facilities be incorporated into new development projects, but there is no Town policy to require such facilities. Beaufort acknowledges the need for regulations requiring bicycle facilities as development occurs. Beaufort should consider revising its Zoning Ordinance and Subdivision regulations to set a standard for the Town and require bicycle facilities with certain development requests. Beaufort should consider an ordinance requiring bike facilities on all arterial and connector roads as development occurs as well as providing connections to neighboring roads and bike facilities.

Local policies and ordinances related to bicycling were discussed in Section 3 of this Plan.

COMPLETE STREETS ORDINANCE

As a short-term priority recommendation, Beaufort should develop and implement a *Complete Streets Ordinance* to ensure all new and reconstruction of roadways have "complete street" elements (components for all types of transportation) incorporated into the design and construction as appropriate. These elements include:

- ADA-complaint curb cuts
- ADA-compliant sidewalk improvements
- New bicycle lanes
- Pedestrian medians
- Roadside improvements for public transportation, including bus shelters and bus priority traffic signals
- Traffic calming measures, such as chicanes, curb extensions, and speed humps/tables
- Improved landscaping and streetscape features, such as benches, trees, and street/pedestrian lighting
- Intersection and crosswalk improvements for all non-motorized users

- Other improvements to ensure safety, accessibility, and quality of the roadway

MAINTENANCE

The Town should consider implementing bicycle facilities into the regular maintenance schedule to maintain safety and usability of facilities. Maintenance activities may include repairing bicycle-parking racks, cracks/potholes in pavement, restriping of lanes, and removal of debris from the roadways/shoulders. Including bicycle facilities in the established maintenance schedule will place a priority on and establish a standard for adequate facilities. The Town should consider a partnership with the Carteret County Parks and Recreation Department to maintain bicycle facilities at county-owned parks in Beaufort. A maintenance policy is a short-term and ongoing priority to maintain new and existing bicycle facilities.

TOWN FUNDING

RECOMMENDATION: Adopt a Bicycle Parking Ordinance.

The Town should consider allocating resources on an annual basis to expand the bicycle network, maintain existing facilities, and fund programs and on-going activities directed towards encouragement, enforcement, and education. The allocation of Town funding for bicycle facilities will be an ongoing need and short-term priority.

ABANDONED BICYCLES

The Town should adopt effective procedures for dealing with abandoned bicycles. Procedures should include provisions about what to do with bicycles left in public areas, shopping centers, and other destinations where the bicycle racks become overcrowded preventing other cyclists from using them. When adopted, the provisions and procedures should be distributed to local businesses and the citizens should be educated so that abandoned bikes can be effectively identified and managed. A policy regarding abandoned bicycles is a short-term priority recommendation to address the current issue of abandoned bicycles.

BICYCLE PARKING ORDINANCE

The Town of Beaufort should consider including bicycle parking in permitted uses or districts to ensure that alternative transportation is adequately served. The bicycle parking ordinance should define the number of expected parking spaces rather than the number of expected racks as racks can be constructed to hold a wide range of spaces for bikes. The downtown area of Beaufort would benefit from this type of ordinance because many of its visitors travel by bicycle since vehicular parking space is limited. Limited vehicular parking spaces affect businesses. The requirement to provide bicycle parking to certain land uses will encourage bicycling and reduce vehicular congestion. The

bicycle parking ordinance should also recommend that bicycle parking racks be placed in identifiable locations to promote convenient access. A bicycle parking ordinance is recommended as a short-term priority.

NEW BRIDGE PROJECTS

As a mid-term priority, the Town should consider a policy requiring bicycle accommodations on all new bridge projects. Currently, the only new bridge project identified is TIP # 3307 to replace the Gallant's Channel Bridge on US Highway 70 as part of the Beaufort bypass extending from the Beaufort – Morehead City causeway at Pivers Island to US Highway 70 north of Beaufort. Bicycle facilities are not currently planned for the project, but the opportunity should be utilized to fulfill the public demand for bicycle connectivity between Beaufort and Morehead City.

STREETS IMPROVEMENTS ORDINANCE

The Town should consider an ordinance requiring bikeway construction on all streets that would provide for continuation and enhancement of existing bikeways, provide access to current or future school sites, or that would conform to the adopted bicycle plan. A Streets Improvements Ordinance is recommended as a short-term priority to enhance connections and expansions to the Town's existing Bike Route.

COMMERCIAL DEVELOPMENT

It is important that the Town maintain a policy of access management to limit the number of commercial and residential crossings of any sidepath and on roadways with bike lanes. Uncontrolled access points from the roadways into the parking area of a commercial building, parking lots, and access from parking lot to the building can all be potential accident areas. Limiting and consolidating vehicle driveways into a commercial site reduces conflict points.

BIKEWAYS AND BIKE FACILITIES ORDINANCE

The Town should consider adopting an ordinance that would define the various types of bikeways and bicycle facilities and set forth a set of criteria for development of such facilities. All criteria should be consistent with minimum approved measures set forth by the NCDOT. A bicycle facilities inventory, including routes by streets and location of bicycle racks, was completed during the development of this Plan. The Town should consider expanding on this inventory as facilities are built and bike racks and signage are installed. A Bikeways and Bike Facilities Ordinance is recommended as a short-term priority to establish criteria for the design and implementation of future bicycle facilities.

Table 6.0: Implementation Table	
Program Name	***Implementation Phase***
Spot Improvement Program	Short-Term
Infrastructure Maintenance Program	Short-Term
Education Programs	Short-Term
Bicycle Rodeo Program	Short-Term
Smart Cycling Program	Mid-Term
Safe Routes to School Program (SRTS)	Short-Term
Public Relations & Awareness Program	Short-Term
Bicycle Registration Program	Short-Term
Police-on-Bikes Program	Short-Term
Bicycle Helmet Give-Away Program	Short-Term
Bicycle Abatement Program	Short-Term
Bicycle Parking Installation Program	Short-Term
Bike to Work Program	Short-Term
Bicycle and Pedestrian Advisory Committee	Short-Term
Bicycle Rental Program	Mid-Term
Policy Name	***Implementation Phase***
Zoning Ordinance & Subdivision Regulations	Short-Term
Complete Streets Ordinance	Short-Term
Maintenance Policy	Short-Term
Town Funding Policy	Short-Term
Abandoned Bicycles Policy and Ordinance	Short-Term
Bicycle Parking Ordinance	Short-Term
New Bridge Projects Policy	Mid-Term
Streets Improvements Ordinance	Short-Term
Commercial Development Policy	Short-Term
Bikeways and Bike Facilities Ordinance	Short-Term

[I] League of American Bicyclists, http://www.bikeleague.org/index.php

[II] Safe Routes to School Guide, http:// www.saferoutesinfo.org/guide/introduction/index.cfm

SECTION 7 – PROJECT RECOMMENDATIONS

Section Outline:

7.0 Construction Projects

7.1 Prioritized Projects

7.0 CONSTRUCTION PROJECTS

The initial list of potential project locations was developed based on input from the Steering Committee meetings, Town staff, Public Open House #1, the public survey, and the results of the roadway inventory. One of the most important considerations in implementing the recommendations of this Plan is the future construction of the US Highway 70 Beaufort Bypass. That project should be evaluated to incorporate the bicycle facility recommended in this Plan as part of the planned bypass project. Bicycle considerations should be included as part of all new road/street construction and maintenance improvement processes.

Note: The provision of bike facilities on NCDOT roads will require further study, particularly the application of sharrows where guidance will not be available until the update of MUTCD and AASHTO Guide for the Development of Bicycle Facilities is adopted (anticipated in 2010).

A wide range of projects have been identified to make the Town more bicycle-friendly. Physical improvements from on-road projects such as adding bike lanes to off-road projects such as multi-use trails are recommended. Thirty-seven (37) construction projects are recommended including four (4) bike lanes, six (6) paved shoulders, nine (9) shared roadways, nine (9) multi-use trails, six (6) intersection improvements, two (2) signage improvements, and an overall hazard/spot improvements project. A comprehensive description of all construction projects are found in Table 7.0.

Table 7.0 is the recommended listing of bicycle improvement construction projects. Refer to Map 7.1 for locations of the projects. The following definitions apply to the terms as utilized in Table 7.0:

- *Map Reference #* - Corresponds to the project identification number used in maps
- *Road Class* – Identified ownership of road(s) in project
- *Type of Project* – Identifies project type (bike lane, shared roadway, multi-use trail, paved shoulder, hazard/spot improvement, intersection improvement)
- *Project / Improvement Name* – Identified project name
- *At/On* – Identifies location of project (street, intersection, etc)
- *From* – Identifies starting point of construction project

- *To* – Identifies ending point of construction project
- *Approx. Length (ft)* – Identifies approximate length of project in feet.
- *Details / Purpose* – Identifies the need for the project.
- *Constraints* – Any pitfalls to implementation of project.
- *Preferred Treatment* – Identifies recommended project improvement(s).
- *Estimated Cost Range* – Magnitude of estimated cost calculated using various sources.
    - *Minimal* : Cost estimate for project is $10,000 or less based on existing conditions, proposed treatment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
    - *Low* : Cost estimate for project range from $10,001 - $99,999 based on existing conditions, proposed treatment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
    - *Moderate* : Cost estimate for project range from $100,000 - $299,999 based on existing conditions, proposed treatment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
    - *High* : Cost estimate for project range is $300,000 or higher based on existing conditions, proposed treatment, any further study that is needed, and level of engineering, and project components (permits, acquisition, coordination, etc.).
- *Preliminary Opinion of Probable Costs* – These costs are rough estimates and should not be considered final. Surveying, engineering design, environmental considerations, rights-of-way considerations and coordination among interested parties need to be completed to determine costs to be utilized for specific project budgeting. **General cost estimates are described in Appendix F.**
- *Implementation Phase* – Phasing schedule category based upon their preliminary estimated cost, priority ranking, and constructability.

Table 7.0: Preliminary Construction Project Recommendations

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Preferred Treatments	Estimated Cost Range	Preliminary Opinions of Probable Costs
1	Town	Bike Lane	Professional Park Drive Route	Professional Park Drive	Live Oak Street / US Hwy 70 East	Campen Road	4,400	Safe route to school and connection to residential and commercial Areas	Section of roadway near Campen Road under construction (anticipated completion by January 2010). Commercial driveways.	Redesign / restripe roadway to accommodate bike lanes per NCDOT guidelines and install appropriate signage and markings	Low	$16,000
2	NCDOT	Paved Shoulder	West Beaufort Road Bike Route Improvements	West Beaufort Road	NC Hwy 101	Aqua 10 Road	6,600	Provides a safe lane of travel on a busy road	Swales (occasional), rough pavement, Project may be affected by US Hwy 70 Bypass (right of way acquisition for new bridge), Development is limited due to proximity to airport, Possible runway expansion	Add paved shoulder per NCDOT guideline with appropriate signage and install lighting where needed. Further study is needed to address drainage and Hwy 70 bypass concerns.	High	$396,000
3	Town	Sharrows	Mulberry Street Route	Mulberry Street	Live Oak Street / US Hwy 70	Craven Street	1,800	US 70 Alt. Route of cyclists and provides connection to Boys & Girls Club	Curbs and Gutter, Parallel parking on both sides	Install Share the Road Signage and possibly paint "Sharrows" per NCDOT guidelines. Address on-street parking issues./concerns	Minimal	$1,300
4	Town	Sharrows	Broad Street Route	Broad Street	Turner Street	Queen Street	800	US 70 Alt. Route with connection to County offices, Town Hall, residential areas, library and Downtown	Curbs & Gutters, a mixture of parking patterns (parallel and diagonal), mixture of pavement width (large r/w from abandoned RR), diagonal parking is an issue on weekdays.	Install shared roadway "Sharrows" per NCDOT guidelines with appropriate signage. Sharrows are not recommended with pull-in diagonal parking; however, sharrows may be a possibility with back-in diagonal parking permitted that there is sufficient roadway space.	Minimal	$1,000
5	NCDOT & Private	Paved Shoulder	Aqua-10 Route	Aqua 10 Road	West Beaufort Road	end of road	800	Serves as part of Airport Loop	Road is currently unimproved (dirt and gravel surface) and had chain-link fence across entrance at end of West Beaufort Road. Easements may need to be acquired from private property owners.	Add paved shoulder per NCDOT guidelines with appropriate signage and street lighting where needed. Further study may be needed based on final US Hwy 70 Bypass alignment and construction	Moderate-High	$58,000
6	NCDOT	Paved Shoulder	Lennoxville Route	Lennoxville Road	Live Oak Street / US Hwy 70 East	end of road	11,800	Provide multi-use route along road serving residential areas and parks	Grading needed. Canal located under road near Taylor's Creek Subdivision, eroded aprons at intersections; some ditches, narrow pavement but large R/W	Add paved shoulder per NCDOT guidelines with appropriate signage and improve pavements/erosion at intersections. Further study is needed to address drainage concerns.	High	$666,000
7	NCDOT	Multi-Use Trail	Carraway Drive	Carraway Drive	NC Hwy 101	Professional Park Drive Extension / Campen Road	3,200	Existing Signed Route with connection to Beaufort's Elementary and Middle Schools from surrounding residential areas	Ditches near intersection of Campen Road	Expand and convert existing sidewalk into a multi-use trail along entire perimeter of school property to accommodate school bike riders	Low	$78,000
8	Town & NCDOT	Multi-Use Trail	Live Oak & West Beaufort Rails to Trails Route	Abandoned Railroad	Stanton Road	Live Oak Street	2,300	Provides off-road connection to residential on West Beaufort Road	Route crosses Town Creek, review area for environmental and easement concerns	Install a multi-use trail along abandoned railroad with an improved connection onto Live Oak Street	High	$339,000
9	Town & NCDOT & Private	Multi-Use Trail	Airport Loop Route	Michael J. Smith Airport Property	Aqua-10 Road	NC Highway 101 / Copeland Road	9,400	Provides a scenic multi-use route connecting to NC Hwy 101	Further review is needed, owner agreements/easements, determine wetlands, narrow pavement on Copeland Road	Install a multi-use trail along waterside of airport property connecting to NC Hwy 101 near Copeland Road Intersection	High	$391,000

Table 7.0: Preliminary Construction Project Recommendations, Continue

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Preferred Treatments	Estimated Cost Range	Preliminary Opinions of Probable Costs
10	NCDOT	Multi-Use Trail	Beaufort – Morehead City Causeway Route	US Hwy 70 West	Pivers Island	Morehead City	6,400	Provides a multi-use facility from Beaufort to Morehead City and bikeability improvements are demanded by public	Area of high traffic volume, High-rise bridge, Narrow shoulder	Provide bicycle facility and Redesign crossing from Pivers Island Road to US Hwy 70 West. Further Study is needed.	High	$520,000
11	Town	Multi-Use Trail	Old Tram Route	Easement	Legare Court	Taylor Farm Road with connection to North River Club	5,400	Provides bicycle trail route along existing easement to connect residential satellite areas	Easement access across properties in alignment area	Further Study is needed to determine alignment and property ownership	Moderate - High	$260,000
12	NCDOT	Paved Shoulder	US Hwy 70 East Route	Live Oak Street / (US Hwy 70 East)	NC Highway 101 connection	Cedar Avenue (ETJ limits)	11,200	Serves as main east/west connection route into Beaufort and connects commercial and residential areas, Part of existing state bike route, road bikers	High traffic, ditches, wetlands, slopes	Redesign to accommodate paved shoulders per NCDOT guidelines with appropriate signage. Further study is needed for accommodating bike lanes on roadway once US Hwy 70 is rerouted	High	$634,000
13	Town	Multi-Use Trail	Beaufort East Village	Utility Easement	Leondra Drive	Fairview Drive	4,500	Provides a multi-use facility from the County Park to surrounding residential areas, improves connectivity	Easement delineation and access points. A majority of property crossed by this project is currently under development proposal. Exact type of bike project will be subject to final approved development plan.	Install a multi-use trail along Town-owned utility easements. Further study required.	Moderate	$113,000
14	NCDOT	Paved Shoulder	NC Hwy 101 Route	NC Hwy 101	Copeland	Lake Road	3,300	Provides area for bicyclists to ride on current narrow road that connects residential and commercial areas, schools, and has distance bikers users. Future development of vacant land (consider)	Increases in roadway speed limits, future development along roadway, narrow pavement	Redesign roadway to accommodate paved shoulders on both sides of NC 101 per NCDOT guidelines with appropriate signage	High	$377,000
15	NCDOT	Signage	Front Street Bike Route Improvements	Front Street	Fulford Street	Lennoxville Road	N/A	Provides an area for bicyclist to travel with connection to park and is a scenic route	Property ownership, residential preferences in scenic area	Provide signs per NCDOT guidelines	Minimal	$1,000
16	NCDOT	Paved Shoulder	Pinners Point Route	Pinners Point Road	US Highway 70 East	Howland Parkway	2,700	Provides alternative route to new commercial area on Hwy 70 East from surrounding residential areas	Ditches, roadway has a couple of curves	Redesign roadway to accommodate a paved shoulder on both sides of Pinners Point Road with signage, consider opportunity for future connection to Steep Point multi-use trail (proposed)	High	$897,000
17	Town	Sharrows	Front Street Bike Route Improvements	Front Street	Sunset Lane	Fulford Street	4,600	Existing bike route with connection to Downtown from surrounding residential areas	Mixture of on-street parking (including diagonal parking), high traffic (seasonal), Sharrows are not recommended with pull-in diagonal parking; however, sharrows may be a possibility with back-in diagonal parking permitted that there is sufficient roadway space.	Install signage and improve street lighting, possibly paint "Sharrows" per NCDOT guidelines. Sharrows are not recommended with pull-in diagonal parking; however, sharrows may be a possibility with back-in diagonal parking permitted that there is sufficient roadway space. Incorporate pedestrian improvements with any bike improvements.	Low	$17,000

Table 7.0: Preliminary Construction Project Recommendations, Continue

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Preferred Treatments	Estimated Cost Range	Preliminary Opinions of Probable Costs
18	Town & NCDOT	Sharrows	Turner Street Bike Route Improvements	Turner Street	West Beaufort Road	Front Street	3,800	Existing Signed Route (portion of) that connects Downtown and County offices with north side of Beaufort, location of four (4) bicycle-motor vehicle crashes, has a 12-foot unpaved shoulder on east-side of road	Curb & Gutter, narrow roadway / pavement width, mixture of on-street parking (allowed on some blocks, not on others), high traffic at peak commuter hours and during tourist season	Paint "Sharrows" per NCDOT guidelines, install signage, and improve street lighting. Further study is needed along northern portion of Turner Street since it will be turned into Hwy 70 Business once Hwy 70 Bypass is complete.	Low-Moderate	$17,000
19	Town	Signed Shared Roadway	Moore Street Route	Moore Street	Cedar Street / US Hwy 70 West	Front Street	1,600	Serves Downtown and provides access to Hwy 70	Curbs & Gutter on both sides, narrow roadway, and parallel parking on east-side	Install Share the Road signage and delineate parking. Eliminate project after Gallant's Channel Bridge is demolished or closed to bicycle travel.	Minimal	$5,000
20	Town	Sharrows	Crescent Drive Route	Crescent Drive	Live Oak Street / US Hwy 70 East	Campen Road	1,800	Connection to residential area and adjacent commercial area, also located within schools zone, US 70 Alt. Route	Narrow roadway width	Possibly paint "Sharrows" per NCDOT guidelines and install signage	Minimal	$1,000
21	Town	Signage	Wellons and Glenda Drive Route	Wellons Drive & Glenda Drive	Campen Road	Pinners Point Road	N/A	US 70 Alt. Route with connection to commercial shopping centers and residential areas	Loading area behind shopping center; ditches along roads	Delineate travel lanes and install signage	Minimal	$8,000
22	NCDOT	Sharrows	US Hwy 70 West Route	US Hwy 70 West	Moore Street	Pivers Island Road	2,500	Roadway serves as a primary entry/exit to/from Beaufort and bicycle improvements are highly demanded by bicyclists	Gallant's Channel Drawbridge is narrow and will be replaced in future; High Traffic area	Install Shared Roadway signage to improve visibility of bikers on the bridge; paint "Sharrows" per NCDOT guidelines (further study may be needed to confirm outside lane width) as a short-term treatment; and improve lighting. Further Study is needed when US Hwy 70 is redirected. Project recommendation may be deleted after Gallant's Channel Bridge is demolished or closed for travel.	Minimal	$3,000
23	NCDOT	Multi-Use Trail	Steep Point Road Route	Steep Point Road	US Hwy 70 West	end of street - with a connection to Howland Parkway	5,600	Connection to residential and commercial areas, route is served by one inlet/outlet and Bicycling Beaufort Route	ditches, no curb& gutter, vacant land in adjacent area with uses not yet determined; availability of right-of-way should be determined during initial planning phases.	Install Multi-Use trail on north side of road and consider connection to Pinners Point Road. Installation of Paved Shoulders is an option on this route.	Moderate-High	$248,000
24	Private & NCDOT	Sharrows	Pivers Island Route	Pivers Island Road	US Hwy 70 West	Duke Marine Lab	1,800	Route used and in high demand by staff and students at Duke and others on Pivers Island	High traffic volumes on US Hwy 70	Install Shared Roadway signage to improve visibility of bikers on the roadways; and paint "Sharrows" per NCDOT guidelines (further study may be needed to insure lane width) as a short-term treatment; Improve lighting; Further Study is needed when US Hwy 70 is redirected in future for possible installation of bike lanes	Minimal	$2,000
25	Town & NCDOT	Sharrows	Live Oak Street Route	Live Oak Street	Front Street	NC Hwy 101	5,500	Roadway serves as a primary thoroughfare through Town, which is often used by experienced cyclists. Public demand improvements for bikeability	Curb and Gutter, high traffic volumes on US Hwy 70, and Broad St. to Front St. is narrow	Install Shared Roadway signage to improve visibility of bikers on roadways; paint "Sharrows" per NCDOT guidelines (may need further study to determine outside lane width) as short-term treatment; Improve lighting. Install bike lanes once US Hwy 70 Bypass is complete to bring roadway down to 'human scale' along Hwy 70 route.	Low - Moderate	$41,000 to $55,000

Table 7.0: Preliminary Construction Project Recommendations, Continue

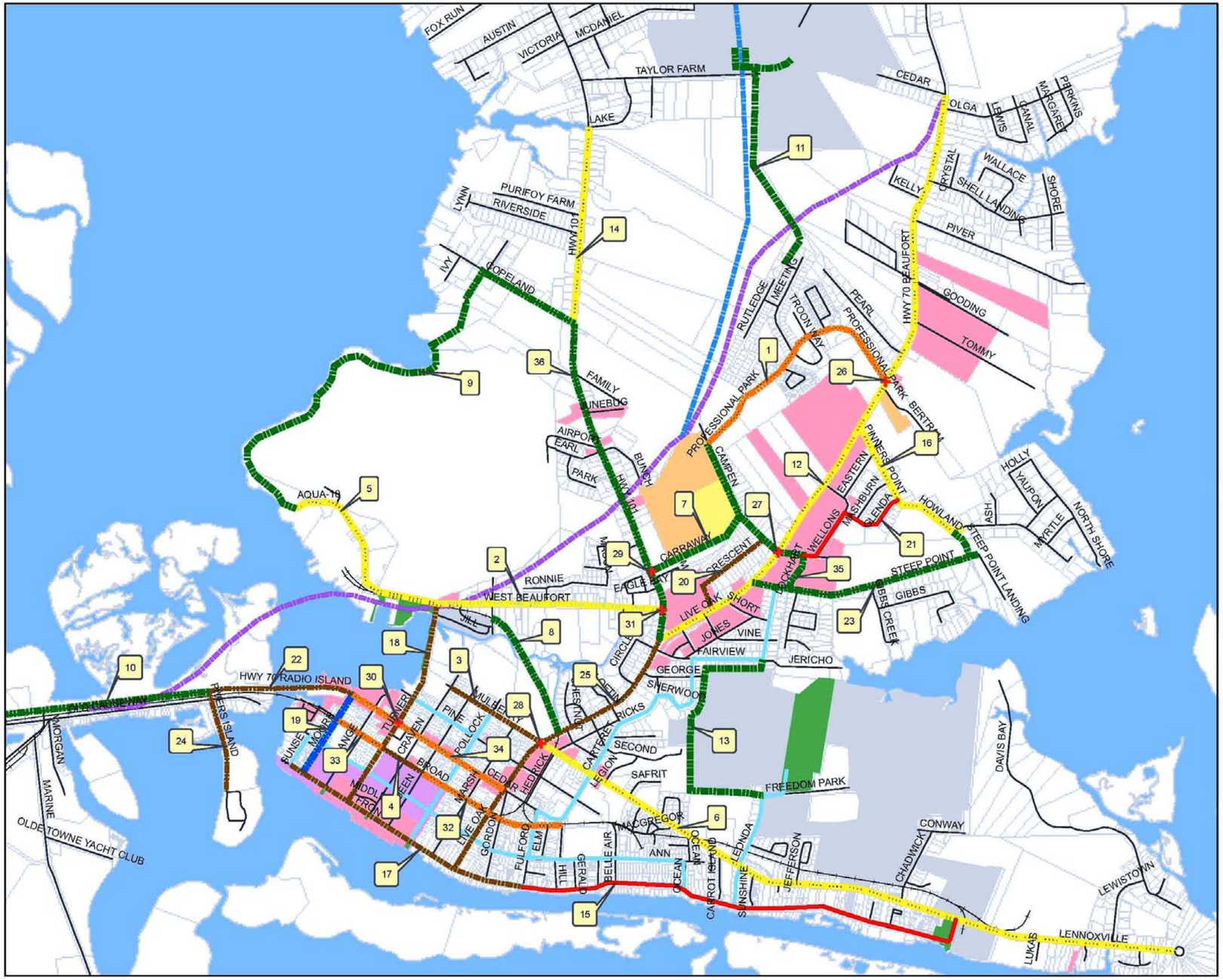
Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Preferred Treatments	Estimated Cost Range	Preliminary Opinions of Probable Costs
26	Town & NCDOT	Intersection Improvement	US Hwy 70 East Route	Professional Park Drive & Live Oak Street (US Hwy 70 E)	*N/A*	*N/A*	0	Improve crossing for better connection between residential and commercial areas, plus is a route to schools	T-intersection, deep ditches along US 70, no signal	Improve bicycle visibility at intersection, provide an improved connection between Tiller School and residential area. Further study is needed once Hwy 70 bypass is complete.	Minimal	$1,000
27	Town & NCDOT	Intersection Improvement	US Hwy 70 East Route	Campen Drive & Live Oak Street (US Hwy 70 E)	*N/A*	*N/A*	0	Location of a bicycle-motor vehicle crash and is on Bicycling in Beaufort Bike Route that connects schools, residential and commercial areas, and future library	Angle of intersection	Pull back stop bar heading westbound on US 70, install a bicycle-activated detector loop and signage. Improve intersection for pedestrian and bicyclists.	Low-Moderate	$45,000
28	Town & NCDOT	Intersection Improvement	Mulberry & Lennoxville Route	Live Oak St / US Hwy 70 and Mulberry / Lennoxville	*N/A*	*N/A*	0	Connection between east and west side of Beaufort, connection to Boys & Girls Club and surrounding residential and commercial areas	Angle of intersection	Install bicycle-activated detector loop to existing traffic signal and signage. Further study based on development and bridge / US 70 Bypass, currently conducting a TIA on intersection.	Low	$11,000
29	NCDOT	Intersection Improvement	Bicycling in Beaufort Route and NC Hwy 101 Route	Carraway Drive & NC Hwy 101	*N/A*	*N/A*	0	Location of a bicycle-motor vehicle crash and on a potential route to schools; Connection to schools, residential and existing bike route	High traffic volumes, no signal	Install a possible signal with bicycle-activated detector loop and install signage. Further Study (US 70 Bypass)	Moderate	$240,000
30	NCDOT	Intersection Improvement	Bicycling in Beaufort Route and Turner Street	Turner Street & US Hwy 70 West	*N/A*	*N/A*	0	Location of bicycle-vehicle crash and is along existing Bicycling in Beaufort route	High traffic volumes, center turn lane	Install a bicycle-activated detector loop and signage . Further Study is needed.	Low	$32,000
31	NCDOT	Intersection Improvement	West Beaufort Road Bike Route Improvements	West Beaufort Road & NC Hwy 101	*N/A*	*N/A*	0	Improve crossing to connect residential and commercial areas, also a route to schools and on existing bike route	High traffic volumes, no signal, open ditches, and erosion along pavement edges	Conduct pavement improvements and install signage. Further study (US 70 Bypass)	Minimal	$2,000
32	Town	Bike Lane*	Broad Street Route	Broad Street	Queen Street	Yaupon Street	2,600	US 70 Alt. Route with connection to County offices, Town Hall, residential areas, library and Downtown	Curb & gutters up to Gordon Street, no curb & gutter from Gordon St. to Yaupon St., parallel parking (undesignated)	Redesign / restripe roadway to accommodate bike lanes per NCDOT guidelines and install appropriate signage. Installation of sharrows is a potential option for locations where on-street parallel parking limits the available space for bike lanes.	Low	$11,000

* The on-street parallel parking on this section of Broad Street may limit the available space for bike lanes.

Table 7.0: Preliminary Construction Project Recommendations, Continue

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Preferred Treatments	Estimated Cost Range	Preliminary Opinions of Probable Costs
33	Town	Bike Lane**	Broad Street Route	Broad Street	Moore Street	Turner Street	900	US 70 Alt. Route with connection to County offices, Town Hall, residential areas, library and Downtown	Curbs & gutters, undivided roadway, parallel parking both sides	Redesign / restripe roadway to accommodate bike lanes per NCDOT guidelines and install appropriate signage. Installation of sharrows is a potential option for locations where on-street parallel parking limits the available space for bike lanes.	Low	$48,000
34	NCDOT	Bike Lane	US Hwy 70 Route	Cedar Street (US Hwy 70 West)	Moore Street	Live Oak Street (US Hwy 70 East)	3,100	Serves as primary thoroughfare through town to provide connection to commercial and residential areas.	High traffic, curb and gutters	Install Bike Lanes on both sides of road per NCDOT guidelines when the US 70 Bypass is completed and the Gallants Channel Drawbridge is removed and bring roadway down to a "human scale"	Low	$37,000
35	Town	Multi-Use Trail	Campen & Lockhart Route	Campen Drive & Lockhart	Carraway Drive	Steep Point Road	3,400	Existing bike route with connection to residential area and schools. Potential SRTS	Existing sidewalk on north side of Campen, right-of-way, driveway cuts	Convert and install multi-use trail/path along Campen and Lockhart to provide a SRTS. Delineate area between path and roadway, install signage. Further study is needed.	Low	$52,000
36	NCDOT	Multi-Use Trail	Hwy 101 Route	Hwy 101	Live Oak Street / US Hwy 70 East	Copeland	5,800	Connect into Airport loop route, a potential SRTS for residential areas near school	Right-of-way, private property limits, heavy traffic (currently)	Install a multi-use trail along Hwy 101 to connect residential areas to schools and commercial areas. Further study is needed to determine best/feasible trail alignment. Installation of paved shoulders is an option on this route.	High	$270,000
N/A	Town & NCDOT	Hazard / Spot Improvements	Current Bicycling in Beaufort Route	Along Entire Bicycling in Beaufort Route	*N/A*	*N/A*	0	There are numerous locations along existing bicycle route that pose a safety hazard for bicyclists. Conducting improvements to these areas will improve bicycle safety.	N/A	Retrofit and/or replace drainage grates, utility covers, and other features that are not bicycle-friendly. All new roadway resurfacing projects should include bicycle-friendly drainage grates, smooth out pavement around grates, gutter aprons, and other features for a smooth, level surface for bicycles. Repair pavement edges that have eroded or been damaged by vehicular use. Install proper guardrails and hazard warning signage in areas where there are deep ditches, culverts and bridges, and where wash out has occurred.	Minimal	$500-5000

** The on-street parallel parking on this section of Broad Street may limit the available space for bike lanes.



Town of Beaufort
Comprehensive Bicycle Plan

Map 7.1: Final Preliminary Project Recommendations

Legend

- Intersection Improvements
- Bike Lane
- Signage Improvement
- Multi-Use Trail
- Paved Shoulder
- Sharrows
- Signed Shared Roadway
- Current Bicycling in Beaufort Route
- US HWY 101 Bypass
- US HWY 70 Bypass
- Roads
- Abandoned Railroad
- Parks
- Future Residential Areas
- Elementary Schools
- Middle Schools
- Commercial Areas
- Downtown
- # Project Reference # (See Tables in Plan for more information on project)

0 0.1 0.2 0.4 0.6
Miles

Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc.

7.1 PRIORITIZED PROJECTS

Project development and prioritization was a multi-step process which included the identification of locations for potential projects, determining the appropriate treatments for projects, and prioritizing those projects. Following project development, projects were then prioritized based on the following factors:

- **Public Input:** information from Steering Committee, comments from participants in Public Open Houses and public survey.

- **Project Characteristics:** During the third Steering Committee Meeting, members were asked to select priority criteria based on factors that include safety, connectivity to schools and other major destinations, diversity in construction and the scenic environment. These results were used to identify top priorities. The following characteristics were identified as important characteristics to making a project a priority:
    1. Downtown
    2. Safety
    3. (tie) Major Thoroughfares and Scenic Environment
    4. Schools
    5. Existing Bike Route
    6. Latent Demand / Existing Use
    7. Neighboring Communities
    8. (tie) Shopping / Retail Areas and Neighborhoods
    9. Diversity in Construction
    10. Parks
    11. Number of Public Comments
    12. Libraries

- **Constructability and Cost:** Including site preparation, engineering services, easement purchases, preliminary design, and ease of construction. **General cost estimates are described in Appendix E.**

Project prioritization involved a process which included all of the above factors. **Appendix D contains details concerning the methodology of project prioritization.** Projects were rated on key characteristics and received one point for having any of the project characteristics listed above. A project cost analysis was compared to the list of projects organized by project rating. Projects which were estimated to be low cost and also received high ratings were placed in the short-term project category. Projects with high costs and low ratings were placed in the long-term project category. Mid-term projects included those projects with low costs and low ratings as well as projects with high costs and high ratings.

All construction projects are listed by priority ranking in Table 7.1.

Table 7.1 Prioritized Projects									
Priority Rank	Project / Improvement Name	Map Ref. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft)	Preliminary Opinion of Probable Costs
1	Turner Street Bike Route Improvements	18	Town & NCDOT	Sharrow	Turner Street	West Beaufort Road	Front Street	3,800	$17,000
2	Front Street Bike Route Improvements	15	NCDOT	Signage	Front Street	Fulford Street	Lennoxville Road	N/A	$1,000
3	Current Bicycling in Beaufort Route	N/A	Town & NCDOT	Hazard / Spot Improvement	Along Entire Bicycling in Beaufort Route	*N/A*	*N/A*	0	$500-$5000
4	Front Street Bike Route Improvements	17	Town	Sharrow	Front Street	Sunset Lane	Fulford Street	4,600	$17,000
5	West Beaufort Road Bike Route Improvements	2	NCDOT	Paved Shoulder	West Beaufort Road	NC Hwy 101	Aqua 10 Road	6,600	$396,000
6	Hwy 101 Route	36	NCDOT	Multi-Use Trail	Hwy 101	Live Oak Street / US Hwy 70 East	Copeland	5,800	$270,000
7	Campen & Lockhart Route	35	Town	Multi-Use Trail	Campen Drive & Lockhart	Carraway Drive	Steep Point Road	3,300	$52,000
8	West Beaufort Road Bike Route Improvements	31	NCDOT	Intersection Improvement	West Beaufort Road & NC Hwy 101	*N/A*	*N/A*	0	$2,000
9	Bicycling in Beaufort Route and Turner Street	30	NCDOT	Intersection Improvement	Turner Street & US Hwy 70 West	*N/A*	*N/A*	0	$32,000
10	Bicycling in Beaufort Route and NC Hwy 101 Route	29	NCDOT	Intersection Improvement	Carraway Drive & NC Hwy 101	*N/A*	*N/A*	0	$240,000
11	Live Oak Street Route	25	Town & NCDOT	Sharrow	Live Oak Street	Front Street	NC Hwy 101	5,500	$41,000 to $55,000
12	US Hwy 70 Route	34	NCDOT	Bike Lane	Cedar Street (US Hwy 70 West)	Moore Street	Live Oak Street (US Hwy 70 East)	3,100	$37,000
13	US Hwy 70 East Route	27	Town & NCDOT	Intersection Improvement	Campen Drive & Live Oak Street (US Hwy 70 E)	*N/A*	*N/A*	0	$45,000

Table 7.1 Prioritized Projects, Continue									
Priority Rank	Project / Improvement Name	Map Ref. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft)	Preliminary Opinion of Probable Costs
14	US Hwy 70 East Route	12	NCDOT	Paved Shoulder	Live Oak Street / (US Hwy 70 East)	NC Highway 101 connection	Cedar Avenue (ETJ limits)	11,200	$634,000
15	Carraway Drive	7	NCDOT	Multi-Use Trail	Carraway Drive	NC Hwy 101	Professional Park Drive Extension / Campen Road	3,200	$78,000
16	US Hwy 70 West Route	22	NCDOT	Sharrow	US Hwy 70 West	Moore Street	Pivers Island Road	2,500	$3,000
17	Lennoxville Route	6	NCDOT	Paved Shoulder	Lennoxville Road	Live Oak Street / US Hwy 70 East	end of road	11,800	$666,000
18	NC Hwy 101 Route	14	NCDOT	Paved Shoulder	NC Hwy 101	Copeland	Lake Road	3,300	$377,000
19	Beaufort – Morehead City Causeway Route	10	NCDOT	Multi-Use Trail	US Hwy 70 West	Pivers Island	Morehead City	6,400	$520,000
20	US Hwy 70 East Route	26	Town & NCDOT	Intersection Improvement	Professional Park Drive & Live Oak Street (US Hwy 70 E)	*N/A*	*N/A*	0	$1,200
21	Pivers Island Route	24	Private & NCDOT	Sharrow	Pivers Island Road	US Hwy 70 West	Duke Marine Lab	1,800	$2,000
22	Broad Street Route	32	Town	Bike Lane	Broad Street	Queen Street	Yaupon Street	2,600	$11,000
23	Broad Street Route	4	Town	Sharrow	Broad Street	Turner Street	Queen Street	800	$1,000
24	Moore Street Route	19	Town	Signed Shared Roadway	Moore Street	Cedar Street / US Hwy 70 West	Front Street	1,600	$5,000
25	Mulberry & Lennoxville Route	28	Town & NCDOT	Intersection Improvement	Live Oak St / US Hwy 70 and Mulberry / Lennoxville	*N/A*	*N/A*	0	$11,000

Table 7.1 Prioritized Projects, Continue									
Priority Rank	Project / Improvement Name	Map Ref. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft)	Preliminary Opinion of Probable Costs
26	Live Oak & West Beaufort Rails to Trails Route	8	Town & NCDOT	Multi-Use Trail	Abandoned Railroad	Stanton Road	Live Oak Street	2,300	$337,000
27	Pinners Point Route	16	NCDOT	Paved Shoulder	Pinners Point Road	US Highway 70 East	Howland Parkway	2,700	$897,000
28	Crescent Drive Route	20	Town	Sharrow	Crescent Drive	Live Oak Street / US Hwy 70 East	Campen Road	1,800	$1,000
29	Professional Park Drive Route	1	Town	Bike Lane	Professional Park Drive	Live Oak Street / US Hwy 70 East	Campen Road	4,400	$16,000
30	Broad Street Route	33	Town	Bike Lane	Broad Street	Moore Street	Turner Street	900	$48,000
31	Airport Loop Route	9	Town & NCDOT & Private	Multi-Use Trail	Michael J. Smith Airport Property	Aqua-10 Road	NC Hwy 101 / Copeland Road	9,400	$391,000
32	Beaufort East Village	13	Town	Multi-Use Trail	Utility Easement	Leondra Drive	Fairview Drive	4,500	$113,000
33	Steep Point Road Route	23	NCDOT	Multi-Use Trail	Steep Point Road	US Hwy 70 West	end of street - connection to Howland Parkway	5,600	$248,000
34	Wellons and Glenda Drive Route	21	Town	Signage	Wellons Drive & Glenda Drive	Campen Road	Pinners Point Road	N/A	$8,000
35	Old Tram Route	11	Town	Multi-Use Trail	Easement	Legare Court	Taylor Farm Road with connection to North River Club	5,400	$260,000
36	Aqua-10 Route	5	NCDOT	Paved Shoulder	Aqua 10 Road	West Beaufort Road	end of road	800	$58,000
37	Mulberry Street Route	3	Town	Sharrow	Mulberry Street	Live Oak Street / US Hwy 70	Craven Street	1,800	$1,000

Short-term opportunities are those that may be completed or implemented in a timeframe of zero to five years (0-5 yrs.). The following projects should be considered in the short-term of implementation of the Bicycle Plan (Table 7.2).

Table 7.2: Short-Term Projects

Priority Rank	Project / Improvement Name	Map Ref. #	Type of Project	At / On	From	To	Preliminary Opinion of Probable Costs
1	Turner Street Bike Route Improvements	18	Sharrow	Turner Street	West Beaufort Road	Front Street	$17,000
2	Front Street Bike Route Improvements	15	Signage	Front Street	Fulford Street	Lennoxville Road	$1,000
3	Current Bicycling in Beaufort Route	N/A	Hazard / Spot Improvements	Along Entire Bicycling in Beaufort Route	*N/A*	*N/A*	$500-$5000
4	Front Street Bike Route Improvements	17	Sharrow	Front Street	Sunset Lane	Fulford Street	$17,000
7	Campen & Lockhart Route	35	Multi-Use Trail	Campen Drive & Lockhart	Carraway Drive	Steep Point Road	$52,000
8	West Beaufort Road Bike Route Improvements	31	Intersection Improvement	West Beaufort Road & NC Hwy 101	*N/A*	*N/A*	$2,000
9	Bicycling in Beaufort Route and Turner Street	30	Intersection Improvement	Turner Street & US Hwy 70 West	*N/A*	*N/A*	$32,000
11	Live Oak Street Route	25	Sharrow	Live Oak Street	Front Street	NC Hwy 101	$41,000 to $55,000
13	US Hwy 70 East Route	27	Intersection Improvement	Campen Drive & Live Oak Street (US Hwy 70 E)	*N/A*	*N/A*	$45,000
15	Carraway Drive	7	Multi-Use Trail	Carraway Drive	NC Hwy 101	Professional Park Drive Extension / Campen Road	$78,000
16	US Hwy 70 West Route	22	Sharrow	US Hwy 70 West	Moore Street	Pivers Island Road	$3,000
22	Broad Street Route	32	Bike Lane	Broad Street	Queen Street	Yaupon Street	$11,000
28	Crescent Drive Route	20	Sharrow	Crescent Drive	Live Oak Street / US Hwy 70 East	Campen Road	$1,000

Mid-term opportunities are those that may be completed or implemented in a timeframe of six to ten years (6-10 yrs). The following opportunities should be considered in the mid-term of implementation of the Bicycle Plan (Table 7.3).

Table 7.3: Mid-Term Projects

Priority Rank	Project / Improvement Name	Map Ref. #	Type of Project	At / On	From	To	Preliminary Opinion of Probable Costs
5	West Beaufort Road Bike Route Improvements	2	Paved Shoulder	West Beaufort Road	NC Hwy 101	Aqua 10 Road	$396,000
6	Hwy 101 Route	36	Multi-Use Trail	Hwy 101	Live Oak Street / US Hwy 70 East	Copeland	$270,000
10	Bicycling in Beaufort Route and NC Hwy 101 Route	29	Intersection Improvement	Carraway Drive & NC Hwy 101	*N/A*	*N/A*	$240,000
12	US Hwy 70 Route	34	Bike Lane	Cedar Street (US Hwy 70 West)	Moore Street	Live Oak Street (US Hwy 70 East)	$37,000
14	US Hwy 70 East Route	12	Paved Shoulder	Live Oak Street / (US Hwy 70 East)	NC Highway 101 connection	Cedar Avenue (ETJ limits)	$634,000
17	Lennoxville Route	6	Paved Shoulder	Lennoxville Road	Live Oak Street / US Hwy 70 East	end of road	$666,000
18	NC Hwy 101 Route	14	Paved Shoulder	NC Hwy 101	Copeland	Lake Road	$377,000
19	Beaufort – Morehead City Causeway Route	10	Multi-Use Trail	US Hwy 70 West	Pivers Island	Morehead City	$520,000
20	US Hwy 70 East Route	26	Intersection Improvement	Professional Park Drive & Live Oak Street (US Hwy 70 E)	*N/A*	*N/A*	$1,000
21	Pivers Island Route	24	Shared Roadway	Pivers Island Road	US Hwy 70 West	Duke Marine Lab	$2,000
23	Broad Street Route	4	Sharrow	Broad Street	Turner Street	Queen Street	$1,000
24	Moore Street Route	19	Signed Shared Roadway	Moore Street	Cedar Street / US Hwy 70 West	Front Street	$5,000
25	Mulberry & Lennoxville Route	28	Intersection Improvement	Live Oak St / US Hwy 70 and Mulberry / Lennoxville	*N/A*	*N/A*	$11,000
26*	Live Oak & West Beaufort Rails to Trails Route	8	Multi-Use Trail	Abandoned Railroad	Stanton Road	Live Oak Street	$339,000
29	Professional Park Drive Route	1	Bike Lane	Professional Park Drive	Live Oak Street / US Hwy 70 East	Campen Road	$16,000

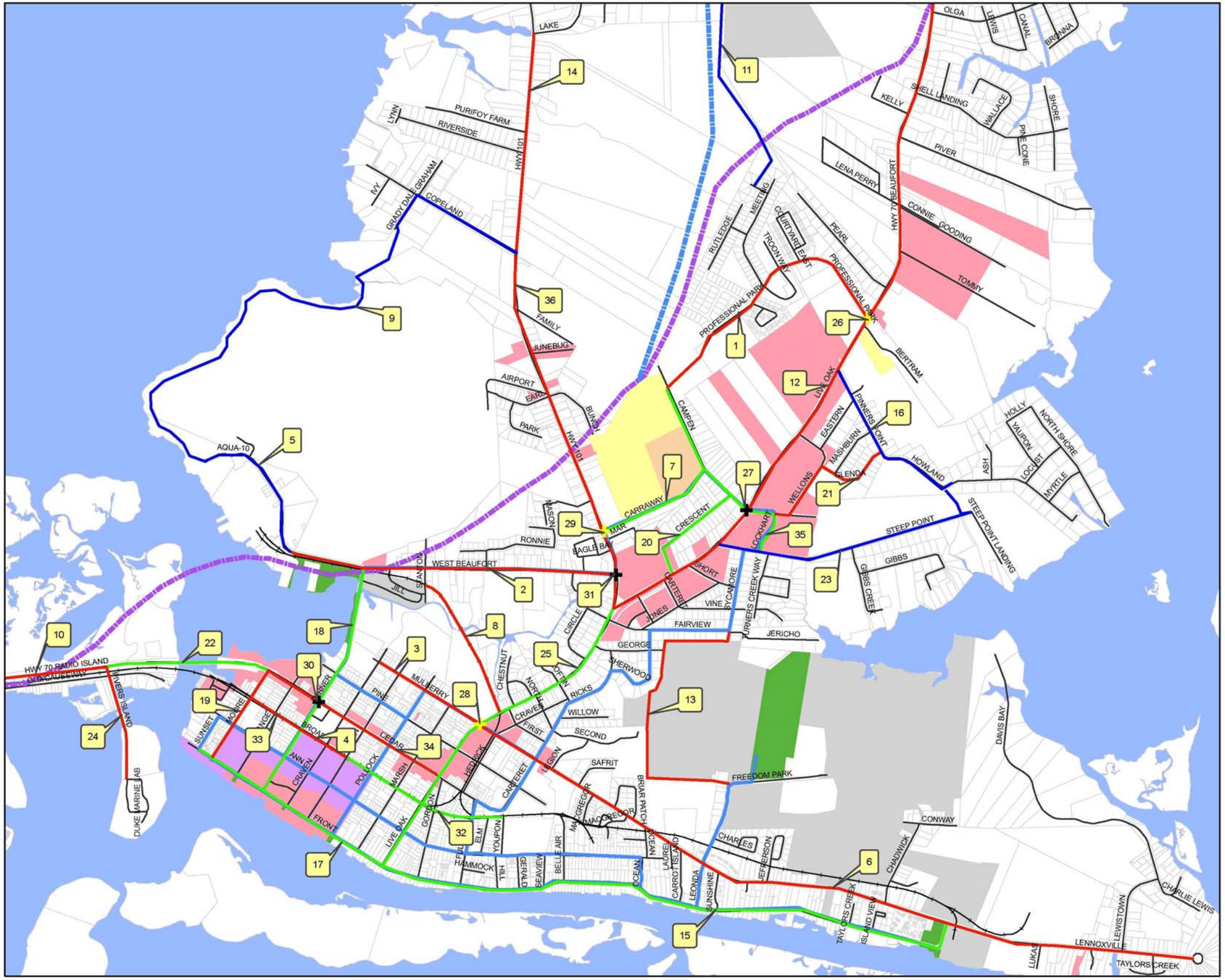
* Acquisition of the railroad easements should be a short-term priority.

Table 7.3: Mid-Term Projects, Continue							
Priority Rank	Project / Improvement Name	Map Ref. #	Type of Project	At / On	From	To	Preliminary Opinion of Probable Costs
30	Broad Street Route	33	Bike Lane	Broad Street	Moore Street	Turner Street	$48,000
32	Beaufort East Village	13	Multi-Use Trail	Utility Easement	Leondra Drive	Fairview Drive	$113,000
34	Wellons and Glenda Drive Route	21	Signage	Wellons Drive & Glenda Drive	Campen Road	Pinners Point Road	$8,000
37	Mulberry Street Route	3	Sharrow	Mulberry Street	Live Oak Street / US Hwy 70	Craven Street	$1,000

Long-term opportunities are those that may be completed or implemented in a timeframe beyond ten years. The following opportunities should be considered in the long-term of implementation of the Bicycle Plan (Table 7.4).

Table 7.4: Long-Term Projects							
Priority Rank	Project / Improvement Name	Map Ref. #	Type of Project	At / On	From	To	Preliminary Opinion of Probable Costs
27	Pinners Point Route	16	Paved Shoulder	Pinners Point Road	US Highway 70 East	Howland Parkway	$897,000
31	Airport Loop Route	9	Multi-Use Trail	Michael J. Smith Airport Property	Aqua-10 Road	NC Highway 101 / Copeland Road	$391,000
33	Steep Point Road Route	23	Multi-Use Trail	Steep Point Road	US Hwy 70 West	end of street - with a connection to Howland Parkway	$248,000
35	Old Tram Route	11	Multi-Use Trail	Easement	Legare Court	Taylor Farm Road with connection to North River Club	$260,000
36	Aqua-10 Route	5	Paved Shoulder	Aqua 10 Road	West Beaufort Road	end of road	$58,000

Map 7.2 illustrates the prioritized project schedule.



Town of Beaufort
Comprehensive Bicycle Plan

Map 7.2: Prioritized Project Schedule

Legend

- Short Term Intersection Projects
- Mid Term Intersection Projects
- Long Term Improvement Projects
- Mid Term Improvement Projects
- Short Term Improvement Projects
- Current Bicycling in Beaufort Route
- US HWY 101 Bypass
- US HWY 70 Bypass
- Abandoned Railroad
- Roads
- Elementary Schools
- Middle Schools
- Parks
- Future Residential Areas
- Commercial Areas
- Downtown
- # Project Reference # (See Tables in Plan for more information on project)

0 0.1 0.2 0.4 0.6
Miles

Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

SECTION 8 – IMPLEMENTATION

Section Outline:

8.0 Implementation Strategy

8.1 Initiating Actions

8.2 Performance Measures

8.0 IMPLEMENTATION STRATEGY

This chapter describes how the recommendations for improving Beaufort's bicycling conditions will be implemented. Priorities are outlined for projects, plans, and policies as well as potential partners and funding sources. Implementation of this Plan will require a collaborative effort between a variety of Town departments and agencies. The Town's staff should be aware of the Plan recommendations and seek to implement them as part of other regular work efforts. The NCDOT Division of Bicycle and Pedestrian Transportation may provide technical expertise on issues related to bicycling and ensure that implementation of the Plan moves forward. Progress on improving the Plan should be monitored on no less than an annual basis. Almost every project involving street or transportation improvements offers an opportunity to implement a component of this Plan. Implementation priorities of recommended programs and policies are listed in **Table 6.0 Implementation Table**, located on page 6-13 of this Plan.

8.1 INITIATING ACTIONS

The following initiating actions will ensure implementation of the Comprehensive Bicycle Plan and help the Town to meet the goals and objectives of it.

Action: Establish a standing Bicycle and Pedestrian Advisory Committee. A Bicycle and Pedestrian Advisory Committee is recommended as a short-term priority and is described in Section 6.

- Establish an on-going committee to monitor progress of plan implementation. Section 7 includes a comprehensive list of all preliminary construction projects, **Table 7.0 Preliminary Construction Projects** on pages 7-3 – 7-7. Projects are listed according to priority rank in **Table 7.1 Prioritized Projects** on pages 7-10 – 7-12. Projects recommended by implementation phase are listed on page 7-13 **Table 7.2 Short-Term Projects**; pages 7-14 – 7-15 **Table 7.3 Mid-Term Projects**, and page 7-15 **Table 7.4 Long-Term Projects**.
- Review development plans to identify opportunities for bicycle and pedestrian facilities.

Action: Provide bicycle facilities as part of all transportation and roadway projects.

- Accommodate bicycling as part of all new roadway projects.
- Provide bicycle facilities as a part of all bridge projects (including bridge ramps and approaches). A New Bridge

Projects policy is recommended as a mid-term priority in Section 6, page 6-12.

- Incorporate requirements for bike facilities into the Town's policies and ordinances. A Bikeways and Bike Facilities ordinance is recommended as a short-term priority, discussed in Section 6, page 6-12.
- Actively seek opportunities to provide bicycle lanes, shared roadway markings, and signage as part of repaving projects. Repaving projects may allow for restriping or marking of roadways to provide bike facilities. Repaving projects may allow for the addition of paved shoulder width. A Complete Streets ordinance is recommended as a short-term priority, discussed in Section 6, page 6-10.
- Repair potholes, surface hazards, sight distance obstructions and other maintenance problems on a regular basis. A maintenance policy is recommended as a short-term priority in Section 6, page 6-11. This action would be supported through the implementation of a Spot Improvement Program discussed in Section 6, page 6-5; a Spot Improvement Program could be developed through the expansion of the Town's current use of its online "Please Fix It" page.

Action: Establish a bicycle facility grant match reserve fund. The Town should consider development of a bicycle facility grant match reserve fund to make it possible for the Town to have matching funds available to take advantage of state and federal grant programs. *For more information about Funding Sources, please refer to Appendix E.*

Action: Dedicate funding for high-priority bicycle project planning and implementation. The Town should take advantage of existing funding provided through the general fund and other private and public sources and dedicate this funding to critical bicycle projects. Some of the most significant bicycle facilities needed in Beaufort such as multi-use trails will not be implemented through routine roadway repaving and reconstruction projects. These types of projects will require independent funding to ensure completion. The Town may be able to secure funding assistance through federal and state grants and through special appropriations. See Table 7.1 Prioritized Projects for a comprehensive list of projects listed by priority rank. Examples of these projects include:

- Airport Loop Route
- Live Oak & West Beaufort Rails to Trails Route
- Beaufort East Village Route
- Old Tram Route
- Steep Point Road Route
- Highway 101 Route

OVERALL GOALS FOR BEAUFORT:

GOAL: AESTHETICS
To provide aesthetically pleasing bicycle facilities and places to ride that compliment Beaufort's scenic environment.

GOAL: EDUCATION & AWARENESS
To educate the community on the wide-range of benefits of a bike-friendly community, as well as to increase bicyclists', pedestrians', and motorists' awareness of traffic laws and safety measures.

GOAL: ENFORCEMENT
To develop and implement policies and programs to educate both motorists and bicyclists and to enforce those laws relating to both motorists and bicyclists which support a safe bicycling atmosphere.

GOAL: DIVERSITY IN CONSTRUCTION
To develop, construct and improve diverse bicycle-friendly facilities throughout the community.

GOAL: CONNECTIVITY
To develop a well-designed continuous bicycle network that will provide residents and visitors with convenient and pleasant access to popular destinations and points of interest.

GOAL: SUPPORT FACILITIES
To provide bicycle-related facilities for a full range of users and abilities.

GOAL: BIKE-FRIENDLY POLICIES
To pursue bicycle-friendly policies and maintenance procedures to continuously improve bicycling in Beaufort.

GOAL: ENCOURAGE OPPORTUNITIES
To encourage and seek opportunities throughout the community to develop and improve bicycle facilities.

- Beaufort – Morehead City Causeway Route

Action: <u>All Town departments should consult the Comprehensive Bicycle Plan when implementing projects and conducting plan reviews.</u>

- Beaufort's development review process should be modified to include requirements for on and off- site bicycle connections, facilities, and amenities.
- Establish a Bicycle and Pedestrian Committee to review development plans.

Action: <u>Develop a Bicycle Education Program and Enforce Traffic Laws.</u> See Section 6 for recommended programs, such as Safe Routes to School, Police-on-Bikes and other encouragement programs.

- Develop a bicycle education program as part of the Town's overall communication and education programs.
- Provide resources and manpower to enforce laws relative to bicycle safety.
- Use the Town's website, newsletter, and local newspaper as information and educational tools.

Action: <u>Plan and Construct Bicycle Amenities.</u>

- The Town should establish requirements for the addition, design, location, and number of racks for land uses. See Section 5 for design guidance and Section 6 for recommended policies, such as a bicycle parking facilities ordinance and bikeways and bike facilities ordinance.
- Provide racks in public areas and along activity corridors. See Section 2, page 2-18, for recommended bike rack locations.
- Develop and provide information facilities and maps of bike routes and destinations. See Section 6 for discussion related to Mapping & Signage ancillary facilities.

Action: <u>Reduce Speed Limits and Use Bicycle-Friendly Devices</u>
The Town should consider traffic calming measures and/or speed reductions on roads with bicycle facilities. See Sections 5 and 6 for guidance and discussion about road diets, traffic calming devices, and lowering speed limits.

Action: <u>Update the Comprehensive Bicycle Plan every 5 – 10 years.</u>
Plan updates will be needed to address the changing needs and priorities of the Town. Many project opportunities may be impacted by a near-future transportation project, such as the US Highway 70 Beaufort Bypass, and further study of the projects will be needed to incorporate appropriate bicycle facilities. Public input is essential for future plan updates and reviews.

Action: <u>Evaluate new bicycle facility treatments.</u> New bicycle treatments should be evaluated to determine their effectiveness. The results of the evaluations will be used to refine, adjust, and guide future

use of these treatments. Bicycle usage, motorist response, safety, and maintenance needs should be addressed during evaluation of new bicycle facilities. This includes the evaluation of the following facilities:

- Shared lane markings or sharrows and bicycle lane markings.
- Signage.
- Roadway crossing improvements / treatments.

Action: Establish partnerships based on their potential interest or involvement in a project. Many local agencies, businesses, organizations and governments provide partnership opportunities to assist the Town in meeting the goals of the Bicycle Plan. Partnerships may be utilized to develop bicycle education, enforcement, and encouragement programs. The Town should consider establishing or strengthening partnerships with the following to achieve the completion of the Plan's projects and recommendations:

- North Carolina Division of Transportation (NCDOT)
- Carteret County Parks and Recreation
- Carteret County Board of Education
- Local developers
- Local bicycle clubs / advocacy organizations
- Local businesses
- Neighboring municipalities
- Community volunteer groups
- Elected officials
- Local health organizations
- Down East RPO
- Area tourism organizations

8.2 PERFORMANCE MEASURES

Performance measures should be monitored to determine the amount of progress being made toward achieving the vision of the Plan. The performance measures should be reviewed and updated every few years to ensure that the Town continues to use the best available resources to assess Plan implementation.

Beaufort's vision is to develop a bike-friendly environment that accommodates all ages and abilities.

EVALUATION / MONITORING PROCESS

The Town should provide an ongoing evaluation of bicycle transportation to determine whether the goals and objectives of the plan are being met, or if the goals and objectives need to be modified to reflect changing circumstances or attitudes. Performance monitoring should be conducted biannually with concern towards the goals of the plan: aesthetics, education & awareness, enforcement, diversity in construction, connectivity, support facilities, bike-friendly policies, encourage opportunities. Performance monitoring should be led by the Town's Planning Department with support of a Bicycling Advisory Committee, or similar advocacy group. Performance measures are used to monitor progress towards the vision of the Plan.

APPENDIX A – PUBLIC INVOLVEMENT STRATEGY

Appendix Outline:

A.0 Strategy Overview

A.1 Steering Committee

A.2 Public Survey

A.3 Public Open Houses

A.0 STRATEGY OVERVIEW

The public involvement strategy for the Comprehensive Bicycle Plan included extensive public participation, including a Steering Committee comprised of local stakeholders, an online survey, and two public open houses. A project kick-off meeting was held on November 18, 2008 to provide information on the NCDOT's role and support of the project, to introduce the consultant team, and to review the scope and schedule for the project. During the project kick-off meeting, members completed a visioning exercise to derive at the vision and/or goals for Beaufort's Bicycle Plan. Members suggested approximately fifty (50) comments regarding their vision and/or goals for Beaufort.

A draft vision for the plan was developed from the visioning exercise, which is "*to develop a bike-friendly environment that accommodates all ages and abilities.*"

A.1 STEERING COMMITTEE

A 17-member Steering Committee was created with stakeholders representing a variety of groups in Beaufort. Four Steering Committee meetings were held throughout the project development: December 18, 2008, January 22, 2009, March 26, 2009, and April 30, 2009.
The first Steering Committee meeting was held on December 18, 2008 from 5:00-6:30 p.m. at the Train Depot adjacent to Town Hall. During the meeting, the vision statement and goals of the Plan were reviewed and the Committee agreed to the vision statement, goals, and objectives. Members participated in a mapping exercise to determine destinations, generators and attractors in Beaufort. The information provided was used to determine future routes. Members also participated in an S.W.O.T. Analysis to identify the Strengths, Weaknesses, Opportunities, and Threats facing cyclists in Beaufort. This exercise provided information about the existing bicycling conditions in Beaufort.

The second Steering Committee meeting was held on January 22, 2009 from 5:30-7:00 p.m. at the Train Depot. The inventory of existing bicycle conditions was presented to the Committee in addition to existing policies, plans and programs related to bicycling. Following discussion, members participated in an informal design charrette to review maps of Beaufort and identify bicycling corridors, areas needing improvements, bicycle parking rack locations, and new facilities. The information provided by the Committee was assessed and opportunities were developed for consideration. Table A.1 is a comprehensive list of all identified bicycle project opportunities.

The third Steering Committee meeting was held on March 26, 2009 from 5:30-7:00 p.m. at the Train Depot. A summary of public involvement was presented to the Committee, which included comments from the first Public Open House and survey results. The results of the field analysis and preliminary program and policy recommendations were reviewed. Committee members received a list of preliminary project recommendations that were developed based on input from the Committee, the public, bicycle-vehicle crash data, existing and proposed plans, field inventory and analysis, and the ability to provide connectivity. Following the presentation, members participated in a priority criteria exercise to rank destinations and other factors. The information provided by the Committee was used to prioritize project recommendations regardless of cost.

The fourth and final Steering Committee meeting was held on April 30, 2009 from 5:30-7:00 p.m. at the Train Depot. The draft Comprehensive Bicycle Plan was presented to the Committee for review and comment. Committee members received a copy of the draft plan prior to the meeting and arrived prepared to discuss it. The prioritized projects were reviewed and the implementation phases were discussed. The Committee suggested a few minor revisions to the Plan, but otherwise accepted the draft with approval.

Steering Committee Meeting #2

Steering Committee Meeting #2

Steering Committee Meeting #4

Steering Committee Meeting #3

MEETING AGENDA

DATE: Tuesday, November 18, 2008 at 5:00 p.m.

LOCATION: Beaufort Train Depot
614 Broad Street, Beaufort, NC

SUBJECT: Town of Beaufort Comprehensive Bicycle Plan
Project Kick-Off Meeting

At this meeting, there will be discussion of project scope and purpose, project schedule, role of steering committee and public in planning process, in addition to identifying overall goals, objectives and vision of project.

This meeting will begin promptly at 5:00 p.m. and will conclude by 6:30 p.m.

AGENDA:

I. **Welcome & Introductions** – Kyle Garner, Town of Beaufort

II. **Project Overview & Role of Steering Committee** – Colleen Simmons, Rivers & Associates, Inc.

III. **Visioning** – All

IV. **Next Steps** – Kelly Lasky, Rivers & Associates, Inc.

V. **Conclusion / Questions**

Thank you for your time and assistance in making Beaufort a bike-friendly community.

Additional project information can be found at http://www.bikebeaufort.com

TOWN OF BEAUFORT
NORTH CAROLINA

215 Pollock Street
PO Box 390
Beaufort, NC 28516

Beaufort Comprehensive Bicycle Plan
Kick-Off Meeting @ Train Depot
November 18, 2008
Minutes

Welcome & Overview

At 5:00 PM the Beaufort Town Planner, Kyle Garner, welcomed the members of the Bicycle Steering Committee to their first meeting and gave a brief overview of the project including the selection process which lead to hiring Rivers & Associates as the consultant for the plan and thanked Mr. John Vine-Hodge from NCDOT for his attendance and the North Carolina Department of Transportation Bicycle and Pedestrian Division for approving the grant. After the brief welcome the committee introduced themselves and why they were interested in becoming a part of the Comprehensive Bicycle Plan project in Beaufort. The town planner then introduced the project team from Rivers & Associates, which was comprised of Mr. Mark Garner, Ms. Colleen Simmons and Ms. Kelly Lasky. The town planner stated that Rivers & Associates had undertaken several bicycle and pedestrian projects specifically in eastern North Carolina communities, which included Williamston, Kinston and Winterville and looked forward to working with them in developing Beaufort's plan.

Project Overview & Role of Steering Committee

After the introductions, Ms. Simmons provided the group an overview to include the project scope and purpose, project schedule, and role of steering committee member.

Under the project scope, Ms. Simmons explained that the plan would be developed under the guideline developed by an NCDOT template that included the following five steps Engineering, Education, Encouragement, Enforcement & Evaluation.

Second under project overview was the schedule/time table. Ms. Simmons informed the committee that there were four steering committee meetings scheduled and that all of them were to take place from 5:00-6:30 P.M. in the train depot and that the next meeting was to take place on December 18th. Ms. Simmons then provided information on the open houses that are to take place in February and May 2009 and would be held in the Maritime Museum and that specific times were not presently available.

Proposed public hearing dates were then given so that the steering committee members would stay involved through the process.

The final component was the role of the Steering Committee Member. Ms Simmons and Mr. Garner emphasized that each member was to represent the entire community of Beaufort and not just one group or idea. Other focus areas included providing information, priorities, feedback and opinions on the plans and ideas brought forth in discussion and design phases of the bicycle plan. Mr. Garner and the town planner then discussed additional involvement in the implementation of the plan once completed and encouraged the steering committee to stay involved so that the plan would become a living and breathing guide rather than just sit on a shelve and collect dust.

Visioning

After the project overview Ms. Simmons and MS. Lasky led the Steering Committee Members through a forty (40) minute visioning exercise in which each member was to share their goals for Beaufort's bicycle plan. The list of those visioning items included:

Bike-friendly Envir

MEETING AGENDA

DATE: Thursday, December 18, 2008 at 5:00 p.m.

LOCATION: Beaufort Train Depot
614 Broad Street, Beaufort, NC

SUBJECT: Town of Beaufort Comprehensive Bicycle Plan
Steering Committee #1

This meeting will discuss kick-off meeting information and identified goals and objectives, cycling basics of a bicycle-friendly environment, and identifying existing strengths, weaknesses, opportunities, and threats facing cyclists in Beaufort.

This meeting will begin promptly at 5:00 p.m. and will conclude by 6:30 p.m.

AGENDA:

I. **Welcome** – Kyle Garner, Town of Beaufort

II. **Recap of Kick-Off Meeting** – Kelly Lasky, Rivers & Associates, Inc.

III. **Bicycle Basics** – Colleen Simmons, Rivers & Associates, Inc.

IV. **Identify Bicycle Destination / Attractions / Generators** – All

V. **Identify Strengths, Weaknesses, Opportunities & Threats facing Cyclists in Beaufort** – All

VI. **Next Steps** – Kelly Lasky, Rivers & Associates, Inc.

VII. **Conclusion / Questions** – All

Thank you for your time and assistance in making Beaufort a bike-friendly community.

Additional project information can be found at http://www.bikebeaufort.com

TOWN OF BEAUFORT
NORTH CAROLINA

215 Pollock Street
PO Box 390
Beaufort, NC 28516

Beaufort Comprehensive Bicycle Plan
Steering Committee Meeting #1 @ Train Depot
December 18, 2008 Minutes

Welcome & Overview

At 5:00 PM the Beaufort Town Planner, Kyle Garner, welcomed the members of the Bicycle Steering Committee to the second meeting and gave an update of the project. After the brief welcome, the committee introduced themselves and the group they represented. The project team of Ms. Colleen Simmons and Ms. Kelly Lasky from Rivers & Associates then introduced themselves.

Recap of Kick-Off Meeting

After the introductions, Ms. Lasky provided the group a recap of the vision, goals and objectives developed in the November meeting. The presented **vision statement** was to ***"develop a bike-friendly environment that accommodates all ages and abilities."*** The group agreed to the vision statement. Ms. Lasky also stated during the goals and visioning exercise that the committee provided over eighty comments that Rivers then grouped into **eight (8)** categories: ***Aesthetics, Education and Awareness, Enforcement, Diversity in Construction, Connectivity, Support Facilities, Bike-Friendly Policies, and Encourage Opportunities.*** Ms. Lasky then reviewed the eight categories with the group for comments and then consensus. The group agreed the eight categories fit the vision, goals and objectives of the group.

Bicycle Basics

After the recap of the kick-off meting, Ms. Simmons gave a PowerPoint presentation and an overview of what she described as bicycle basics. These basics included laws that apply to bicycles and bicycling and rules of the road. Another basic included the different types of bicycle facilities to include multi-purpose trails, wider street pavement and designated bicycle lanes on major thoroughfares. Following the types of facilities Ms. Simmons then discussed design considerations such as community demographics, local traffic volumes and speed, local street configuration, type of bicycle system needed, and existing conditions and constraints. The final bicycle basic were the benefits of bicycling, which included lower risk of heart disease, stroke, diabetes and general overall exercise.

Identify Bicycle Destinations/Attractions/Generators

Following the discussion on bicycle basics, Ms. Simmons proceeded to ask the steering committee members to participate in an exercise to identify bicycle destinations, attractions and generators in Beaufort. As part of the exercise members, where asked to place colored dots on a display map of the Town. Each color represented a specific category to ind[illegible]

destinations and routes identified tonight will be placed on maps that will be used to determine future routes at the next steering committee meeting.

S.W.O.T. Analysis

At the conclusion of cycling destinations, members were asked to participate in another exercise of identifying strengths, weaknesses, threats and opportunities facing cyclists in Beaufort. The committee supplied various opinions of these four categories with some pertaining to more than one category. This discussion went on for over thirty-five minutes and provided a good overview on which areas the plan can build upon and which will have obstacles that will need to be overcome in order for the plan to be successful. Results on these exercise is as follows:

Strengths:	*Weaknesses:*	*Threats:*	*Opportunities:*
• Flat terrain • Low speed limits areas • Scenic areas • Low winter population • Not many "attack dogs" • Shade • Year-round biking climate • Convenient & clean public restrooms • County Seat – public services available • Various retail businesses • Downtown area • Shopping areas • Compact • A lot of cyclists in community • Recreation cyclists • Public support is strong	• Lack of bike racks – current ones full • Need additional racks and at more locations • Bike lanes • Signage – identification • Shape of community – limited entry/exit • Narrow roads • On-street parking • Road conditions • Lack of shoulders (existing ones are eroded) • Access points – major roads • Bicycling not will accepted by motorists • Distance riders – lack of opportunities • Diagonal parking • Intersections lack crossings / bike awareness • Education / awareness amongst motorists & bicyclists • Future bypass construction – work zones • Road surfaces inconsistent • Beaufort Bridge to Morehead	• Tourists – unfamiliarity with roadways & presence of bicyclists • Beaufort Bridge • Drainage grates • Railroad tracks • Narrow roads • Trucks with trailers & boats • Sand / debris on roadways • Signage / Education / Awareness • Stray animals – not as much in Beaufort • Highway 70 and 101 • Lack of centralization • Lack of street level lighting • Sense of insecurity at night	• Widening of streets to accommodate bike lanes • New developments – incorporate into plans • Partnerships (County, Airport, Maritime Museum, School, Duke, NOAA) • Public Support • Land donations • Grants • Schools – proximity of Elem. & Middle Schools • Include recreation opportunities • Economic - keep people and businesses in town • Connectivity • Tourism / Attractions • Reduce parking issues on Front Street • Events (races, educations, etc.) • Duke University – student bikes for use • Tours • New bridge • Include lighting – causeway, W. Beaufort Rd, Turner St., Lennoxville Rd. • Connections around Freedom Park • Parks/Greenways/ Scenic Areas/ Water access areas • Provide more racks & amenities • Logo / branding for

			businesses that are bike-friendly • Business incentives • Off-Road bike paths (RR, easements, airport) • Bike track (BMX)

Next Steps

Looking towards the next meeting Ms. Lasky provided a cursory review of the topics to be discussed in January. Those items included a presentation of existing conditions, constraints, policies and programs that are currently in place in Beaufort. Ms. Lasky also reminded the members that there would be an informal design exercise identifying potential bicycle corridors, improvements and infrastructure.

Conclusion

At the conclusion of the meeting, Mr. Garner addressed questions regarding the future schedule and funding of the plan and encouraged members to fill out the bicycle survey prior to February 16, 2009 and to visit the website at www.bikebeaufort.com for further information.

In closing, Mr. Garner thanked everyone for their attendance and involvement and reminded them about the January 22, 2009 meeting at **5:30 PM** instead of 5:00 to allow members additional time to arrive for the meeting. Ms. Simmons and Ms. Lasky thanked everyone for their participation and wished everyone a Merry Christmas and a Happy New Year.

The Steering Committee then recessed at 6:30 PM.

Minutes prepared by:
Kyle Garner, AICP, Planner, Town of Beaufort

Reviewed by:
Colleen Simmons, AICP, Planner, Rivers & Associates, Inc

MEETING AGENDA

DATE: Thursday, January 22, 2009 at 5:30 p.m.

LOCATION: Beaufort Train Depot
614 Broad Street, Beaufort, NC

SUBJECT: Town of Beaufort Comprehensive Bicycle Plan
Steering Committee #2

This meeting will present and discuss findings from previous meeting, existing conditions and constraints, and existing policies and programs. This meeting will also have an informal design charrette to identify potential bicycle corridors and improvements. Plans for Public Open House #1 will also be finalized.

This meeting will begin promptly at 5:30 p.m. and will conclude by 7:00 p.m.

AGENDA:

I. **Welcome** – Kyle Garner, Town of Beaufort

II. **Recap of Meeting #1** – Colleen Simmons, Rivers & Associates, Inc..

III. **Existing Conditions & Constraints** – Kelly Lasky, Rivers & Associates, Inc.

IV. **Existing Policies & Programs** – Kelly Lasky, Rivers & Associates, Inc.

TOWN OF BEAUFORT
NORTH CAROLINA

215 Pollock Street
PO Box 390
Beaufort, NC 28516

Beaufort Comprehensive Bicycle Plan
Steering Committee Meeting #2 @ Train Depot
January 22, 2008 Minutes

Welcome & Overview

At 5:30 PM the Beaufort Town Planner, Kyle Garner, welcomed the members of the Bicycle Steering Committee to the second working meeting and gave an update of the project.

Recap of Steering Committee Meeting #1

After the welcome, Ms. Simmons provided the group a recap from the December meeting which included a review of ***Bicycle Basics***, a ***Mapping Exercise*** identifying bicycle destinations, attractions and generators in Beaufort, and a ***SWOT Analysis*** (Strengths Weaknesses Opportunities Threats) listing items that bicyclist may encounter while cycling in Beaufort.

Existing Bicycle Inventory

bicycle crash database. Ms. Simmons stated that over the ten year period that nine bicycle/vehicle crashes have occurred. Four (4) of those crashes occurred at posted 25 mile per hour (mph) speed areas while five (5) occurred in posted 35 mph areas. Of all nine accidents four (4) occurred at four way intersections. Times accidents occurred varied as well in that five (5) crashes occurred between 2:00 PM and 5:59 PM in the afternoon while the remaining four (4) crashes occurred between 6:00 PM and 9:59 PM when visibility is decreased.

Existing Policies, Plans & Programs

After review of the inventory, Ms. Simmons gave a brief overview of the existing policies, plans and programs that the Town had in place. She also mentioned areas that may need refinement and new policies all together. Ms. Simmons stated that the current zoning ordinance does not address bicycle safety issues however, such official documents such as the CAMA Landuse Plan and Shoreline access plan did include identify items related to cyclist. Ms. Simmons went on to say that in the future that the Town may consider expanding some of their existing programs associated with bicycle safety such as having more bicycle rodeos, helmet donations, National Night Out and Police on Bikes. All members of the committee were in agreement.

Informal Design Charrette

Following the discussion on existing conditions, policies, and programs Mr. Mark Garner led the group in a design activity. Two groups were formed and placed at different tables and were then asked to review the existing map of Beaufort and identify potential corridors, areas that need infrastructure improvement and locations for bicycle racks and new facilities. Once completed with the exercise the groups spokesperson presented their concept of ideas for the community. Ironically both groups had a few similarities, but overall two very different concepts of how develop a new bicycle system in Beaufort. The following items were identified as improvements that would serve the future bicycle community in Beaufort.

1. **Rails to Trails.** The Town of Beaufort has several areas of abandoned railroad lines that would provide opportunities for conversion to off-road bicycle or multi-use trails. The following abandoned railroad lines were identified to improve connectivity in Beaufort:
    - Abandoned railroad beginning near the intersection of Broad Street and Fulford Street extending eastwardly across Lennoxville Road and terminating at the intersection of Leonda Drive and Charles Street. This potential trail would improve access from the downtown area to Freedom Park and other residential areas.
    - A new multi-use trail to run along an abandoned railroad from West Beaufort Road to Live Oak Street (US Hwy 70) near Old Beaufort Elementary School. Currently, an abandoned railroad begins near the intersection of West Beaufort Road and Stanton Road and extends in a southeast direction across the creek and terminates at Live Oak Street at a location north of the intersection of Live Oak Street and Mulberry Street.
    - Conversion of the abandoned railroad located on West Beaufort Road adjacent to the West Beaufort Water Access Park is another opportunity to install a multi-use trail around the water-side of the airport property.
2. **Bicycle Parking Facilities.** Bicycle parking facilities should be provided at the following locations:
    - All major commercial areas
    - Airport
    - Schools
    - Government Buildings (town, county, state)

- Parks and Public Open Spaces
- Near all public restrooms
- Maritime Museum and Historical Museum
- Boat and water access areas
- At the end of Aqua -10 Road and Broad Street

3. **Bicycling Beaufort Bike Route. (signed route and connectors)**
   - Improve street lighting along entire route
   - Improve road conditions for safer bicycle use on the following route segments:
     - **Front Street**
       - Improve current route from the intersection of Front St. and Orange St. extending to the intersection of Front St. and Ocean St.
       - Extend the bicycle route eastwardly along Front Street to Jaycee Park located at the intersection of Front St. and Lennoxville Rd.
       - Remove and install appropriate drainage grates that will reduce roadway hazards.
     - **Turner Street**
       - Improve bicycle route along street
       - Address lighting issues along Turner Street from West Beaufort Road to Cedar Street
     - **West Beaufort Road**
       - Improve bicycle route along road, possible wide paved shoulders or bike lane
       - Address lighting issues along road
     - **SR1299 /Carraway Drive**
       - Improve roadway conditions and provide some sort of bicycle facility in order to improve safety and create a designated area for bicycles along this route and to the schools.
     - **Campen Road**
       - Extend a bicycle facility along entire length of this road to Professional Park Drive and Hwy 70.

4. **Intersections.** Opportunities to improve intersections by providing increase bicycle visibility through signage, markings, etc. The following identified areas may benefit from the installation some sort of improvements:
   - NC Hwy 101 at Carraway Drive. This area of the existing bicycle Route is located adjacent to the Beaufort Middle School and Beaufort Elementary School. The installation intersection improvements may improve visibility and safety of students and parents who bicycle to school and increase the number of bicycling trips through improved access.
   - US Hwy 70 E at Campen Road. Currently, this is a lighted intersection and is located along the commercial district and is also the site of a past bicycle crash.
   - US Hwy 70 E at Pinners Point Road. This area would benefit from intersection improvements because it would provide a link to two commercial shopping areas and improve visibility, connectivity, and safety for bicyclists from residential areas.
   - All intersections that had vehicle-bicycle crashes sites.

5. **Airport Loop.**
   - Provide a scenic multi-use trail to follow the water-side boundary of the Michel J. Smith Airport property along Gable Creek and Newport River.
   - Extend the multi-use trial along Grady Dale Lane and Copeland Road to connect with Professional Park Drive to create a complete bicycle loop.

6. **Beaufort East Village Development Connection**
   - Provide a multi-use trail using existing easements from Freedom Park to surrounding residential areas (connecting into existing Bicycling Beaufort Bike Route on Sherwood Blvd.)
   - The trail would improve access to the components of the proposed commercial and residential development.
   - Proposed streets with this development will be bicycle-friendly; therefore providing additional connectivity to surrounding areas on both sides of Freedom Park.

7. **US Highway 70 West (to Pivers Island, Radio Island, and Morehead City)**
   - Provide bicycle facilities to connect Beaufort to these desired areas of bicycle travel
   - Improve bicycle visibility across Gallants Channel Bridge. This bridge will be replaced and access will be redirected in the future and no bicycle facilities have been planned for the new bridge.

8. **Highway 70 East (from Hwy 101 to Professional Park Drive)**
   - Provide bicycle facilities to connect residential neighborhoods and commercial establishments along this portion of Hwy 70 with either wide paved shoulders or bike lane.

9. **Professional Park Drive**
   - Connectivity with community schools to surrounding neighborhoods
   - Opportunity to install a bicycle facility along Professional Park Drive connecting to Campen Road to Elementary and Middle schools located at the intersection of Campen Road and Carraway Drive.

10. **NC Highway 101**
    - Provide some sort of bicycle facility along NC Hwy 101 to connect outlaying residential areas to the rest of the community.

11. **Crescent Drive**
    - Provide some sort of bicycle facility along Crescent Drive to connect this residential neighborhood to the schools and commercial establishments. This street is currently being used by bicyclists to avoid Hwy 70.

12. **Broad Street**
    - Provide some sort of bicycle facility along Broad Street to improve bicycle safety along a street that connects many destinations (County Courthouse, County Buildings, Town Hall, Library, etc)

13. **Live Oak Street**
    - Provide some sort of bicycle facility along Live Oak Street from Front Street to Cedar Street/HWY 70 since this was an identified alternative bicycle route.

14. **Old Tram Road**
    - Use the old logging road to create a multi-use trail from Pearl Drive to North River Club development.

15. **Aqua-10 Road**

- Provide a bicycle facility, possibly a multi-use trail or wide paved shoulders, along Aqua 10 Road from West Beaufort Road to connect into Airport Loop.

16. Lewistown Road Route

- Provide bicycle facilities along Lewistown Road and Lennoxville Point Road to Davis Bay Drive to create a scenic bicycle route that is currently being used by bicyclists.

17. Lennoxville Road

- Improve street lighting along entire road length
- Improve bicycling conditions along entire road with possible wide paved shoulders, bike lane, or wide outside lanes.

18. Pivers Island Road

- Provide bicycle facilities along Pivers Island Road to connect Hwy 70 route to Duke Lab and NOAA.

19. Moore Street

- Provide bicycle facilities along Moore Street to connect downtown and Hwy 70 West. This was an identified alternative bicycle route for individuals biking to Pivers Island.

20. Pinners Point Road and Howland Parkway Route

- Provide bicycle facilities along Pinners Point Road, Howland Parkway, Myrtle Lane, and North Shore Drive to create a scenic bicycle route currently being used by bicyclists.

21. Wellons Drive / Glenda Drive Route

- Provide bicycle facilities along Wellons Drive and Glenda Drive to connect residential areas, connect to possible Pinners Point/Howland Parkway Route, surrounding commercial establishments and existing Bicycling Beaufort Bike Route.

Next Steps

Looking towards the next meeting Town Planner, Kyle Garner reminded everyone of the open house on February 19th at the Maritime Museum to begin at 5:30 PM and run until 7:00 PM. He also reminded the group that the public survey would be closing on February 9th so make sure that they get them filled out and returned by the 9th.

Conclusion

At the conclusion of the meeting, Kyle Garner thanked everyone for their hard work and reminded them about the public open house on January 19th, 2009 at **5:30 PM.**

The Steering Committee then recessed at 7:00 PM.

Minutes prepared by:
Kyle Garner, AICP, Planner, Town of Beaufort

Reviewed by:
Colleen Simmons, AICP, Planner, Rivers & Associates, Inc

MEETING AGENDA

DATE: Thursday, March 26, 2009 at 5:30 p.m.

LOCATION: Beaufort Train Depot
614 Broad Street, Beaufort, NC

SUBJECT: Town of Beaufort Comprehensive Bicycle Plan
Steering Committee #3

At this meeting, a summary of public involvement results (survey and 1st Open House), field analysis, and preliminary recommendations for projects, programs, and policies will be presented for discussion. In addition, Steering Committee members will be identifying criteria to assist in prioritizing the list of preliminary project recommendations; therefore, your attendance is important.

This meeting will begin promptly at 5:30 p.m. and will conclude by 7:00 p.m.

AGENDA:

I. **Welcome** – Kyle Gamer, Town of Beaufort

II. **Public Involvement Results & Field Analysis** – Kelly Lasky, Rivers & Associates, Inc.

III. **Preliminary Recommendations** – Kelly Lasky, Rivers & Associates, Inc.

IV. **Priority Criteria Exercise -** Kelly Lasky, Rivers & Associates, Inc.

V. **Next Steps** – Kelly Lasky, Rivers & Associates, Inc.

VI. **Conclusion / Questions** – All

Thank you for your time and assistance in making Beaufort a bike-friendly community.

Additional project information can be found at http://www.bikebeaufort.com

TOWN OF BEAUFORT
NORTH CAROLINA

215 Pollock Street
PO Box 390
Beaufort, NC 28516

Beaufort Comprehensive Bicycle Plan
Steering Committee Meeting #3 @ Train Depot
March 26, 2009 Minutes

Welcome & Overview

At 5:30 PM the Beaufort Town Planner, Kyle Garner, welcomed the members of the Bicycle Steering Committee to the second working meeting and gave an update of the project.

Recap of Public Involvement Results & Field Analysis

After the welcome, Ms. Lasky provided the group a recap from the February Open House which included the results of the public input. Ms. Lasky stated that the key issues identified by the public where similar to those that the committee had been discussing since December. Those items included: Public Education and Outreach Connectivity and Routes to Schools, Downtown, Subdivisions, Morehead City, Library, Parks, Multi-Use Trails and Rails-to-Trails, Safe Crossing of US 70 and NC 101, Complete Loop Routes, Create Thoroughfares, Dangerous Intersections, Future Bypass Route, Bicycle Policies, Traffic, Motorist Behavior, More Bicycle Parking Racks, Input from minority populations, Events: bicycle rodeos, bike-to-work, Crosswalks and Pedestrian lights at school intersections: NC Hwy 101/Carraway Dr. & US70/Campen Rd. After hearing the list the committee members agreed that in fact these were similar or exactly what they observed in developing the plan so far and were happy with the results.

After review of the public involvement results Ms. Lasky also shared the results of the online survey. Overall Rivers & Associates and the Town where pleased with the number of surveys submitted as well as their responses. Ms. Lasky went on to inform the group that the results were in no particular order or ranking prior to listing the responses which were:
Survey Results (195 Responses):
– 62.6% (119) biked last week
– 82.4% (155) feel unsafe, due to traffic
– 79.4% (154) bike for recreation
– 92.3% (180) prefer to bike during the daytime
– 38.7% (75) bike to work
– 65.8% (125) bike downtown
– 52.1% (99) wear a helmet when they bike
– 99.5% (182) would like to bike more often

In addition to the list of survey statistics Ms. Lasky also shared the results of specific questions to each person who responded such as: **What roads would citizens would most like improved for Bicycling; what perceptions to be the major barriers to bicycle transportation in Beaufort; and a list of the facilities or types of places that bicycle routes should connect.**

At the conclusion of the involvement results Ms. Lasky displayed a power point slide with a map of field analysis taken throughout Beaufort with corresponding numbers for referencing a chart that complemented the map.

Preliminary Recommendations

The next presentation given was a list of preliminary recommendations for the Bicycle Plan. These items included development of policies for – Bicycle Parking, Complete Streets Ordinance, Town Funding, Development of a Streets Improvements Program, and a Abandoned Bike and Facilities Ordinance. Ms. Lasky also mentioned that several programs were recommended such as a Safe Routes to School program, Spot Safety Improvements, an infrastructure maintenance program, Education Initiatives and enforcement strategies.

These strategies were based on various items such as Steering Committee meetings, the public surveys, Bicycle crash data proposed development projects, the field inventory and improved connectivity and safety for cyclist. Overall 37 projects are recommended that were brought out through the process.

Once again the committee supported the list of proposed policies and programs to be included as part of the overall plan.

PRIORITY CRITERIA EXERCISE

The next agenda item had each committee member place dots next to projects and rank them in priority that they thought should be accomplished for the plan. Those included connectivity and

then other factors. After about ranking each project, which took about 20 minutes, Mr. Mark Garner stated that Rivers & Associates would calculate the results and submit them for review at the April 30th meeting as well as have proposed timelines and associated cost of the ranked projects. The committee was very excited about the last portion as they considered the projects as very important to the success if the plan.

Next Steps

Looking towards the next meeting Town Planner, Kyle Garner reminded everyone that the next meeting was April 30th and that he would be working with Ms. Warren about securing a date for the second open house at Beaufort Elementary School in May and would provide that information when the agenda was set for the April meeting.

Conclusion

At the conclusion of the meeting, Kyle Garner thanked everyone for their hard work and reminded them about the April 30th meeting.

The Steering Committee then recessed at 7:00 PM.

Minutes prepared by:
Kyle Garner, AICP, Planner, Town of Beaufort

Reviewed by:
Colleen Simmons, AICP, Planner, Rivers & Associates, Inc

MEETING AGENDA

DATE: Thursday, April 30, 2009 at 5:30 p.m.

LOCATION: Beaufort Train Depot
614 Broad Street, Beaufort, NC

SUBJECT: Town of Beaufort Comprehensive Bicycle Plan
Steering Committee #4

At this meeting, the Team will present the draft Comprehensive Bicycle Plan and receive comments from members that will be applied to the development of the Final Plan.

AGENDA:

I. **Welcome** – Kyle Garner, Town of Beaufort

II. **Draft Plan Review** – Kelly Lasky, Rivers & Associates, Inc.

III. **Next Steps** – Kelly Lasky, Rivers & Associates, Inc.

IV. **Conclusion / Questions** – All

Thank you for your time and assistance in making Beaufort a bike-friendly community.

Additional project information can be found at http://www.bikebeaufort.com

A.2 PUBLIC SURVEY

The online survey was developed to gather input from the community. The questionnaire was available online from November 18, 2008 through February 9, 2009 (nearly three months). Hard copies of the survey were available at Town Hall and public buildings. In addition to a story in the local newspaper, Steering Committee members and Town staff notified the public of the survey through Town utility billing and distribution of marketing cards. The Consultant received One-hundred ninety-five (195) surveys for analysis. Results of the survey provided the Town, Steering Committee members, and the Consultant with information regarding bicycling preferences, constraints, opportunities, and areas for improvement. Highlights of the survey are discussed in Section 2 of the Plan and complete results of the survey are found below.

BEAUFORT BICYCLE SURVEY

With funding from the North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation, the Town of Beaufort is preparing a Comprehensive Bicycle Plan. The Plan will serve as a guide to improve the conditions and opportunities for bicycling in the community for all ages. The intent of this survey is to obtain general information about you as a cyclist, current bicycling conditions and environment in Beaufort, and your opinion on needed improvements. Your input will support the work in progress to develop the Beaufort Comprehensive Bicycle Plan. Thank you for your participation!

The survey was available from November 18, 2009 to February 8, 2009. During that time we received 195 completed surveys full of information. Below are the results.

1. **Have often do you ride a bicycle?** ***(check one) Average Response:***

   3.3 Days/Week **12.25** Days/Month **145.85** Days/Year

2. **When was the last time you rode a bicycle?** ***(check one)***

   62.6% Last Week **20.5%** Within the last Month **6.3%** Within the last 2 months

   3.2% Within the last 4 months **1.6%** Within the last 6 months **5.8%** Within the last year

3. **What is the reason you have not ridden your bicycle more?** ***(Check all that apply)***

Distances to destinations are too far	**12.8%**
Unsafe, due to traffic	**82.4%**
Unsafe, due to surface conditions	**44.1%**
Too busy, no time	**17.6%**
Lack of interest	**0.0%**
Other	**18.6%**

4. **Why do you ride your bike?** ***(check all that apply)***

Shopping trip	**41.2%**
Commute to work	**38.7%**
Physical exercise	**91.8%**
Family Event	**25.8%**
Recreation	**79.4%**
Commute to school	**12.9%**
Run errands	**49.5%**
Visit neighbor/family/friend	**66.0%**
Other	**16.0%**

5. When do you usually bike? *(check all that apply)*

92.3% Daytime 35.4% Nighttime 77.4% Weekdays 82.6% Weekends 42.1% Holidays
43.1% Vacation 90.8% Summer 87.2% Fall 43.6% Winter 90.3% Spring

6. Do you ride your bike regardless of weather? *(check one)*

20.1% Yes, any conditions
66.7% No, only when it's not raining
13.2% No, only when it's warm and sunny out

7. How often during the week do you ride your bike (round trip)?

24.2% Infrequently (a couple times a month)
27.4% 1-2 times
28.9% 3-4 times
19.5% 5 or more times

8. When you bike, where do you typically go? *(check all that apply)*

Library	31.6%
In neighborhood	68.4%
To or in a park	27.4%
School	17.4%
Store along Highway 70	27.4%
Downtown	65.8%
Into Town	43.2%
County or Town Offices	16.8%
Work	33.7%
All of the above	4.7%
Other	22.1%

9. When you bike, do you wear a helmet?

52.1% YES 47.9% NO

10. If no, why not?

47.7% Don't own one 21.6% Uncomfortable 11.4% Looks silly 19.3% Unnecessary

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11. **Would you like to be able to ride your bike more?**

99.5% YES **0.5%** NO

12. **Would you ride a bike more if:** ***(check all that apply)***

You felt more comfortable on your bike	**12.0%**
You felt safer amongst traffic	**89.6%**
Vehicles moved slower	**23.0%**
There were more clearly marked trails	**84.7%**
You had better places to ride	**77.0%**
You felt motorists respected cyclists and better understood cyclists' rights and responsibilities	**74.9%**
There were better roadway conditions such as smoother pavement, less debris, etc.	**67.8%**
There were wider roads to ride on	**71.0%**
There were designated bike lanes on busy street	**92.3%**
There were more bike route signage	**47.5%**
There were maps of bike routes	**34.4%**
There were more bike racks at your destination	**39.9%**

13. **What roads would you most like improved for bicycling?**

Top Ranked Responses: **1)** US Highway 70 (in general); **2)** NC Highway 101; **3)** US Highway 70 Westbound (inc. bridges to Morehead City); **4)** Front Street; **5)** Lennoxville Road; **6)** Live Oak Street (US Hwy 70); **7)** (tie) Anne Street; **7)** (tie) West Beaufort Road; **7)** (tie) Cedar Street (US Hwy 70); **8)** Merrimon Road; **9)** Turner Street.

14. **Name the facilities or types of places you think bicycle routes should connect.**

Top Ranked Facilities or Types of Places: **1)** Shopping Centers / Retail Stores / Local Businesses; **2)** Areas along US Hwy 70 Westbound (Piver's Island, Duke Marine Lab, Morehead City); **3)** Downtown Beaufort; **4)** Grocery Stores; **5)** Schools; **6)** Neighborhoods; **7)** Parks; **8)** Libraries; **9)** Eastern Athletic Club; **10)** Post Offices.

15. **Do you support change in bicycle facilities and policies to make Beaufort a more bicycle-friendly community?**

99.5% YES **0.5%** NO

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16. How do you rate (on a scale from 1-5) the following ideas for improving bicycling in Beaufort?

	Very Important				Not Important
	1	2	3	4	5
Bike lanes with striping on the pavement	60.1%	31.1%	6.6%	2.2%	0.0%
Wide outside travel lane to provide space for bicycle	69.8%	24.7%	3.8%	1.1%	0.5%
Removal / repair of hazards such as potholes	51.1%	30.2%	17.0%	1.6%	0.0%
Repair or replace high drainage grates	36.3%	36.3%	22.9%	4.5%	0.0%
Streets that are signed as bike routes	25.1%	32.4%	26.8%	11.7%	3.9%
Bike paths that are separate from the street	45.9%	27.1%	18.8%	8.3%	0.0%
Bikeways that go from residential areas to nearby commercial areas	63.7%	25.3%	11.0%	0.0%	0.0%
Bikeways that connect to each other for long distances	55.5%	31.3%	10.4%	2.2%	0.5%
More bicycle parking at destinations	25.3%	29.8%	31.5%	12.4%	1.1%
Bicycle racks available on buses	11.8%	13.5%	28.8%	27.6%	18.2%
Lockers and showers at workplace	5.8%	17.4%	29.1%	25.0%	22.7%
Removal of curbside parking on local streets to provide more space for bikes	6.9%	19.7%	29.5%	28.9%	15.0%
Provide local bicycle facility map	16.4%	26.6%	32.8%	17.5%	6.8%
Educational materials describing safe bicycle riding	13.1%	21.0%	33.5%	21.6%	10.8%
Educating motorists on bicyclists' use of roadways	47.2%	27.0%	18.0%	3.9%	3.8%
Bicycle education in elementary and middle schools	43.6%	32.4%	16.2%	3.4%	4.5%

17. What do you perceive to be the major barriers to bicycle transportation in Beaufort?

Top Ranked Responses: **1)** No bike lanes on major roads and thoroughfares; **2)** Motorist Behavior; **3)** Narrow Roads; **4)** Cyclist Insecurity / Dangerous Situations; **5)** US Highway 70; **6)** (tie) Traffic / Congestion; 6) (tie) Lack of Off-Street Routes with Connectivity; **7)** (tie) Bridges; **7)** (tie) Lack of Shoulders; **8)** (tie) NC Highway 101; **8)** (tie) Road Surface / Debris Conditions.

18. In general, how would you rate the bicycle conditions in Beaufort?

0.5% Excellent **10.3%** Good **46.2%** Fair **42.9%** Poor

19. Do you live within the Town limits of Beaufort?

67.8% YES **32.2%** NO

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20. If no, where do you live? Please identify:

1) Morehead City; **2)** NC Highway 101; **3)** Deerfield; **4)** Merriman; **5)** East Creek Subdivision; **6)** Havelock

21. Are you: **37.9%** Male **62.1%** Female

23. What is your age group?

0.0% Age 0-5 **0.5%** Age 6-12 **1.1%** Age 13-18 **19.8%** Age 19-29
24.7% Age 30-39 **30.2%** Age 40-54 **23.6%** Age 55+

23. Please list the number of individuals for each age group in your household.

1.16 Age 0-5 **0.74** Age 6-12 **0.72** Age 13-18 **1.51** Age 19-29
1.18 Age 30-39 **1.24** Age 40-54 **2.31** Age 55+

SUBMISSION OF COMPLETED SURVEY

Once you have completed this survey, please return it to Town Hall no later than February 16, 2009 to be tabulated.

If you have any questions about the survey, please call Mr. Kyle Garner, Beaufort Town Planner, at (252) 728-2141 or Ms. Colleen Simmons, Planner for Rivers & Associates, Inc. at (252) 752-4135

Thank you for your time and assistance in making Beaufort a bike-friendly community.

Additional project information can be found at http://www.bikebeaufort.com

Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

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A.3 PUBLIC OPEN HOUSES

Two Public Open Houses were held throughout the course of the Plan development. On February 19, 2009 the first Public Open House was held from 5:30 – 7:00 p.m. at the NC Maritime Museum in downtown Beaufort to introduce the project to the public and receive comments from the public regarding bicycling opportunities, destinations, and improvements. Information was presented to the public through five (5) stations throughout the facility. Each station provided different information to the public and some requested action from the participations.

Thirty (30) members of the community attended the Public Open House. At Station 2, participants were asked to place a sticker on the general area that they live. This activity revealed that the participants live throughout the project area and not just one part of the community. Image boards were set up throughout the room and a slideshow of the project website and images continuously played.
The Project was well received by the community and concerns about bicycling safety, opportunities, challenges and destinations were expressed. Participants were encouraged to stay involved in the project by attending the second Public Open House, visiting the project website, discussing the project with others, or contacting the Project Coordinator. The attached comments were provided by the open house participants.

The second Public Open House was conducted at the Beaufort Elementary School from 5:30 – 7:00 on May 19, 2009. The draft Comprehensive Bicycle Plan including graphics of proposed recommendations was available for public scrutiny, discussion and comment. Overall, the participants felt that their needs and concerns had been addressed and were eager for the Town to implement the projects.

Public Open House #1

Public Open House #2

FEBRUARY 19TH, 2009
PUBLIC COMMENTS RECEIVED:

www.bikebeaufort.com

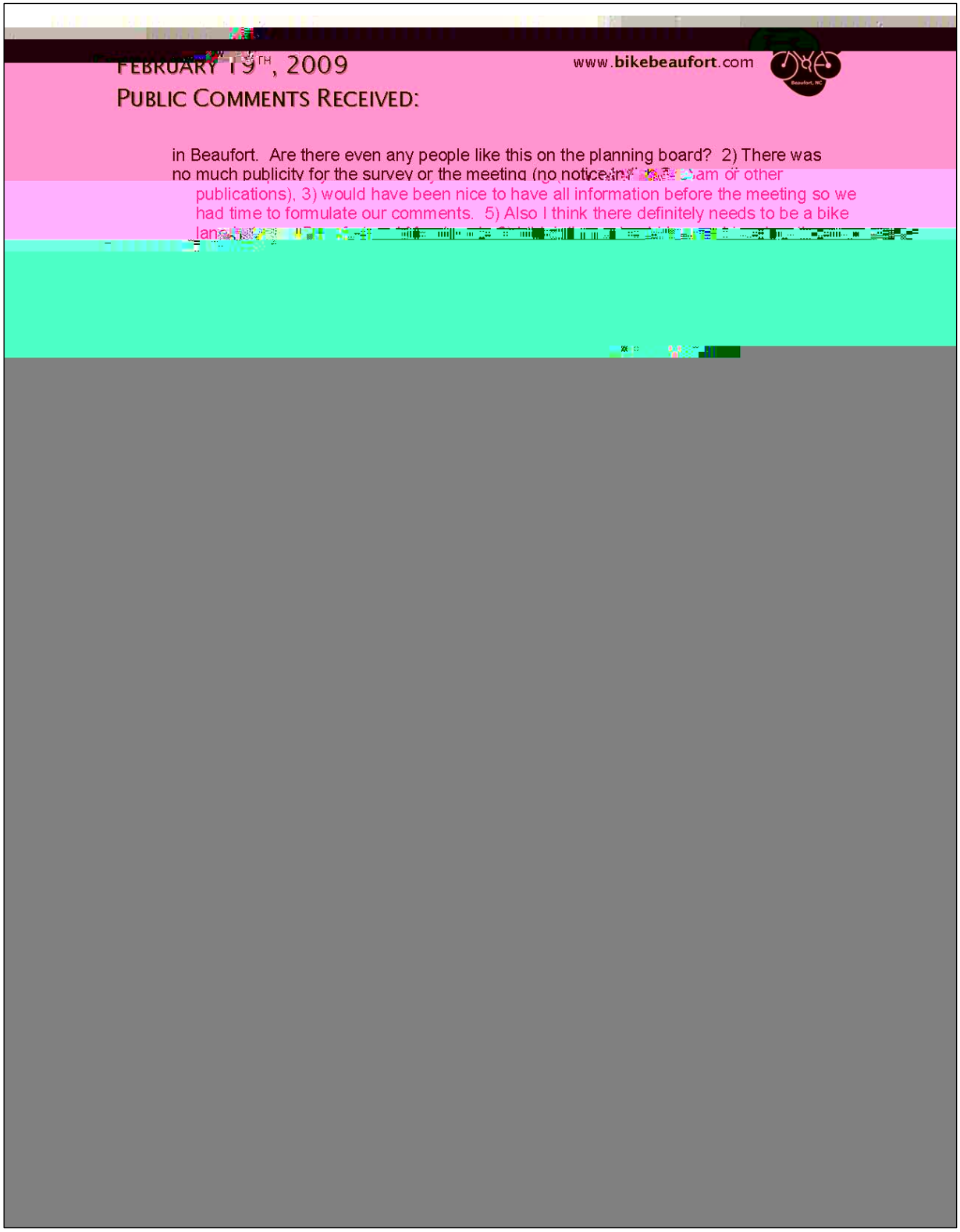
COMMENT SHEETS:

1) I see you have incorporated many of our suggestions in the future bike plan to integrate our community to a more green and active form of transportation. Please extend this plan Down East, our High School and communities east of Professional Park should be integrated into this plan. The plan is forward looking and with our expanding community we should plan as such. Public education and outreach should also be incorporated. Priority should be given to connecting all parks and schools. Routes are also effective when large loops can be made, not only creating thoroughfares for primary traffic but also loops for weekend walkers, long-distance runners, and cyclists. A lot of dead end trails will be quickly un-utilized. Complete loop for Steep Point Road to Pinners with an easement an future development plans.

2) Please include the Maritime Museum in "examples of existing bike facilities" because we begged for a bike rack for many years and just got it in 2007. It's a great place for people to lock up and shop/visit the downtown area. A bad intersection is Turner and Board Street next to the Courthouse during commuter (8 AM and 5 PM M-F) hours. Traffic is not considerate of bikers. Thanks for providing an arena for public input.

3) It is extremely important to connect schools to where children live (ex. Olde Beaufort Village, Glenda Drive area) and where the library is moving to (Campen/US 70). This includes a pedestrian light and painted crosswalk at Campen/70 and Carraway/101. I ride these routes on my bike with my child and they are not safe. What is it going to take - a kid getting killed? There should also be a safe bike route to Freedom Park. Beaufort sadly lacks parks at all and to have a County Park only accessible by car is poor planning.

4) The Town of Kitty Hawk created a mandate that all future road work include bike lanes. This may be more attractive of an option to those who may be frightened by a large lump sum. Creating bike lanes on 70E to E. Carteret High is a selfish need. This would to

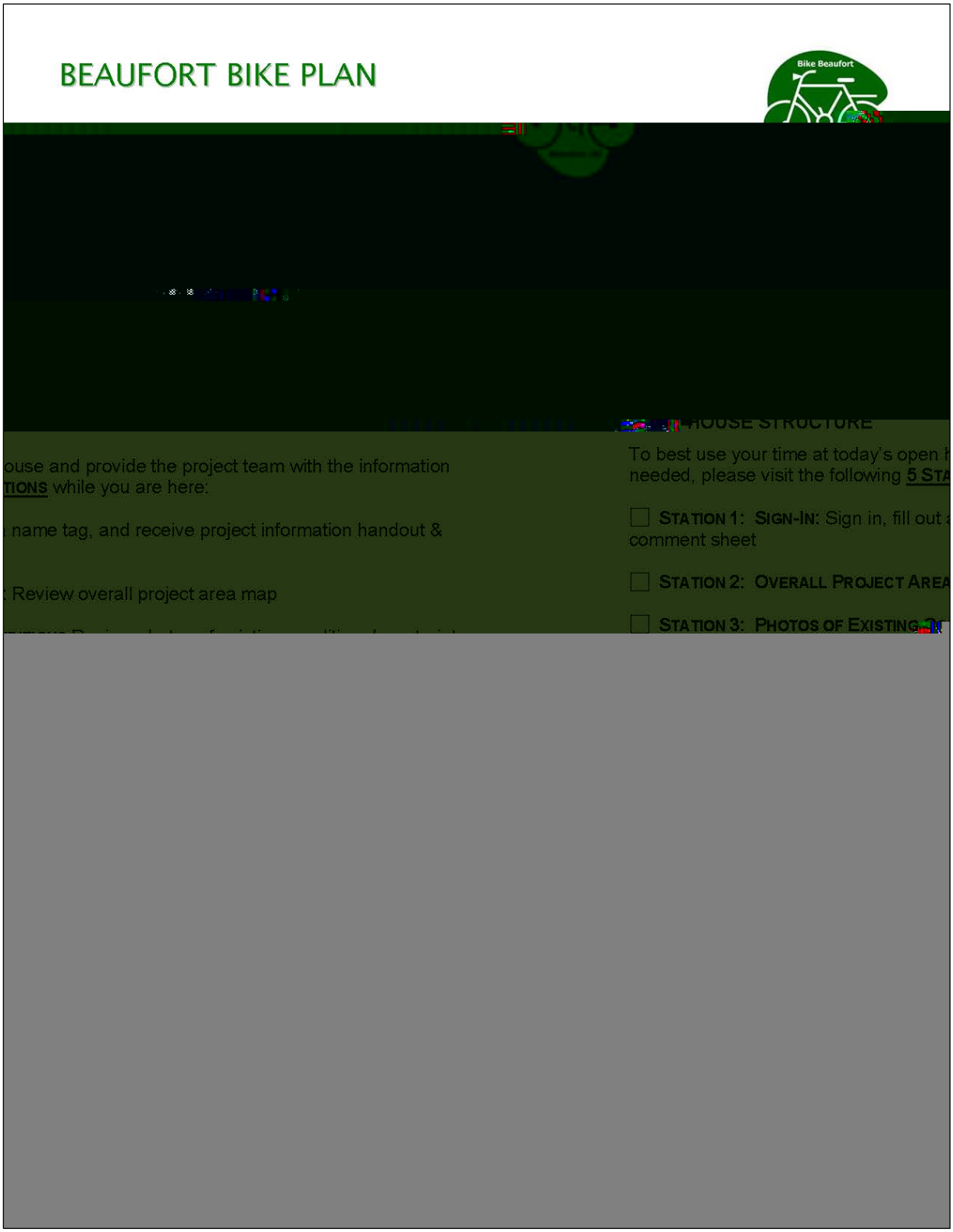


FEBRUARY 19TH, 2009

www.bikebeaufort.com

PUBLIC COMMENTS RECEIVED:

in Beaufort. Are there even any people like this on the planning board? 2) There was no much publicity for the survey or the meeting (no notice in the Beaufort Observer Beam or other publications). 3) would have been nice to have all information before the meeting so we had time to formulate our comments. 5) Also I think there definitely needs to be a bike lane


BEAUFORT BIKE PLAN

Bike Beaufort

HOUSE STRUCTURE

ouse and provide the project team with the information
TIONS while you are here:

name tag, and receive project information handout &

Review overall project area map

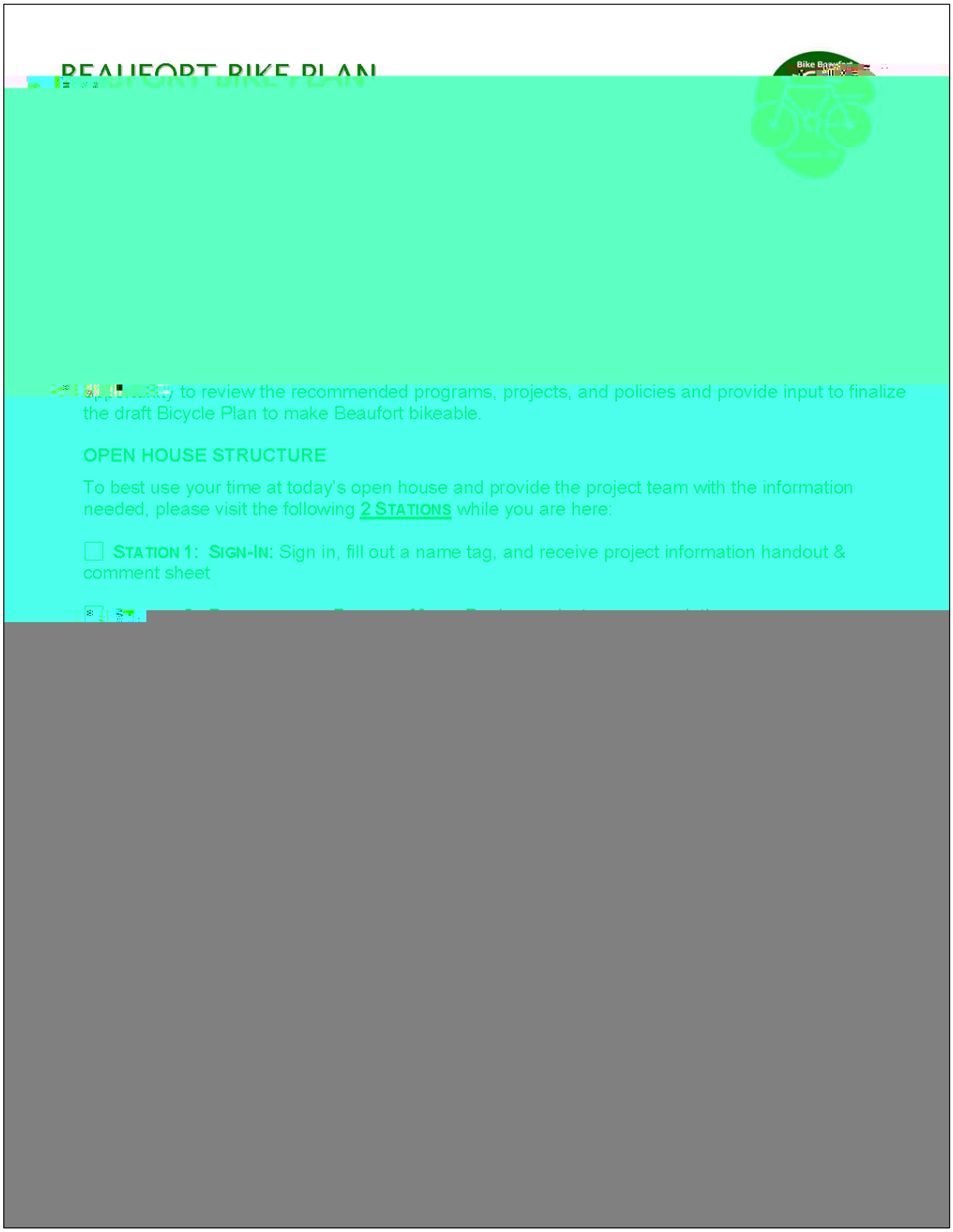
To best use your time at today's open h
needed, please visit the following 5 STA

STATION 1: SIGN-IN: Sign in, fill out a
comment sheet

STATION 2: OVERALL PROJECT AREA

STATION 3: PHOTOS OF EXISTING

Do you enjoy riding your bicycle? Would you like a more bikeable community?
WHAT:
Comprehensive Bicycle Plan
Open House



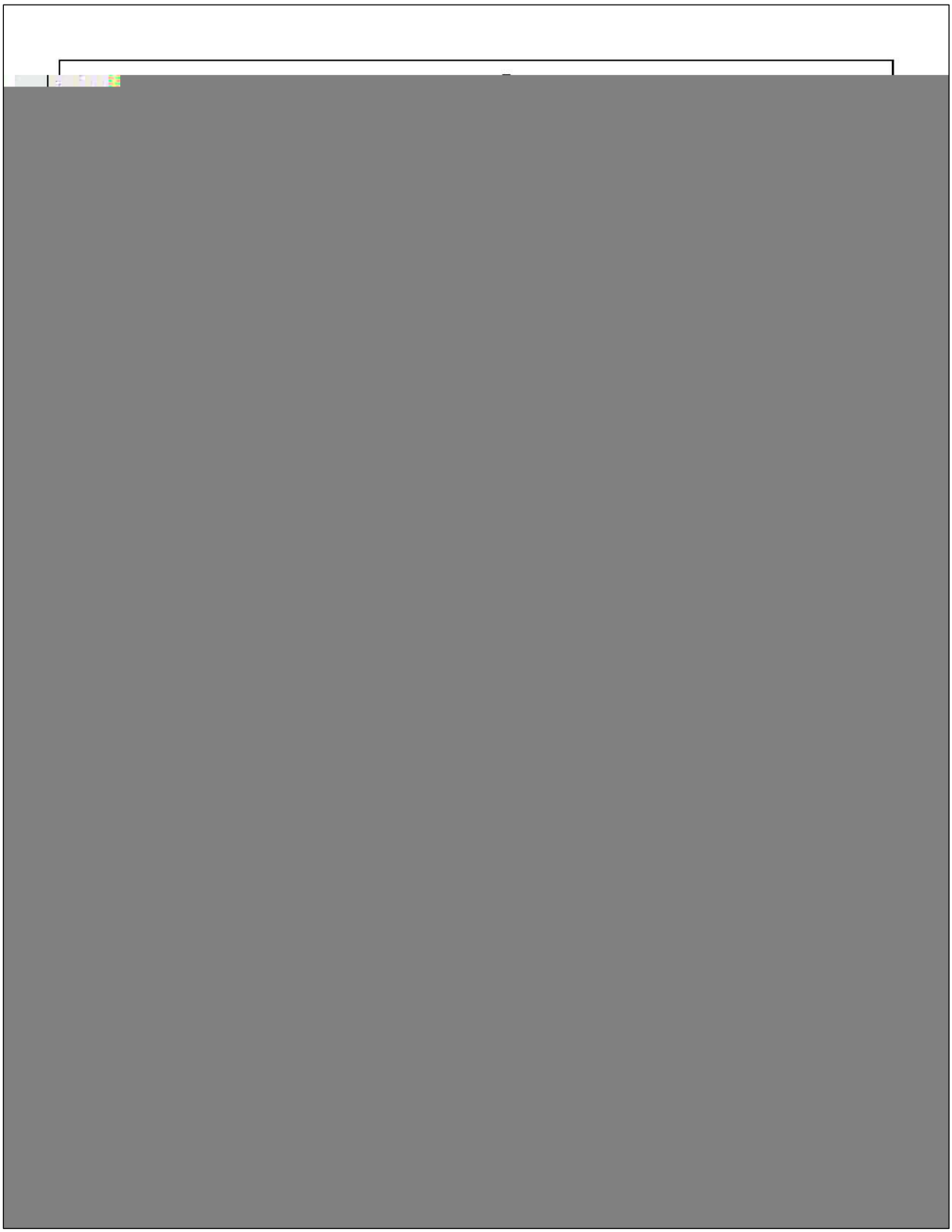
BEAUFORT BIKE PLAN

to review the recommended programs, projects, and policies and provide input to finalize the draft Bicycle Plan to make Beaufort bikeable.

OPEN HOUSE STRUCTURE

To best use your time at today's open house and provide the project team with the information needed, please visit the following **2 STATIONS** while you are here:

☐ **STATION 1: SIGN-IN:** Sign in, fill out a name tag, and receive project information handout & comment sheet



APPENDIX B – IDENTIFIED BICYCLE PROJECT OPPORTUNITIES

TABLE B.1: IDENTIFIED BICYCLE PROJECT OPPORTUNITIES

TABLE B.1: IDENTIFIED BICYCLE PROJECT OPPORTUNITIES, CONTINUE

Project / Improvement	From	To	Benefit / Details / Purpose / Need	Constraints	General Treatment
Campen Road	Carraway Drive	Professional Park Drive	extend bicycle route to improve connectivity to residential neighborhoods, schools, Post Office and Food Lion	Professional Park Drive (partial) is unimproved, but is currently under construction.	Multi-Use Trail
	Live Oak Street	Carraway Drive	Existing Route; Signaled Intersection	ditches on both sides; No crosswalks	Shared Roadway, Hazard Reduction
	Turner's Creek Way	Live Oak Drive	Existing Route; access to commercial areas/shopping	ditch on S-side; Paved parking lot connected to road without striping dividing lot from road	Shared Roadway, Hazard Reduction
Carraway Drive	NC Hwy 101	Campen Road	Existing Route; Enhance transportation and improve safety for Elementary and Middle School students	4-foot paved shoulder; ditches on both sides of road; deep ditch near Campen Road.	Multi-Use Trail
NC Hwy 101	US Hwy 70	Northern limits of project area	Provide bicycle facilities along NC 101 to improve bicycle travel from the communities along NC 101 to downtown Beaufort and commercial areas.;	High vehicular traffic; ditches on both sides; increasing speed limits	paved shoulder / widen shoulder or multi-use trail to Copeland Rd
	Carraway Drive	West Beaufort Road	Existing Route; School Zone area	No signal or crossing; ditches on both sides	Hazard Reduction
West Beaufort Road	NC Hwy 101	Turner Street	Existing Route; Address lighting issues; US Hwy 70 bypass	Poor lighting; Occasional swales	paved shoulder
	Turner Street	Aqua-10 Road	Abandoned rail road; Connection to possible Airport Loop	None.	paved shoulder
Aqua-10 Road	West Beaufort Road	end at waterfront	connection to Airport Route opportunity	road is currently unimproved (dirt) and blocked off by a locked fence/gate	Paved Shoulder
Stanton Road	West Beaufort Road	abandoned RR crossing	Access Live Oak/West Beaufort Rail to Trail Route	Easement alignment; property ownership d	M ura l i t l

TABLE B.1: IDENTIFIED BICYCLE PROJECT OPPORTUNITIES, CONTINUE					
Project / Improvement	**From**	**To**	**Benefit / Details / Purpose / Need**	**Constraints**	**General Treatment**
	West Beaufort Road	Pine Street	Existing Route; Location of two (2) bicycle-motor vehicle crashes; 12-foot unpaved		

TABLE B.1: IDENTIFIED BICYCLE PROJECT OPPORTUNITIES, CONTINUE					
Project / Improvement	**From**	**To**	**Benefit / Details / Purpose / Need**	**Constraints**	**General Treatment**
Pollock Street	Broad Street	Cedar Street (US 70)	US 70 Alt Route; Serves downtown, Town Hall & County Offices; Wide roadway	Curbs & gutters; Parallel parking (at-will)	Shared Roadway
	Broad Street	Ann Street	Serves Beaufort Town Hall; Crash site at Ann/Pollock	Curbs & Gutters; Parallel parking; narrow roadway	Shared Roadway
	Mulberry Street	Pine Street	Serves as part of US 70 Alt. Route and connector route	Curbs & Gutters; Parallel Parking	Shared Roadway
	Pine Street	Cedar Street (US 70)	Serves as route to County offices, Town Hall, downtown;	Intersects US 70; Curbs & Gutters; parallel parking	Shared Roadway
Live Oak Street	Cedar Street (US 70)	Broad Street	Identified as an alternative bicycle route; provide facility to improve safety, visibility	Curbs; narrow; major intersection at US 70	Shared Roadway
	Broad Street	Ann Street	Route serving downtown	Curbs; Narrow; High Vehicular traffic to downtown	Shared Roadway
	Ann Street	Front Street	Route serving downtown	Curbs & Gutters, narrow roadway	Shared Roadway
Lennoxville Road	Live Oak Street (US 70)	Leonda	improve lighting along road; provide paved shoulder or bicycle lane; wide ROW, divided roadway	ditches; bumpy pavement; eroded shoulders and turn aprons; 35 mph	Paved Shoulder
	Leonda	Front Street	Route serves subdivisions, parks, industrial and commercial (future) developments; high demand for biking	35 mph; ditches on s-side; overgrowth of roadside grasses;	Paved Shoulder
	Front Street	Lennoxville Pointe	wide ROW; serves residences	Culvert over canal needed for improvements; eroded turn aprons;	Paved Shoulder
Lewistown Road	Lennoxville Road	Lennoxville Pointe	improve lighting and roadway conditions	Davis Bay Drive is a private, gated community.	None
Lennoxville Pointe	Lewiston	Davis Bay	residential area; light traffic	eroded turn aprons; vehicular parking on grass; faded division of roadway	None

TABLE B.1: IDENTIFIED BICYCLE PROJECT OPPORTUNITIES, CONTINUE					
Project / Improvement	**From**	**To**	**Benefit / Details / Purpose / Need**	**Constraints**	**General Treatment**
Leondra Drive	Lennoxville Road	Freedom Park	Utility easements, serves Freedom Park, residential areas (existing & future)	eroded turn aprons; future development; abandoned RR in area difficult to identify	Paved Shoulder
Mulberry Street	Live Oak Street	Elementary School (Closed)	US 70 Alt. Route; wide roadway; Intersection provides critical connectivity across town; signaled intersection with crosswalk (timed)	Curbs & gutters; parking arrangement on street due to school (closed)	Shared Roadway
	Old Elementary School	Pollock Street	US 70 Alt. Route; Boys & Girls Club connectivity	Curbs & Gutters; parallel parking	Shared Roadway
Old Tram Road	Pearl Drive	North River Club Development	Convert the former logging road to a multi-use trail from Pearl Drive to the residential development	existing conditions; easement identification or dedication; determine ownership	Multi-Use Trail
Copeland Road	NC 101	Grady Dale Lane	Serves Airport Loop opportunity; low traffic; residential area	intersects NC 101; ditches; narrow pavement; eroded shoulders; near airport	Multi-Use Trail
Grady Dale Lane	Copeland Road	airport property	Serves Airport Loop opportunity; low traffic; residential area; nature look	narrow, gravel road; near airport	Multi-Use Trail
Moore Street	Cedar Street (US 70)	Front Street	Currently used as an alternative route connecting bikers from US 70 to downtown; commonly used by bikers from areas west of Town.	parallel parking on East side; curb & gutter; narrow roadway	Shared Roadway
Pinners Point Road	Live Oak Drive (US 70)	Howland Parkway	This section of Live Oak is a popular desired destination; residential area adjacent to commercial shopping	Intersects US 70; ditches	Paved Shoulder

TABLE B.1: IDENTIFIED BICYCLE PROJECT OPPORTUNITIES, CONTINUE					
Project / Improvement	**From**	**To**	**Benefit / Details / Purpose / Need**	**Constraints**	**General Treatment**
Wellons Drive	Campen Road	Glenda Drive	located behind shopping center, potential access route to schools, residential connection	Loading Zone behind Shopping Center	Signage
Glenda Drive	Wellons Drive	Pinner's Point	Wide ROW; US 70 Alt.; Residential area	ditches, swales along road sides	Signage
Howland Drive	Pinners Point	Myrtle Road	subdivision road, little traffic	no outlet; ditches	none
North Shore Road	Myrtle Road	end	subdivision road, little traffic	no outlet; ditches	None
Professional Park Drive	Live Oak (US 70)	Campen - future ext.	Provides connection to schools, residences, commercial, and recreational areas	section at Campen under construction until Jan 2010	Bike Lane
Crescent	Live Oak (US 70)	Campen Road	Wide ROW; Connector route to Existing Route, Residential adjacent to Commercial Shopping	ditches; thru-traffic to shopping ctr.	Shared Roadway
Pivers Island Road	US 70 West	Duke Marine Lab	Serves Duke Marine Lab and NOAA; Scenic Route	Intersection at US 70; no outlet	Shared Roadway
Rails-to-Trails					
Rails-to-Trails	Live Oak Street (US 70)	West Beaufort Road	develop a multi-use trail along abandoned railroad	Further study needed to verify property ownership and easement locations	Multi-Use Trail
Rails-to-Trails	West Beaufort Road	Aqua-10 Road	develop trail and connectivity to Airport Route opportunity	Further study needed. Currently, part of the land area of RR is being developed at the West Beaufort Water Access	Multi-Use Trail
Rails-to-Trails	Broad St./Fulford St. intersection	Leonda Drive	develop a multi-use trail along abandoned railroad	Further study needed to verify easement location	Multi-Use Trail
Intersections					
NC 101 and Carraway Drive	*N/A*	*N/A*	Schools, existing route	No signal	Intersection Improvement
NC 101 and West Beaufort Road	*N/A*	*N/A*	existing route, schools, water access	No signal	Intersection Improvement

TABLE B1: IDENTIFIED BICYCLE PROJECT OPPORTUNITIES, CONTINUE					
Project / Improvement	**From**	**To**	**Benefit / Details / Purpose / Need**	**Constraints**	**General Treatment**
Intersections					
Live Oak Street (US 70) and Campen Road	*N/A*	*N/A*	existing route, shopping centers, schools	Yes	Intersection Improvement
Live Oak Street (US 70) and Piners Point Road	*N/A*	*N/A*	Food Lion, Post Office, Eastern Athletic Club, Shopping Centers	No signal	Intersection Improvement
Live Oak Street and NC 101	*N/A*	*N/A*	primary thoroughfare, shopping centers	No signal	Intersection Improvement
Cedar Street (US 70) and Live Oak Street (US 70)	*N/A*	*N/A*	downtown	Yes	Intersection Improvement
Cedar Street (US 70) and Turner Street	*N/A*	*N/A*	downtown, County offices and Courthouse	Yes	Intersection Improvement
Live Oak Street (US 70) and Mulberry Street	*N/A*	*N/A*	connector route to bicycle route, Boys & Girls Club, downtown	Yes	Intersection Improvement
Turner Street and Pine Street	*N/A*	*N/A*	existing route and connector route to water access, downtown, bike crash site	No signal	Intersection Improvement
Front Street and Turner Street	*N/A*	*N/A*	downtown, bike crash site	No signal	Intersection Improvement
Pollock Street and Ann Street	*N/A*	*N/A*	downtown, Town Hall, bike crash site	No signal	Intersection Improvement
Queen Street and Ann Street	*N/A*	*N/A*	downtown, bike crash site	No signal	Intersection Improvement

TABLE B.1: IDENTIFIED BICYCLE PROJECT OPPORTUNITIES, CONTINUE					
Project / Improvement	**From**	**To**	**Benefit / Details / Purpose / Need**	**Constraints**	**General Treatment**
Bicycle Parking Facilities					
Commercial areas	*N/A*	*N/A*	placed in visible location, downtown racks are typically full	property ownership	install bicycle parking rack
Airport	*N/A*	*N/A*	suggested location for bicycle rack associated with Airport Route opportunity	property ownership	install bicycle parking rack
Schools	*N/A*	*N/A*	placed near the building entrance to prevent theft and ensure safety of students	property ownership	install bicycle parking rack
Government Buildings	*N/A*	*N/A*	County Courthouse, Town Hall, County Offices experience limited vehicular parking; availability of bicycle parking racks may increase bicycle trips	property ownership	install bicycle parking rack
Parks	*N/A*	*N/A*	conveniently located to park facilities	property ownership	install bicycle parking rack
Public Open Spaces	*N/A*	*N/A*	placed in visible location for use of public bikers	property ownership	install bicycle parking rack
Public Restrooms	*N/A*	*N/A*	bike parking needed to prevent theft while bikers using facilities	property ownership	install bicycle parking rack
Maritime Museum	*N/A*	*N/A*	popular destination by locals and visitors to area, located downtown	property ownership	install bicycle parking rack
Historical Museum	*N/A*	*N/A*	place in visible location, near entrance to building	property ownership	install bicycle parking rack
Boat and Water Access Areas	*N/A*	*N/A*	reduces vehicular parking needs and increase availability of parking spaces; popular destination for biking	property ownership	install bicycle parking rack
Gallant's Channel Museum	*N/A*	*N/A*	place in visible location, near entrance to building	property ownership	install bicycle parking rack

APPENDIX C – EXISTING ROADWAY CONDITIONS/INVENTORY INFORMATION

Beaufort Town staff and the consultant conducted an inventory of the existing conditions of the existing Beaufort Bicycle Route on November 25, 2008. The information collected included street widths, presence and width of curbs and gutters, speed limits, condition of surface, and identification of constraints. Analysis of this data allows recommendations to be made as part of the Town of Beaufort Comprehensive Bicycle Plan.

An inventory of the roadways identified during the public participation process and Steering Committee meetings to be added to the bikeway routes was conducted on Friday, February 13, 2009 by the consultant. During this inventory process, data was gathered on the existing transportation system to assist with project recommendations and to determine existing conditions of these transportation components.

Table C.1 contains data gathered during the roadway inventories.

TABLE C.1: EXISTING ROADWAY CONDITIONS

Roadway Road	From	To	Traffic Volumes (2007 AADT) From NCDOT TSG	Speed Limit	# of Lanes	Center Turn Lane	Pavement Width	Ave. Width of lanes	Paved Shoulders (PS), Bike Lane (BL), Wide Outside Lane (WOL), or Curb & Gutter (CG)	On Street Parking (Y or N), Parallel, Perpendicular, Diagonal (width)	Notes
Sunset Lane	Anne St	Front St		25 mph	1	no	10 ft	10 ft	none	N	
Front Street	Sunset Ln	Moore St		25 mph	2	no	30 ft	15 ft	CG 30"	Y - n-side	
	Moore St	Orange St		25 mph	2	no	42 ft	21 ft	CG 30"	Y - diagonal, s-side	
	Orange St	Turner St		25 mph	2	no	46 ft	23 ft	CG 30"	Y - diagonal, s-side	Multiple grates in opposite directions
	Turner St	Queen St		25 mph	2	no	40 ft	20 ft	CG 30"	Y - diagonal, n-side	Grates at 90 degrees
	Queen St	Grayden Paul Park		25 mph	2	no	26 ft	13 ft	CG 30"	N	Bike Rack at waterside park
	Grayden Paul Park	Pollock St		25 mph	2	no	42 ft	21 ft	CG 30"	Y - diagonal, s-side	Grate at 90 degrees, but without intermediate bar
	Pollock St	one lot over		25 mph	2	no	50 ft	25 ft	CG 30"	Y - Parallel, n-side; diagonal, s-side	
	one lot over	Live Oak St		25 mph	2	no	42 ft	21 ft	CG 30"	Y - diagonal, s-side	depressed grate, grates turned wrong way, depressed pavement
	Live Oak St	Fulford St		25 mph	2	no	31 ft	15.5 ft	CG 30"	N	Grate at 90 degrees
	Fulford St	Ocean St		35 mph	2	no	20 ft	10 ft	none	N	Eroded apron shoulder at int. of Hill St and Front St
	Ocean St	Perry Park		35 mph	2	no	21 ft	10.5 ft	PS	N- gravel parking lot at park	eroded turn aprons, u-style bicycle rack and restrooms at park, road width at turn is 19ft, grass shoulder measures 4ft from edge of pavement to post in ROW, cracked pavement, faded paint/striping
Ocean Street	Front St	Ann St		25 mph	2	no	18 ft	9 ft	none	N	
Ann Street	Ocean St	Hill St		25 mph	2	no	20 ft	10 ft	none	Y-parallel	
	Hill St	Fulford St		25 mph	2	no	21 ft	10.5 ft	CG 30"	Y-parallel	
Fulford Street	Ann St	Broad St		25 mph	2	no	12 ft	6 ft	none	N	
	Broad St	Cedar St		25 mph	2	no	20 ft	10 ft	none	N	
Cedar St / Hwy 70W	Fulford St	Carteret Ave	14000 between Turner and Live Oak	25 mph	2	no	21 ft	10.5 ft	CG	N	Eroded shoulder, Ditch on north and west side
	Moore	Bridge to Morehead	19000 between Turner and drawbridge	35 mph	3	Y	-	-	CG, ps	N	two lanes leaving Beaufort, opens to 4 in beaufort, bridge has narrow shoulder, no paved shoulder after bridge
Carteret Avenue	Pine St	Lennoxville Rd		25 mph	2	no	27 ft	13.5 ft	CG 24"	Y - parallel both sides	Grate at 90 degrees
	Lennoxville Rd	Ricks Ave		25 mph	2	no	21 ft	10.5 ft	none	N	short deep side ditch without barrier
Ricks Avenue	Carteret Ave	Sherwood Blvd		25 mph	2	no	20 ft	10 ft	none	N	side swales

TABLE C.1: EXISTING ROADWAY CONDITIONS, CONTINUE

Roadway Road	From	To	Traffic Volumes (2007 AADT) From NCDOT TSG	Speed Limit	# of Lanes	Center Turn Lane	Pavement Width	Ave. Width of lanes	Paved Shoulders (PS), Bike Lane (BL), Wide Outside Lane (WOL), or Curb & Gutter (CG)	On Street Parking (Y or N), Parallel, Perpendicular, Diagonal (width)	Notes
Sherwood Blvd	Ricks Ave	Fairview Dr		25 mph	2	no	18 ft	9 ft	none	N	side ditches on both sides
Fairview Drive	Sherwood Blvd	Sycamore Dr		35 mph			19 ft	9.5 ft	none	N	side ditches on both sides
Sycamore Drive	Fairview Dr	Steep Point Rd		35 mph	2	no	20 ft	10 ft	none	N	ditch next to pavement near Vine St; swale on e-side; ditches on both sides of rd.
Steep Point Rd	Sycamore Dr	Turner's Creek Way		25 mph	2	no	19 ft	9.5 ft	none	N	ditches on both sides
Turner's Creek Way	Steep Point Rd	Campen Rd		25 mph	2	no	20 ft	10 ft	none	N	ditches both sides
Campen Rd	Turner's Creek Way	Live Oak Dr		25 mph			24 ft	12 ft	none	N	paved parking lot connecting to road, ditch on s-side
	Live Oak St	Carraway Dr	15000 at intersection	25 mph	2	no	21 ft	10.5 ft	none	N	ditches both sides, signaled intersection (no crosswalks), 40 ft wide across intersection (Live Oak has 1 travel lane with 1 turn lane), may consider pulling back stop bar heading West on 70 at intersection
	Carraway Dr	Professional Park		25 mph	2	no	21 ft	10.5 ft	none	N	ditches both sides, steep on school side, residences on right side, future connection to Prof Park Dr
Carraway Dr	Campen Rd	middle school		35 mph	2	no	25 ft	12.5 ft	PS (4ft, n-side)	N	deep ditch on s-side
	elementary school	NC 101		35 mph	2	L-turn lane	21 ft	10.5 ft	none	N	ditches both sides, eroded shoulders, 35 mph on 101, some narrow areas of paved shoulder
NC 101	Carraway Dr	W. Beaufort Rd	8300	35 mph	2	no	22 ft	11 ft	none	N	ditch on both sides
	Carraway Dr	north to Havelock	7300	35 mph	2	no	23 ft	11.5 ft	none	N	potential for paved shoulder, striped/divided, minor ditches, speed limit to 45 at Family Lane and up to 55 at Copeland Rd
W. Beaufort Rd	NC 101	Turner St	3600	35 mph	2	no	18 ft	9 ft	none	N	occasional swales, Share the Road sign near turner intersection across from *Handle Bar*
	Turner St	Aqua 10	500		2	no	18 ft	9 ft	none	N	eroded turns, ditches by marina, divided road, wide ROW, ditches L-side, ends at gravel entrance to Aqua 10

TABLE C.1: EXISTING ROADWAY CONDITIONS, CONTINUE

Roadway Road	From	To	Traffic Volumes (2007 AADT) From NCDOT TSG	Speed Limit	# of Lanes	Center Turn Lane	Pavement Width	Ave. Width of lanes	Paved Shoulders (PS), Bike Lane (BL), Wide Outside Lane (WOL), or Curb & Gutter (CG)	On Street Parking (Y or N), Parallel, Perpendicular, Diagonal (width)	Notes
Turner Street	W. Beaufort Rd	end of boardwalk		35 mph	2	no	21 ft	10.5 ft	none	N	boardwalk on w-side
	end of boardwalk	slight bend before Pine		35 mph	2	no	21 ft	10.5 ft	CG 24", 4ft sidewalk	N	12 ft wide unpaved shoulder on e-side
	Pine St	Cedar St		35 mph	2	no	25 ft	12.5 ft	CG 30"	N	
	Cedar St	Broad St	1400 at intersection	25 mph	2	no	25 ft	12.5 ft	CG 30"	N	Grates at 90 degrees
	Broad st	Ann St		25 mph	2	no	28 ft	14 ft	CG 30"	yes - some, not striped	
Ann Street	Turner St	Sunset Ln		25 mph	2	no	28 ft	14 ft	CG 30"	Y - parallel n-side	Grates at 90 degrees
Broad Street	Turner St	Craven		25 mph	2	no	54 ft	27 ft	CG	Y- diagonal on both sides	proper grates, no striping, narrow travel, diagonal entrance to courthouse
	Craven	Queen		25 mph	2	no	42 ft	21 ft	CG	Y- diagonal on S-side, parallel n-side	
	Queen	Pollock		25 mph	2	no	39 ft	19.5 ft	CG- n-side	Y- parallel both sides	no striping, undivided roadway, at will parking (no signage)
	Live Oak St	Gordon		25 mph	2	no	36 ft	13 ft	CG	Y- parallel on S-Side	undivided, road bends slightly to north, no striping
	Gordon	Fulford		25 mph	2	no	21 ft	10.5	none	N	undivided
	Fulford	Yaupon		25 mph	2	no	21 ft	10.5	none	N	undivided, no striping, no signage, , abandoned RR?, somewhat parallel to Cedar, cemetery adjacent
	Moore	Turner		25 mph	2	no	34 ft	17 ft	CG	Y- parallel both sides	undivided
Pollock Street	Broad	Cedar (70)		25 mph	2	no	48 ft	24 ft	CG	Y - parallel both sides	no striping, at will parking (no signage)
	Broad	Ann St		25 mph	2	no	29 ft	14.5 ft	CG	Y - parallel both sides	Crash site at Pollock/Ann Intersection. Parking on N-side of Ann, stops on Pollock St.
	Mulberry	Pine		25 mph	2	no	34 ft	17 ft	CG	Y - parallel both sides, no designation	undivided road, no pavement striping
	Pine	Cedar (70)		25 mph	2	no	34 ft	17 ft	CG	Y - parallel both sides, no designation	undivided road, no pavement striping
Live Oak Street / Hwy 70E	Cedar Street/Hwy 70W	Hwy 101	16000	35 mph	4	no			CG	N	high traffic volume, trucks, multiple driveway cuts due to residences along street
	Hwy 101	Cedar Ave. (ETJ)	15000	35 mph	2	no			None	N	high traffic volume, trucks, limited driveway cuts, ditches
Live Oak Street	Broad St	Ann	1900 between Cedar and Front Street	25 mph	2	no	25 ft	22.5	no gutter, curb only	N	undivided roadway
	Broad ST	Cedar St		25 mph	2	no	22 ft	11.5 ft	no gutter, curb only	N	Undivided roadway, proper grates, lighted intersection at Cedar and Live Oak. Cedar 35 mph, Live Oak 25 mph, striped crossings, stop bars, 1 through lane, 1 turn lane, c&g
	Ann St	Front St		25 mph	2	no	24 ft	12 ft	CG	N	Undivided road, Broad and Ann Intersection has blinking red/yellow lights above int.

TABLE C.1: EXISTING ROADWAY CONDITIONS, CONTINUE

Roadway Road	From	To	Traffic Volumes (2007 AADT) From NCDOT TSG	Speed Limit	# of Lanes	Center Turn Lane	Pavement Width	Ave. Width of lanes	Paved Shoulders (PS), Bike Lane (BL), Wide Outside Lane (WOL), or Curb & Gutter (CG)	On Street Parking (Y or N), Parallel, Perpendicular, Diagonal (width)	Notes
Lennoxville Rd	Front St	Lennoxville Point		35 mph	2	no	24 ft	12 ft	none	N	wide ROW, Canal/creek on sides, culverts needed near Taylor's Creek subdivision, divided roadway (paint faded), eroded turns at intersections
	Front St	Leonda	1600	35 mph	2	no	24 ft	12 ft	none	N	some eroded shoulders, grass overgrowth, ditches on s-side, grading needed
	Leonda	Live Oak		35 mph	2	no	24 ft	12	none	N	ditches, pavement bumpy, wide ROW, eroded shoulders, divided
Lewiston	Lennoxville	Lennoxville Pointe		20-25 mph	2	no	18 ft	9 ft	none	Y - on grass	ditches on east side by Lennoxville int., some on w-side; eroded shoulders, creek on r-side, residential, cracked pavement on w-side of intersection of Lennoxville/Lewiston
Lennoxville Pointe	Lewiston	Davis Bay - Private		15-25 mph	2	no	16 ft	8 ft	no	Y - on grass	undivided (paint faded away), eroded turn apron, ditches on sides, wide ROW, grass overgrown on road
Leonda	Lennoxville Rd	Freedom Park		25-35?	2	no	21 ft	10.5	none	N	divided (faded paint), grass growing on road, eroded turn radius at turn towards park, utility easement exists from dirt path (fenced off), abandoned RR nearby difficult to determine
Moore St	Front St	Cedar ST (70)		25 mph	2	no	23 ft	12.5	CG	Y- parallel on E-side	undivided road, no designated parking
Mulberry	Live Oak	Old Elementary School		25 mph	2	no	50 ft	25 ft	CG	Y - diagonal on S-side (15-min)	bus/fire lane on N-side, sidewalk on school side, old crosswalk markings, (abandoned RR behind school having ditches on both sides, good opportunity, 13 ft wide at entrance), ped x-ing timed signal at intersection, crosswalk on n-side only
	School	Pollock		25 mph	2	no	28	14	CG	Y- parallel	Boys and Girls Club located between at Pollock Intersection, ped. Crosswalk across Mulberry at Club, small bike rack in front of Club, residential area, sidewalks, school bus ctr. Behind Club
Pine St	Pollock	Turner		25 mph	2	no	34 ft	17 ft	CG	Y- parallel both sides	undivided, no signage, crash site at Pine/Turner intersection (required turn onto Turner b/c Pine ends, different speed limits on roads)
Aqua 10	West Beaufort Rd	end		unmarked	1	no	unknown		none	N	dirt road, uneven, gated off entrance
Stanton Road	West Beaufort	end		unmarked	2	no			none	N	Abandoned RR across Stanton, bisects areas of private property. Further study

TABLE C.1: EXISTING ROADWAY CONDITIONS, CONTINUE

Roadway Road	From	To	Traffic Volumes (2007 AADT) From NCDOT TSG	Speed Limit	# of Lanes	Center Turn Lane	Pavement Width	Ave. Width of lanes	Paved Shoulders (PS), Bike Lane (BL), Wide Outside Lane (WOL), or Curb & Gutter (CG)	On Street Parking (Y or N), Parallel, Perpendicular, Diagonal (width)	Notes
Wellons Dr	Campen	Pinners Point		unmarked	2	no	24 ft	12 ft	none	N	Undivided, grass shoulder, ditch on right behind apartments, ditch on left. Wellons runs behind shopping center
Glenda	Wellons	Pinners Point		25 mph	2	no	24 ft	12 ft	none	N	residential area with adjacent water tower, wide ROW, ditches and swales on sides
Pinners Point	Glenda	Howland		25, 15	2	no	20 ft	10 ft	none	N	unmarked/faded, 15 mph sharp curve with potholes, ditches
	Glenda	Live Oak (70)		25 mph	2	no	21 ft	10.5	none	N	Divided/faded, shallow ditches on sides of road, intersection at 70 is a crash site. Food lion/bank/post office area. Benefit from crossing application, eroded turn aprons onto 70, rock ditches, painted division, no shoulder, striped
Howland	Pinners Point	Myrtle		25	2	no	21 ft	10.5	none	N	Howland Rock subdivision, faded division, ditches on sides of road
Myrtle	Howland	N. Shore		25	2	no	21	10.5	none	N	faded division
N. Shore	Myrtle	dead end		25	2	no	21	10.5	none	N	dead ends at HRPO private marina, end of state maintained road sign, no parking, shallow ditches
Professional Park Drive	Hwy 70 E	future - Campen		25 mph	2	no	27 ft	13.5 ft	CG	N	unmarked division, sidewalk on left side, Eastern Athletic Club on left and child development center, multi-family homes/apts, potential to be pedestrian oriented new community, slow child at play signs
Steep Point Rd	Hwy 70E	end of roadway	740	35 mph	2	no	-	-	none	N	ditches, unmarked
Pearl	Hwy 70 E	extension through ROW		25 mph	2	no					further study
Copeland	NC 101	Grady Dale		25 mph	2	no	16 ft	8 ft	none	N	eroded shoulders, undivided, near airport, ditches on sides, wide ROW on some sides, residential area, Hwy 101 width at intersection is 21 ft
Grady Dale	Copeland	out of sight		unmarked	1 or 2	no	10 ft	5 ft	none	N	gravel road, nature look, very little traffic, narrow
Crescent Drive	Live Oak (70)	Campen		25 mph	2	no	18 ft	9 ft	none	N	unmarked, undivided, wide ROW
Pivers Island Rd	70	Duke		25 mph	2	no	24 ft	12 ft	none	N	crossing difficulty from Pivers Isl Rd onto 70 West,

TABLE C.1: EXISTING ROADWAY CONDITIONS, CONTINUE

Roadway Road	From	To	Traffic Volumes (2007 AADT) From NCDOT TSG	Speed Limit	# of Lanes	Center Turn Lane	Pavement Width	Ave. Width of lanes	Paved Shoulders (PS), Bike Lane (BL), Wide Outside Lane (WOL), or Curb & Gutter (CG)	On Street Parking (Y or N), Parallel, Perpendicular, Diagonal (width)	Notes
Intersections	NC 101	US 70		35 mph	2+	some					high traffic, some shoulders, speeding vehicles, share road sign after turn onto 101 before W. Beaufort Rd., paved shoulder needed
	Carteret	Lennoxville		25 mph	2				CG	N	eroded shoulders, poor surface, undivided, apt. complex on right,
	Pine	Carteret		25 mph	2	no					Crash site: park on one corner, water tower across, apartments on one side. Traffic coming from curved intersection from Broad onto Pine
	Cedar (70)	Turner		35 mph	3	yes			CG	N	Lighted intersection, grates good, no warning signs, busy intersection to downtown, striped/faded crossings
	Cedar (70)	Orange		35 mph	3	yes					
	Craven	Ann		25 mph	2	no			CG	Y - Ann Parking on N-side only with parking signage	Craven converts from 2-way to a Do Not Enter at the intersection at Ann. Craven has stop signs, no stop bar, narrow at Craven
	Queen	Ann		25 mph	2	no			CG	Y - no signage, parallel parking	Queen begins 1-way at Ann Intersection, Queen has stop signage, cracked pavement

APPENDIX D – PROJECT PRIORITIZATION METHODOLOGY

Appendix Outline:

D-1 Prioritization Factors

D-2 Process

Steering Committee members met on March 26th, 2009 to discuss the preliminary project recommendations and identify priority criteria to determine priority projects. To assist Steering Committee members in determining which projects to construct first, an exercise was performed at this meeting to prioritize projects based on preselected priority factors. These preselected priority factors were taken from the determined goals and objectives in Section 1.

D-1 PRIORITIZATION FACTORS

Prioritization and scheduling of recommended projects was based on the following factors:

PROJECT CHARACTERISTICS

At the beginning of the planning process, Steering Committee members were asked to identify their goals for Beaufort's Bicycle Plan. Those goals were developed into the final goals and objectives of the Plan. These characteristics include the following:

- Provides connectivity and accessibility to schools, parks, Downtown, shopping/retail areas, libraries, neighboring communities, existing bike route, and neighborhoods
- Improve bicycle safety, especially on major thoroughfares and at past vehicle-bicycle crash sites
- Provide a diversity in construction for multiple users and abilities
- Compliments Beaufort's scenic environment
- Improves an area of existing use or need

PUBLIC COMMENTS/INPUT

Comments received from public involvement methods (Steering Committee, public survey, public open houses, and Town staff interviews) as to what the bicycle needs and concerns are for Beaufort.

COST AND CONSTRUCTABILITY OF PROJECT

The complexity or ease of constructing the project based on various components and engineering design work needed, as well as the cost of construction.

D-2 PROCESS

At the March 26, 2009 Steering Committee meeting, members were given five numbered dots from one to five (1-5) with one being the most important to five (5) being the least important. The list was tabulated with each factor given a numeric value based on their ranking (1=5 pts, 2=4 pts, 3=3 pts, 4=2 pts, & 5=1 pts).

Each recommended project was rated on the above-mentioned factors. A project received points based on the following steps:

STEP 1 - RATE PROJECTS ON PROJECT CHARACTERISTICS & PUBLIC COMMENTS

Connectivity & Accessibility to Schools: Is a schools located within the project limits?
Yes = 1 point
No = 0 points

Connectivity & Accessibility to Parks: Is a park located within the project limits?
Yes = 1 point
No = 0 points

Connectivity & Accessibility to Downtown: Is Downtown located within the project limits?
Yes = 1 point
No = 0 points

Connectivity & Accessibility to Shopping/Retail Areas: Is a shopping/retail area located within the project limits?
Yes = 1 point
No = 0 points

Connectivity & Accessibility to Libraries
Yes = 1 point
No = 0 points

Connectivity & Accessibility to Neighboring Communities: Does project provide a connection to neighboring communities?
Yes = 1 point
No = 0 points

Connectivity & Accessibility to Existing Bike Route: Does the project link to or complete a segment of the existing Bicycling in Beaufort Bike Route?
Yes, Connect to = 1 point
No, Does not connect to = 0 points

Connectivity & Accessibility to Neighborhoods: Does the project provide connection to neighborhoods.

Yes = 1 point
No = 0 points

Improves Safety: Does the project improve a vehicular-bicycle crash site or provide improved safety/visibility along major thoroughfares?

Yes = 1 point
No = 0 points

Diversity in Construction: Does the project provide a bicycle facility that is not currently available?

Yes = 1 point
No = 0 points

Scenic Environment: Does the project provide a bicycle facility along a scenic corridor or view in Beaufort?

Yes = 1 point
No = 0 points

Latent Demand/Existing Use: Does the project improve an area of existing use or need?

Yes = 1 point
No = 0 points

Public Comments: Is the Project mentioned repeatedly by the public as a need?

Yes = 1 point
No = 0 points

STEP 2 - RATE PROJECTS ON COSTS

Once projects were rated based on characteristics and public input, projects were given a rough associated cost based on their complexity and ease of construction; such as further study needed to identify potential environmental or constraints, property acquisition, surveying and engineering, permitting, utility relocation, etc.

Minimal Cost

Minimal costs is $10,000 or less for a project based on existing conditions, proposed treatment, any further study that is needed, level of engineering required, and project components (permits, acquisition, coordination, etc.). Examples of projects include installation of signage and pavement markings, and spot and/or hazard improvements.

Low Cost

Low costs for a project range from $10,001 - $99,999 based on existing conditions, proposed treatment, any further study that is needed, level of engineering required, and project components (permits, acquisition,

coordination, etc.). Examples of projects include striping, signage, and pavement markings.

Moderate Cost
Moderate cost estimate for projects range from $100,000 - $299,999 based on existing conditions, proposed treatment, any further study that is needed, level of engineering required, and project components (permits, acquisition, coordination, etc.). Examples of projects include small multi-use trails outside of environmentally sensitive areas, restriping/striping for bike lanes where milling is required.

High Cost
High cost estimate for projects range is $300,000 or higher based on existing conditions, proposed treatment, any further study that is needed, level of engineering required, and project components (permits, acquisition, coordination, etc.). Examples of project include long multi-use trail/paths segments through environmentally sensitive areas and paved shoulders or other overlay or new construction treatment projects.

STEP 3 – PLACEMENT OF PROJECTS ON PHASING SCHEDULE

Once each project was ranked and given a cost estimate they were placed into a category (short-term, mid-term, or long-term) based upon their preliminary estimated cost and priority ranking. For instance, projects that had an estimated minimal and low costs and high priority ranking were placed on the short-term (0-5 yrs) implementation schedule. Mid-term (6-10 yrs) projects are those projects with a minimal, low and/or moderate costs and low and high priority ranking. Long-term (10+ yrs) projects were those projects that had high cost and low priority ranking. However, mid- and long-term projects should be expedited if financing becomes available.

APPENDIX E – FUNDING SOURCES

Appendix Outline:

E.1 Local Sources

E.2 State & Federal Sources

E.3 Private Sources

E.4 Special Funding Sources

To bring Beaufort's vision of a bicycle-friendly community to fruition, a combination of funding sources would need to be utilized to implement the identified projects and programs outlined in this Plan. Beaufort should seek all funding opportunities for project implementation, including State, Federal, and Private monies where available. Special funding programs for specific types of projects such as Safe Routes to School should also be pursued. The use of private foundation contributions should be thoroughly researched and private donations accepted to assist in funding. Even with the vast funding sources available, there usually is a local match requirement. The most reliable funding will be local government; therefore, it is important for the Town of Beaufort to continue to allocate the necessary funds each year to ensure completion of bicycle infrastructure. An annual budget line item will ensure that bicycle projects identified in this Plan will be completed. This action will also illustrate the Town's commitment to improve the bicycle environment in the community.

This Appendix has identified funding opportunities for bicycle facilities from local, state, and federal level; as well as from public and private initiatives to aid in the implementation of this Plan. As mentioned earlier, some projects will require a combination of funding sources.

E.1 LOCAL SOURCES

Several types of potential local funding sources are available for the Town of Beaufort. Local funds should be used for projects not on major state routes and as local match. Local funding sources tend to be flexible and include general revenue expenditures as well as proceeds from bond programs. Some local funding sources are:

ANNUAL IMPROVEMENT PROGRAM

The Town should allocate a specified amount each fiscal year in the Capital Improvement Program (CIP) for street repairs, construction of new bicycle facilities, and intersection improvements.

FEE OR PAYMENT "IN-LIEU OF"

If it is determined that adequate bicycle provisions cannot be provided on a property under development review, Beaufort could utilize the use of a fee in-lieu of as a funding source to implement on-road bicycle facilities and multi-use trails. Mitigation may be based on impacts on population increase caused by the development, property values, or percentage of development fees.

IMPACT FEES

The use of impact fees to provide funding for greenways and multi-use trails. Impact fees are monetary one-time charges levied by a local government on new development. Unlike required dedications, impact fees can be applied to finance bicycle facilities located outside the boundary of the development. The NC General Assembly has permitted a 'small but growing number of local governments to impose impact fees." These fees can be levied through the subdivision or building permit process to finance bicycle facilities in Beaufort.

SPECIAL ASSESSMENT BONDS

Beaufort could use special assessment bonds to install bicycle facilities within an area in need. Special assessment bonds are secured by a lien on a property that benefits by the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners in the assessment area.

REVENUE BONDS

Revenue bonds are bonds that are secured by a pledge of the revenues from a certain local government activity. The entity issuing the bond pledges to generate sufficient revenue annually to cover the program's operating costs, and meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceiling of general obligation bonds, but they are generally more expansive than general obligation bonds.

GENERAL OBLIGATION BONDS

A general obligation bond (GOB) is a bond that is legally backed by the full faith and credit of the issuing government. The local government that issues the bond pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bond. A GOB pledge is considered more robust than a revenue pledge, and thus is likely to carry a lower interest rate then a revenue bond.

TRANSPORTATION BONDS

Transportation bonds have been instrumental in strategic implementation of local roadways, transit, and non-motorized travel throughout North Carolina. Voters in communities have regularly approved the use of these bonds in order to improve their transportation system. Improvements to the bicycle system in Beaufort would be a type of project that could be funded using a transportation bond program.

EXCISE TAX

Excise taxes are taxes on specific goods and services. These taxes require special legislation and the use of the funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation related activities.

PROPERTY TAX

Property taxes generally support a significant portion of a municipality's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance greenway or multi-use trail acquisitions. Because of limits imposed on tax rates, use of property taxes to fund greenways could limit the municipality's ability to raise funds for other activities. Property taxes can provide a steady stream of financing while broadly distributing the tax burden.

SALES TAX

North Carolina authorizes a sale tax at the state and county levels. Local governments that choose to exercise the local option sales tax, use the tax revenues to provide funding for a wide variety of projects and activities. Any increase in the sales tax, even if applying to a single county, must gain approval of the state legislature.

DOWN EAST REGIONAL PLANNING ORGANIZATION (DOWN EAST RPO)

As a member of the Down East RPO, Beaufort is able to assist in determining the transportation needs for their community in regards to state and federal road improvements, as well as transportation enhancement projects that are placed on the State Transportation Improvement Program (STIP).

E.2 STATE & FEDERAL SOURCES

The Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEALU) law guarantees funding for highways, highway safety, and public transportation. Provisions of the law address specific safety issues, including pedestrian and bicycle safety. Funds for pedestrian projects come from several different sources that are described below; however, allocation of those funds depends on the type of project or program and other criteria.[i]

The American Recovery and Reinvestment Act of 2009 (ARRA) included $8 billion for transportation infrastructure investments. Of that money, more than $27.5 billion are in funding categories that make funds

eligible for projects with complete streets elements, and another $3.8 billion are available for bicycle and pedestrian infrastructure.[ii]

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP)

HSIP allows States to target their most critical safety needs. States are required to develop and implement a safety plan and submit safety reports that describe hazardous locations, progress in implementation of highway safety improvement projects, and the effectiveness of those projects in reducing injuries and fatalities. [iii]

SAFE ROUTES TO SCHOOLS PROGRAM (SRTS)

The SRTS program is new to North Carolina. It intends to enable and encourage elementary and middle school students to walk safely to school. Funding is available to facilitate planning, development, and implementation of activities and projects that reduce traffic, fuel consumption, air pollution, and improve safety within approximately two (2) miles of elementary and middle schools (K-8 only). The North Carolina Safe Routes to School program provides opportunities for schools to apply for grant funding to develop an action plan, non-infrastructure improvements (education, enforcement, and encouragement), and infrastructure improvements to encourage walking and cycling to school. The maximum amount an applicant can receive to develop an action plan is $15,000 for one to two schools and $30,000 for three or five schools. The maximum amount for non-infrastructure grants is $50,000[iv]. The funding range for infrastructure projects is $100,000 to $300,000 per project.

HIGHWAY DIVISION FUNDS

Highway Division Funds are a component of the SRTS program. Under the SRTS program, each Highway Division in North Carolina will receive $200,000 in fiscal year 2008 and $230,000 in fiscal year 2009. These funds will be used for timely, relatively low-cost spot safety improvements within the rights-of-way on state maintained roadways. Requests for these funds must be made directly to the Division offices. The maximum amount per request is $50,000. The Town of Beaufort is in the NCDOT Division 2 with headquarters in Greenville and District office in New Bern.

POWELL BILL FUNDS

Powell Bill funds are collected by the state in the form of a gasoline tax. These funds are distributed based on the number of street miles to be maintained and the Town's population.[v]

THE RECREATIONAL TRAILS PROGRAM

This program has thirty percent (30%) of its funds set aside for motorized trail projects, thirty percent (30%) for non-motorized trail uses, and the remainder can be spent on either. These funds can be used to cover the costs of construction, maintenance of equipment, real estate, educational programs, state administration, and assessment of trail conditions. The maximum amount an applicant can receive is $75,000 and there is a twenty percent (20%) local match requirement.[vi]

TRANSPORTATION IMPROVEMENT PROGRAM (TIP)

As a part of the state's Transportation Improvement Program (TIP), incidental (those related to a scheduled highway project) pedestrian TIP projects can receive allocations through an array of funding resources including Federal Aid Construction Funds and State Construction Funds/State Highway Trust Fund. Projects programmed into the TIP as independent (those that are not related to a scheduled highway project) pedestrian projects are managed and selected by NCDOT, Division of Bicycle and Pedestrian Transportation (DBPT). The Division has an annual budget of $6 million. Eighty percent of these funds are from STP-Enhancement funds, while the State Highway Trust provides the remaining 20 percent of the funding.

Each year, the DBPT regularly sets aside a total of $200,000 of TIP funding for the department to fund projects such as training workshops, pedestrian safety and research projects, and other pedestrian needs statewide. Those interested in learning about training workshops, research and other opportunities should contact the DBPT for information.

A total of $5.3 million dollars of TIP funding is available for funding various bicycle and pedestrian independent projects, including the construction of multi-use trails, the striping of bicycle lanes, and the construction of paved shoulders, among other facilities. Prospective applicants are encouraged to contact the DBPT regarding funding assistance for bicycle and pedestrian projects. For a detailed description of the TIP project selection process, visit http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html. Another $500,000 of the division's funding is available for miscellaneous projects.

However, one of the most cost-effective ways of providing pedestrian facilities is to incorporate them as part of larger reconstruction, new construction, and repaving projects as incidental projects. Projects with bicycle and pedestrian accommodations such as bike lanes, widened paved shoulders, sidewalks and bicycle-safe bridge design are frequently included as incidental features of highway projects. In addition, bicycle-safe drainage grates are a standard feature of all highway construction. Most bicycle and pedestrian safety accommodations built by NCDOT are

included as part of scheduled highway improvement projects funded with a combination of National Highway System funds and State Highway Trust Funds.

SURFACE TRANSPORTATION PROGRAM (STP)

Funds allocated to the STP can be used to construct bicycle facilities, create maps and brochures, or develop public service announcements (PSAs) promoting safe biking.[vii]

TRANSPORTATION ENHANCEMENT ACTIVITIES (TEAS)

North Carolina earmarks ten percent (10%) of their annual STP funds for Transportation Enhancement Activities (TEAs). Transportation enhancements are transportation-related activities that are designed to strengthen the cultural, aesthetic, and environmental aspects of transportation systems and must benefit the traveling public and help communities increase transportation choices and access, enhance the built or natural environment, and create a sense of place. Eligible projects in this category include providing bicycle and pedestrian facilities for safe accommodation, either through construction of new facilities or modifications to existing facilities. The facility must comply with American Association of State Highway Transportation Officials (AASHTO), Americans with Disabilities Act (ADA) and NCDOT standards." Funds may be used to add or modify new bike lanes on existing roadways, to add or modify road shoulders for bicycle facilities, installation of bicycle parking racks. Conversion of abandoned railway corridors to multi-use paths can also be funded with these monies.[viii]

STATEWIDE DISCRETIONARY FUNDS

The Statewide Discretionary Fund consists of $10 million and is administered by the Secretary of the Department of Transportation. This fund can be used on any project at any location within the State. Primary, urban, secondary, industrial access, and spot safety projects are eligible for this funding. To request funding, an entity must submit a written request to the NCDOT Highway Division office with a clear description of project and project justification.

HAZARD ELIMINATION AND RAILWAY-HIGHWAY CROSSING PROGRAMS

These funds are an additional subset of the State Transportation Improvement Program (STIP) funding, constituting ten percent (10%) of a state's funds. This program is intended to inventory and correct the safety concerns of all travel modes including pedestrian. Publicly-owned bicycle facilities can be funded under this program. Bicycle projects can also be eligible for the Hazard Elimination Program, which is administered through locations that have a documented history of

previous crashes. A maximum of $100,000 is offered per NCDOT Highway Division for hazard elimination projects.[ix]

LAND AND WATER CONSERVATION FUND (LWCF)

The Land and Water Conservation Fund provide grants for communities to build a variety of park and recreation facilities including trails and greenways. In North Carolina, the federally granted money is allocated through the State Division of Park and Recreation. There is a fifty percent (50%) local match.[x]

NORTH CAROLINA'S CLEAN WATER MANAGEMENT TRUST FUND (CWMTF)

CWMTF provides grants to local governments, state agencies, and conservation nonprofits to help finance projects that specifically address water pollution problems. CWMTF funds may be used to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits. Grants are designed to fund projects that bring parks and recreation, including multi-use trails closer to people's homes.[xi]

GOVERNOR'S HIGHWAY SAFETY PROGRAM (GHSP)

The Governor's Highway Safety Program is committed to enhancing the safety of the roadways in North Carolina. To achieve this, GHSP funding is provided through an annual program, upon approval of specific project requests to undertake a variety of bicycle safety initiatives. Communities may apply for a GHSP grant to be used as seed money to start a program to enhance highway safety. Funding is provided on a reimbursement basis and evidence of reductions in crashes, injuries, and fatalities is required. Amounts of GHSP monies vary from year to year.[xii]

NORTH CAROLINA PARKS AND RECREATION TRUST FUND (PARTF) GRANT PROGRAM

The PARTF program provides local governments with dollar-for-dollar matching grants to acquire land and renovate or develop of recreational projects for the public, including multi-use trails. The maximum amount an applicant is eligible for is $500,000.[xiii]

NORTH CAROLINA ADOPT-A-TRAIL PROGRAM

North Carolina Adopt-A-Trail Program provides communities with grant monies up to $5,000 for construction, maintenance, facilities, signage, brochures, and maps.[xiv]

CONSERVATION TAX CREDIT

The Conservation Tax Credit program allows landowners who donate property for conservation purposes by easements or sale. These landowners are eligible for the North Carolina Conservation Tax Credit. The goal of the program is to provide incentive to protect water supply watersheds, manage stormwater, retain forests and working farms, and to allow for ecological communities through the formation of trails and wildlife corridors.[xv]

CONGESTION MITIGATION AND AIR QUALITY IMPROVEMENT PROGRAM

This Environmental Protection Agency's (EPA's) program can assist in funding many of the same projects funded by the STP including bicycle facilities, maps, brochures, and public service announcements.[xvi]

WATERSHED PROTECTION AND FLOOD PREVENTION GRANTS FOR SMALL WATERSHEDS

Watershed Protection and Flood Prevention Grants for Small Watersheds provides funding to state and local agencies or nonprofit organizations to create and maintain watershed improvements of less than 250,000 acres. Financial and technical assistance are available and a fifty percent (50%) local match is required for public recreation projects.[xvii]

BICYCLE COMMUTER FEDERAL TAX PROVISIONS

Beginning January 1, 2009 a bill became effective that provides new tax benefits to employers with employees who ride their bicycle to work. Like current benefit programs for those who take a commuter vehicle or mass transit, bicycle commute has been recognized by the Internal Revenue Service (IRS) as a qualified tax deduction from expenses. A qualified employee is defined as one who rides their bike from home to work for a substantial period of a given month. Qualified bicycle commuting expenses include the purchase of a bicycle and bicycle improvements, repair, and storage. The IRS recognizes that employers have already been extending fringe benefits to employees who use mass transit or van-pool transportation. Effective January 1, 2009, employers may extend transportation fringe benefits to employees who bicycle. Currently, the benefit is only $20 per month, but many bicycle advocacy groups are hopeful that effective implementation of the program will lead to an increase in the benefit amount.

E.3 PRIVATE SOURCES

BLUE CROSS BLUE SHIELD FIT TOGETHER GRANTS

The FitCommunity Program is a designation and grant program to recognize and reward municipality and county efforts to promote physical activity, healthy eating and tobacco-free programs, policies, environments and lifestyles. A municipality or county is eligible for grant money once it has received a FitCommunity designation. This program awards up to nine partnerships with up to $30,000 annually for a two-year period.[xviii]

ACTIVE LIVING BY DESIGN (ALBD)

Active Living by Design is a program sponsored by the Robert Wood Johnson Foundation. The program seeks to bring together the health care and transportation communities to create an environment that encourages residents to pursue active forms of transportation such as walking and bicycling. Grants are awarded each year to a selected number of communities with a local match requirement. These monies can be used to create plans, change land use policies, institute education policies, and develop pilot projects.[xix]

THE TRUST FOR PUBLIC LAND

The Trust for Public Land (TPL) is the only national nonprofit working exclusively to protect land to enhance the health and quality of life in American communities. TPL works with landowners, government agencies, and community groups to create urban parks and greenways as well as to conserve land for watershed protection.[xx]

DEVELOPER CONTRIBUTIONS

Through diligent planning and early project identification, regulations, policies, and procedures could be developed to protect future pedestrian corridors and require contributions from developers when the property is subdivided. To accomplish this goal, it will take a cooperative effort between local planning staff, NCDOT planning staff, and the development community.

DESIGN ARTS PROGRAM, THE NATIONAL ENDOWMENT FOR THE ARTS

The Design Arts Program can provide states, local agencies, individuals, and nonprofit organizations with grants if their project incorporates urban design, planning, historic preservation, architecture, landscape architecture, or other community improvement activities – for example multi-use trail development. Maximum amount per applicant is $50,000 with a required 50% local match.[xxi] These monies can be used for bicycle facilities or multi-use trails/paths in the historical district of Beaufort.

THE ROBERT WOOD JOHNSON FOUNDATION

The Robert Wood Johnson Foundation is dedicated to enhancing the health and health care of every American. Grants are prioritized into four goal areas, one of which is the promotion of healthy communities and lifestyles. Projects would include multi-use trails and sidewalks.

SMALL GRANTS

Small grants of $250-$2,000 are offered for planning, design, and development of greenways through a partnership between the Conservation Fund's American Greenways Program[xxii], Eastman Kodak Corporation, and the National Geographic Society. These grants can be used for off-road multi-use trails.

WAL-MART FOUNDATION

Local community and environmental activities and educational programs for children that are put on by charitable organizations may be funded through the Wal-Mart Foundation.[xxiii] Organizations must work with the local store manager to discuss application. These funds should be used for bicycle safety education.

BIKES BELONG GRANTS

The Bikes Belong Grant Program strives to put more people on bicycles more often by funding important and influential projects and build momentum for bicycling in communities. Local governments may apply for a Bikes Belong Grant; however, Bikes Belong encourages local governments applying for grants to partner with a local bike advocacy group. Grant funds may be used for bike paths, lanes, and routes including rail-trails. Bikes Belong awards up to $10,000 in funds for about 20 projects per year. Grant applications are reviewed on a quarterly basis and priority is given to applicants that have not received Bikes Belong funding in the past. Additionally, Bikes Belong will not consider grant requests in which it is listed as the sole funder; however, it will consider being the initial funder[xxiv].

LEAGUE OF AMERICAN BICYCLISTS (LAB) BICYCLE-FRIENDLY COMMUNITY PROGRAM

LAB recognizes states, communities and businesses for their efforts to promote bicycling and provide roadmaps to improve. Recognition is awarded based on an application process.[xxv]

OTHER PRIVATE FUNDING OPPORTUNITIES

Project sponsors can purchase amenities such as benches, trash receptacles, mile markers, entry signage and bollards to assist in funding while enhancing the overall project. Another option is to sell linear feet of

a multi-use path at the unit cost for said path. Some sort of recognition should be provided for sponsors possibly through a plaque or certificate.

Volunteers from within the community can aid in the expansion of the pedestrian network by conducting fundraisers or by donating labor to construction, landscaping, and maintenance after the facility is in place. Community volunteers can be drawn from civic groups, scouting groups, and outdoor clubs. Volunteers can adopt trails, bike facilities, or portions of them to keep clean and beautify through the years, saving the Town money over time.

E.4 SPECIAL FUNDING OPPORTUNITIES FOR HIGH PRIORITY PROJECTS

All of the funding opportunities listed above, and others that are not listed that may become available in the future should be applied for when possible. Mid- and long-range projects may be included in later editions of the TIP as enhancement projects. If a roadway improvement project is scheduled for a road that currently has no pedestrian facilities, NCDOT should be approached in an effort to get pedestrian facilities installed incidental to the project. Mapping and signing projects may also be included in the TIP. Safety projects should be funded by the Governor's Highway Safety Program. The Safe Routes to School program funds should be utilized for pedestrian safety and access within two (2) miles of all K-8th grade schools.

Projects scheduled for construction along major and minor thoroughfares throughout the Town may be funded by a bond referendum. Grant programs are the preferred method of payment for large-scale projects, as they do not have to be repaid by the Town or its citizens. A Capital Improvement Program (CIP) should be utilized for planning and funding pedestrian facilities. Private partnerships are another good way to make pedestrian facility improvements since they allow the public to take an extra sense of pride from the facility.

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[i] SAFETEALU, http://www.fhwa.dot.gov/safetealu/factsheets/hsip.htm

[ii] US Department of Transportation, Federal Highway Administration, American Recovery & Reinvestment Act of 2009, http://www.fhwa.dot.gov/economicrecovery/index.htm

[iii] Highway Safety Improvement Program (HSIP), http://safety.fhwa.dot.gov/state_program/hsip/index.htm & http://www.fhwa.dot.gov/safetealu/factsheets/hsip.htm

[iv] North Carolina Safe Routes to School Program, http://ncdot.org/transit/bicycle/saferoutes/SafeRoutes.html

[v] Powell Bill Funds, http://ncdot.org/programs/Powell_Bill/

[vi] Recreational Trails Program, http://www.fhwa.dot.gov/environment/rectrails/index.htm

[vii] Surface Transportation Program, http://www.fhwa.dot.gov/programadmin/113005.cfm

[viii] Transportation Enhancement Activities, http://www.ncdot.org/financial/fiscal/Enhancement/ProgramInformation/Background/

[ix] Hazard Elimination & Railroad-Highway Crossing Programs, http://safety.fhwa.dot.gov/safetealu/siebyside.htm

[x] Land and Water Conservation Fund, http://www.nps.gov/ncrc/programs/lwcf/

[xi] North Carolina's Clean Water Management Trust Fund, http://www.cwmtf.net/

[xii] Governor's Highway Safety Program, http://www.ncdot.org/programs/GHSP/

[xiii] North Carolina Parks and Recreation Trust Fund Grant Program, http://www.partf.net/

[xiv] North Carolina Adopt-A-Trail Program, http://ils.unc.edu/parkproject/trails/grant.html#a

[xv] Conservation Tax Credit, http://www.enr.state.nc.us/conservationtaxcredit/

[xvi] Congestion Mitigation and Air Quality Improvement Program, http://www.fhwa.dot.gov/environment/cmaqpgs/

[xvii] Watershed Protection and Flood Prevention Grants for Small Watersheds, http://12.46.245.173/pls/portal30/CATALOG.PROGRAM_TEXT_RPT.SHOW?p_arg_names=prog_nbr&p_arg_values=10.904

[xviii] Blue Cross Blue Shield Fit Together Grants, www.healthwellNC.com

[xix] Active Living by Design, www.activelivingbydesign.org

[xx] The Trust for Public Land, www.tpl.org.

[xxi] Design Arts Program, The National Endowment for the Arts, http://www.nea.gov/grants/apply/Design.html

[xxii] Conservation Fund's American Greenways Program, http://www.conservationfund.org/node/245

[xxiii] Wal-Mart Foundation, http://www.walmartfoundation.org/wmstore/goodworks/scripts/index.jsp

[xxiv] Bike Belong Organization, http://bikesbelong.org.

[xxv] League of American Bicyclists, http://bicyclefriendlycommunity.org

APPENDIX F – COST ESTIMATES

Appendix Outline:

F.0 On-Road Bicycle Facilities

F.1 Off-Road Bicycle Facilities

F.2 Intersection Crossings

F.3 Bicycle Parking Facilities

F.4 Streetscape Improvements

Preliminary opinion of probable costs for recommended pedestrian projects in this Plan are provided in this appendix. These costs are generic estimates based on the Federal Highway Administration[i], Pedestrian and Bicycle Information Center Bikecost Tool[ii], and similar projects recently implemented.

The listed cost estimates should be used as a planning guide and do not include extra costs such as land acquisition, utility relocation, roadway size, drainage, final materials used, grading, land clearing and demolition, professional engineering and surveying, inspection and legal and administration. These costs are not and should not be considered to be a substitute for professional engineering and surveying regarding actual costs of individual project construction.

In many cases, on-road bicycle facilities can be low costs by restriping a roadway to remove or narrow travel lanes as part of a roadway repaving or reconstruction project. If the Town or NCDOT were undertaking a roadway improvement project as part of its normal maintenance program, it would be advantageous to provide the bicycle facility identified in this Plan during that effort.

F.0 ON-ROAD BICYCLE FACILITIES

The types of on-road improvements include restriping, overlay, full depth, and signed route.

1. **Restriping** includes removing, changing, or adding street striping to an existing roadway to provide space for bicycles. The space may be used exclusively for bicyclists (i.e. bike lane) or shared (i.e. wide outside lane). Roadway paving is typically not required. Travel lanes may be removed, moved or narrowed to provide space for a bicycle lane or wide outside lane.

2. **Overlay** pavement refers to a new layer of bituminous concrete pavement to an existing paved surface. The overlay pavement also may be used to install paved shoulders over an existing grass or gravel shoulder.

3. **Full depth** construction includes either a new road, or complete reconstruction of an existing road. Full depth construction may extend the width or length of an existing road. The cost of including a bike lane or additional width for bicycles is considered part of the larger full depth construction roadway project.

4. **Signed route** applies directional signs to an existing roadway, identifying a single or series of bicycle routes. A signed route is often located on a street with low traffic volume or route that connects two or more desirable destinations. Route signs and pavement markings may be placed in intervals as needed.

RESTRIPING OR STRIPING

- Lane striping delineated travel lanes, shoulders, and bike lanes cost approximately $14,000 per mile for a 4-inch white solid line on one side of a lane, or as a trail centerline.

- Restriping a mile of street to include bike lanes or reducing number of traffic lanes to add bike lanes cost approximately $20,000 - $48,000 per mile depending upon the number of old lane lines to be removed.

OVERLAY IMPROVEMENT

- Construction of additional lane pavement added during roadway construction or reconstruction cost approximately $287,000 - $300,000 per mile.

SIGNED ROUTE

- Regulatory, warning, and informational signs on post cost approximately $200 per sign and post plus $100 per each for installation.

- Bicycle Arrow (directional arrow) marking cost approximately $70 - $200 per marking. The more expensive tape markings are more durable then the less expensive thermoplastic markings when installed properly.

- Bicycle (symbol) marking cost approximately $70 - $200 per marking. The more expensive tape markings are more durable then the less expensive thermoplastic markings when installed properly.

- Sharrow marking cost approximately $ 75 - $100 per marking.

F.1 OFF-ROAD BICYCLE FACILITIES

The types of off-road improvement types include multi-use trails consisting of stone, asphalt, or concrete.

1. **Stone trail** is a crushed stone surface, which is a lower cost method of surfacing for trails with low use, in rural areas, in environmentally sensitive areas to minimize run-off, or other reasons as locally specified.

2. **Asphalt trail** is the most common surface for both roadways and trails.

3. **Concrete trail** is preferred application over asphalt for roadway and trail surfaces in several regions of the country due to maintenance and durability.

STONE TRAILS/PATHS

- A 10 foot wide stone trail or path with 6 inches of CABC cost approximately $12 - $ 15 per linear foot (2009)

ASPHALT TRAILS/PATHS

- Town of Winterville, NC spent $11.90 per linear feet for the pavement structure for a 5-foot wide asphalt multi-use trail with 6-inches of CABC (2009); therefore, a 10-foot wide trail with 6-inches of CABC would be $30.00 per linear foot.

- Warren County, NC spent $ 14.11 per linear feet for the pavement structure for a 5-foot wide asphalt multi-use trail with 6-inches of CABC (2006); therefore, a 10-foot wide trail with 6-inches of CABC would cost $28.22 per linear foot.

BOLLARDS

- Bollards cost approximately $180-$250 depending on size and type.

TRAIL GATE

- Purchase and installation of a trail gate for placement at entrance into a trail (to prevent access by motorized vehicles except for public safety, security, and maintenance vehicles) cost approximately $2,000 - $5,000 depending on size and type.

F.2 INTERSECTION CROSSINGS

Intersection improvement types include color pavement markings, signals, signs, and bicycle detector loops.

COLORED PAVEMENT MARKINGS

- Installation of colored markings (thermoplastic application) to increase bicycle visibility at intersections or to create a bike box cost approximately $12.00 per square foot.

SIGNALS

- Pedestrian/Bicycle Signal Activation -4 Way activated signal (a 4-corner walk/don't walk signal system with a signal head and activator – with eight of each unit) cost approximately $15,000 - $20,000.

- Pedestrian/Bicycle Signal Activation – 2 Way activated signal (a 2-corner walk/don't walk signal system with a signal head and activator) cost approximately $2,500 - $5,000. Additional costs may be required if a full signal system is installed.

SIGNS

- NO TURN ON RED Signs cost approximately $50 - $200 per each depending if a post is needed plus installation at $100 per each

- Regulatory, warning, and informational signs on post cost approximately $200 per sign and post plus $100 per each for installation.

BICYCLE DETECTOR LOOPS

- Loop detector in the pavement cost approximately $2,000 - $2,500 per loop detector.

F.3 BICYCLE PARKING FACILITIES

Bicycle parking facilities include either a bicycle rack or locker.

BICYCLE RACK

- An inverted U rack that holds two bicycles cost approximately $240 each installed. Unique designs may have a higher cost associated with them.

- A bike rack designed to hold multiple bicycles (coathanger or similar) cost approximately $440 - $900 depending on style, length, and quantity order will affect cost.

BICYCLE LOCKER

- A bicycle locker that typically holds two bicycles each cost approximately $1,300 - $2,000 per locker installed. Special designs would increase the cost.

F.4 STREETSCAPE IMPROVEMENTS

Streetscape improvement types include street lighting and landscaping.

LIGHTING

- Varies depending upon type of light, location, and utility provider; however, costs usually start at $3,600 per fixture. If a light pole is needed, additional costs will be added based on style and height of pole.

LANDSCAPING

- Street trees (depending on foliage, type, and size) range from $350 - $500 per street tree.

- Shrubs (depending on type) cost approximately $50 - $75 per each installed by a contractor.

F.5 ROAD DIET TREATMENTS

Traffic Calming Devices include the following:

SPEED BUMPS

- Standard speed bump is approximately $500 / each

CURB EXTENSIONS

- Concrete curb extension vary from $2,000 to $20,000 / corner, depending upon design and site conditions

CHICANES

- Landscaped chicanes cost approximately $10,000 for a set of three on an asphalt street and $15,000 - $30,000 on a concrete street

RAISED MEDIAN

- Raised median cost approximately $15,000 - $30,000 / 100 feet

CROSSING ISLAND/ PEDESTRIAN REFUGE ISLAND

- Crossing island cost approximately $6,000 - $9,000 / island
- Raised concrete pedestrian refuge island with landscaping cost approximately $10,000 - $30,000 / each

CHICANES

- Landscaped chicanes cost approximately $10,000 for a set of three on an asphalt street and $15,000 - $30,000 on a concrete street

MINI-CIRCLE

- Landscaped traffic mini-circle on an asphalt street cost approximately $6,000 and can cost approximately $8,000 - $12,000 on a create street

ROUNDABOUT

- Landscaped roundabout for neighborhood intersections range from $45,000 - $150,000
- Landscaped roundabout for arterial streets can cost approximately $250,000

RAISED MEDIAN

- Raised median cost approximately $15,000 - $30,000 per 100 feet

CROSSING ISLAND/PEDESTRIAN REFUGE ISLAND

- Crossing island cost $6,000 - $9,000
- Raised concrete pedestrian refuge island with landscaping cost approximately $10,000 - $30,000

[i] Federal Highway Administration (FHWA) Pedestrian Safety, *Safer Journey Library* , October 2007, http://safety.fhwa.dot.gov/saferjourney/library/matrix.htm

[ii] Pedestrian and Bicycle Information Center, Active Communities/Transportation Research Group, *Bikecost Tool: Benefit-Cost Analysis of Bicycle Facilities*, March 2009, http://www.bicyclinginfo.org/bikecost/

APPENDIX G – GLOSSARY OF TERMS

The following terms are used throughout this Plan. The material in this glossary is largely taken from the "Guide for the Development of Bicycle Facilities 1999" by the American Association of State Highway and Transportation Officials and "A Guide to North Carolina Bicycle and Pedestrian Laws" by the NCDOT Division of Bicycle & Pedestrian Transportation.

BICYCLE: Every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. The term "bicycle" also includes three- and four-wheeled human-powered vehicles, but not tricycles for children.

BICYCLE FACILITIES: A general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically designated for bicycle use.

BICYCLE LANE (BIKE LANE): A portion of a roadway, which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

BICYCLE PATH (BIKE PATH): A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Bike paths may also be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users.

BICYCLE ROUTE (BIKE ROUTE): A system of bikeways designated by the jurisdiction having authority with appropriate directional and informational route markers, with or without specific bicycle route numbers. Bike routes should establish a continuous routing, but may be a combination of any and all types of bikeways.

BIKEWAY: A generic term for any road, street, path or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

HIGHWAY: A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

RIGHT-OF-WAY: A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

RIGHT OF WAY: The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.

ROADWAY: The portion of the highway, including shoulders, intended for vehicular use.

SHARED ROADWAY: A roadway, which is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes, or road with paved shoulders.

SHOULDER: The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use and for lateral support of sub-base, base and surface courses.

SIDEWALK: The portion of a street or highway right-of-way designed for preferential or exclusive use by pedestrians.

STREET: A highway, as defined above. The terms "highway" and "street" and their cognates are synonymous.