DRAFT

The Town of Atlantic Beach

Comprehensive Bicycle Plan

2012

Funded by:

Division of Bicycle & Pedestrian Transportation

Consultant:

Rivers & Associates, Inc. Since 1918

ENGINEERS, PLANNERS, SURVEYORS & LANDSCAPE ARCHITECTS

COMPREHENSIVE BICYCLE PLAN

FOR

TOWN OF ATLANTIC BEACH, NC

BIKE ATLANTIC BEACH

Prepared by:
Rivers and Associates, Inc.
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Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

TOWN OF ATLANTIC BEACH, NC

COMPREHENSIVE BICYCLE PLAN

BIKE ATLANTIC BEACH

Approved by NCDOT Division of Bicycle and Pedestrian Transportation
XXXX, 2012

Recommended for Approval by Atlantic Beach Planning Board
XXXX, 2012

Approved & Adopted by the Atlantic Beach Town Council
XXXX, 2012

Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The development of the Town of Atlantic Beach Comprehensive Bicycle Plan signifies the Town's dedication to creating a safe and bike-friendly community. Atlantic Beach is a destination community for both tourists and locals alike. The Town of Atlantic Beach has recognized the need to develop a multi-modal transportation system to connect neighborhoods, activity centers and community assets. The Comprehensive Bicycle Plan is the first of its kind for the Town of Atlantic Beach and will serve as guiding document for improving, developing and maintaining bike facilities.

The Atlantic Beach Comprehensive Bicycle Plan was funded in part by a grant from the North Carolina Department of Transportation (NCDOT), Bicycle and Pedestrian Transportation Division. The Town of Atlantic Beach submitted a NCDOT Application for Bicycle and Pedestrian Planning Grant Funds for the 2011 grant year. The Town was awarded $28,000 of NCDOT funds to develop a Comprehensive Bicycle Plan. Accompanied by a local match, the Town of Atlantic Beach 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, town citizens and regional organizations such as the Crystal Coast Tourism Authority support Atlantic Beach's commitment to developing a bike-friendly community.

Atlantic Beach's vision is to ***create a safe and convenient bike network throughout Town that accommodates users of varying ages and abilities***. Identified goals and objectives to achieve this vision are discussed further in **Section 1**.

The current conditions of the Town of Atlantic Beach 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 Atlantic Beach's current conditions provide the framework for planning bicycle facilities, programs, and policies based on the community's wants and needs.

Existing conditions, 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**.

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 provide connectivity & improve safety.

Section 5 will provide guidance to the Town of Atlantic Beach 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.

Section 6 outlines recommendations for ancillary facilities, programs, and policies to make the Town of Atlantic Beach 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 Atlantic Beach 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, public survey, and the results of the roadway inventory. 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

Existing Plans, Programs and Policies Considered in developing Section 3

- Town of Atlantic Beach Land-Use Plan
- Town of Atlantic Beach Code of Ordinances
- Carteret County Parks and Recreation Master Plan and Shoreline Access Update Plan (2006)
- NCDOT Transportation Improvement Program (TIP)
- Croatan Regional Bike Plan (Draft 2012)
- State Programs and Initiatives
- Atlantic Beach Commons Master Plan (2012)
- The Grove Development Concept Plan (2007)

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, sharrows and refuge islands) to off-road projects (multi-use trails). Sixty (60) construction projects are recommended including one (1) bike lane, two (2) roadway widening / bike lane improvements, seventeen (17) multi-use trail segments, four (4) pedestrian sidewalks, three (3) existing crosswalk improvements, sixteen (16) sharrow improvements, four (4) intersection improvements, seven (7) crosswalk improvements, (5) refuge island improvements and one (1) park and ride 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 two years (0-2 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 three to five years (3-5 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 between six to ten (6-10) 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.

Table ES.0 Projects by Priority Rank									
Priority Rank	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**	**Implementation Phase**
1	27	NCDOT	Multi-Use Trail	Atlantic Beach Causeway	Bogue Blvd.	Old Causeway Rd.	1,300 ft.	$100,000	Long-Term
2	3	NCDOT	Multi-Use Trail	Fort Macon Rd.	Brooks St.	Atlantic Beach Causeway Rd.	2,000 ft.	$120,000	Long-Term
3	1	NCDOT	Multi-Use Trail	Fort Macon Rd.	Town Limits/ Fort Macon State Park	Near Oceana Dr.	8,700 ft.	$652,500	Long-Term
4	2	NCDOT	Multi-Use Trail	Fort Macon Rd.	Near Oceana Dr.	Brooks St.	1,500 ft.	$112,500	Long-Term
5	28	NCDOT	Multi-Use Trail	Atlantic Beach Causeway	Old Causeway Rd.	Atlantic Beach Bridge Abutment	2,600 ft.	$200,000	Mid-Term
6	6	NCDOT	Multi-Use Trail	Fort Macon Rd.	Cedar Ln.	Town Park Entrance	2,600 ft.	$195,000	Long-Term
7	7	NCDOT	Multi-Use Trail	Fort Macon Rd.	Town Park Entrance	Ocean Ridge Dr.	4,300 ft.	$322,500	Long-Term
8	8	NCDOT	Multi-Use Trail	Fort Macon Rd.	Ocean Ridge Dr.	Coral Bay Club area	1,600 ft	$120,000	Long-Term
9	23	N/A	Pedestrian Sidewalk	N/A	West Dr.	Raleigh Ave.	740 ft.	$38,000	Long-Term
10	24	N/A	Pedestrian Sidewalk	N/A	West Dr.	Kinston Ave.	450 ft.	$23,000	Long-Term
11	38	N/A	Multi-Use Trail	N/A	Fort Macon Rd	Tryon St	200 ft.	$2,000	Mid-Term

Table ES.0 Projects by Priority Rank, Continued									
Priority Rank	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**	**Implementation Phase**
12	57	NCDOT	Multi-Use Trail	Fort Macon Rd.	N/A	N/A	700 ft.	$45,000	Long-Term
13	58	NCDOT	Multi-Use Trail	Fort Macon Rd.	N/A	N/A	260 ft.	$16,000	Long-Term
14	53	NCDOT	Multi-Use Trail	Fort Macon Rd.	Island Quay dr.	Henderson Blvd.	350 ft.	$22,000	Long-Term
15	49	N/A	Multi-Use Trail	N/A	Freeman Ln.	Club Colony Dr.	250 ft.	$20,000	Mid-Term
16	4	NCDOT	Pedestrian Sidewalk	Fort Macon Rd.	Atlantic Beach Causeway Rd.	Charlotte Ave.	1,850 ft.	$92,500	Mid-Term
17	5	NCDOT	Pedestrian Sidewalk	Fort Macon Rd.	Charlotte Ave.	Cedar Ln.	900 ft.	$45,000	Mid-Term
18	9	NCDOT	Multi-Use Trail	Fort Macon Rd.	Coral Bay Club area	Town Limits (at Pine Knoll Shores)	4,850 ft.	$560,000	Long-Term
19	18	N/A	Multi-Use Trail	Town Easement	Charlotte Ave.	Atlantic Beach Causeway Rd.	1,400 ft.	$75,000	Mid-Term
20	39	N/A	Multi-Use Trail	N/A	Ocean Ridge Dr.	Town Park	450 ft.	$27,000	Mid-Term
21	42	NCDOT	Park and Ride / Trailhead Park	Atlantic Beach Causeway	N/A	N/A	N/A	TBD	Mid-Term
22	47	N/A	Multi-Use Trail	N/A	New Bern St.	Club Colony Dr.	140 ft.	$9,000	Long-Term

Table ES.0 Projects by Priority Rank, Continued									
Priority Rank	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**	**Implementation Phase**
23	60	NCDOT	Sharrows	Fort Macon Rd.	Brooks St.	Cedar Ln.	4,000 ft.	$4,000	Short-Term
24	19	Town	Sharrows	Charlotte Ave.	Davis Blvd.	W. Boardwalk	1,200 ft.	$1,500	Short-Term
25	45	Town	Refuge Island & Rapid Flash Beacon	Fort Macon Rd.	N/A	N/A	N/A	$35,000	Mid-Term
26	29	Town	Intersection Improvement	Old Causeway Rd.	N/A	N/A	N/A	$12,000	Short-Term
27	22	Town	Widen Road Shoulder with Bike Lanes	Bogue Blvd., Cedar Ln.	Fort Macon Rd.	Wilson Ave.	4,300 ft.	$200,000	Long-Term
28	20	Town	Sharrows	W. Boardwalk	Durham Ave.	Raleigh Ave.	850 ft.	$1,500	Short-Term
29	44	Town	Sharrows	E. Atlantic Blvd.	East Dr.	Wilson Ave.	1,500 ft.	$3,000	Short-Term
30	21	Town	Widen Road Shoulder with Bike Lanes	Ocean Ridge Dr.	Fort Macon Rd	Durham Ave.	6,000 ft.	$270,000	Long-Term
31	36	Town	Sharrow	E. Boardwalk / Glenn St.	East Dr.	CAMA rain garden	3,000 ft.	$4,000	Short-Term
32	46	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$15,000	Short-Term
33	34	Town	Sharrow	W. Bogue Sound Dr.	E. Fort Macon Rd.	Public Access Ramp	600 ft.	$1,000	Short-Term

Table ES.0 Projects by Priority Rank, Continued									
Priority Rank	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**	**Implementation Phase**
34	30	Town	Sharrows	Old Causeway Rd.	Atlantic Beach Causeway	Caribbean Way Rd.	3,400 ft.	$3,000	Short-Term
35	14	Town	Sharrows	Pelican Dr.	Fort Macon Rd.	Forest Knoll Dr.	2,000 ft.	$2,500	Short-Term
36	37	Town	Sharrow	Money Island Dr & Tryon Street	Glenn St.	Tryon St. terminus (east).	1,150 ft.	$2,500	Short-Term
37	50	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	50 ft.	$15,000	Short-Term
38	16	NCDOT	Intersection Improvement	Fort Macon Rd.	Charlotte Ave.	Fort Macon Rd.	N/A	$60,000	Mid-Term
39	17	Town	Sharrows	Davis Blvd. & Kinston Ave.	Charlotte Ave.	Bowen St.	1,600 ft.	$2,000	Short-Term
40	41	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	250 ft	$30,000	Short-Term
41	56	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500	Short-Term
42	35	Town	Sharrow	W. Atlantic Blvd.	West Dr.	Durham Ave.	1,450 ft.	$2,000	Short-Term
43	51	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	50 ft.	$5,000	Short-Term
44	52	NCDOT	Refuge Island	Atlantic Beach Causeway	N/A	N/A	N/A	$35,000	Mid-Term

Table ES.0 Projects by Priority Rank, Continued									
Priority Rank	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**	**Implementation Phase**
45	59	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500	Short-Term
46	31	Town	Sharrows	Moonlight Dr.	Atlantic Beach Causeway Rd	Smith St.	400 ft.	$1,000	Short-Term
47	40	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	100 ft.	$8,500	Short-Term
48	48	Town	Sharrows	Fort Macon Rd., New Bern St., Dunes Ave. and Freeman Ln.	New Bern Ave.	Dunes Ave. & Freeman Ln.	4,000 ft.	$5,000	Short-Term
49	55	Town	Sharrow	Commerce Way	Fort Macon Rd	Roadway Terminus	1,000 ft.	$1,500	Short-Term
50	43	Town	Sharrows	Wilson Ave.	Fort Macon Rd.	E. Boardwalk	880 ft.	$2,000	Short-Term
51	54	Town	Sharrows	Henderson Blvd.	Triple S Marina	Henderson Blvd. Beach Access	1,700 ft.	$3,500	Short-Term
52	25	Town	Bike Lane	Atlantic Blvd., East & West Dr.	Central Dr.	Atlantic Blvd.	2,300 ft.	$2,500	Short-Term
53	26	NCDOT	Intersection Improvement	Fort Macon Rd., Atlantic Beach Causeway	N/A	N/A	N/A	$3,000	Short-Term
54	10	NCDOT	Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500	Short-Term

Table ES.0 Projects by Priority Rank, Continued									
Priority Rank	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs***	**Implementation Phase**
55	11	NCDOT	Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500	Short-Term
56	33	NCDOT	Refuge Island & Rapid Flash Beacons	Atlantic Beach Causeway	N/A	N/A	N/A	$35,000	Mid-Term
57	13	NCDOT	Refuge Island & Rapid Flash Beacons	Fort Macon Rd.	N/A	N/A	N/A	$55,000	Mid-Term
58	15	NCDOT	Intersection Improvement	Fort Macon Rd.	Town Park Entrance	Atlantic Station Shopping Center	N/A	$60,000	Mid-Term
59	12	NCDOT	Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500	Short-Term
60	32	NCDOT	Refuge Island & Rapid Flash Beacons	Atlantic Beach Causeway	N/A	N/A	N/A	$35,000	Mid-Term

Section 8 describes how the recommendations for improving Atlantic Beach'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.

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SECTION I – INTRODUCTION

1.0 BICYCLE PLAN INITIATIVE

Section Outline

The development of the Town of Atlantic Beach Comprehensive Bicycle Plan signifies the Town's dedication to creating a safe and bike-friendly community. Atlantic Beach is a destination community for both tourists and residents alike. The Town of Atlantic Beach has recognized the need to develop a multi-modal transportation system to connect neighborhoods, activity centers and community assets. The Comprehensive Bicycle Plan is the first of its kind for the Town of Atlantic Beach and will serve as guiding document for improving, developing and maintaining bike facilities.

The Atlantic Beach Comprehensive Bicycle Plan was funded in part by a grant from the North Carolina Department of Transportation (NCDOT), Bicycle and Pedestrian Transportation Division. The Town of Atlantic Beach submitted a NCDOT Application for Bicycle and Pedestrian Planning Grant Funds for the 2011 grant year. The Town was awarded $28,000 of NCDOT funds to develop a Comprehensive Bicycle Plan. Accompanied by a local match, the Town of Atlantic Beach 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 Town of Atlantic Beach has received $28,000 in funds from NCDOT to develop a Comprehensive Bicycle Plan.

The local government, Town citizens and regional organizations such as the Crystal Coast Tourism Authority support Atlantic Beach's commitment to developing a bike-friendly community.

1.1 PUBLIC INVOLVEMENT

Public input played an important role in the development of the Atlantic Beach 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 Town Council. Media outreach was utilized with press releases, public notices, and invitations to all meetings and open houses to announce the project.

A 13 – Member Steering Committee, comprised of Atlantic Beach citizens, 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. The Steering Committee members are listed in the acknowledgements page of this Plan. 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 Town's website and hard copies of the survey available at Town Hall. Atlantic Beach citizens were notified of the survey through local media outlets, "business card" announcements distributed by the Steering Committee Members, the town's website and notices placed in utility bills.

Two Public Open Houses were held during development of the Comprehensive Bicycle Plan. The first Public Open House was held on March 20, 2012 at Town Hall. 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 June 5, 2012 at Town Hall. 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

During the first Steering Committee Meeting, members discussed their vision for the Bicycle Plan. That discussion formulated the final vision for the plan:

> Atlantic beach's vision is to ***CREATE A SAFE AND CONVENIENT BIKE NETWORK THROUGHOUT TOWN THAT ACCOMMODATES USERS OF VARYING AGES AND ABILITIES.***

1.3 OVERALL GOALS & OBJECTIVES

The overall goals were generated by the Steering Committee at the January 17, 2012 meeting. The following goals and objectives were developed for the Town of Atlantic Beach Comprehensive Bicycle Plan based on input from the Steering Committee.

GOAL: IMPROVE CONNECTIVITY

To develop a comprehensive bicycle network that connects local & regional destinations while serving as an alternate to motor-vehicle transportation.

Objectives

- Identify key community destinations, such as beach accesses, marinas, parks, tourist attractions and shopping centers.
- Create safe and convenient bike routes to connect points of *interests.*
- Provide improved bike access from neighboring communities (i.e. Morehead City and Pine Knoll Shores).

GOAL: PROMOTE BICYCLING FOR TOURISM, TRANSPORTATION & HEALTH

To acknowledge bicycling as a community asset for promoting alternate transportation through Town while being a tool for increasing the health of residents and visitors alike.

Objectives:

- Increase the quality of life for residents of Atlantic Beach.
- Encourage the use of bicycling as a legitimate mode of transportation.
- Use the Bicycle Plan as a marketing tool for the Town.
- Coordinate Town, County, and private-sector efforts to improve bicycling facilities and routes.

GOAL: EDUCATE CITIZENS AND VISITORS ON THE BENEFITS OF A BIKE-FRIENDLY COMMUNITY.

To provide opportunities for community engagement that will encourage safe bicycle use.

Objectives:

- Develop programs that encourage bike usage for all citizens.
- Educate residents and visitors of local and state laws in regard to road safety.

GOAL: ENSURE COMMUNITY BIKEABILITY THROUGH POLICIES & PROGRAMS.

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

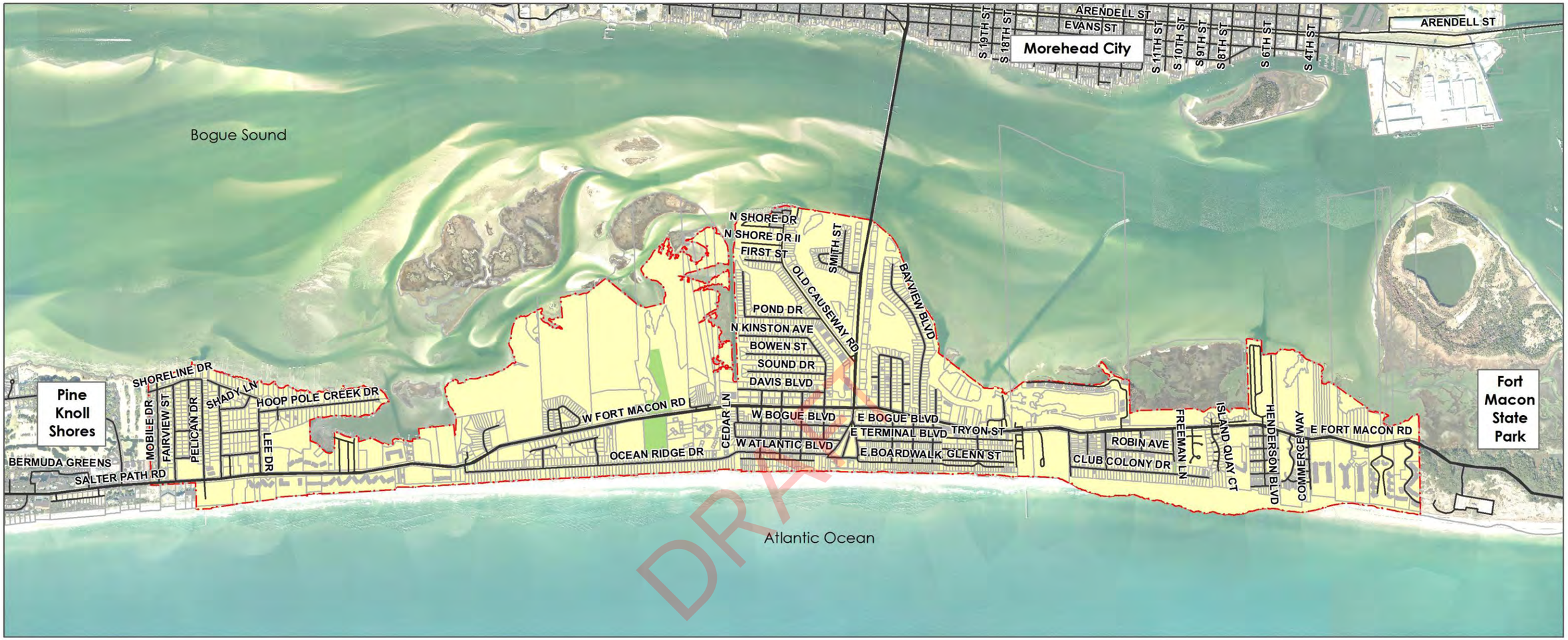
Objectives:

- Develop ordinances and policies to require bicycle facilities in new and redevelopment projects.

1.4 PURPOSE OF PLAN

The Comprehensive Bicycle Plan provides a comprehensive, affordable approach to bicycle planning that maximizes Atlantic Beach'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 Atlantic Beach's town limits. Map 1.1 illustrates the project study area.



Map 1.1
Study Area

Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

The Town of ATLANTIC BEACH
Comprehensive Bicycle Plan

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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

The Development of this Comprehensive Bicycle Plan included public involvement to develop project recommendations.

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 Atlantic Beach citizens by way of an on-line survey available on the Town's 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.

PHASE 2 – PRELIMINARY RECOMMENDATION DEVELOPMENT

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

- 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.
- 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;
- Met with NCDOT representatives to discuss preliminary recommendations.
- Held a third Steering Committee meeting to present preliminary improvements recommendations and to discuss project prioritization.

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.

Appendix 'A' contains meeting minutes from Steering Committee Meetings and Public Open House sessions.

PHASE 4 – FINAL PLAN DEVELOPMENT AND APPROVAL

Based upon comments from the NCDOT and Atlantic Beach Planning Board review, the Plan was revised and resubmitted to the NCDOT for approval and to the Town Council 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 Atlantic Beach 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 Town Council's Review;
- Developed a revised final Comprehensive Bicycle Plan based upon feedback from the Town's Planning Board and the Town Council;
- Submitted final plan to Town for approval and adoption by the Town Council.

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 Atlantic Beach. 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 Atlantic Beach 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. Many of the community's goods, services, and recreational facilities are located within cycling 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 Atlantic Beach that will increase opportunities for further economic development within the Town. Bicycling facilities will make bicyclists feel safer in the community. 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. Providing bicycling facilities in Atlantic Beach may increase visits to local businesses and recreation facilities. Other economic benefits of bicycling include reduced health care costs and reduced dependency on auto ownership.

[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

2.0 TOWN OF ATLANTIC BEACH OVERVIEW

Section Outline

The current conditions of the Town of Atlantic Beach 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.

Atlantic Beach was first envisioned in the 1870's by Appleton Oaksmith. His vision was for Atlantic Beach to become "a new resort by the sea". John J. Royal and Winifred S. Chadwick began the construction of Oaksmith's vision. In 1928, the Royal Pavilion or "the circle" was developed. This area later become the heart of Atlantic Beach with boulevards extending east and west from the "Circle" named for local geographical features and avenues extending north / south in honor of towns and cities of North Carolina.[1]

Today, the Town of Atlantic Beach has grown to a population of 1,495 residents (2010 Census). During summer months, the Town's population swells due to its notoriety as a tourist activity center. The Town of Atlantic Beach 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 Atlantic Beach encourage an active lifestyle, including efforts to develop alternative transportation systems for bicycling.

Atlantic Beach is a tourist activity center which experiences a large influx of visitors during summer months.

Town of Atlantic Beach gateway signage near the "Circle". *Photo Courtesy of Rivers and Associates, Inc.*

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.

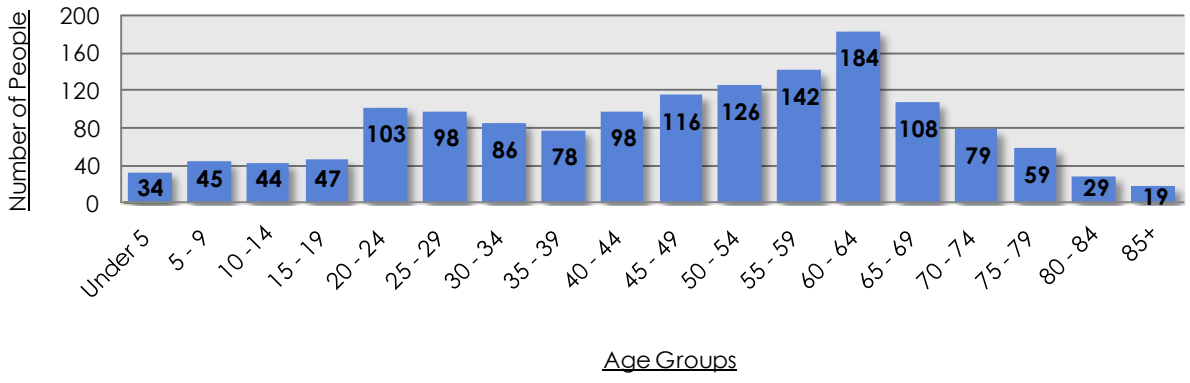
DEMOGRAPHIC ANALYSIS

A demographic analysis was completed based on data obtained from the US Census Bureau. In 2000 the Census reported, Atlantic Beach's population at 1,781. As of the 2010 Census, the total population for the Town of Atlantic Beach was 1,495 representing a decline of 281 people from the 2000 Census. Of the 1,495 residents currently residing in Atlantic Beach, 941 are female and 840 are males with a median age of 48.7 years. In the 2010 Census year, the population of North Carolina was recorded at 9,535,483 up from the 2010 population of 8,049,313. The United States population was recorded at 308,745,538 in 2010 up from 281,421,906 in 2000. The average age was 38.6 in North Carolina and 37.2 in the United States in 2010.

The majority of Atlantic Beach's residents are over the age of 18 with a median age of 48.7 years which is above state and national averages.

In 2010, the Town's population was distributed with 92% of the population over the age of 18 of which 20% were over the age of 65. In 2000, 93% of the Town's population was over the age of 18 and 18% were over the age of 65. Overall, Atlantic Beach's age distribution is within range of State and National averages. However, Atlantic Beach does contain a higher proportion of residents over the age of 65. Figure 2.0 reflects the age demographics for the Town of Atlantic Beach in the year 2010.

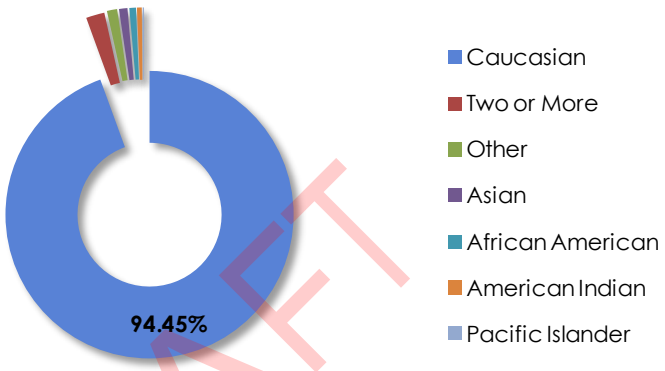
Figure 2.0 Atlantic Beach Age Demographics (2010)



Source: U.S. Census Data

The racial breakdown of the population of the Town of Atlantic beach in 2010 weas as follows: 94.45% Caucasian, 2.07% from two or more races, 1.14% from other races, 0.94% Asian, 0.74% African American, 0.54% America Indian and 0.13% Pacific Islander. The racial breakdown of North carolina's population in 2010 included 68.5% Caucasians and 21% African American. The racial breakdown for the United States in 2010 included 72.4% Caucasian and 12.6% African American. These statistics indicate that the Town of Atlantic Beach has a much lower minority population than the state and national average. Figure 2.1 illustates the racial breakdown of the population for the Town of Atlantic Beach.

Figure 2.1: Atlantic Beach Population by Race (2010)

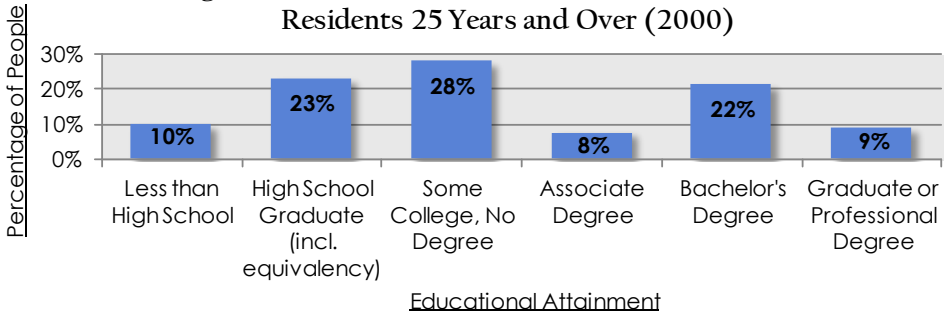


Source: U.S. Census Data

Education

The educational attainment for residents 25 years and over in 2000 was as follows: 10% with less than 9th grade, 23% were high school graduautes (including equivalency), 28% with some college, no degree, 8% with an associates degree, 22% with a bachelors degree, and 9% with a graduate or professional degree. Therefore, 90% of the population earned an education of high school graduate or higher. Figure 2.2 reflects the educational attainment for Atlantic Beach's residents 25 years and over in 2000 (2010 Census data for educational attainment was not avilable at this time.)

Figure 2.2 Atlantic Beach Educational Attainment for Residents 25 Years and Over (2000)



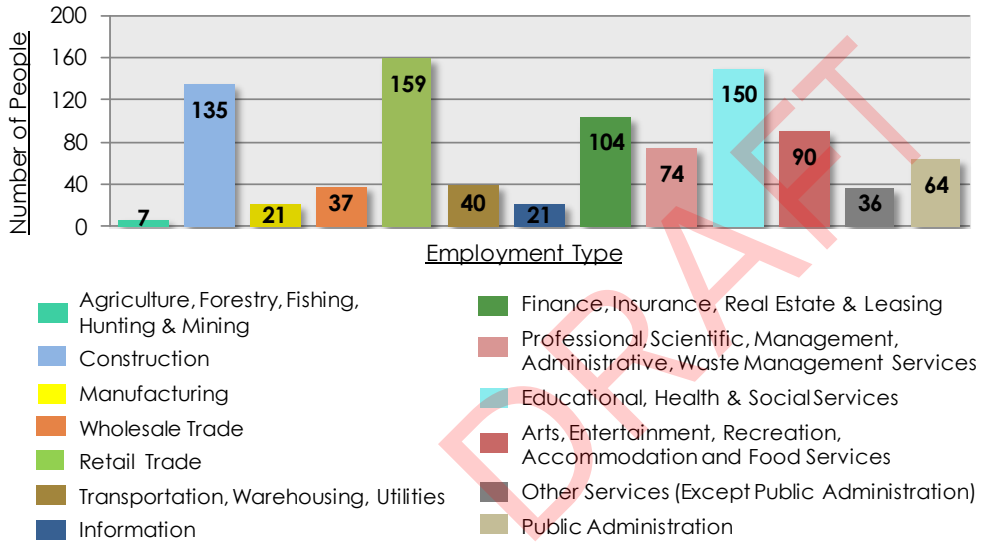
Source: U.S. Census Data

Employment

Atlantic Beach's labor force (population 16 years and over) in 2000 was 938. Atlantic Beach's employment profile features a wide range of professions. Overall, the employment industry for Atlantic Beach is focused around retail trade. This is strongly due to Atlantic Beach's economic focus as a tourist community. Following closely behind the rertail trade sector of employment is education, health and social services. In Atlantic Beach, these two employemnt sectors represent 32% of the employed population. Figure 2.4 illustrates Atlantic Beach's employment industry by population in 2000 (2010 Census data for educational attainment was not avilable at this time.)

The top five employment types of Atlantic Beach include retail, construction, education, health and social services.

Figure 2.3 Atlantic Beach Employment Profile (2000)



Source: U.S. Census Data

Income

According to the North Carolina Rural Economic Development Center, the median household income for Atlantic Beach was $49, 199 between 2005-2009. Atlantic Beach's median household income is higher than the state average of $45,570 and slightly less than the national average of $51,914 (2008-2010). Atlantic Beach's per capita income in 2005-2009 was $31,541 which was above state and national averages of $24,745 and $27,334 respectively. Poverrty rates within Atlantic Beach were close to state averages at 15.10% in Atlantic Beach and 15.5% in North Carolina. Both Atlantic Beach and North Carolina had higher poverty rates than the national average of 13.80%. Figure 2.5 illustrates household income demopgraphics for Atlantic Beach in comparison to state and national statistics.

Figure 2.4: Household Income Demographics (2005-2010)

Income Category	Atlantic Beach (2005-2009)	North Carolina (2008-2010)	United States (2008-2010)
Median Household Income	49,199	$45,570	$51,914
Per Capita Income	$31,541	$24,745	$27,334
Poverty Rate	15.10%	15.50%	13.80%

Source: U.S. Census Data

Transportation

The majority of Atlantic Beach residents 16 years or older that are employed commute to work via car, truck or van. 5% of the employed work at home and 2.4% walked to work. Less than 1% of residents biked to work in 2000 (2010 Census data for educational attainment was not avilable at this time.) Figure 2.6 illustrates the percentage of Atlantic Beach residents that commute to work via bicycling.

RECOMMENDATION
Offer incentives such as bike-to-work programs to encourage biking to work.

Figure 2.5: Methods of Transportation for Work Commute (2000)

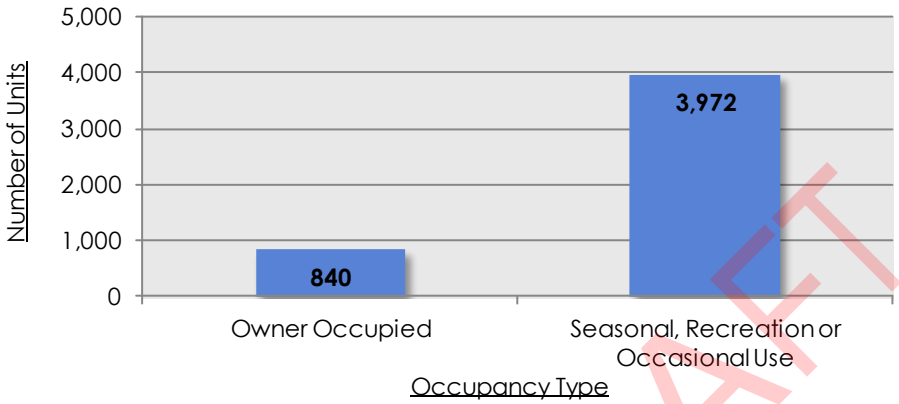
Transportation Method	Percentof People
Car, truck, or van:	91.50%
Public transportation:	0.20%
Bicycle	0.30%
Walked	2.40%
Other means	0.30%
Worked at home	5.10%

Source: U.S. Census Data

Housing

Atlantic Beach is a community that experiences heavy seaonal traffic due to its proxinity to scenic and recreational amenities. According to US Census data, Atlantic Beach has 4,812 total housing units. 17% of these housing units are owner occupied dwelling units. In comparision, 83% of Atlantic Beach's housing units are used for seasonal, recreation or occasional use. Figure 2.6 illustrates owner occupied housing compared to seasonal, recreation or occasional use occupancy units.

Figure 2.6 Atlantic Beach Housing Occupancy (2010)



83% of Atlantic Beach's housing units are used for seasonal, recreational or occasional use

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 Town's website (www.Atlantic Beach-nc.org) and hard copies were available at the Atlantic Beach Town Hall.

The survey was advertised in a notice posted at Town Hall. The local newspaper published an article 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 Town's website and take the public survey.

The survey period began on January 11, 2012 and continued to accept responses until April 5, 2012. During this time, 114 responses were received for tabulation by the consultant. **For a copy of the survey questions and complete results, please see Appendix A.**

Respondents were nearly evenly split between females and males. 512% of respondents were female and 48% were male. The majority of respondents were age 55 and over (42%).

RECOMMENDATION
Provide opportunities for physical exercise and outdoor recreation by creating scenic and user friendly bicycle routes.

The survey found that nearly 55% of respondents had ridden a bicycle in the last week. Preference to biking on weekends, when the weather conditions are warm and dry were the most common responses selected.

The most common reason for bicycling by respondents was recreation which received an 88 response rate. Physical exercise also ranked high amongst respondents at 80%. The survey also found that 37.3% of respondents ride a bicycle to visit neighbors, family and friends, 34.5% of respondents ride a bicycle for shopping trips, 31.8% of respondents ride a bicycle to run errands, 27.3% of respondents ride a bicycle to commute to family event. Less than 25% of respondents ride a bicycle to work (12.7%) or to commute to school (1.8%).

There were a wide variety of bike destinations revealed by the survey results. "The Circle" was the most popular bicyclist destination receiving a response rate of 57.4%. Other popular destinations included Fort Macon State Park (50%), beach accesses (45.4%), shopping centers (44.4%), restaurants / taverns (36.1%) and Atlantic Beach Town Park (34.3%).

Nearly half of the respondents do not wear a helmet (51.4%) when they ride their bike. Of the respondents that don't wear a helmet when biking, 50.9% indicated they don't wear a helmet because they don't own one.

This information reveals that a program is needed in Atlantic Beach to encourage the benefits of wearing a helmet.

Nearly 100% of all respondents indicated that they would like to ride their bicycle more. 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 streets (93.8%)
2. They felt safer amongst traffic (84.8%)
3. There were more clearly marked trails (81%)
4. They had better places to ride (75.2%)
5. They felt motorist respected cyclists and better understood cyclists' rights and responsibilities (60%)

RECOMMENDATION
Increase bicyclist safety by installing roadway markings, signage and off-road bicycle facilities.

Survey respondents were asked questions about their perceptions of bicycling and bicycling facilities within Town.

Respondents were given the opportunity to fill-in answers in response to a question regarding roads needing improvements for bicycling. In general, this road received an overwhelming response because NC Hwy 58 is a major thoroughfare through Atlantic Beach. The following were the most commonly suggested by survey respondents for roadway improvements:

1. NC Hwy 58 (Fort Macon Road)
2. Atlantic Beach Causeway Road
3. Atlantic Beach Causeway Bridge

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

1. "The Circle"
2. Shopping Centers / businesses
3. Parks
4. Residential areas
5. Community attractions
6. Neighboring communities

The following responses were perceived to be the top major barriers to bicycling transportation in Atlantic Beach:

1. Lack of bicycle facilities
2. Lack of respect for bicyclists / motorist education
3. Unsafe / cyclists insecurity / dangerous situations
4. Seasonal traffic

Nearly 100% of respondents support change in bicycle facilities and policies to make Atlantic Beach a more bicycle-friendly community

Only 16% of respondents believe that bicycle conditions in Atlantic Beach are "good". Nearly 60% of respondents believe that bicycle conditions in Atlantic Beach are "fair" while 25% of respondents rated bicycle conditions in Atlantic Beach as "poor".

Over half (53.8%) of the survey respondents lived within the Town Limits of Atlantic Beach. 46.2% of survey respondents do not live within the Atlantic Beach town limits. However, many of the respondents live in neighboring communities. Some respondents may own or rent season housing located within Atlantic Beach. The following were the most commonly indicated areas of residence:

1. Morehead City
2. Beaufort
3. Pine Knoll Shores
4. Emerald Isle

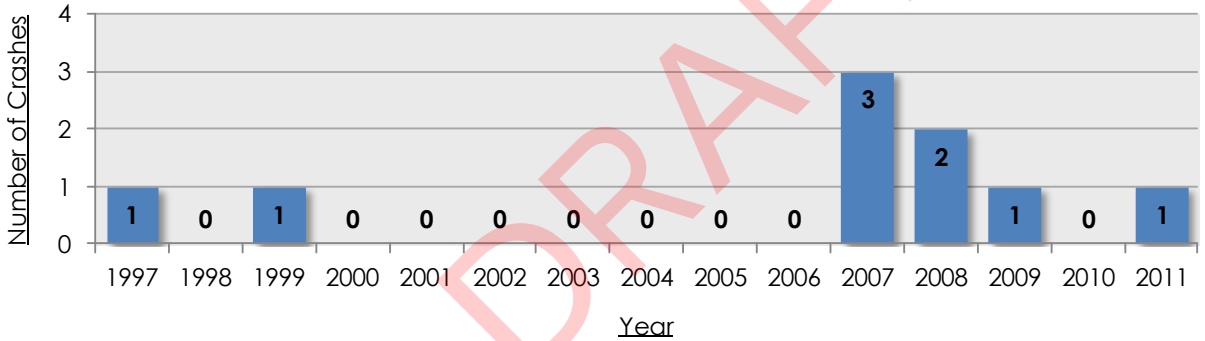
LOCAL BIKE CRASH DATA

The Town of Atlantic Beach's bicycle crash data was analyzed using the NCDOT's web-based bicycle crash database and Atlantic Beach Police Department Report data. This data was created by the UNC Highway Safety Research Center from all reported bicycle-motor vehicle crashes within Atlantic Beach from 1997 to 2007.[2] The data was analyzed to determine trends and to identify the high-risk areas of Atlantic Beach. Police report data from the Atlantic Beach Police department were also included in the analysis to provide the most up-to-date crash data through 2011. This information from both data sources does not include instances involving only bicycles, like a fall, where medical attention may have been sought.

Between 2007-2011 There were **9** reported bike crashes.

From 1997-2011, the Town of Atlantic Beach experienced nine (9) reported bicycle-motor vehicle crashes. Figure 2.7 shows the distribution of crashes during the time period.

Figure 2.7: Total Number of Bicyclist Involved in Crashes by Year (1997-2011)

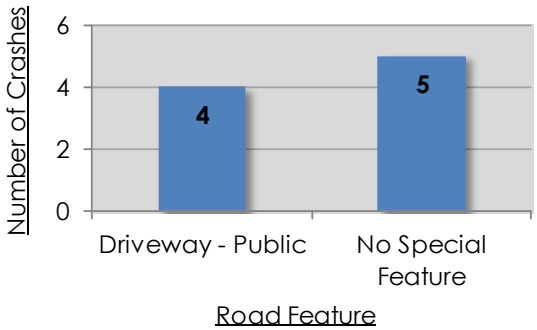


Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle crash data & Town of Atlantic Beach Police Department crash data.

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 public driveways. Five (5) of the nine (9) bicycle-motor vehicle crashes occurred at locations that had "no special feature". Improving roadway conditions and intersections will aid in reducing crashes within these areas.

Figure 2.8: Crashes Depending Upon Road Feature (1997-2011)



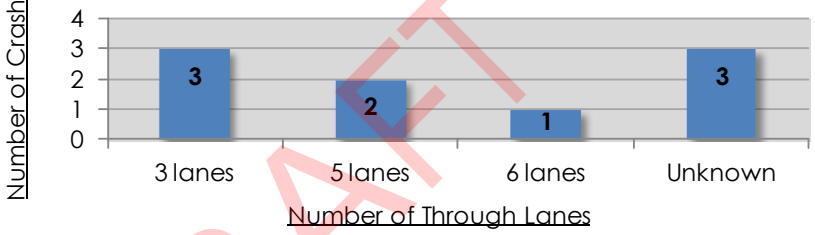
Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle crash data & Town of Atlantic Beach Police Department crash data.

67% of bike crashes that have occurred in Atlantic Beach from 1997-2011 occurred on multi-lane roads.

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

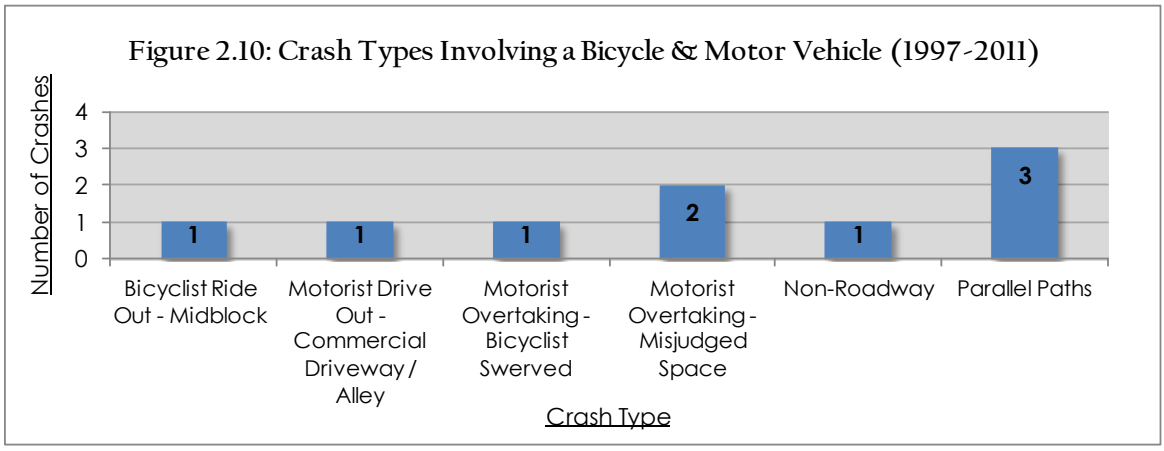
Figure 2.9 shows the distribution of crashes according to road configurations. Three (3) bicycle-motor vehicle crashes occurred on a three-lane road within the Town of Atlantic Beach. The Town's five-lane roads experienced two (2) crashes and one six lane road experienced one (1) crash. The number of 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.

Figure 2.9: Road Configuration at Crashes Involving at Least One Bicyclist (1997-2011)



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data & Town of Atlantic Beach Police Department

The bicyclists' compliance with the rules of the roadway is indicated by the direction the bicyclist is traveling. According to the data, four (4) crashes occurred when bicyclists were facing traffic and two (2) crashes occurred when cyclist were following traffic. The bicyclists were traveling with traffic in three (3) of the crashes that occurred in Atlantic Beach. Two (2) crashes occurred when the bicyclist was facing traffic and two (2) crashes occurred when bicycle direction was inapplicable. The crash data indicates a need for increased safety education for bicyclists and motorists alike.

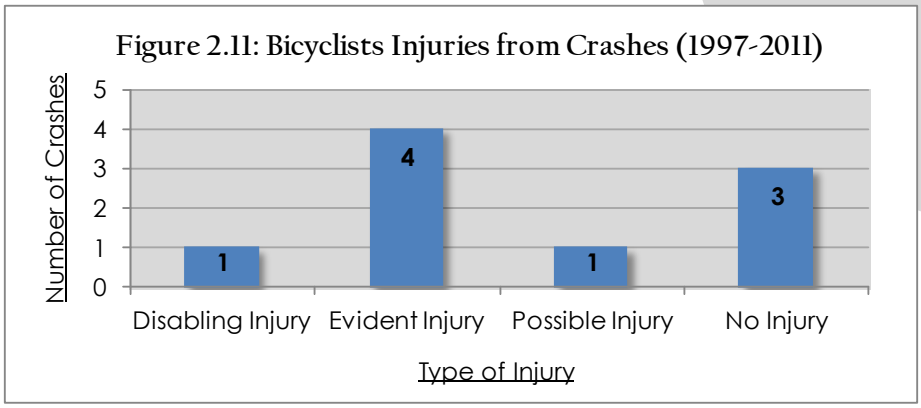


Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data & Town of Atlantic Beach Police Department

The likelihood of bicycle injury 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. One (1) crash occurred on a t a driveway with a speed limit of 5-15 mph. Six (6) crashes occurred on roads with a 30-35 mph speed limit and Two (2) crash occurred on a road with a 40-45 mph speed limit. 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

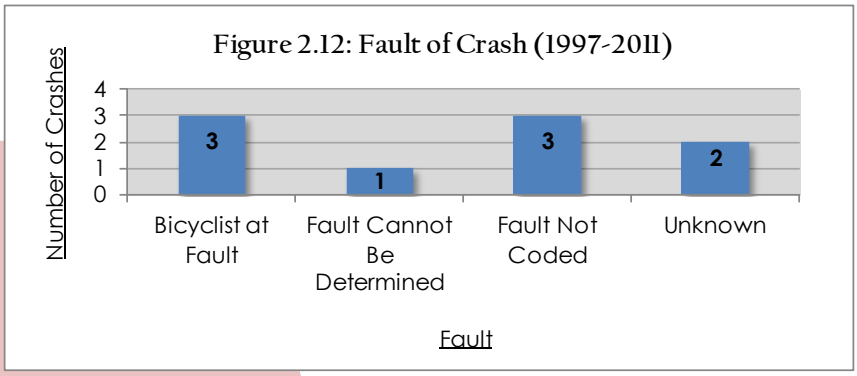
The degree of injuries obtained in bicycle crashes is illustrated in the Figure 2.11.



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data & Town of Atlantic Beach Police Department

Figure 2.12 indicates the need for motorist and bicyclist education regarding safety. The data shows that there is an increased need for bicycling education.

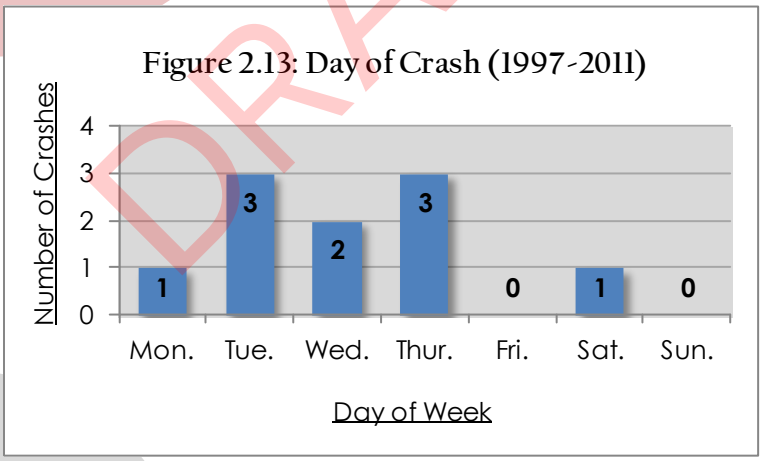
Bicyclists were at fault in 30% of bicycle crashes from 1997-2011.



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data & Town of Atlantic Beach Police Department

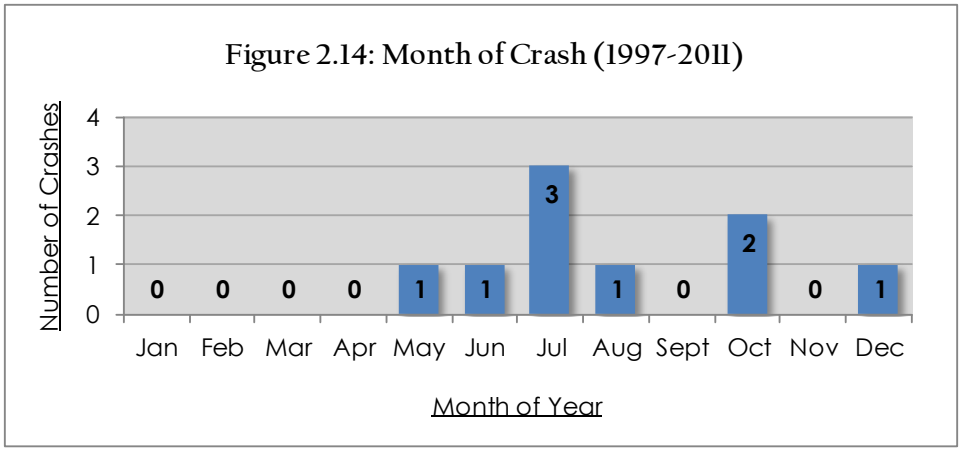
Figure 2.13 illustrates the day of the week when the bicycle-motor vehicle crashes occurred. Crashes occurred throughout the week with one (1) crashes on Monday and Saturday, three (3) crashes on Tuesday and Thursday, two (2) crashes on Wednesday, and zero (0) crashes on Friday and Sunday.

Summer months with increased tourist traffic experienced increased bike crashes.



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data & Town of Atlantic Beach Police Department

The months of moderate – warm weather saw the majority of bicycle-motor vehicle crashes with 8 of 9 crashes occurring from May through October. The weather conditions reported in Atlantic Beach's bicycle-motor vehicle crash data indicate that the weather does not impact crash occurrence. All (9) bicycle-motor vehicle crashes occurred on a clear day. These numbers indicate that there is a higher level of bicycle activity during the months with warm weather.



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data & Town of Atlantic Beach Police Department

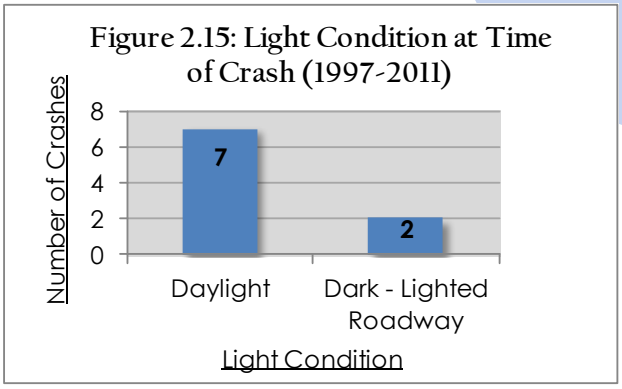
The time of day when the bicycle-motor vehicle crashes took place indicate rider preferences throughout the day. Four (4) of the crashes occurred between 8:00 a.m. and 12: 00 p.m. This timeframe suggests that people may be riding bicycles when local traffic increase for work or school commutes. Three (3) crashes occurred at 1:00 p.m. and 6:00 p.m. during times of the day when bicycle visibility is high but road traffic may increase during these times due to an influx or visitors into Town. Two (2) crashes occurred between 8:00 p.m. and 10:00 p.m. This timeframe indicates crashes occurred during times when road visibility was 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 as well as suggesting reflective outer garments.

RECOMMENDATION

Improve signage , signals and bicycle facilities to decrease crashes during high traffic daylight hours.

Improve lighting and signage to decrease nighttime crashes

Crash data also indicates a higher degree of bicycle-motor vehicle interaction during the daytime (not graphed). Seven (7) of Atlantic Beach's bicycle-motor vehicle crashes occurred during the daylight and one occurred at dusk. Two (2) crashes occurred during darkness on a lighted roadway. Figure 2.15 illustrates the light conditions during bike crashes in Atlantic Beach.

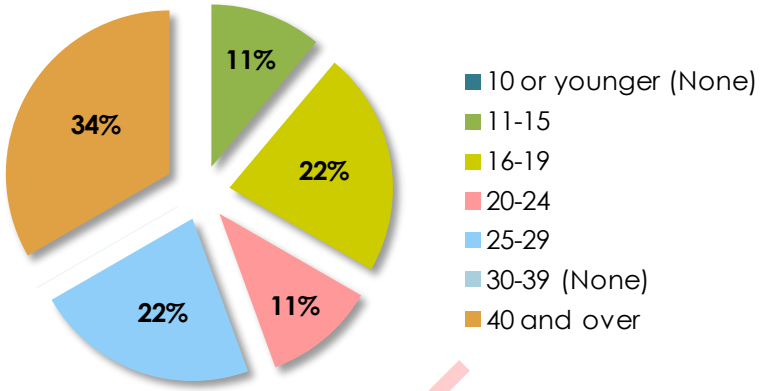


Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data & Town of Atlantic Beach Police Department

Figure 2.16 shows that bicycle-motor vehicle accidents involved both older and young adults in Atlantic Beach. This statistic reflects the need for bicycling education for bicyclists of all ages.

RECOMMENDATION
Develop community based programs to educate citizens and visitors to local and state laws for roadway safety.

Figure 2.16: Age of Bicyclist in Crash (1997-2011)



Source: NC DOT Division of Bicycle and Pedestrian Transportation, Bicycle Crash Data & Town of Atlantic Beach Police Department

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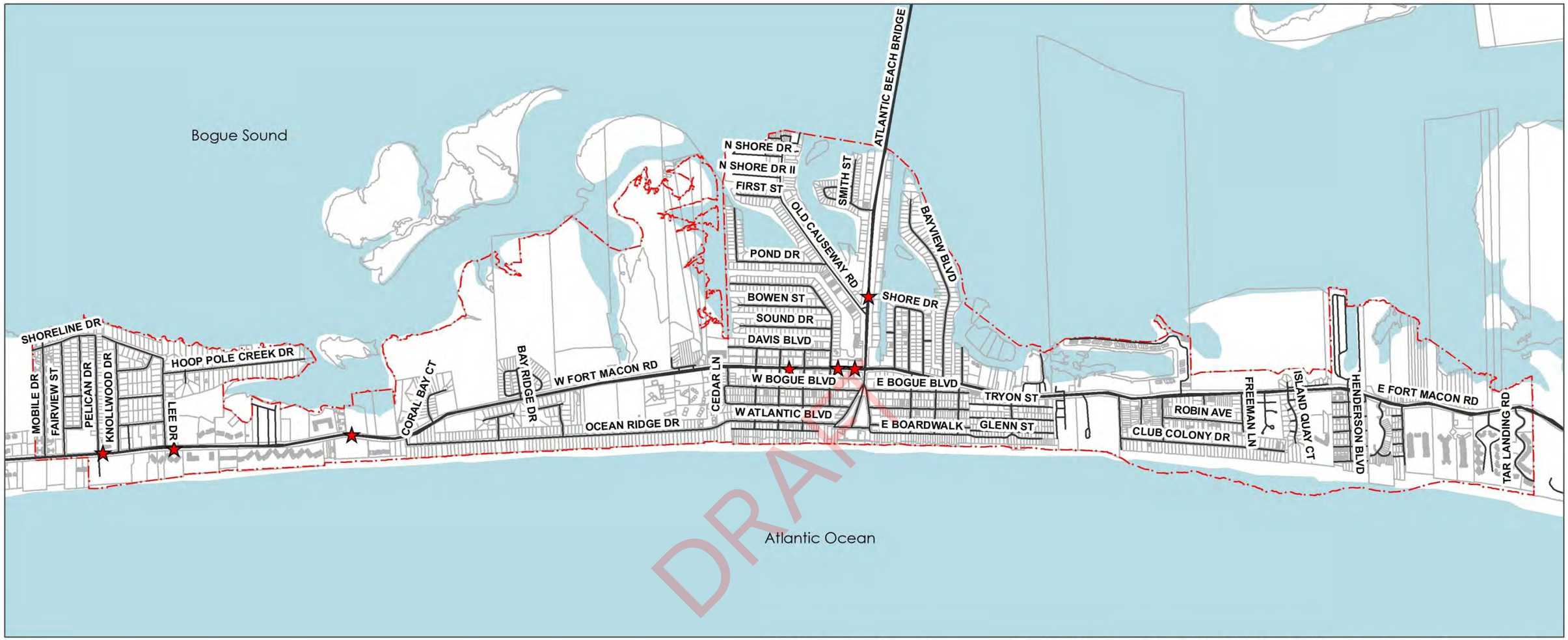

*A total of nine (9) crashes occured in Atlantic Beach from 2007-2011. Two (2) crashes have unknown locations.

0 0.125 0.25 0.5 Miles

Legend

- Crash Sites
- State Road
- Street
- Parcel
- Water Feature

Map 2.1

Bike Crash Sites

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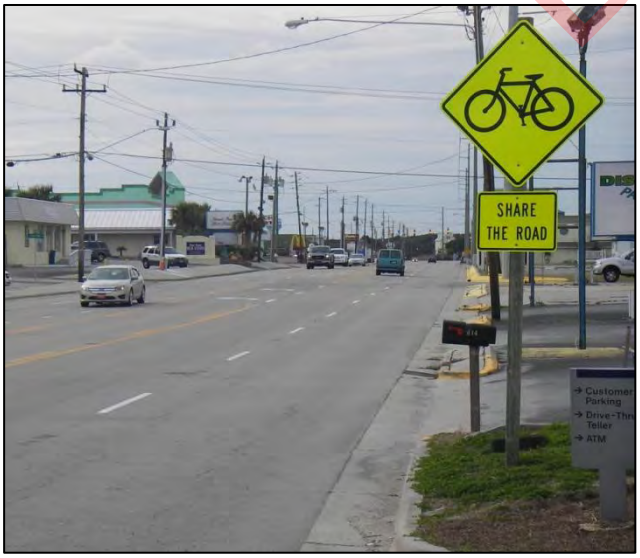
2.2 INVENTORY & ASSESSMENT OF EXISTING BICYCLE FACILITIES

As part of the planning process, it was important to inventory and assess the existing bicycle facilities and roadways in Atlantic Beach. 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 Atlantic Beach's bicycle network and bicycling preferences throughout the community.

RECOMMENDATION

Lower traffic secondary streets provide opportunities for safer bike routes for bicyclists

Currently, there are no designated bicycle routes in Atlantic Beach. The consultant conducted a preliminary inventory of the existing conditions of the roadways on January 12, 2012. Currently, there are no existing bike lanes in Atlantic Beach. Road shoulders are located along NC 58 but are too narrow to comfortably support bicyclist use. Road shoulders are located along portions of the Atlantic Beach Causeway and are up to 4' wide from approximately the Old Causeway Road to the Atlantic Beach Causeway Bridge. There are a few bicycle signs located within Town, but they are limited and located far apart. After bicycling project opportunities were identified, the consultant conducted a detailed inventory of the existing roadways suggested for bicycling improvements to include street widths, presence and width of curbs and gutters, speed limits, condition of surface, and identification of constraints. Consideration of this data allows recommendations to be made as part of the Town of Atlantic Beach Comprehensive Bicycle Plan. Map 2.1 illustrates locations of bike crashes in Atlantic Beach. Map 2.2 illustrates existing bicycle facilities within the Town Limits.



Existing "Share the Road" sign located along NC 58 near Town Hall. *Photo Courtesy of Rivers and Associates, Inc.*

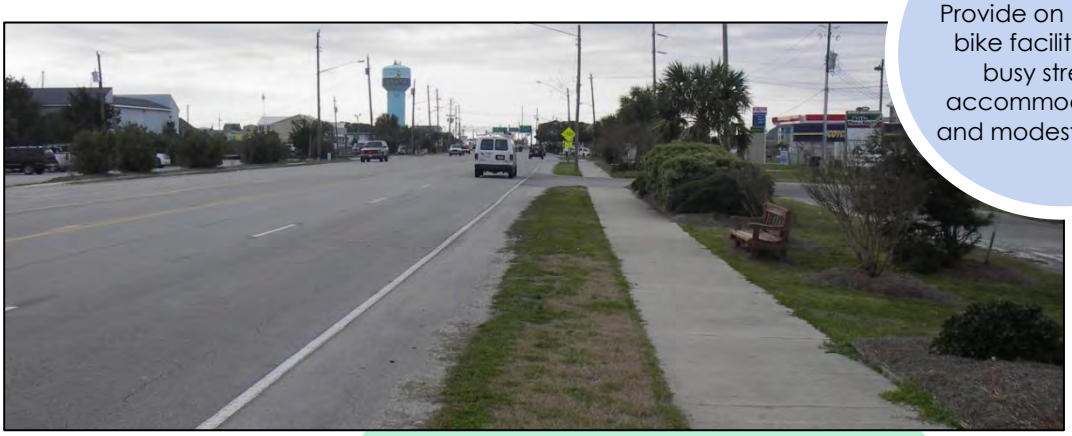
The following are the most common observations that were recorded during the preliminary assessment of the existing conditions in Atlantic Beach:

- No bike lanes
- Narrow sidewalks
- Narrow to no shoulders
- Inadequate signage
- Eroded shoulders and turn aprons
- Dips along the roadways
- On-street parking (unmarked/unsigned)
- Hazardous drainage grates
- High-traffic intersections
- High traffic thoroughfares (NC 58 and Atlantic Beach Causeway)
- Low traffic secondary streets
- Inadequate bike racks

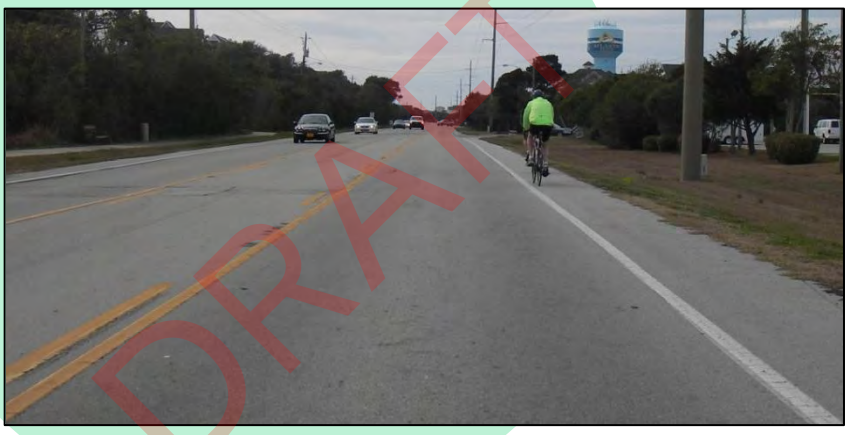
- Coastal wetlands
- Wide right-of-ways (ROW)
- Narrow ROWs

RECOMMENDATION

Provide on & off-road bike facilities along busy streets to accommodate avid and modest bicyclists.



Existing road shoulder and sidewalk along Atlantic Beach Causeway. *Photo Courtesy of Rivers and Associates, Inc.*

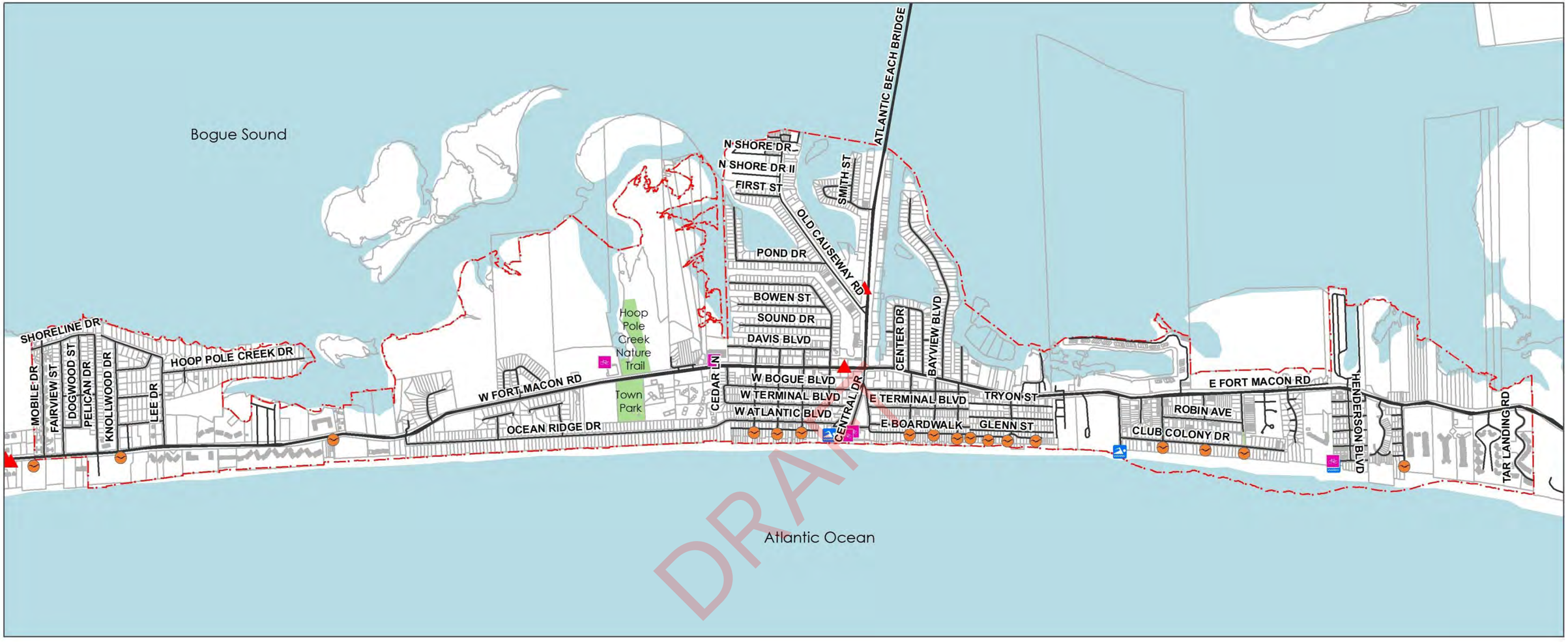


Existing road conditions along NC 58 near Atlantic Station Shopping Center and Town Park. *Photo Courtesy of Rivers and Associates, Inc.*

RECOMMENDATION

Provide bicycle facilities along lower traffic secondary streets where possible to provide safe access to local destinations.

Low-speed low-traffic secondary street in Atlantic Beach *Photo Courtesy of Rivers and Associates, Inc.*



0 0.125 0.25 0.5 Miles

Legend

- Existing Bike Racks
- Existing Bike Signage
- Public Park / Open Space
- Beach Access & Bath House
- Public Beach Access
- Major Roads
- Street
- Parcel
- Town Limits/ Study Area
- Water Feature

Map 2.2
Existing Bicycle Facilities

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BIKE RACKS

Existing Bike Rack located near the "Circle" and beach access. *Photo Courtesy of Rivers & Associates, Inc.*

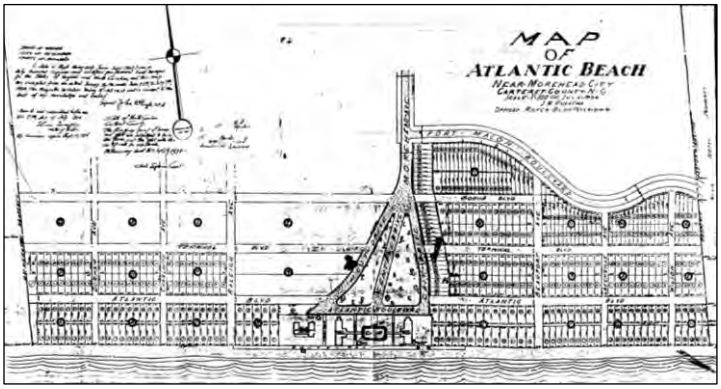
There are relatively few bike racks located throughout Atlantic Beach. There are Bicycle parking racks located at the "Circle" beach access and Henderson beach access. There were also bike racks observed at the Atlantic Station Shopping Center (Food Lion) and also a local Motel. According to Town Staff, some key areas for potential addition of bike racks include all shopping centers and beach accesses, Town Park, the "Circle Redevelopment" and business districts.

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 Atlantic Beach's transportation system is compatible with these user groups, the following information must be identified:

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

An inventory of the roadways identified during the public participation process and Steering Committee meetings was conducted for suggested bike routes on February 8, 2012. 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.



Town of Atlantic Beach's central area was originally designed with a traditional street grid pattern. *Photo Courtesy of www.atlantic-beach.com*

ROADS

The Town's primary thoroughfares influence transportation in Atlantic Beach: the Atlantic Beach Causeway and Fort Macon Road (NC 58). These roads affect the development of bicycle facilities because many of the Town's destination points are located across, on or near these corridors, a bicycle route will need to cross thoroughfares. Careful planning will be

needed to improve the safety of bicycling on NC 58 (Fort Macon Road) and Atlantic Beach Causeway. Atlantic Beach's central area was originally constructed in a grid pattern, which allows opportunities for various connector or alternative routes. However, most of the newer development has been designed around cul-de-sacs and non-connecting streets. In general, Atlantic Beach has low posted speed limits; however, some areas may benefit from traffic calming devices.

INTERSECTIONS

The Town has three signalized intersections. The intersection located at Atlantic Beach Causeway and NC 58 is the largest of the three. This intersection has 6' wide hybrid standard/ high-visibility crosswalks on the three sides of the intersection with pedestrian countdown timers. The signalized intersection of NC 58 and Charlotte Avenue is located within the Towns business district and has no pedestrian or bike crossing improvements. The Town's third signalized intersection is located on NC 58 at Town Park and Atlantic Station Shopping Center and also doesn't have adequate pedestrian and bike crossing facilities.

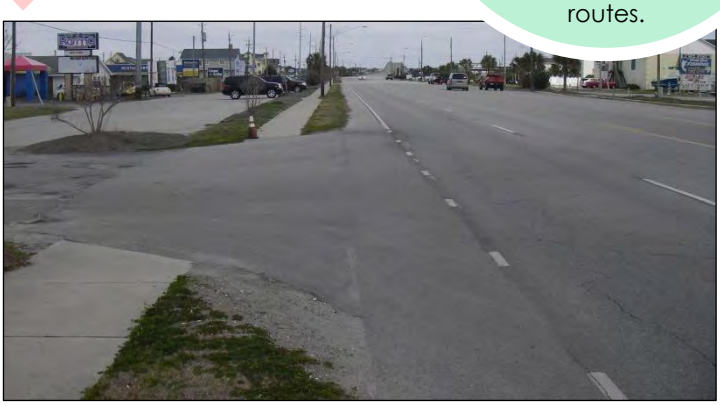
It is important to design intersections to increase awareness of bicyclists and improve connectivity between destinations to achieve safe crossing of roadways. The intersections could be improved with advance warning signage indicating bicycle crossing and pedestrian crosswalks, as well as providing refuge islands to facilitate crossing of roadways.

RECOMMENDATION

Adopt a streetscape master plan along Atlantic Beach Causeway to improve street character while providing adequate bike and pedestrian routes.

TRANSITION AREAS

Atlantic Beach has several transition areas that are impacted by the development of bicycle facilities. Gateway areas should provide a distinct transition point for bicyclists and motorists as they enter the Town's limits. Gateways can be improved through use of signage, landscaping, and streetscape enhancements. Currently, Atlantic Beach has a landscaped area with welcoming sign near the "Circle".



The Atlantic Beach Causeway is a primary thoroughfare into the Town of Atlantic Beach. *Photo Courtesy of Rivers & Associates, Inc.*

Atlantic Beach Causeway has become a heavily traveled route for visitors. As a Town with a tourist based economy, it is important to provide a unique, welcoming and visually stimulating gateway to welcome visitors into Town.

Throughout Atlantic Beach, roadway width transitions occur where the road is wide and then narrows, such as along NC 58. These road transitions occur near the ABC Store and Dunes Club where NC 58 widens from 3 lanes (2 travel lanes and 1 turn lane) to 5 lanes (4 travel lanes and 1 turn lane). Another major transition area occurs at near the NC 58 and Atlantic Beach Causeway as the road widens further to accommodate additional turn lanes.

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 Atlantic Beach, some of these barriers will need to be removed or redesigned to improve safety and connectivity.

NATURAL ENVIRONMENT

The Town has low-lying coastal marsh and beachfront areas that are subject to CAMA (Coastal Area Management Areas) regulations which is managed by the NC Department of Environmental and Natural Resources. The topography of Atlantic Beach is relatively flat; therefore, the safety hazards are low with respect to grade and incline. The natural environment of Atlantic Beach may provide constraints for development of off-road bicycle facilities that may be resolved through the construction of elevated boardwalks and bridges. Map 2.1 illustrates environmental considerations.

Potential CAMA regulated coastal wetlands are a constraint to installing multi-use trails along some portions of E. Fort Macon Rd. *Photo Courtesy of Rivers & Associates, Inc.*

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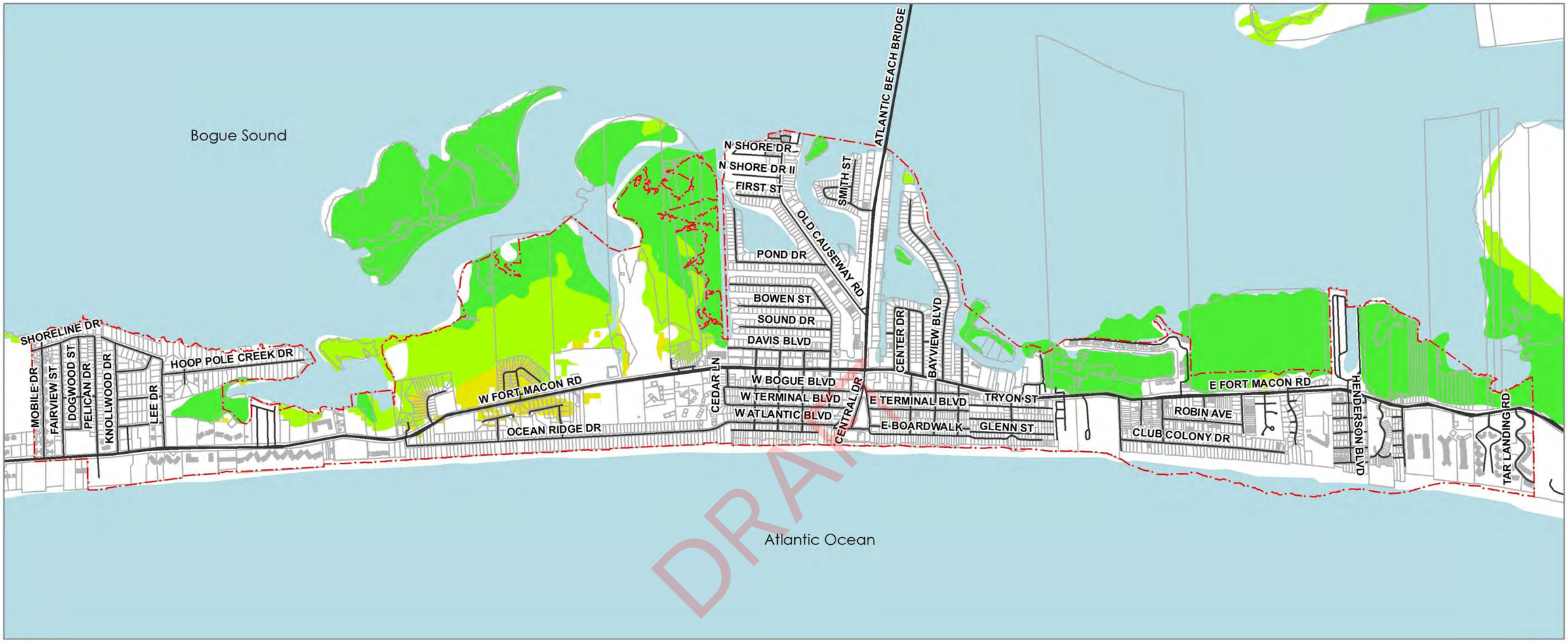

0 0.125 0.25 0.5 Miles

Legend

- Estuarine Shrub/Scrub
- Maritime Forest
- Salt/Brackish Marsh
- Street
- Major Roads
- Parcel
- Water Feature
- Town Limits/ Study Area

Map 2.3

Environmental Considerations

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MAN-MADE HAZARDS

Bicyclists currently use narrow paved shoulders as bike lanes to avoid travel lanes. *Photo Courtesy of Rivers & Associates, Inc.*

The omission of bicycle facilities during the development of the Town's roads and thoroughfares is a man-made barrier to bicycling. Many of the roads within Atlantic Beach lack paved shoulders of adequate width for bicyclists resulting in inadequate separation between motor vehicles and bicyclists. This is a man-made barrier to bicyclists particularly on roads with higher speed and greater volumes of 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.

SAFETY HAZARDS

A number of potential safety hazards were identified as barriers to bicycling in Atlantic Beach. Safety hazards include the condition of the roads, drainage grates, major intersections, and a lack of signage. Barriers caused by safety hazards can be minimized by improvements to the existing Town roadways.

RECOMMENDATION
Replace hazardous drainage grates with a bike safe alternative.

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

Drainage grates with wide openings can become hazardous for bicyclists. *Photo Courtesy of Rivers & Associates, Inc.*

Another safety hazard involves drainage grates in the roadway. Potentially hazardous drainage grates were observed during the preliminary 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 adequate signage is a possible safety

hazard to bicyclists. Signage could be used to indicate, "Narrow Road" or "Share the Road" to educate motorists and bicyclists of potentially hazardous situations.

Major intersections can potentially be an unsafe area for bicyclists sharing the road with motorists. Many of the intersections within Atlantic Beach need improvement. Currently, there are no special provisions for bicyclists at the intersections. Many of the Town's intersections have 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 2.4 illustrates the existing transportation infrastructure within the study area.

[1] http://www.atlanticbeach-nc.com/history.asp

[1] NCDOT, Division of Bicycle and Pedestrian Transportation – Bicycle Crash Data. November 2009, http://www.pedbikeinfo.org/pbcat/bike_main.htm

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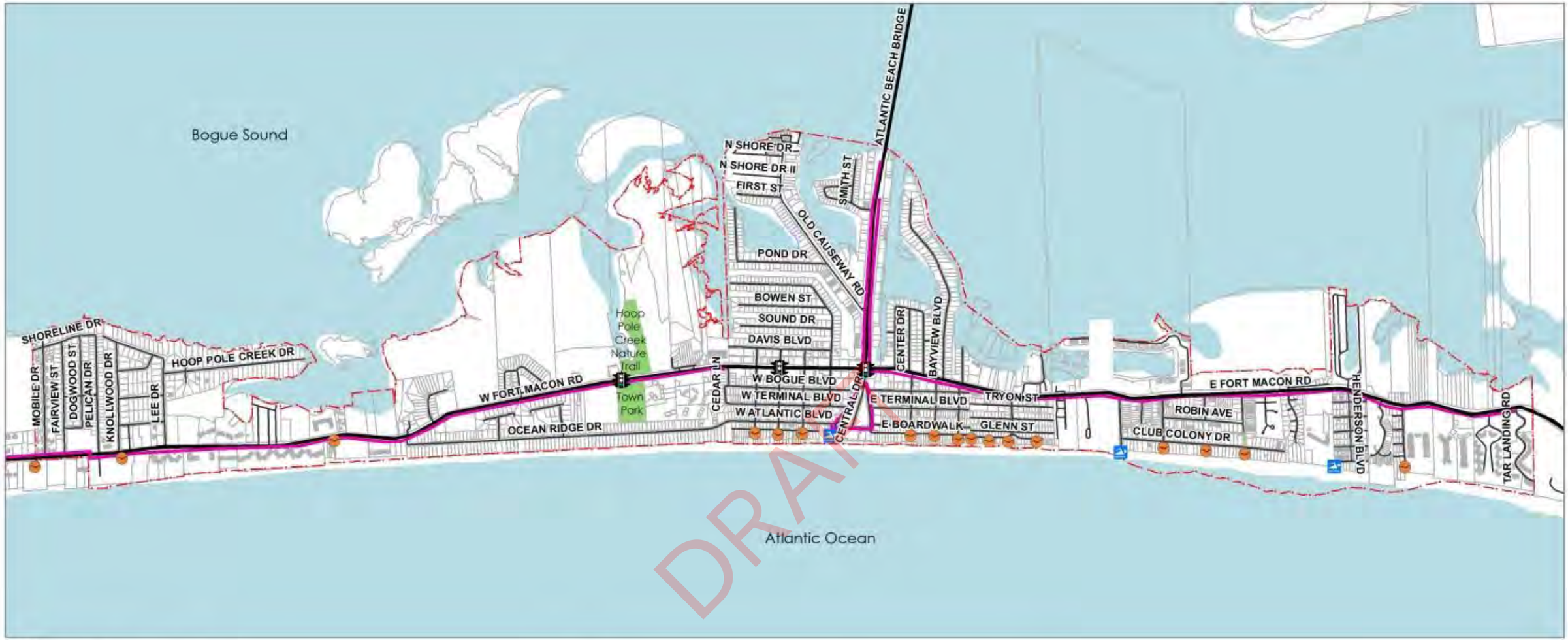

0 0.125 0.25 0.5 Miles

Legend

- NC Route
- Local / Private Street
- Sidewalk
- Signalized Intersection
- Public Park / Open Space
- Beach Access
- Beach Access & Bath House
- Parcel
- Water Feature
- Town Limits/ Study Area

Map 2.4
Existing Infrastructure

Division of Bicycle & Pedestrian Transportation

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SECTION 3 – EXISTING PLANS, PROGRAMS, & POLICIES

Section Outline:

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 preparation of the Atlantic Beach Comprehensive Bicycle Plan:

- Town of Atlantic Beach Land-Use Plan
- Town of Atlantic Beach Code of Ordinances
- Town of Atlantic Beach Park Master Plan
- Atlantic Beach Commons Master Plan (2012)
- The "Grove" Development Concept Plan (2007)
- Carteret County Parks and Recreation Master Plan and Shoreline Access Update Plan (2006)
- Morehead City Comprehensive Bicycle Plan (2007)
- NCDOT Transportation Improvement Program (TIP)
- Croatan Regional Bike Plan (Draft 2012)
- State Programs and Initiatives

3.0 RELEVANT PLANS

LOCAL PLANS

Town of Atlantic Beach Land-Use Plan and Causeway Overlay District

In 2006 the Town of Atlantic Beach adopted a new comprehensive land-use plan. An overlay district was created to along Atlantic Beach Causeway Road to "The Circle" redevelopment area. The purpose of the Causeway Overlay Regulations is to:

- Accommodate vertical mixed-use buildings with retail, service, office, institutional, and other uses on the ground floor and residential units above the nonresidential space.
- Encourage development that exhibits the physical design characteristics of pedestrian-oriented, storefront-style shopping streets.

- Promote the health and well-being of residents by encouraging physical activity, interconnectivity through pedestrian facilities, and greater social interaction.

Town of Atlantic Beach current zoning configuration. *Image Courtesy of the Town of Atlantic Beach.*

Atlantic Beach Commons Master Plan

The Town of Atlantic Beach is currently working on transforming the former Coral Bay Shopping Center into a regional park. The park is planned to have outdoor recreation activities (i.e. playgrounds, walking trails and play courts) and an indoor recreation facility. The new park will also accommodate entertainment such as outdoor concerts and events. Providing bicycle facilities at the Park will be important for promoting alternate vehicle access to and within the park.

Image Courtesy of the Town of Atlantic Beach.

The "Circle" Redevelopment Plan

An area defined by East Drive, West Drive and Atlantic Boulevard has become known by many in the community as the "Circle". The "Circle" is considered as the center of the community. This area is part of the Causeway overlay district and is planned for redevelopment.

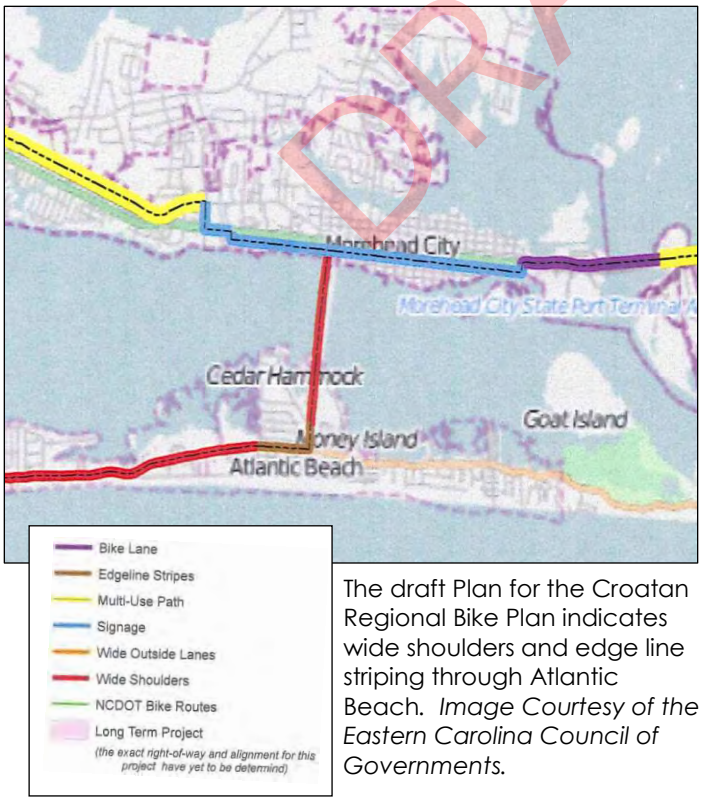
Private developers have envisioned a redevelopment concept branded the "Grove", which will include medium-high density mixed uses with provisions for bicycle and pedestrian amenities including bike lanes and wide sidewalks. The Overlay District Ordinance has been beneficial in ensuring the development of a bike and pedestrian friendly design.

REGIONAL PLANS

Carteret County Parks and Recreation Master Plan and Shoreline Access Update Plan (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. 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 Atlantic Beach should consider a partnership opportunity with Carteret County to identify potential regional corridors that could help provide countywide bicycle connectivity.

Croatan Regional Bike Plan (Draft 2012)



The draft Plan for the Croatan Regional Bike Plan indicates wide shoulders and edge line striping through Atlantic Beach. *Image Courtesy of the Eastern Carolina Council of Governments.*

A regional bike plan is currently being developed for the Crystal Coast Region. The Croatan Regional Bike Plan will connect major towns and rural areas such as New Bern, Oriental, Havelock, Newport, Emerald Isle, Morehead City, Beaufort and Atlantic Beach. Recommended improvements through Atlantic Beach include widened road shoulders and edge line striping. It will be important for Atlantic Beach's Bicycle Plan provide provisions for accommodating regional access throughout the Town.

Morehead City Comprehensive Bicycle Plan (2007)
The Town of Morehead City, North Carolina developed a Comprehensive Bicycle Plan in September 2007. However, there were no plans to improve connectivity from Morehead City to Atlantic Beach. Currently, the only way to access Morehead City is via the Atlantic Beach Causeway by the use of Atlantic Beach Causeway Bridge, which has a 4 ft. wide shoulder and bike safe railing. However, many bicyclists feel unsafe crossing the bridge due to the narrow shoulder width, bridge grade changes (arch) and high traffic.

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

NCDOT Transportation Improvement Program (TIP)

As part of the transportation improvement of, the following TIP Projects have been identified as they relate to the Town of Atlantic Beach. These

projects could incorporate bicycle safety components.[i] Map 3.1 illustrates these projects. Recently, NC Hwy 58 was repaved from the Atlantic Beach – Pine Knoll Shores Town Limits to Atlantic Beach Causeway. During the repaving process, 6 ft. wide hybrid standard/ high visibility crosswalks were installed on three sides of the NC 58 and Atlantic Beach Causeway intersection. The crosswalk width was determined by pedestrian & bike traffic patterns through the intersection. Crosswalks were not installed on the north side of on the intersection to reduce conflicts between bicyclists/ pedestrians with turning vehicles.

There are no planned bicycle improvements in the Atlantic Beach planning area at this time by NCDOT.

Hybrid standard/ high-visibility crosswalks under construction at the NC 58 and Atlantic Beach Causeway intersection. *Photo Courtesy of NCDOT.*

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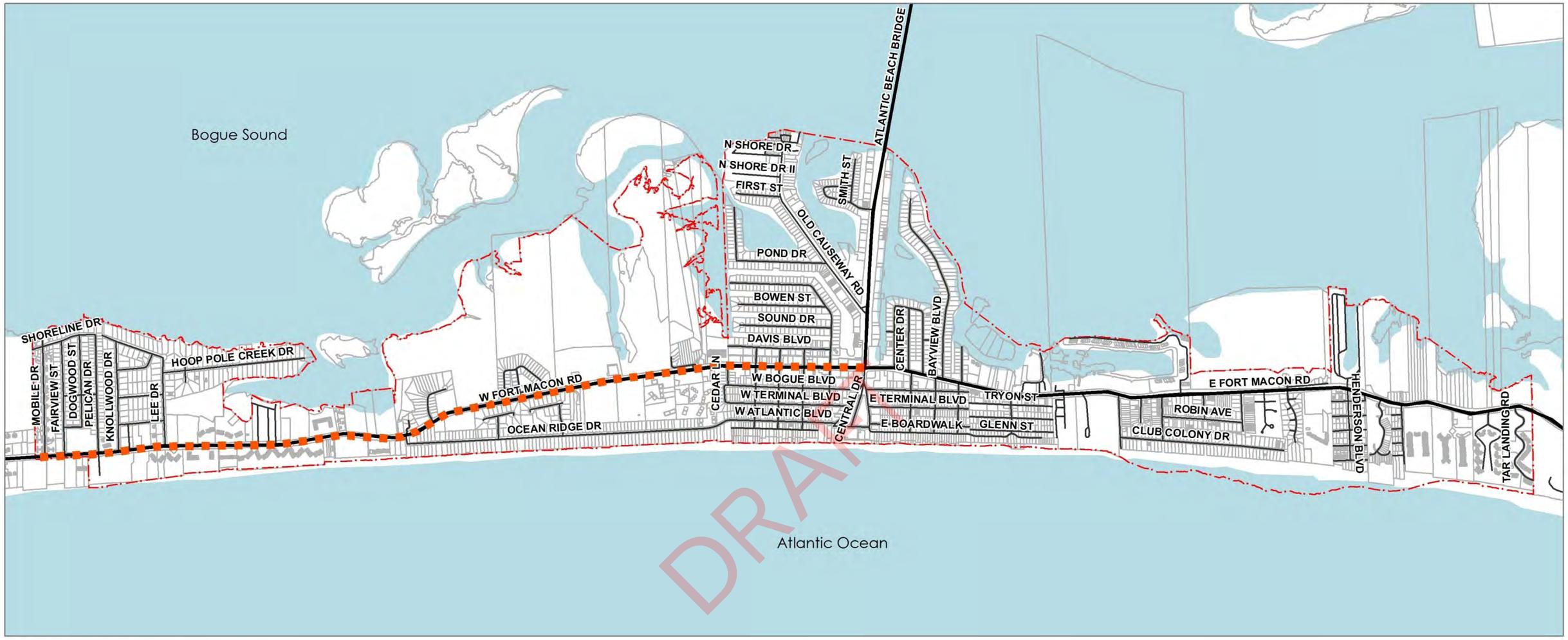

0 0.125 0.25 0.5 Miles

Legend

- Road Resurfacing
- NC Route
- Local / Private Street
- Parcel
- Water Feature
- Town Limits/ Study Area

Map 3.1
NCDOT Transportation Improvement Projects

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PROGRAMS AND INITIATIVES

Law Enforcement

RECOMMENDATION: Develop educational material, such as a brochure, to distribute to cyclists

Over the last few years, the Police Department has observed an increase in bike ridership in Atlantic Beach. This increased bike activity has not only been observed during favorable weather months (i.e. summer and spring) but also as a year round activity.

According to the Atlantic Beach Police Department, bicycling safety education is an important component to the development of Atlantic Beach's Comprehensive Bicycle Plan. The Department once enacted programs such as bike safety equipment giveaways (i.e. safety helmets). These programs were possible due to state. However, due to economic constraints, these programs were reduced then eliminated. The last giveaway event had a low turnout and mostly consisted of young children.

Police officials have observed conditions throughout Town that are unfavorable for bicycle traffic, in particular, NC Highway 58 (Fort Macon Road) and Atlantic Beach Causeway Rd. NC 58 and the Atlantic Beach Causeway are the most heavily traveled roads in Atlantic Beach. The intersection of the two thoroughfares has been the site of many "close calls" and "near misses" for accidents between bicyclists and vehicles. At this intersection, drivers frequently make free-flowing right turns which endanger bicyclist. Uncontrolled intersections have also been observed as being dangerous for bicyclists.

Education among bicyclist and motorist is needed. During the summer months especially, the Town experiences an influx of drivers into Town. These drivers may be visiting from other communities that have more pedestrian and bicycle facilities (i.e. vehicular warning signs and crosswalks). The Department believes this is a challenge for Atlantic Beach since the Town lacks many of these safety improvements. Another challenge is visitors who may not be "paying attention" to road conditions while looking for destinations or enjoying the scenic views.

RECOMMENDATION: Visibility of bicyclists and pedestrians would be increased if lower level lighting was provided

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 Department would like to develop educational material, such as a brochure, to distribute to bicyclists to make them more aware of the rules of the roadway and to encourage compliance with the law. Police officials believe it is vital to educate not only Atlantic Beach residents but also visitors to the Town. The Department is "on-board" with enacting more programs that encourages roadway safety.

Currently, the Department manages 3 officers per shift in combination with a community policing program. There have not been any issues within Atlantic Beach in regards to greenway safety. All parks and greenways are monitored by the Department.

Currently, bicycling on sidewalks is illegal according to Town Ordinances. However, the ordinance could be presented to Town Council for modification.

Public Works Department

Atlantic Beach's Public Works Department is responsible for the major utilities and infrastructure of the Town, including the Town's streets and sidewalks. According to Public Works, there are street improvement projects proposed by NCDOT along Hwy 58, which would include road resurfacing and improvements. This project currently does not include road shoulder widening or bike lane improvements. The Town has requested intersection improvements at the Hwy 58 and Atlantic Beach Causeway Rd.

Bicycle event as part of the Atlantic Beach National Night Out event festivities. *Photo Courtesy of the Atlantic Beach Police Department.*

The Town's most recent bicycle/ pedestrian project included adding a brick walking path around the "Circle" (East – West Dr.). The only other bike facilities in Atlantic Beach are narrow road shoulders along Hwy 58 and Atlantic Beach Causeway Rd (These road shoulders do not meet NCDOT Standards for designated bike lane min. widths). Public works maintain road shoulders by removing encroaching grass.

The commercial district along Hwy 58 (From approx. Atlantic Beach Causeway Road and Cedar Lane has limited ROW for adding additional sidewalks and bike lanes. Angled concrete retaining walls are located along the street edge and are a constraint for adding bike and pedestrian facilities in these areas. A polling survey was conducted by the Town to evaluate whether business owners along this area of the HWY 58 corridor would be willing to allow Town ROW expansion onto their property. Most business owners expressed no desire for allowing Town to purchase ROW expansion onto their property.

Recreation Department

Atlantic Beach's Recreation Department manages the Town's public parks and recreation facilities and provides programming for citizens of all ages. A goal of the Recreation Department would be to provide safe bicycling routes to connect neighborhoods, waterfront amenities and recreation facilities. Although the department does not offer bicycling programs, the Town's public facilities are a destination of bikers. The Recreation Department would like to see routes developed that would provide "across town" connections within Atlantic Beach. Some of the identified hazardous areas for bicycling include Hwy 58 and Atlantic Beach Causeway Rd. Also, areas along Hwy 58 are dark during night-evening hours making bicycling dangerous during these hours.

The "Circle" and "Circle Boardwalk" has traditionally been the largest social gathering spot in the community for residents, visitors and tourists alike. Through the years, the "Circle" has undergone major transitions in land use from amusement park, night clubs and hotels to the current farmers market, sand-based sporting events (i.e. volleyball), outdoor movies and concerts with additional mixed-use commercial/residential planned for the future. During summer movie nights, the space often accommodates 250-300 visitors and residents. Town Park is located on Hwy 58 near the Atlantic Station Shopping Center and the Hoop Pole Creek Nature Trail. As Town Park continues to develop, this location will be a key destination within the community. Currently, there are no bike racks located at Town Park.

Crystal Coast Tourism Authority

The Crystal Coast Tourism Authority (CCTA) supports the development of bike facilities in Atlantic Beach. The organization believes that is important to promote alternate transportation not only in Atlantic Beach but in the entire Crystal Coast Region. The CCTA has experienced an increase in visitors to the area that are looking for recreational opportunities such as bicycling.

The CCTA has recognized outdoor recreation as a major asset for the region for increasing tourism. There are several bike race events planned for the area and bike facility improvements would help facilitate future efforts. Increasing bikibility would also allow the region to market itself as a healthy lifestyle center which will encourage physical fitness.

3.2 RELEVANT POLICIES & INSTITUTIONAL FRAMEWORK

FEDERAL & STATE POLICIES

There are several State and Federal policies for the development of pedestrian facilities. Through updating their 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".[ii] These guidelines provide communities with information regarding NCDOT funding for replacement of existing sidewalks as a part of street widening projects.

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 dissemination of complete streets best practices.[iii]

In July of 2009, the North Carolina Department of Transportation (NC DOT) adopted a Complete Streets Policy. This policy represents an increased commitment to providing bicycle and pedestrian facilities with new NCDOT construction projects, including road repavings, widenings, and bridge replacements. While NCDOT had previously adopted several policies to support the provision of bicycle and pedestrian facilities, the new policy goes further in its recommendations to routinely provide for all users of the roads - bicyclists and pedestrians, public transportation users, and drivers of all abilities and ages. The new Complete Streets Policy:

- Provides that "all transportation facilities within a growth area of a town or city funded by or through NCDOT, and planned, designed, or constructed on state maintained facilities, must adhere to this policy");

- Asserts the Department's role as a partner to local communities in transportation projects;
- Addresses the need for context-sensitivity;
- Sets exceptions (where specific travelers are prohibited and where there is a lack of current or future need) and a clear process for granting them (approval by the Chief Deputy Secretary); and
- Establishes a stakeholders group, including transportation professionals and interest groups, tasked to create comprehensive planning and design guidelines in support of the policy.[iv]

A member of the NCDOT Board of Transportation, Nina Szlosberg, introduced the policy, and Tom Norman, Manager of the Bicycle and Pedestrian Division guided the policy through a staff development process. The National Complete Streets Coalition has applauded NCDOT for this important step. The policy is available at: https://apps.dot.state.nc.us/pio/releases/details.aspx?r=2777.

Bicycle and Pedestrian Planning Grant Initiative

NCDOT's Division of Bicycle & Pedestrian Transportation (DBPT) along with the Transportation Planning Branch launched the Bicycle and Pedestrian Planning Grant Initiative in 2004. This matching-grant program, the first of its kind in the nation, enables municipalities across the state to develop comprehensive bicycle and pedestrian transportation plans. Nearly $3 million has been awarded through this program to 122 municipalities. These comprehensive plans promote livability/sustainability by helping communities to create bicycle and pedestrian friendly environments that encourage safe walking and bicycling. The most recent DBPT grant recipients was selected and approved in 2011 in which Atlantic Beach was granted funding to complete a Comprehensive Bicycle Plan.

A survey was distributed electronically to the 64 communities awarded grant funds from 2004 to 2007 resulting in responses from 41 communities.

Survey results indicate the following: 63 percent allocated local funds for bicycle/pedestrian facilities, 54 percent created a bicycle/pedestrian committee, 51 percent developed an education, encouragement or enforcement program, 54 percent developed bicycle/pedestrian-friendly policies, 46 percent updated design/engineering standards, and 49 percent have programmed or constructed multi-use paths. Among the pedestrian plans (27 responses of 45 adopted plans), 89 percent have programmed or constructed sidewalk.

Among the bicycle plans (14 responses of 19 adopted plans), the following types of facilities were programmed or constructed: bicycle lane (57 percent), paved shoulder (14 percent), wide outside lane (36 percent), bicycle route (21 percent), and bicycle parking (50 percent).[v]

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.[vi]

FHWA Memorandum on Mainstreaming Bicycle and Pedestrian Projects

In October 2008, the Federal Highway Administration (FHWA) updated the *Policy for Mainstreaming Non-motorized 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.[vii]

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.[viii]

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

NCDOT RIGHT-OF WAY ENCROACHMENT

Along state maintained roads, NCDOT often times have right-of-way (ROW) allocated for future roadway improvements such as sidewalks, multi-use trails and road widening. The two state maintained roads in Atlantic beach Include Fort Macon Road and Atlantic Beach Causeway. ROW widths along these thoroughfares vary. The widest NCDOT ROW areas are located along Atlantic Beach Causeway. ROW widths along this corridor range from around 100' to 200' ft. However, over time the development of private parking lots and other encroachment onto this ROW has occurred. Map 3.2 illustrates NCDOT ROW within the commercial district.

RECOMMENDATION:
Consolidate driveways and reconfigure parking to reduce potential conflicts between motorists and bicyclists.

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The Town of
ATLANTIC BEACH
Comprehensive Bicycle Plan

BIKE ATLANTIC BEACH

LOCAL POLICIES

The Town acknowledges the need for additional policies and ordinances to ensure bicycle or multi-use trail facilities when new development occurs. While these types of recreational facilities can be recommended during the planning and permit approval phases, the Town should consider an ordinance to require such facilities. The Town has already adopted provisions to include bicycle facilities at new development within the Causeway Overlay District.

The Town would like increased trail or route connectivity and it is recommended 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 Atlantic Beach. 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[ix]

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 Atlantic Beach Code of Ordinances includes provisions related to bicycles. Currently, the Town's ordinances do address facility standards for bicycle facilities, such as bike lanes and wide outside lanes. The Town should consider implementing additional requirements to make it safer for bicyclists to access destination points safely. The Town's Code does require bicycle racks in some instances and require provisions for including bicycle lanes and wide outside shoulders on new minor collector streets. Sections of The Town of Atlantic Beach's Code of Ordinances that influence bicycling are outlined in Table 3.1.

Table 3.0: Town of Atlantic Beach Local Ordinances Related to Bicycling

Section and Title	Ordinance Text
§ 9-1 OFF-STREET PARKING AND OFF-STREET LOADING REQUIREMENTS	A secure bicycle rack is required for all parking lots greater than ten (10) spaces. Bicycle parking may be placed in the front yard.
§ 6-26 PEDESTRIAN WALKWAYS AND BICYCLE RIDING WAYS	(A) Maximum width, eight (8) feet. (B) Minimum setback from any street or highway right-of-way, five (5) feet. (C) Where walkways and ridingways confront other than a local street, a pedestrian-controlled stoplight, a pedestrian overpass or underpass shall be installed. (D) All pedestrian walkways and ridingways shall be so planned and developed as to prevent the destruction of natural topography and vegetation. (E) Pedestrian walkways planned for usage during the hours of darkness shall be lighted with light fixtures which would blend into and complement the surrounding vegetation and natural surroundings during daylight hours. (F) Only human powered vehicles shall be permitted on pedestrian walkways or bicycle ridingways. Signs of a maximum square footage of four (4) square feet shall indicate that these non-pedestrian modes of transportation are prohibited. Wheelchairs and motorized scooters utilized by handicapped individuals shall be permitted.
§ 7.4.6 STANDARDS FOR BICYCLE FACILITIES	(A) Bicycle lanes and/or wide outside lanes shall be incorporated in the design of all minor collectors. On local streets low traffic speeds and volumes allow bicyclists and motorists to safely share the road. Sidewalks are not acceptable as substitutes for bike lanes. Bike lanes shall be a minimum of four feet in width (excluding adjacent curb and gutter, if applicable). (B) Development shall provide appropriate bicycle amenities to encourage cyclists. Signage indicating the presence and location of such amenities shall be scaled for easy reading by bicyclists and pedestrians as well as motorists. Bicycle parking shall be provided as part of all high density residential, commercial, retail, office, and mixed use development where appropriate.

Source: Town of Atlantic Beach Code of Ordinances

Table 3.0: Town of Atlantic Beach Local Ordinances Related to Bicycling	
Section and Title	**Ordinance Text**
§ 7.4.5.2 PEDESTRIAN WALKWAYS/PATHS	While not encouraged to substitute for a good system of on-street facilities, multi-use paths may be used to enhance pedestrian and bicycle travel where the existing circulation system does not serve these patrons well, where open spaces provide corridors free of obstacles. However, all paths shall connect to the street system in a safe and convenient manner, and shall meet the following requirements in addition to any additional standards provided by the Town of Atlantic Beach: (A) All path connections shall be well signed with destination and directional signing. (B) All paths shall be located in corridors that serve origin and destination points such as residential areas, schools, shopping centers, parks, etc. (C) All paths shall be built in locations that are visible and easily accessible, for the personal safety of users. (D) Whenever possible, paths shall be designed in such a manner that motor vehicle crossings can be eliminated or significantly minimized. Where crossings exist, they must be carefully designed to ensure the safety of the users. In situations where asphalt paths are proposed to run parallel with roadways they shall be offset a minimum of 12' from the back of curb. Asphalt paths will only be permitted parallel to roadways where there are a limited number of driveway and street crossings. (E) All paths shall be constructed of durable, low-maintenance materials, with sufficient width and clearance to allow users to proceed at reasonable speeds. Asphalt paths shall be 1. SF 9.5A underlain by 4" CABC. Generally, paths shall be at least six feet in width. Where multiple uses are intended (i.e., shared pedestrian and bicycle traffic) the path should be ten feet wide whenever possible. (F) Paths shall be maintained in usable condition throughout the year depending on level of use, including snow removal as appropriate. (G) All paths must be located in easements dedicated to pedestrian and bicycle access.

Source: Town of Atlantic Beach Code of Ordinances

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

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

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

[iv] North Carolina Department of Transportation, Complete Streets Policy, http://www.bytrain.org/fra/general/ncdot_streets_policy.pdf

[v] North Carolina Department of Transportation, Division of Bicycle and Pedestrian Transportation, Planning Grant Initiative, http://www.ncdot.gov/bikeped/planning/default.html

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

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

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

[ix] 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

In order to develop a strategic bicycle plan to make Atlantic Beach 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[i], 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 (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.

RECOMMENDATION: Design bicycle facilities to address the three types of bicycle users: advanced, basic & Children

Therefore, developing bicycle facilities for Atlantic Beach 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

The overall transportation system in Atlantic Beach is automobile dependent. As a result, intersections and thoroughfares were designed to accommodate automobile travel only. The Town's more recent commercial growth has evolved around the HWY 58 (Fort Macon Rd.) and Atlantic Beach Causeway Rd. corridors. Recent growth includes a new shopping center on West Fort Macon Rd.: Atlantic Station. Atlantic Station includes a grocery store, restaurants, movie theater and retail establishments. While Atlantic Beach's "urban sprawl" is limited due to its island geography, the pattern of commercial development along the existing thoroughfares is intimidating for bicyclists due to many commercial driveways, intersections that are unsafe to cross, limited access and lack of provisions to accommodate bicycle travel. Currently, special signage used to identify bicyclists in the roadway, such as "Share the Road", is nearly non-existent.

The most bicycle and pedestrian accessible areas of Atlantic Beach are its residential areas due to low traffic speeds, short blocks and nearby parks and waterfront access.

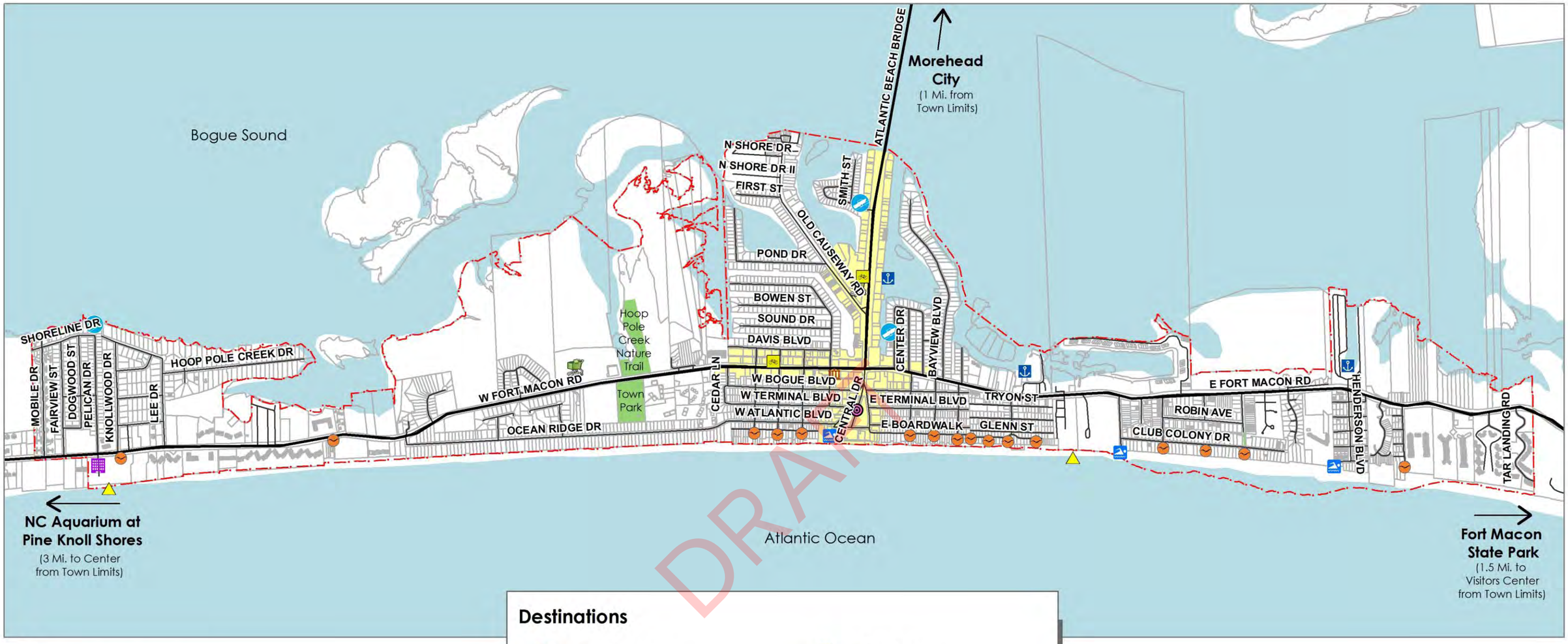
An inventory and assessment of existing bicycle facilities is discussed in Section 2 and Appendix C of the Plan.

4.1 CORRIDOR IDENTIFICATION

RECOMMENDATION: Use bicycle facilities to connect key Town destinations to encourage bicycle use.

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 Atlantic Beach: destinations, origins, and desired corridors of bicycle travel.

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



0 0.125 0.25 0.5 Miles

Destinations

- Beach Access
- Beach Access & Bath House
- Boat Access
- Marina
- Pier
- The "Circle"
- Atlantic Station
- Sharaton Hotel
- Town Hall
- Bike Shop
- Commercial District
- Public Park / Open Space
- Water Feature
- Parcel
- NC Route
- Local / Private Street
- Town Limits/ Study Area

Map 4.1

Destinations & Points of Interest

Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

The Town of ATLANTIC BEACH

Comprehensive Bicycle Plan

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4.2 OPPORTUNITIES / POTENTIAL PROJECTS

Potential projects to improve the existing bicycling network in Atlantic Beach were developed from public input activities, Steering Committee meetings, and community evaluation. Twenty-five (25) 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 provide connectivity & improve safety

Twenty-five (25) preliminary project recommendations were developed from public involvement and steering committee sessions as well as Consultant field reconnaissance.

During the February 21, 2010 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 citizens and 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 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.

ON-ROAD PROJECTS & OFF-ROAD POTENTIAL PROJECTS

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. The following projects were identified:

Money Island Drive Route
The route along Money Island Drive was identified as a connector route to provide access from Fort Macon Road to residential areas and public waterfront accesses along Glen Street and East Boardwalk. Sharrows are recommended for this route.

Pelican –Mobile Loop
Pelican Drive currently terminates at a public boat access area. The access area also includes a pier which may be a destination for bicyclists. A route along Pelican Drive through Mobile Drive could link the boat access and residential area to proposed bicycle improvements along Fort Macon Road. Sharrows are recommended for this route.

Knollwood-Lee Loop
A route along Knollwood, Forest Knoll and Lee Drive would provide access for residential areas north of NC 58 to connect with proposed bicycle improvements along Fort Macon Road. Sharrows are recommended for this route.

RECOMMENDATION: Sharrows provide bike facilities along streets too narrow for traditional bike lanes.

Moonlight Drive Route
Moonlight Drive provides access to a public boat ramp and residential area. A route along portions of Moonlight Drive will provide access from the residential area and boat ramp to shopping and destinations along Atlantic Beach Causeway Road. Sharrows are recommended for this route.

Bogue – Cedar Route
The Bogue – Cedar Route was identified as an opportunity to become an alternate / parallel route to Fort Macon Road. Bogue Boulevard and Cedar Street are low traffic residential streets that can serve as a spine for bicycle connectivity within the Town's center. Widened paved shoulders with bike lanes are recommended for this route.

Wilson Avenue Route
A route along Wilson Avenue will provide a connection between commercial areas along Fort Macon Road, residential areas and public beach accesses along East Boardwalk and Glenn Street. Sharrows are recommended for this route.

RECOMMENDATION: Widen road shoulders on routes used heavily by bicyclists and add dedicated bike lanes.

Commerce Way Route
Commerce Drive extends from Fort Macon Road and terminates at a public beach access. Providing bicycle facilities along Commerce Drive will provide a connection between residential areas along and near Fort Macon Road to the beach access. Sharrows are recommended for this route.

Henderson Boulevard Route
The Henderson Boulevard route will provide a connection between the densely populated Triple S Marina and a public beach access located at the terminus of Henderson Boulevard. The Henderson Boulevard beach access is one of three major beach and bathhouse access facilities in Atlantic Beach. Sharrows are recommended for this route.

Club Colony Loop
The Club Colony Loop consists of New Bern Avenue, Club Colony Drive and Freeman Lane. This route provides access to residential areas, public beach accesses and a public rain garden. The Club Colony Route will also provide access to the New Bern Avenue beach access which is one of three major beach and bathhouse access facilities in Atlantic Beach. Sharrows and multi-use trail connectors are recommended for this route.

Old Causeway Road Route
A route along Old Causeway Road will serve as collector route for the residential areas located along and near this corridor. This route will connect the residential areas to shopping, destinations and Atlantic Beach Causeway Road. Sharrows are recommended for this route.

Davis – Kinston Avenue Route
Routes along portions of Kinston Avenue and Davis Street will provide access for residential neighborhoods to commercial areas located along Fort Macon Road. This route will also guide bicyclists to an existing signalized intersection at Charlotte Avenue and Fort Macon Road to help facilitate bicycle traffic across Fort Macon Road. Sharrows are recommended for this route.

Charlotte Avenue Route
A route along Charlotte Avenue will provide a safe route for bicyclists across Fort Macon Road while connecting commercial and residential areas to public beach access locations along West Boardwalk. Sharrows are recommended for this route.

Boardwalk – Glenn Route
East Boardwalk and Glenn Street are east-west connectors that extend through portions of the town center. These streets are located along the waterfront which provides scenic views and public beach access. These streets are also narrow and low traffic which make them potentially ideal for bicyclists. Sharrows are recommended for this route.

Atlantic Ocean Ridge –Route
The Atlantic Boulevard and Ocean Ridge Drive is an east-west connector that extends from the Town Center to Fort Macon Road. This route is located within a residential waterfront neighborhood which provides scenic views and low-traffic streets. These streets are also narrow and low traffic which make them ideal for bicyclists. Widened paved shoulders with bike lanes are recommended from NC 58 to Durham Avenue. Sharrows are recommended from Durham Avenue to the "Circle".

The "Circle" Route
The "Circle" consists of East Street, West Street and portions of Atlantic Boulevard. The Circle serves as the heart of Atlantic Beach's town center. This location remains undeveloped at the current date but plans have been developed to transform the area into a high density mixed-use development. Due to the location and project size of the potential development, connectivity is needed to link the area to adjacent neighborhoods and routes. Bike lanes are recommended for this route.

Intersection Improvements

NC 58 & Atlantic Beach Causeway
The NC 58 and Atlantic Beach Causeway intersection is the largest and most heavily traveled intersection in Atlantic Beach. The intersection is a major crossing point for connecting residential and commercial areas north of NC 58 to beach accesses and other destinations located on the south side of NC 58. Existing infrastructure include traffic lights, pedestrian countdown timers and crosswalks along 3 sides of the intersection. Opportunities to stop all traffic at the intersection to allow safe bike & pedestrian crossing and high-visibility crosswalks on all sides of the intersection are recommended.

RECOMMENDATION
Increase the width of existing road shoulders to create a safer roadway area for bicyclists.

NC 58 & Charlotte Avenue
This intersection is located in Atlantic Beach's commercial district. This intersection connects residential areas north of NC 58 to beach access and destinations south of NC 58 as well as commercial areas along NC 58. Currently, there are no pedestrian or bike facilities located at the intersection. The addition of sidewalks and sharrows along this portion of NC 58 will require high-visibility crosswalks and crossing signals.

NC 58 and Town Park / Atlantic Station Shopping Center Entrance
This intersection is located at two of the Town's major destinations. The addition of a proposed multi-use trail, it will be essential that this intersection become safe for pedestrians and bicyclists. High-visibility crosswalks and countdown timers are recommended for this intersection.

Atlantic Beach Causeway & Old Causeway Road
The current intersection configuration consist of a triangular island to allow for free-right turn travel from Atlantic Beach Causeway to Old Causeway

Road. It is recommended that the "pork chop island" become accessible refuge island for pedestrians and bicyclists by incorporating ADA ramps and high visibility crosswalks.

RECOMMENDATION

Provide pavement markings across streets that intersect multi-use trails

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.

Atlantic Beach Causeway Route

Atlantic Beach Causeway Road is a major high-traffic volume thoroughfare that connects Atlantic Beach to Morehead City north across Bogue Sound. Located along the thoroughfare is commercial and retail activity that joins adjacent residential neighborhoods. This route currently has sidewalks and road shoulders that do not serve bicyclists adequately. Developing a multi-use trail along the west side of this thoroughfare will encourage long term redevelopment while promoting alternate transportation.

Fort Macon Route

Fort Macon Road is a major thoroughfare that extends east-west through Atlantic Beach. Modest bicyclists may be intimidated by the high traffic volumes along the corridor. Installing a multi-use trail adjacent to the road way will provide safe transportation corridors for bicyclist and pedestrians.

RECOMMENDATION

Boardwalks should be designed at a minimum of 10 ft. width to accommodate bicyclists and pedestrians

Club Colony Loop (Rain Garden Connector)

Freeman Drive has been considered part of the Club Colony Route (See On-Road Projects and Treatments). To connect Freeman Drive to Club Colony Drive, improvements through the Town's rain garden area will be needed. Currently, a narrow boardwalk provides a pedestrian connection from Freeman to Club Colony Drive. This connection will need to be widened to a multi-use trail to accommodate bicyclists.

Club Colony Loop (New Bern Street Bath House and Beach Access)

Currently Club Colony Drive and New Bern Street does not connect. Also located between these disconnected streets are the New Bern Street Bath House and Beach Access. A multi-use connector from Club Colony Drive to New Bern Street is recommended to provide inter-neighborhood connectivity and beach access for bicyclist and pedestrians.

Town Park Connector

Town Park is located on Fort Macon Road and is planned to become a major regional destination for recreation and events. Currently, residents

who live in the Town Center and along Ocean Ridge Drive can only access the park from Fort Macon Road. A connection to the park along Ocean Ridge Drive will provide increased access to residents.

Trailhead Park and Park & Ride
Located near the Atlantic Beach Bridge abutment is the potential location of a new trailhead park and park & ride. This would allow visitors to park near the entrance of Town and access businesses along the Causeway and community destinations (i.e. beach accesses). Park improvements such as fishing piers, landscaped areas and other amenities will create a destination for visitors and residents.

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.).

Roadway crossing should be considered to connect major destinations commercial areas and residential areas to multi-use trails. These roadway crossings should be strategically placed to ensure the most convenient and safe crossing for bicyclists as well as pedestrians

Bicycle racks are needed at destination locations in Atlantic Beach. 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, and shopping centers.

RECOMMENDATION

Provide amenities such as play areas and public art along greenway corridors to create "mini" destinations and interest.

Rest areas should be included along bicycle routes that involve longer distances or isolation from public facilities. For example, the recommended routes along the park boundary should include benches for people to rest and enjoy the scenery of the Atlantic Beach Creek. 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 (A-C) shows these potential opportunities.

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

0 250 500 1,000 Feet

Existing Conditions

- Bike Rack
- Beach Access & Bath House
- Beach Access
- Marina
- Public Park
- State Road
- Town / Local Street
- Town Limits

Preliminary Opportunities

- Crossing Improvement
- Bike Racks
- Commerce Route
- Henderson Route
- Club Colony Loop
- Fort Macon Route

*Route names determined by street names.

Map 4.2 (A)
Preliminary Opportunities (East)

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The Town of ATLANTIC BEACH
Comprehensive Bicycle Plan

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Existing Conditions

- Bike Rack
- ABC Store
- Boat Access
- Post Office
- Shopping Center
- Beach Access
- Beach Access & Bath House
- Marina
- Public Park
- Town hall
- The Circle
- Bike Shop
- State Road
- Local / Private Street
- Town Limits

Preliminary Opportunities

- Bike Racks
- Crossing Improvement
- Trailhead Park / Park & Ride
- Bayview Route
- Money Island Route
- Moonlight Loop
- Bogue Sound Loop
- Bogue - Cedar Route
- Wilson Route
- Commerce Route
- Henderson Route
- Club Colony Loop
- Old Causeway Route
- Davis-Kinston Route
- Durham Route
- Charlotte Route
- Raleigh Route
- Alleyway Connector Route
- Boardwalk-Glen Route
- Causeway Route
- Atlantic-Ocean Ridge Route
- The Circle Route
- Fort Macon Route
- Town Park Connector

*Route names determined by street names.

Map 4.2 (B)
Preliminary Opportunities (Central)

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Comprehensive Bicycle Plan

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0 250 500 1,000 Feet

Existing Conditions

- Boat Access
- Beach Access
- Sheraton Hotel
- Post Office
- State Road
- Local / Private Street
- Town Limits

Preliminary Opportunities

- Bike Rack
- Crossing Improvement
- Knollwood - Lee Loop
- Pelican - Mobile Loop
- Atlantic-Ocean Ridge Route
- Fort Macon Route

*Route names determined by street names.

Map 4.2 (C)
Preliminary Opportunities (West)

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Section Outline:

SECTION 5 – BICYCLE FACILITY STANDARDS & GUIDELINES

This section will provide guidance to the Town of Atlantic Beach 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.

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.

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.

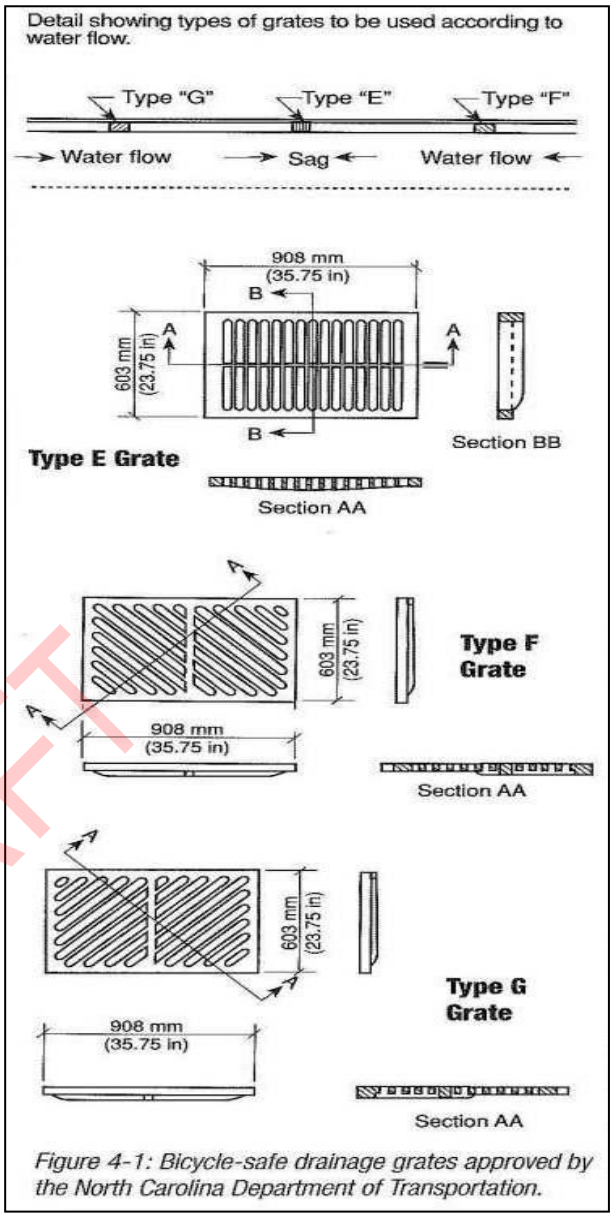


Figure 4-1: Bicycle-safe drainage grates approved by the North Carolina Department of Transportation.

Bicycle safe drainage grates. Image courtesy of the NCDOT Bicycle Facilities Planning & Design Guidelines

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. The existing Atlantic Beach Causeway Bridge meets the guidelines for bicycle facility standards. The following standards are required by the guidelines:

- **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*.

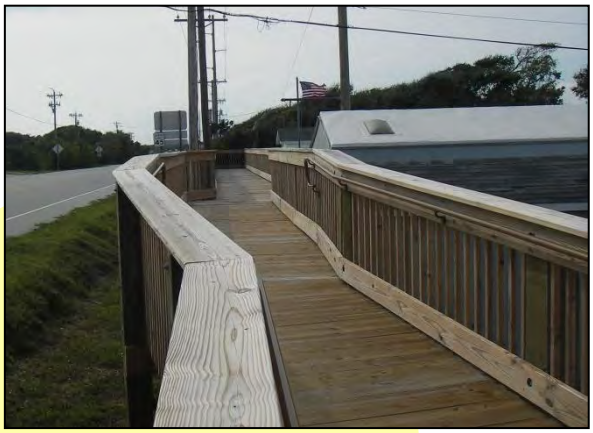
A 10-foot boardwalk in Warren County, NC. *Photo courtesy of Rivers & Associates, Inc.*

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 to provide protection along the boardwalk.

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.



The existing boardwalks located near the Atlantic Beach / Pine Knoll Shores town limit is too narrow to accommodate bi-direction bicycle traffic. *Photo courtesy of Rivers & Associates, Inc.*

PAVEMENT QUALITY

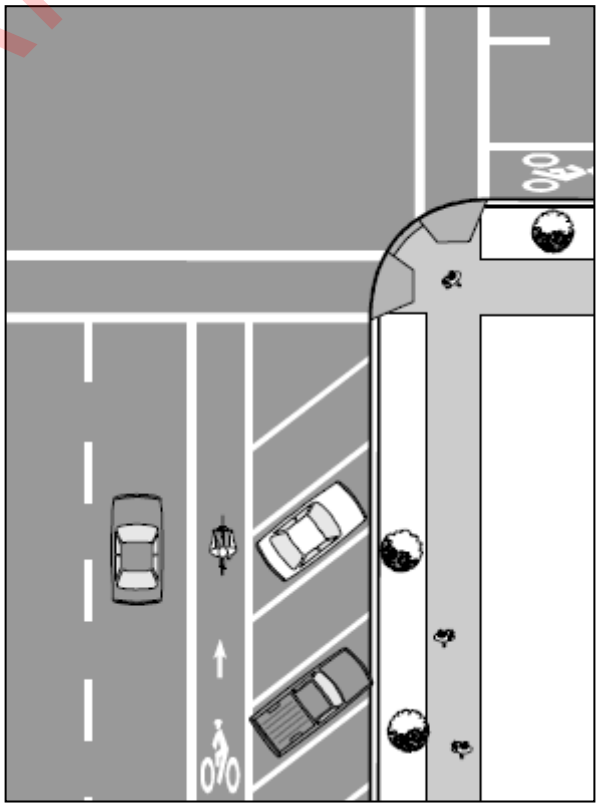
The pavement quality of a roadway can cause an unpleasant bicycling experience. Pavement irregularities, potholes, and depressions from heavy traffic may not be as noticeable or a concern to motorists, but bicycles with their narrow wheels and lack of suspension cannot handle these hazard spots. Therefore, 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.

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



Provide wide stripe to separate bike lanes from vehicular parking. *Image courtesy of the Federal Highway Administration.*

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

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

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.

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.

A typical bike lane. Photo courtesy of planetizen.com

BIKE LANES

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.

Bike lanes provide separation between vehicular traffic & bicyclists

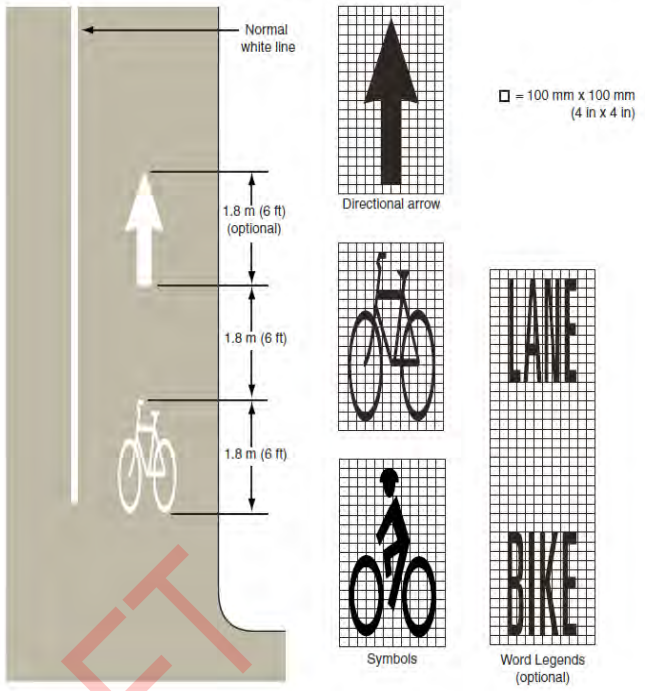
According to AASHTO, there are four different width standards for bike lanes depending on the type of roadway it will be installed on. For roadways with no curb and gutter, the minimum width is 4 feet. On streets with curb and gutter, NCDOT supports 4-foot bike lanes measured from the edge of the gutter 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.

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.

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.

Wide outside lanes provide adequate roadway width for bicyclist and motorist.

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.[ii]

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.

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.).

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.

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

D11-1

M1-8

M7-6

Examples of Bike Route Signs
Image courtesy of MUTCD

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.

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

- Assists bicyclists on identifying 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;

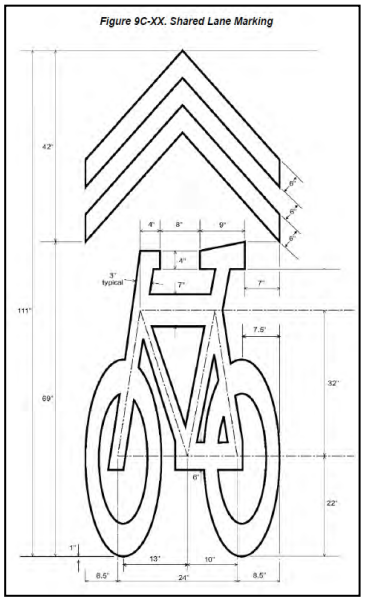


Illustration of Shared Lane Marking
Image courtesy of: NCUTCD

Installed Shared Lane Marking
Photo courtesy of Ohio State Transportation & parking

- 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.

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.

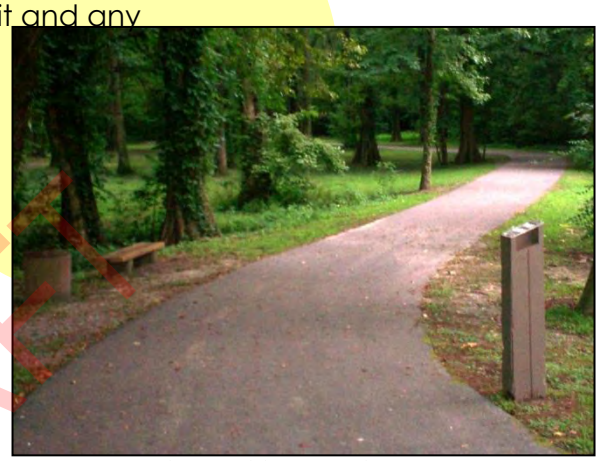
SIDE PATHS / BICYCLE PATHS

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.



An asphalt multi-use trail in Greenville, NC. Photo courtesy of Rivers & Associates, Inc.

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

MULTI-USE TRAILS

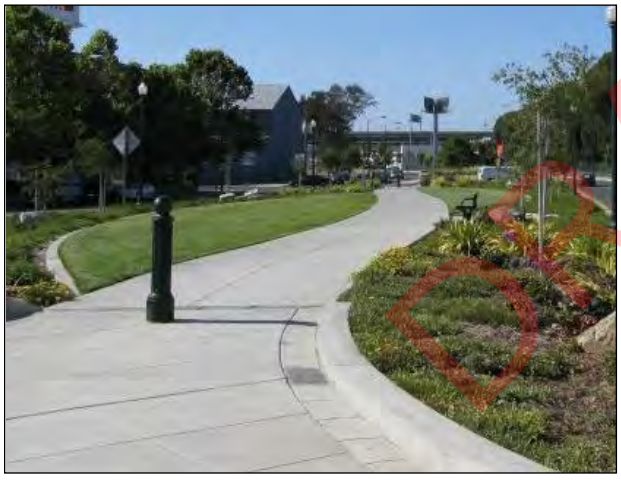
Multi-use trails and greenways are developed to serve bicyclists, runners, walkers, and wheelchairs. Multi-use trails are installed in many locations, such as a connection through residential neighborhoods, along rivers, on abandoned railroad beds, in parks to provide additional recreation, and along 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[iv]:

A multi-use trail with access from a street in Williamston, NC. Photo courtesy of Rivers and Associates, Inc.

- 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 concrete paved multi-use trail with bollards to facilitate vehicular access. The tail is also landscaped with lush vegetation and seating. *Photo courtesy of dbarchitects.com*

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

REFUGE ISLANDS

Refuge islands, also known as center islands, pedestrian islands or median slow points, are raised islands placed in the center of a street at the intersection or mid-block crossing locations to assist in protecting bicyclists and pedestrians from motorists. The island allows bicyclists to deal with only one direction of traffic at a time and enables them to stop part-way across the street and wait for an adequate gap in traffic to cross the remaining vehicle travel lanes.

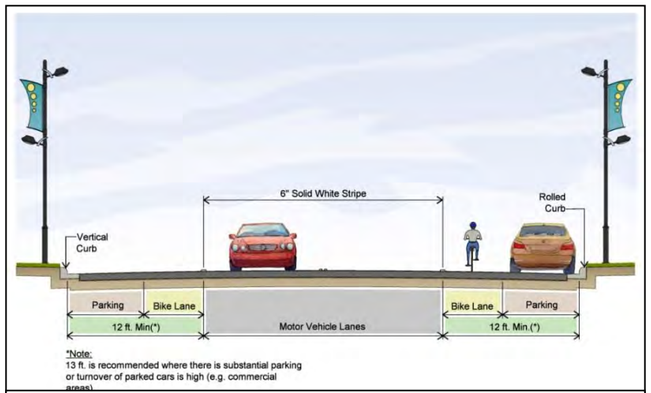
Crossing islands should be considered at uncontrolled locations where there are no traffic signals or stop signs and on larger streets with multi-traffic lanes as a supplement to the pedestrian crosswalk. If the street is wide enough, these islands may be used with curb extensions to further enhance pedestrian crossings. AASHTO recommends that median/crossing island be at least 20 ft. in length and 6 ft. in width. They also recommend a 4 ft. square landing within the island to accommodate wheelchair users[v].

All crossing islands should accommodate bicycles and persons in wheelchairs by providing a cut-through design. A "cut through" is areas where the road level incline up to the level of the median allowing wheels easier mobility. Consideration should also be given for placement of islands at intersections or near driveways so they do not affect left turn access. Adequate signage is suggested to warn motorists of the island.

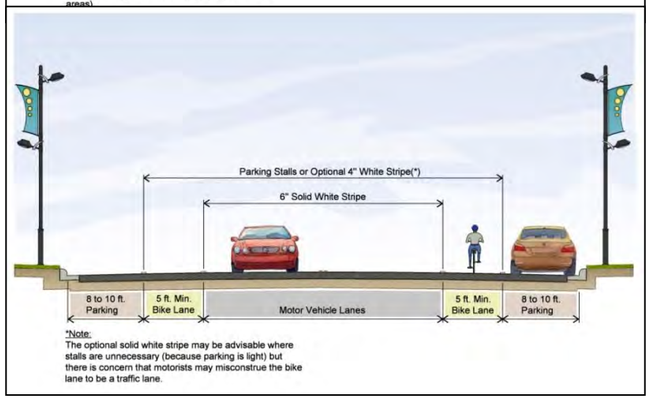
Refuge island. *Photo courtesy of bikepedimages.org*

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

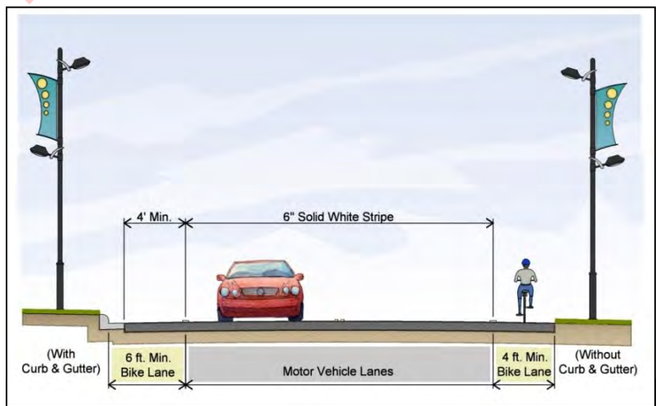
FACILITY TYPE	APPLICATION	TREATMENT	PURPOSE	IMAGE EXAMPLE	CROSS-SECTION EXAMPLE
Bike Lane	Applied to the right side of roadways (one-way only), to carry cyclists in the same direction of motorists. Located between on-street parking and the travel lane (if parking is allowed).	• 4-feet minimum width of 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



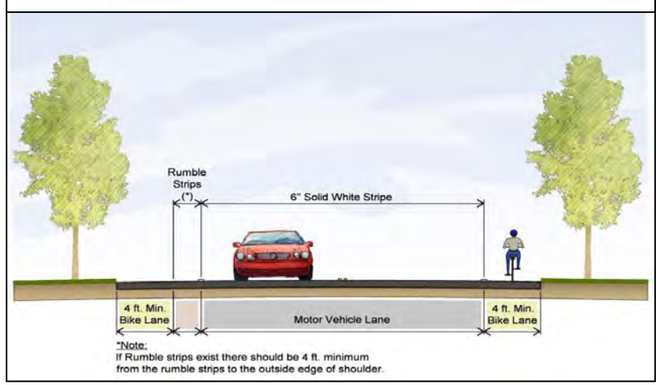
Bike Lane with On-Street Parking Permitted Without Parking Stripe Or Stall



Bike Lane with On-Street Parking Permitted & Delineated



Bike Lane Where On-Street Parking is Prohibited



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

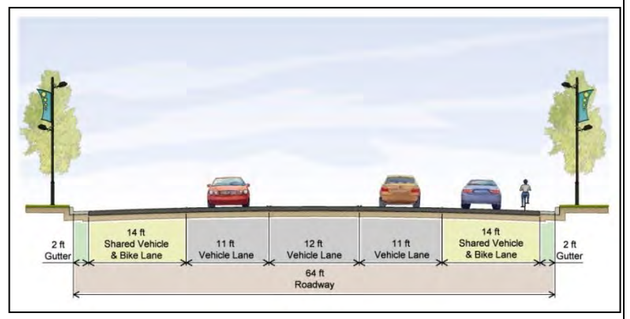
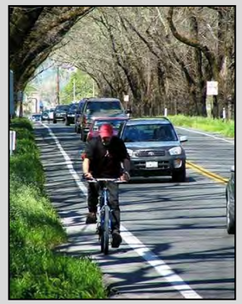
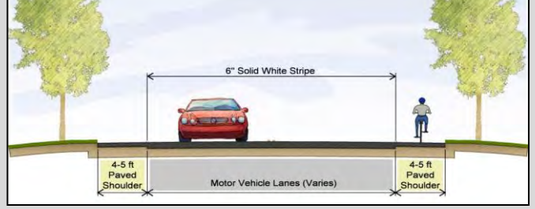
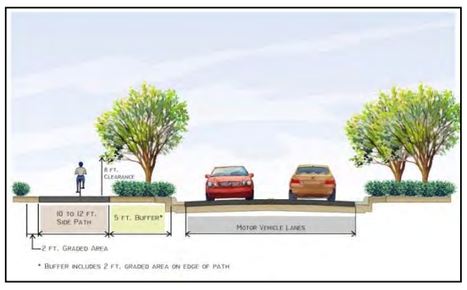
FACILITY TYPE	APPLICATION	TREATMENT	PURPOSE	IMAGE EXAMPLE	CROSS-SECTION EXAMPLE(S)
Wide Outside Lane (WOL)	Most appropriate on high-speed rural highways or high volume arterials when there is insufficient room for a bike lane. Used on streets where designating bike facilities is not advisable but due 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 *Photo 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 *Photo 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 *Photo courtesy of Rivers & Associates, Inc.*	 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

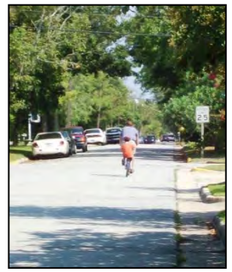
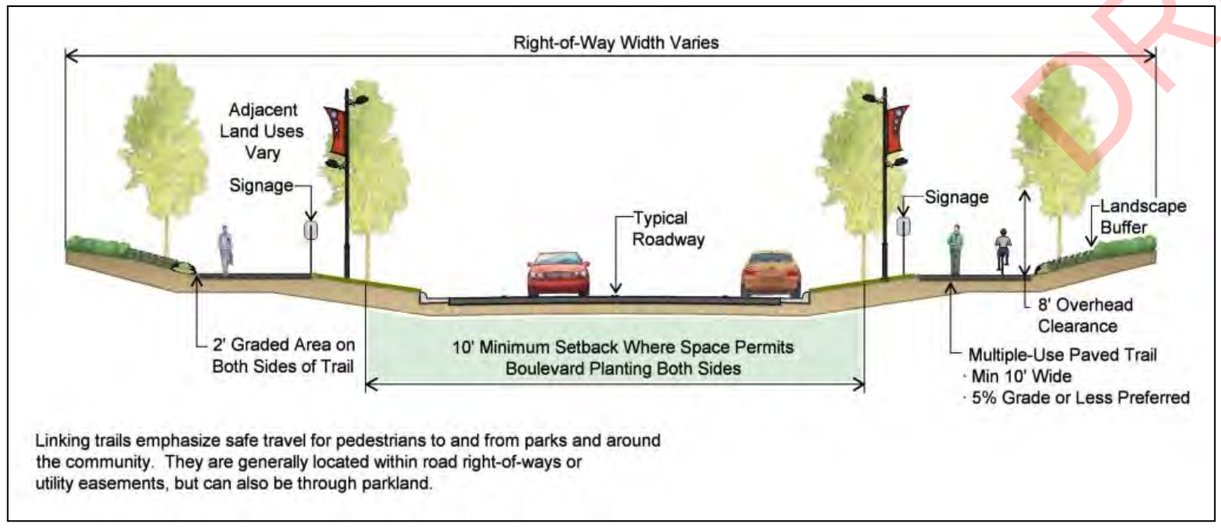
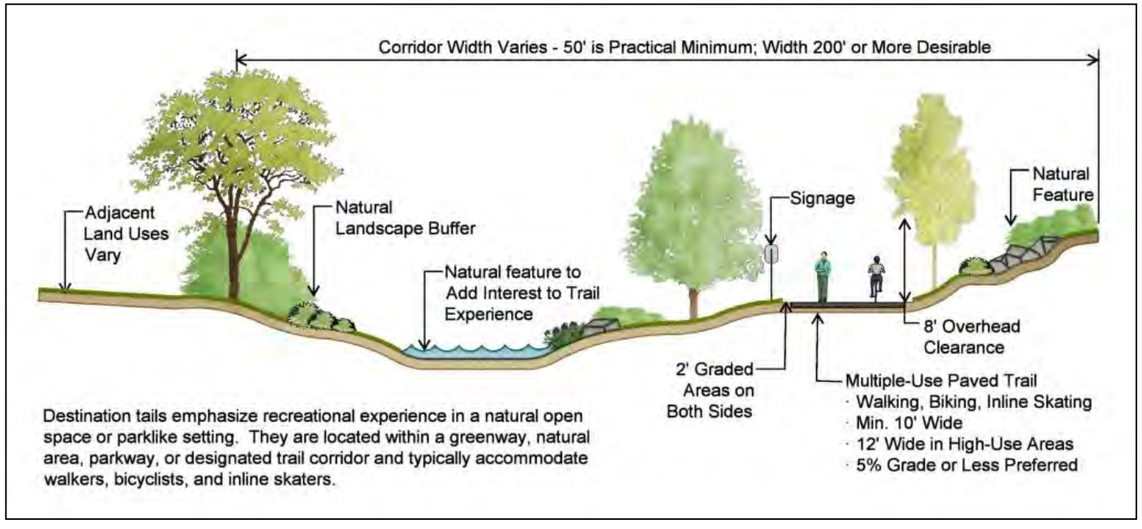
FACILITY TYPE	APPLICATION	TREATMENT	PURPOSE	IMAGE EXAMPLE	CROSS-SECTION EXAMPLE
Un-Signed Shared Roadway	On local streets in residential areas with low speed and volume, used when local streets are needed to be a part of the designated route system to provide connectivity and linkage throughout the community.	• 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 *Photo courtesy of Rivers & Associates, Inc.*	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.).	• Routes 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.	BIKE ROUTE Signed Shared Roadway in Beaufort, NC *Photo courtesy of Rivers & Associates, Inc.*	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 *Photo courtesy of www.pedbikeimages.org / Carl Sundstrom*	Centerline of Marking to Door 1'-6" Approximate Door Open Width 2'-6" Approximate Parked Passenger Vehicle Width From Curb 7'-0" Placement of Shared Use Arrow From Curb for Study Purposes 11'-0"

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 has 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 *Photo courtesy of Rivers & Associates, Inc.*	See cross-sections below.



Linking Trail



Destination Trail

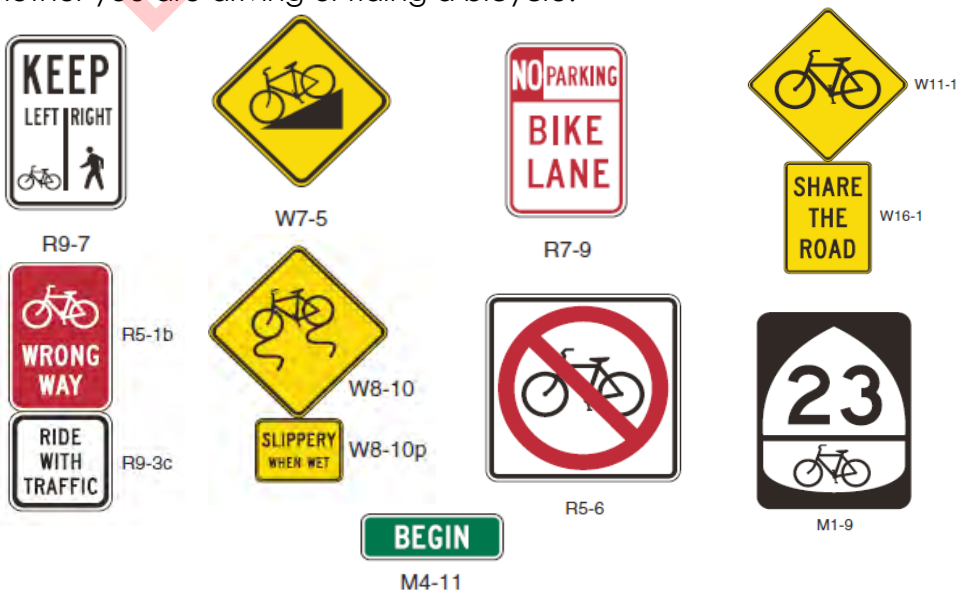
5.4 BICYCLE SIGNAGE

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
Image Courtesy of MUTCD, Part 9

RAPID FLASHING BEACONS

According to the National Highway Traffic Safety Administration, there were a total of 14,340 pedestrian fatalities and 193,000 pedestrian injuries resulting from pedestrian vehicle crashes nationwide during the 2004-2006 periods. Rapid Flash Beacons (RFB) can enhance safety by reducing crashes between vehicles and pedestrians at unsignalized intersections and mid-block pedestrian crossings by increasing driver awareness of potential pedestrian conflicts. Common names for this application include: light Emitting Diode (LED) Rapid-Flash System, Stutter Flash or LED Beacons.

Examples of rapid flashing beacons used to facilitate street crossings. Photos Courtesy of the FHWA

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 Atlantic Beach 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:

Image of Bicycle Parking Sign
Image courtesy of: MUTCD

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

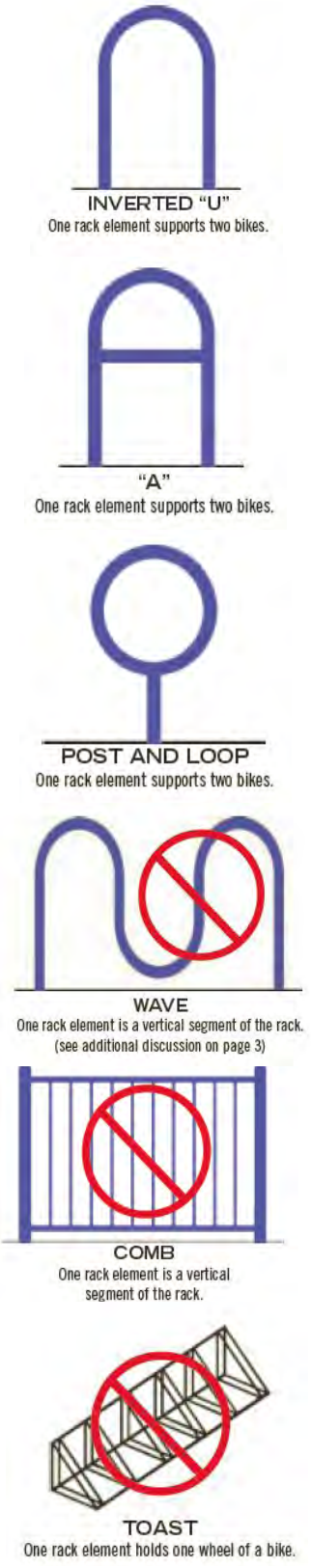


Image courtesy of APBP Bicycle Parking Guidelines

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:

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.

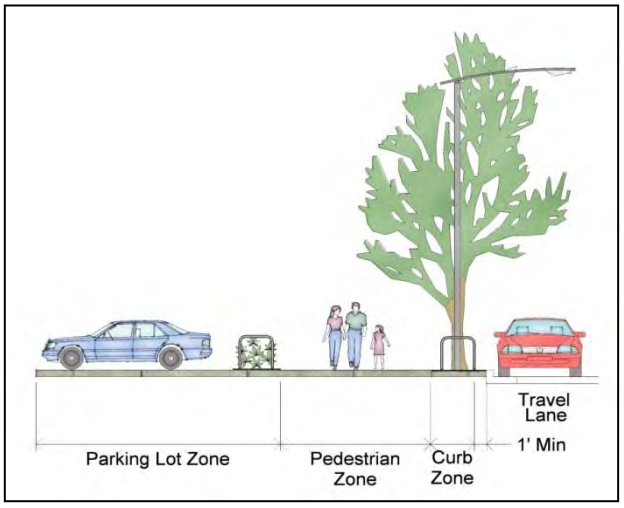


Illustration of Bike Rack Placement
Image *courtesy of Rivers & Associates, inc.*

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.

Bike racks can be used for bike storage as well as public art.
Photos courtesy of Rivers and Associates, inc.

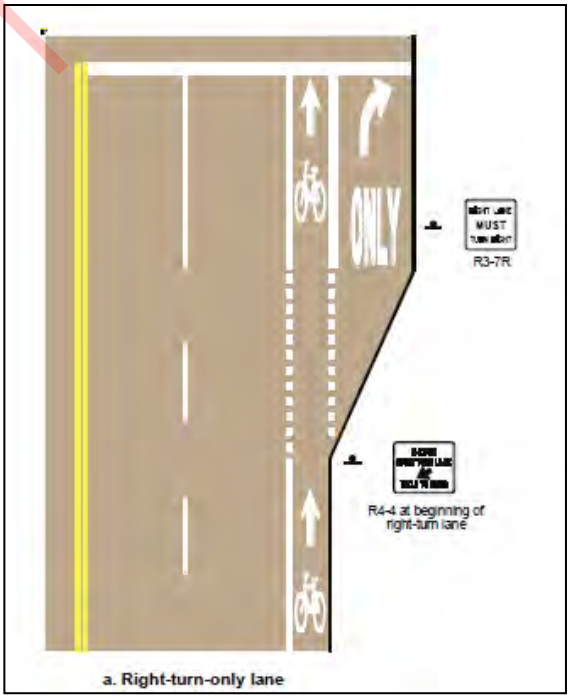
5.6 INTERSECTION TREATMENTS

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

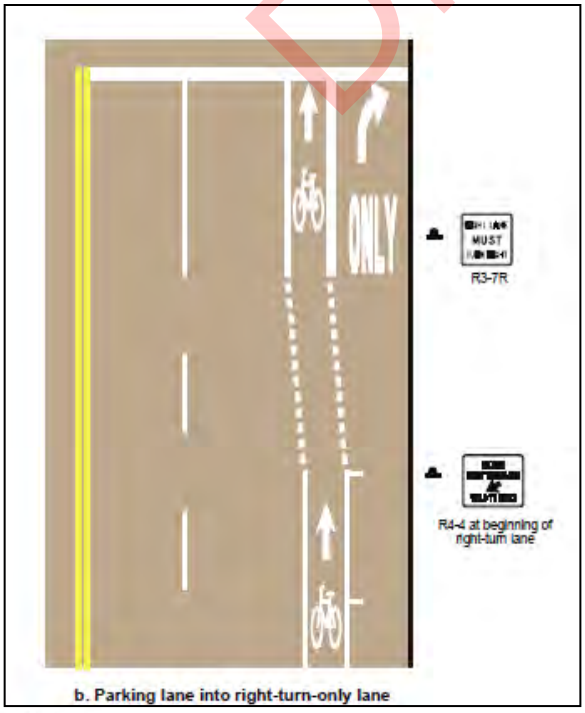
Intersections with bicycle lanes tend to confuse both cyclists and motorists when it comes to turning movements. Bike lanes are designed to keep bicyclists to the right side of the roadway; however, without additional signage or markings bicyclists and motorists have a hard time determining how to conduct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



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

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.

those roadways with on-street parking, the best option for marking appropriate travel paths for bicyclists and motorists is shown in the illustration below.

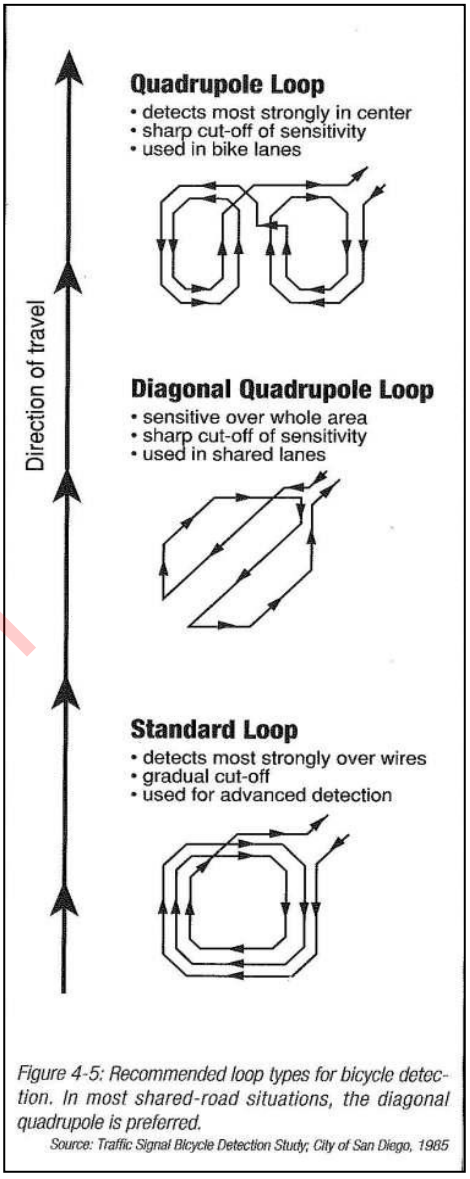


Figure 4-5: Recommended loop types for bicycle detection. In most shared-road situations, the diagonal quadrupole is preferred.
Source: Traffic Signal Bicycle Detection Study, City of San Diego, 1985

Image courtesy of: NCDOT Bicycle Facilities Planning & Design Guidelines

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.

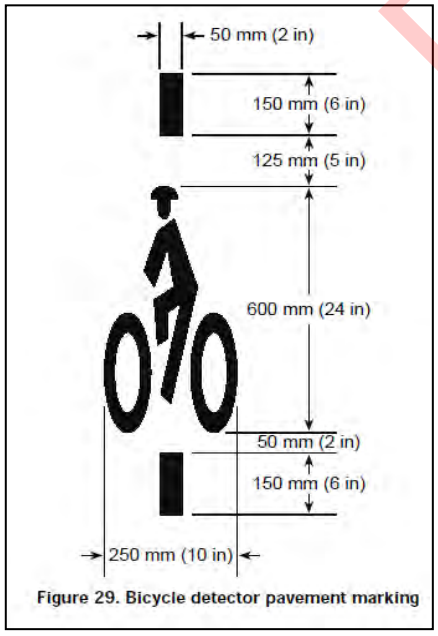
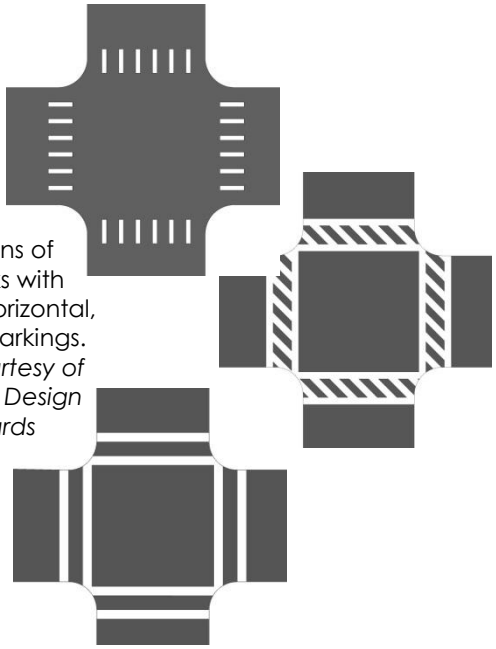


Figure 29. Bicycle detector pavement marking

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.



Illustrations of crosswalks with diagonal, horizontal, & ladder markings. *Image Courtesy of APA Urban Design Standards*

HIGH-VISIBILITY CROSSWALKS

Intersections should be designed to ensure bicycle and pedestrian connectivity as well as safety. For a street to be truly bike-friendly, intersections cannot be intimidating for users. With the right design features and layout, intersections can improve bike and pedestrian usage. An important aspect of redesigning intersections is providing adequate sight distance to reduce both vehicle-vehicle and vehicle-pedestrian crashes. Careful attention to placement of pedestrian design features such as bollards, landscaping, benches, and placement of on-street parking around intersections is essential at initial design stages.

A striped crosswalk and trail crossing in Williamston, NC. *Photo courtesy of Rivers & Associates, Inc.*

A raised speed table and trail crossing in Williamston, NC. *Photo courtesy of Rivers & Associates, Inc.*

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.

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.

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.

Colored bike lane
Photo courtesy of Streetprint.com

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.

Bike boulevard
Photo courtesy of www.SRTS.org

BICYCLE BOULEVARDS

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 box
Photo courtesy of www.SRTS.org

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.

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.

M4-9a

M4-9c

Detour Signs
Image courtesy of MUTCD, Chapter 6

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.

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.

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.

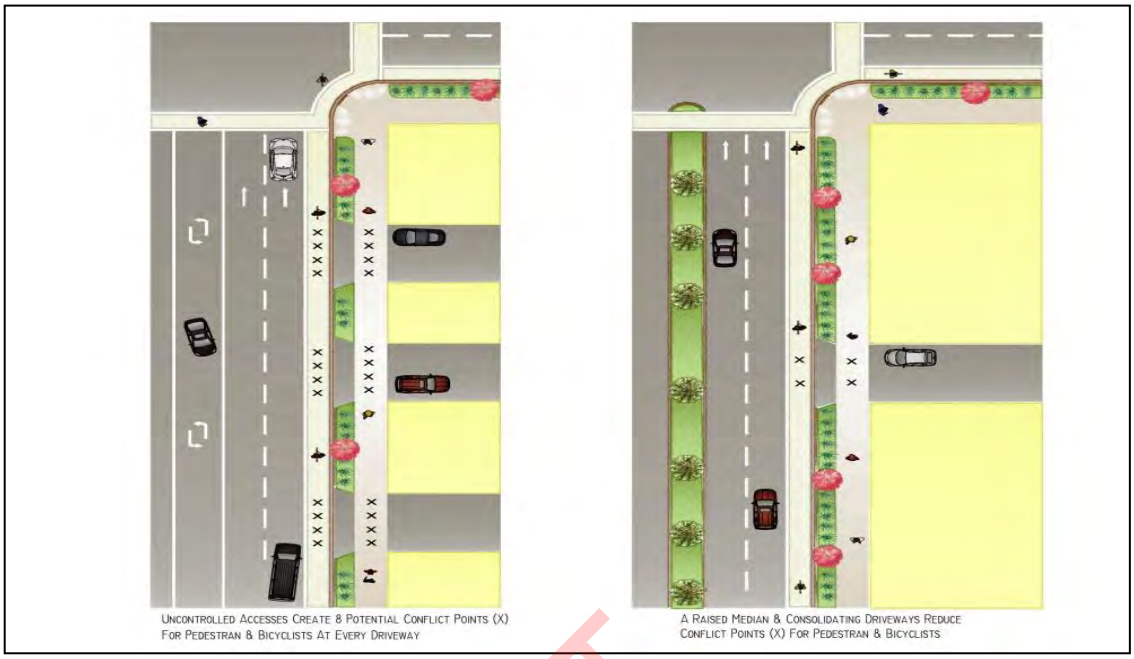


Illustration of uncontrolled and controlled driveway access. Image courtesy of Rivers and Associates, Inc.

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[x].

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 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.

[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 27

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

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

[v] Federal Highway Administration (FHWA) Pedestrian Safety, *Traffic Calming – Crossing Islands*, October 2007, http://safety.fhwa.dot.gov/saferjourney/library/countermeasures/25.htm

[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] 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:

This section outlines recommendations for ancillary facilities, programs, and policies to assist in making the Town of Atlantic Beach 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 two years of the Plan's completion. Mid-term priorities are those that should be addressed within 3 – 5 years and long-term priorities are those that should be addressed within 6-10 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 Atlantic Beach has a comprehensive bicycle network where its users feel comfortable to bike in the community. The recommended programs for Atlantic Beach include:

- Spot Improvement Program
- Infrastructure Maintenance Program
- Driveway Consolidation Program
- Education Programs
- 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 Atlantic Beach. 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

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 Atlantic Beach.

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 Atlantic Beach 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 NC 58 and Atlantic Beach Causeway 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

Currently, Atlantic Beach does not have a public transportation system. Bicycles have become one of the primary transportation methods within Town. Atlantic Beach is an outdoor community with many residents and visitors that choose to commute via bicycling and walking. Opportunities to provide supporting facilities for these activities are critical in providing a walkable and bikeable community.

Bikes on Buses Program

When the opportunity arises to develop a mass transit network in Atlantic Beach, programs must be in place to ensure bicycle compatibility. One opportunity to ensure this compatibility is to develop a "Bike on Bus" program. This 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 Atlantic Beach, then the Bikes on Buses Program should be incorporated into the transportation planning.

Trail information sign in Williamston, NC. Photo Courtesy of Rivers & Associates, Inc.

BICYCLE PARKING FACILITIES

Providing appropriate bicycling facilities in Atlantic Beach will encourage bicycling by increasing bicycling trips and reducing vehicular traffic. Bicycle parking racks are an in-demand facility in many areas of Atlantic Beach due to limited vehicular parking availability. Parking racks should be located in popular destinations such as shopping centers, parks, boat accesses, beach accesses 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. Photo Courtesy of Rivers & Associates, Inc.

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.

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 Atlantic Beach's location amongst several water bodies, wetlands, and marshes, there may 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 Atlantic Beach has a comprehensive bicycle network where its users feel comfortable to bike in the community. The recommended programs for Atlantic Beach include:

- Spot Improvement Program
- Infrastructure Maintenance Program
- Driveway Consolidation Program
- Education Programs
- 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 Town's Customer Service webpage includes a "Please Fix It" webpage link. 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 Atlantic Beach and promote local businesses and vendors. An infrastructure maintenance program is recommended as a short-term priority to maintain 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 Atlantic Beach should consider Bicycle Rodeo programs to educate children and parents about safe bicycling skills. The development of bicycle rodeos offers potential partnerships among the Police Department, Parks and Recreation Department, Planning Department and local bike shops and businesses. Bike rodeo programs often include 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 has been enacted in Atlantic Beach in the past.

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.[I] 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.

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 Atlantic Beach 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 Atlantic Beach 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 Atlantic Beach 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 Atlantic Beach can be accomplished by enhancing the Town's website (www.atlanticbeach-nc.com). The Atlantic Beach's Police Department's could include links to Bicycle Safety Tips such as those produced by the UNC Highway Safety Research Center or League of American Bicyclists. 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 Atlantic Beach. 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 Atlantic Beach 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 Atlantic Beach 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

Currently, private bicycle shops offer bicycle rental choices. However, these bike shops are located along busy thoroughfares and away from major destinations (i.e. beach access and public parks). To provide citizens and visitors with more access to bike rental options, bike rental kiosks can be considered. Bike rental kiosks could be publicly or privately managed and can be placed close at key destinations such as hotels, key beach accesses and major activity centers. Bike kiosks can be manned or electronic and can even allow users to register and rent a bike in advance of arrival to the kiosk station.

6.2 POLICIES

Bicycle-friendly policies are an efficient way to improve bicycling in Atlantic Beach because they require bicycle facilities at the onset of development rather than a retroactive approach. Atlantic Beach 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. Atlantic Beach 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 within the Causeway Overlay District, but there is no Town policy to require such facilities communitywide. Atlantic Beach acknowledges the need for regulations requiring bicycle facilities as development occurs. Atlantic Beach should consider revising its Zoning Ordinance and Subdivision regulations to set a overall standard for the Town and require bicycle facilities with certain development requests. Atlantic Beach 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, Atlantic Beach 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. A maintenance policy is a short-term and ongoing

priority to maintain new and existing bicycle facilities.

TOWN FUNDING

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 Atlantic Beach 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 Atlantic Beach 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.

BRIDGE IMPROVEMENTS

Currently, there are no plans to replace or renovate the Atlantic Beach Causeway Bridge. The bridge currently has a 4' shoulder and bike safe guard rails. Opportunities to provide additional bike facilities along the bridge including signage and additional roadway markings should be considered.

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.

DRIVEWAY CONSOLIDATION

To facilitate the development of safe bicycle infrastructure the Town should consider adopting a "Driveway Consolidation Program". Currently, along areas of NC 58 and Atlantic Beach Causeway there are a high number of driveway entrances to businesses along these corridors. 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
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
Driveway Consolidation	Mid-Term
Commercial Development Policy	Short-Term
Bikeways and Bike Facilities Ordinance	Short-Term

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

SECTION 7 – PROJECT RECOMMENDATIONS

7.0 CONSTRUCTION PROJECTS

Section Outline

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. 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.

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. Sixty (60) construction projects are recommended including one (1) bike lane, two (2) roadway widening / bike lane improvements, seventeen (17) multi-use trail segments, four (4) pedestrian sidewalks, three (3) existing crosswalk improvements, sixteen (16) sharrow improvements, four (4) intersection improvements, seven (7) crosswalk improvements, (5) refuge island improvements and one (1) park and ride 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	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment	Estimated Cost Range	Preliminary Opinion of Probable Costs
1	NCDOT	Multi-Use Trail	Fort Macon Route	Fort Macon Rd.	Town Limits/ Fort Macon State Park	Near Oceana Dr.	8,700 ft.	Provide a scenic and accessible off-road route on the South side of Fort Macon Rd., connecting residential and commercial areas to Fort Macon Park and Public Beach Accesses.	Slope (in some areas), existing utilities and driveways.	Not Anticipated	Develop a multi-use trail that replaces the existing 6' sidewalk. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high visibility crosswalks at street crossings.	High	$652,500
2	NCDOT	Multi-Use Trail	Fort Macon Route	Fort Macon Rd.	Near Oceana Dr.	Brooks St.	1,500 ft.	Provide off-road route from the Oceana Drive area to Brooks Street. Will provide access for residential and commercial areas on the North side of Fort Macon Rd. to connect with community destinations.	Limited ROW, encroachment into existing ROW (i.e. boats) and utilities.	Not Anticipated	Develop a multi-use trail on the North side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high-visibility crosswalks at street crossings.	Moderate	$112,500
3	NCDOT	Multi-Use Trail	Fort Macon Route	Fort Macon Rd.	Brooks St.	Atlantic Beach Causeway Rd.	2,000 ft.	Provide off-road route to connect residential and commercial areas to existing and future destinations along Fort Macon Rd. and Atlantic Beach Causeway.	Limited ROW (some structures located nearly adjacent to the existing ROW), utilities and increased traffic.	Anticipated	Develop a multi-use trail on the North side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high-visibility crosswalks at street crossings.	Moderate	$120,000
4	NCDOT	Pedestrian Sidewalk	Fort Macon Route	Fort Macon Rd.	Atlantic Beach Causeway Rd.	Charlotte Ave.	1,850 ft.	Provide a pedestrian connection from commercial areas along Fort Macon Rd. to surrounding residential areas and destinations.	Limited ROW, parking lots located near existing ROW, utilities and grade changes (from curb to Existing ROW).	Anticipated	Develop a pedestrian sidewalk on the North side of Fort Macon Rd. The sidewalk should include lighting and high-visibility crosswalks at street crossings.	Low	$92,500
5	NCDOT	Pedestrian Sidewalk	Fort Macon Route	Fort Macon Rd.	Charlotte Ave.	Cedar Ln.	900 ft.	Provide a pedestrian connection from commercial areas along Fort Macon Rd. to surrounding residential areas and destinations.	Limited ROW, parking lots located near existing ROW, utilities and grade changes (from curb to Existing ROW).	Anticipated	Develop a pedestrian sidewalk on the South side of Fort Macon Rd. The sidewalk should include lighting and high-visibility crosswalks at street crossings.	Low	$45,000
6	NCDOT	Multi-Use Trail	Fort Macon Route	Fort Macon Rd.	Cedar Ln.	Town Park Entrance	2,600 ft.	Provide a scenic and accessible off-road route on the South side of Fort Macon Rd., connecting residential and commercial areas to Town Park and Atlantic Station Shopping Center.	Limited ROW in some areas, utilities and some drainage swales.	Anticipated	Develop a multi-use trail that replaces the existing 6' sidewalk on the South side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation) and trail signage.	Moderate	$195,000

Table 7.0: Preliminary Construction Project Recommendations, Continued

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment	Estimated Cost Range	Preliminary Opinion of Probable Costs
7	NCDOT	Multi-Use Trail	Fort Macon Route	Fort Macon Rd.	Town Park Entrance	Ocean Ridge Dr.	4,300 ft.	Provide a scenic and accessible off-road route on the South side of Fort Macon Rd., connecting residential and commercial areas to Town Park, Atlantic Station Shopping Center and Post Office.	Limited ROW in some areas and utilities.	Not Anticipated	Develop a multi-use trail that replaces the existing 6' sidewalk on the South side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation) and trail signage.	High	$322,500
8	NCDOT	Multi-Use Trail	Fort Macon Route	Fort Macon Rd.	Ocean Ridge Dr.	Coral Bay Club area	1,600 ft	Provide a scenic and accessible off-road route on the South side of Fort Macon Rd., connecting residential areas and tourist destinations to beach accesses and community attractions.		Not Anticipated	Develop a multi-use trail on the South side of Fort Macon Rd that replaces the existing 6' sidewalk. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high-visibility crosswalks at street crossings.	Moderate	$120,000
9	NCDOT	Multi-Use Trail	Fort Macon Route	Fort Macon Rd.	Coral Bay Club area	Town Limits (at Pine Knoll Shores)	4,850 ft.	Provide a scenic and accessible off-road route on the North side of Fort Macon Rd., connecting residential areas and tourist destinations to beach accesses and community attractions.	Some areas have increased number of driveways. Existing boardwalk is too narrow for multi-use movement.	Not Anticipated	Develop a multi-use trail on the North side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high-visibility crosswalks at street crossings. The existing boardwalk should be replaced or widened to accommodate multi-use movement.	High	$560,000
10	NCDOT	Existing Crosswalk Improvement	Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	Traffic along Fort Macon Rd.	Not Anticipated	Replace existing crosswalk with a high-visibility crosswalk and complimentary signage per NCDOT guidelines.	Minimal	$2,500
11	NCDOT	Existing Crosswalk Improvement	Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	Traffic along Fort Macon Rd.	Not Anticipated	Replace existing crosswalk with a high-visibility crosswalk and complimentary signage per NCDOT guidelines.	Minimal	$2,500
12	NCDOT	Existing Crosswalk Improvement	Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	Traffic along Fort Macon Rd.	Not Anticipated	Replace existing crosswalks with high-visibility crosswalk and complimentary signage per NCDOT guidelines.	Minimal	$2,500
13	NCDOT	Refuge Island & Rapid Flash Beacons	Refuge Island	Fort Macon Rd.	N/A	N/A	N/A	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	Traffic along Fort Macon Rd. and roadway curve.	Not Anticipated	Replace and relocated the existing crosswalk with a refuge island including, high-visibility crosswalks and rapid flash beacons per NCDOT guidelines.	Low	$55,000
14	Town	Sharrows	Pelican Route	Pelican Dr.	Fort Macon Rd.	Forest Knoll Dr.	2,000 ft.	Provide bicyclists safe access to a local destination (CAMA water access and small pier).	Narrow existing street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$2,500

Table 7.0: Preliminary Construction Project Recommendations, Continued

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment	Estimated Cost Range	Preliminary Opinion of Probable Costs
15	NCDOT	Intersection Improvement	Intersection Improvement	Fort Macon Rd.	Town Park Entrance	Atlantic Station Shopping Center	N/A	Provide bicyclists safe access to local destinations (Town Park and Atlantic Station Shopping Center) across Fort Macon Rd.	High traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalks and pedestrian signals per NCDOT guidelines.	Low	$60,000
16	NCDOT	Intersection Improvement	Intersection Improvement	Fort Macon Rd.	Charlotte Ave.	Fort Macon Rd.	N/A	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	High traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalks and pedestrian signals per NCDOT guidelines.	Low	$60,000
17	Town	Sharrows	Davis-Kinston Route	Davis Blvd. & Kinston Ave.	Charlotte Ave.	Bowen St.	1,600 ft.	Provide access to residential and commercial areas while directing users to a signalized crossing at Fort Macon Rd.	Narrow existing street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$2,000
18	N/A	Multi-Use Trail	Alleyway Connector (1)	Town Easement	Charlotte Ave.	Atlantic Beach Causeway Rd.	1,400 ft.	Utilize existing easements to provide access to residential and commercial areas as well as local destinations.	Further easement study is needed.	Possible	Install a multi-use trail that incorporates wayfinding signage and high-visibility crosswalks at street crossing.	Low	$75,000
19	Town	Sharrows	Charlotte Route	Charlotte Ave.	Davis Blvd.	W. Boardwalk	1,200 ft.	Provide bicyclists safe access to residential and commercial areas as well as local destinations (beach accesses).	Narrow existing street width and driveways	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$1,500
20	Town	Sharrows	W. Boardwalk Route	W. Boardwalk	Durham Ave.	Raleigh Ave.	850 ft.	Provide bicyclists safe access to beach accesses.	Narrow existing street width, homes located close to existing ROW.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$1,500
21	Town	Widen Road Shoulder with Bike Lanes	Ocean Ridge Route	Ocean Ridge Dr.	Fort Macon Rd	Durham Ave.	6,000 ft.	Provide a scenic route from the "Circle" to Fort Macon Rd.	Existing narrow street width.	Not Anticipated	Widen Ocean Ridge Road within the existing right-of-way and include bike lane / roadway striping and roadway resurfacing.	Moderate	$270,000
22	Town	Widen Road Shoulder with Bike Lanes	Bogue-Cedar Route	Bogue Blvd., Cedar Ln.	Fort Macon Rd.	Wilson Ave.	4,300 ft.	Provide a alternate route parallel to Fort Macon Rd.	Existing narrow street width.	Not Anticipated	Widen Bogue Blvd. and portions of Cedar Ln. within the existing right-of-way and include bike lane / roadway striping and roadway resurfacing.	Moderate	$200,000
23	N/A	Pedestrian Sidewalk	Alleyway Connector (2)	N/A	West Dr.	Raleigh Ave.	740 ft.	Provide pedestrian / bike access from the "Circle" to adjacent neighborhood.	Homes located along alleyway.	Not Anticipated	Install pedestrian sidewalk.	Low	$38,000
24	N/A	Pedestrian Sidewalk	Alleyway Connector (3)	N/A	West Dr.	Kinston Ave.	450 ft.	Provide pedestrian / bike access from the "Circle" to surrounding neighborhoods.	Homes located along alleyway.	Not Anticipated	Install pedestrian sidewalk.	Low	$23,000
25	Town	Bike Lane	Circle Route	Atlantic Blvd., East & West Dr.	Central Dr,	Atlantic Blvd.	2,300 ft.	Improve access around the "Circle".	One way streets and high traffic during summer months.	Not Anticipated	Install bike lanes per NCDOT guidelines.	Minimal	$2,500

Table 7.0: Preliminary Construction Project Recommendations, Continued

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment	Estimated Cost Range	Preliminary Opinion of Probable Costs
26	NCDOT	Intersection Improvement	Intersection Improvement	Fort Macon Rd., Atlantic Beach Causeway	N/A	N/A	N/A	Provide access across Fort Macon Rd. to connect residential and commercial areas.	High traffic along Fort Macon Rd. & Atlantic Beach Causeway Rd.	Not Anticipated	Install crosswalks along north side of intersection. Program intersection signals to accommodate a 4-way stop to allow safe bicycle and pedestrian crossing.	Minimal	$3,000
27	NCDOT	Multi-Use Trail	Atlantic Beach Causeway	Atlantic Beach Causeway	Bogue Blvd.	Old Causeway Rd.	1,300 ft.	Provide an accessible off-road route on the West side of Atlantic Beach Causeway, connecting residential, commercial areas and tourist destinations.	Narrow ROW in some areas, ROW encroachment with parking lots and driveway cuts.	Anticipated	Install multi-use trail along West side of Atlantic Beach Causeway. Adopt a streetscape master plan to address ROW encroachment and trail design.	Moderate	$100,000
28	NCDOT	Multi-Use Trail	Atlantic Beach Causeway	Atlantic Beach Causeway	Old Causeway Rd.	Atlantic Beach Bridge Abutment	2,600 ft.	Provide an accessible off-road route on the West side of Atlantic Beach Causeway, connecting residential, commercial areas and tourist destinations.	Narrow ROW in some areas, NCDOT ROW encroachment with parking lots and driveway cuts.	Not Anticipated	Install multi-use trail along West side of Atlantic Beach Causeway. Adopt a streetscape master plan to address ROW encroachment and trail design.	Moderate	$200,000
29	Town	Intersection Improvement	Intersection Improvement	Old Causeway Rd.	N/A	N/A	N/A	Provide bicyclists safe access to residential and commercial areas as well as local destinations.	Angle of existing intersection and high traffic.	Not Anticipated	Install access ramps and high visibility crosswalks.	Low	$12,000
30	Town	Sharrows	Old Causeway Route	Old Causeway Rd.	Atlantic Beach Causeway	Caribbean Way Rd.	3,400 ft.	Improve connectivity to commercial areas along Atlantic Beach Causeway.	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$3,000
31	Town	Sharrows	Moonlight Route	Moonlight Dr.	Atlantic Beach Causeway Rd	Smith St.	400 ft.	Provide bicyclists safe access to a local destination (CAMA water access).	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$1,000
32	NCDOT	Refuge Island & Rapid Flash Beacons	Refuge Island	Atlantic Beach Causeway	N/A	N/A	N/A	Provide bicyclists and pedestrians a safe crossing along Fort Macon Rd. to access retail / commercial destinations.	High traffic along Atlantic Beach Causeway and driveways.	Not Anticipated	Install a refuge island including, high-visibility crosswalks and rapid flash beacons per NCDOT guidelines.	Low	$35,000
33	NCDOT	Refuge Island & Rapid Flash Beacons	Refuge Island	Atlantic Beach Causeway	N/A	N/A	N/A	Provide bicyclists and pedestrians a safe crossing along Fort Macon Rd. to access retail / commercial destinations.	High traffic along Atlantic Beach Causeway and driveways.	Not Anticipated	Install a refuge island including, high-visibility crosswalks and rapid flash beacons per NCDOT guidelines.	Low	$35,000
34	Town	Sharrow	Bogue Sound Route	W. Bogue Sound Dr.	E. Fort Macon Rd.	Public Access Ramp	600 ft.	Provide access to local destination (boat access ramp).	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$1,000

Table 7.0: Preliminary Construction Project Recommendations, Continued

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment	Estimated Cost Range	Preliminary Opinion of Probable Costs
35	Town	Sharrow	W. Atlantic Route	W. Atlantic Blvd.	West Dr.	Durham Ave.	1,450 ft.	Provide access from the "Circle to a scenic route Ocean Ridge Dr. Provides inter-neighborhood connectivity.	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$2,000
36	Town	Sharrow	E. Boardwalk-Glenn	E. Boardwalk / Glenn St.	East Dr.	CAMA rain garden	3,000 ft.	Provide bicyclists safe access to residential areas as well as local destinations (beach accesses).	Existing narrow street width one-way vehicular circulation (Atlantic Beach Ave. to East Dr.).	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$4,000
37	Town	Sharrow	Money Island Dr.	Money Island - Tryon Route	Glenn St.	Tryon St. terminus (east).	1,150 ft.	Provide access from the proposed Fort Macon Route to residential neighborhoods and beach accesses.	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$2,500
38	N/A	Multi-Use Trail	Fort Macon - Tryon St Connector	N/A	Fort Macon Rd	Tryon St	200 ft.	Provide bicyclists safe access to residential and commercial areas as well as local destinations (beach accesses).	Easement acquisition needed.	Anticipated	The multi-use trail segment should include lighting, support facilities (i.e. vegetation) and trail signage.	Minimal	$2,000
39	N/A	Multi-Use Trail	Town Park Connector	N/A	Ocean Ridge Dr.	Town Park	450 ft.	Provide neighborhood access to Town Park and shopping destinations along Fort Macon Road.	Easement acquisition needed.	Anticipated	The multi-use trail segment should include lighting, support facilities (i.e. vegetation) and trail signage.	Low	$27,000
40	NCDOT	Crosswalk Improvement	High-Visibility Crosswalk and Signage	Fort Macon Rd.	N/A	N/A	100 ft.	Connect residential area on the North side of Fort Macon Rd. to the proposed multi-use trail.	High traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines. Install multi-use trail segment on North side of Fort Macon Rd. from crosswalk to subdivision entrance.	Minimal	$8,500
41	NCDOT	Crosswalk Improvement	High-Visibility Crosswalk and Rapid Flash Beacon	Fort Macon Rd.	N/A	N/A	250 ft	Connect residential area and post office on the North side of Fort Macon Rd. to the proposed multi-use trail.	High traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage with rapid flash beacon per NCDOT guidelines. Install multi-use trail segment on North side of Fort Macon Rd. from crosswalk to subdivision entrance and post office.	Low	$30,000
42	NCDOT	Park and Ride / Trailhead Park	Park and Ride / Trailhead Park	Atlantic Beach Causeway	N/A	N/A	N/A	Encourage bicycle transportation from the Causeway District to the "Circle and beach accesses. Create a destination at the Town entrance.	NCDOT ROW Encroachment	Not Anticipated	A park and ride facility should include vehicular and bicycle parking, lighting, support facilities (i.e. benches and vegetation), trail signage and high visibility crosswalks at driveway crossings. Destination facilities such as fishing piers and viewing areas should be considered.	TBD	TBD

Table 7.0: Preliminary Construction Project Recommendations, Continued

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment	Estimated Cost Range	Preliminary Opinion of Probable Costs
43	Town	Sharrows	Wilson Route	Wilson Ave.	Fort Macon Rd.	E. Boardwalk	880 ft.	Provides access from Fort Macon Road to residential neighborhoods and beach accesses.	Existing narrow street width and homes located close to the existing ROW.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$2,000
44	Town	Sharrows	E. Atlantic Route	E. Atlantic Blvd.	East Dr.	Wilson Ave.	1,500 ft.	Connects residential areas to the "Circle".	Existing narrow street width one-way vehicular circulation (Atlantic Beach Ave. to East Dr.).	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$3,000
45	Town	Refuge Island & Rapid Flash Beacon	Refuge Island	Fort Macon Rd.	N/A	N/A	N/A	Creates a safe crossing from neighborhoods and commercial areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	May require driveway consolidation.	Not Anticipated	Install a refuge island with high visibility crosswalks and rapid flash beacons per NCDOT guidelines.	Low	$35,000
46	NCDOT	Crosswalk Improvement	High-Visibility Crosswalk and Rapid Flash Beacon	Fort Macon Rd.	N/A	N/A	N/A	Creates a safe crossing from neighborhoods and commercial areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage with rapid flash beacon per NCDOT guidelines.	Low	$15,000
47	N/A	Multi-Use Trail	New Bern - Club Colony Connector	N/A	New Bern St.	Club Colony Dr.	140 ft.	Improve bicycle and pedestrian access from Club Colony Dr. to the New Bern Street Bath House.	Existing boardwalk, sand dunes and possible septic utilizes.	Not Anticipated	Install a multi-use trail segment from Club Colony Dr. to New Bern Street.	Minimal	$9,000
48	Town	Sharrows	Club Colony Loop	Fort Macon Rd., New Bern St., Dunes Ave. and Freeman Ln.	New Bern Ave.	Dunes Ave. & Freeman Ln.	4,000 ft.	Improves accesses from proposed multi-use trail to adjacent residential areas and beach accesses.	High traffic along Fort Macon Rd.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$5,000
49	N/A	Multi-Use Trail	Freeman-Club Colony Connector	N/A	Freeman Ln.	Club Colony Dr.	250 ft.	Utilize existing easement to provide access to the proposed Fort Macon Multi-Use trail to neighborhoods and beach accesses.	Existing boardwalk and sidewalk too narrow.	Not Anticipated	Install a multi-use trail from Freeman Ln. to Club Colony Dr.	Low	$20,000
50	NCDOT	Crosswalk Improvement	High-Visibility Crosswalk and Rapid Flash Beacon	Fort Macon Rd.	N/A	N/A	50 ft.	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines. Install multi-use trail segment on North side of Fort Macon Rd. from crosswalk to subdivision entrance.	Low	$15,000
51	NCDOT	Crosswalk Improvement	High-Visibility Crosswalk and Signage	Fort Macon Rd.	N/A	N/A	50 ft.	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines. Install multi-use trail segment on North side of Fort Macon Rd. from crosswalk to subdivision entrance.	Minimal	$5,000

Table 7.0: Preliminary Construction Project Recommendations, Continued

Map Ref. #	Road Class.	Type of Project	Project / Improvement Name	At / On	From	To	Approx. Length (ft)	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment	Estimated Cost Range	Preliminary Opinion of Probable Costs
52	NCDOT	Refuge Island	Refuge Island and Rapid Flash Beacon	Atlantic Beach Causeway	N/A	N/A	N/A	Provide bicyclists and pedestrians a safe crossing along Fort Macon Rd. to access retail / commercial destinations.	High traffic along Fort Macon Rd.	Not Anticipated	Install a refuge island including, high-visibility crosswalks and rapid flash beacon per NCDOT guidelines.	Low	$35,000
53	NCDOT	Multi-Use Trail	Island Quay Connector	Fort Macon Rd.	Island Quay dr.	Henderson Blvd.	350 ft.	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	High traffic along Fort Macon Rd.	Not Anticipated	Install a multi-use trail segment from Island Quay Dr. to Henderson Blvd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation) and trail signage.	Low	$22,000
54	Town	Sharrows	Henderson Route	Henderson Blvd.	Triple S Marina	Henderson Blvd. Beach Access	1,700 ft.	Connect Triple S Marina and proposed multi-use trail to the Henderson Blvd. Beach Access and Bath House.	Diagonal parking along roadway.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$3,500
55	Town	Sharrow	Commerce Route	Commerc e Way	Fort Macon Rd	Roadway Terminus	1,000 ft.	Connect Fort Macon Rd. and proposed multi-use trail to the Commerce Way Beach Access and Bath House.	Narrow existing street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.	Minimal	$1,500
56	NCDOT	Crosswalk Improvement	High-Visibility Crosswalk and Signage	Fort Macon Rd.	N/A	N/A	N/A	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines.	Minimal	$2,500
57	NCDOT	Multi-Use Trail	Multi-Use Trail	Fort Macon Rd.	N/A	N/A	700 ft.	Connect residential uses on the North side of Fort Macon Rd. to the proposed multi-use trail and beach accesses South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install multi-use trail segment on North side of Fort Macon Rd. in front of residents.	Low	$45,000
58	NCDOT	Multi-Use Trail	Multi-Use Trail	Fort Macon Rd.	N/A	N/A	260 ft.	Connect residential uses on the North side of Fort Macon Rd. to the proposed multi-use trail and beach accesses South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install multi-use trail segment on North side of Fort Macon Rd. in front of residents.	Low	$16,000
59	NCDOT	Crosswalk Improvement	High-Visibility Crosswalk and Signage	Fort Macon Rd.	N/A	N/A	N/A	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines.	Minimal	$2,500
60	NCDOT	Sharrows	Sharrows	Fort Macon Rd.	Brooks St.	Cedar Ln.	4,000 ft.	Increases on-road safety for bicyclists and creates motorist awareness.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install sharrows along roadway per NCDOT guidelines.	Minimal	$4,000

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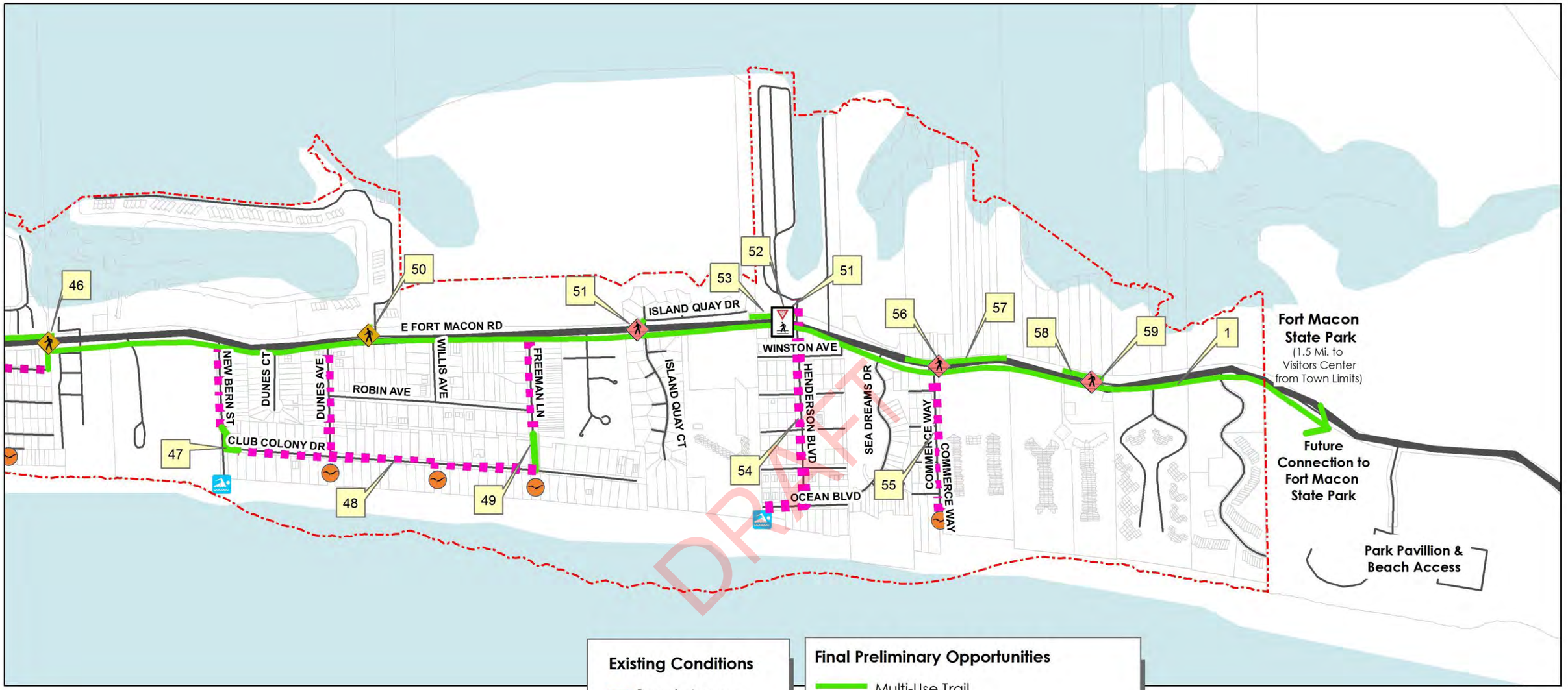

0 250 500 1,000 Feet

Existing Conditions

- Beach Access & Bath House
- Beach Access
- State Road
- Town / Local Street
- Parcel
- Town Limits

Final Preliminary Opportunities

- Multi-Use Trail
- Sharrows
- Crosswalk & Signage
- Crosswalk & Rapid Flash Beacon
- Refuge Island

Map 7.1 (A)
Final Preliminary Project Recommendations (East)

Division of Bicycle & Pedestrian Transportation

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The Town of ATLANTIC BEACH
Comprehensive Bicycle Plan

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Bogue Sound

N SHORE DR
N SHORE DR II
FIRST ST
SMITH ST
MOONLIGHT DR
OLD CAUSEWAY RD
ATLANTIC BEACH CAUSEWAY
POND DR
N KINSTON AVE
BOWEN ST
SOUND DR
DAVIS BLVD
SHORE DR
W BOGUE SOUND DR
E BOGUE SOUND DR
BAYVIEW BLVD
BROOKS ST
E FORT MACON RD
TRYON ST
CASWELL ST
GLENN ST
CEDAR LN
N DURHAM AVE
S DURHAM AVE
S KINSTON AVE
WILSON AVE
WEST DR
EAST DR
W BOGUE BLVD
E BOGUE BLVD
W TERMINAL BLVD
E TERMINAL BLVD
W ATLANTIC BLVD
E ATLANTIC BLVD
W BOARDWALK
E BOARDWALK
ATLANTIC BLVD
NEEDLE RUSH DR
W FORT MACON RD
BAY RIDGE DR
CORAL BAY CT
OAK FOREST LN
SWINDELL LN
TALFORD DR
OCEAN RIDGE DR
Atlantic Station Shopping Center
Hoop Pole Creek Nature Trail
Town Park
PARK & RIDE
Atlantic Ocean

42 28 32 31 33 30 29 17 27 60 16 18 4 26 34 3 15 6 5 45 2 46 1 40 41 7 39 19 22 43 37 38 35 20 25 23 24 44 36 8 21

DRAFT

Existing Conditions

- Boat Access
- Beach Access
- Beach Access & Bath House
- Post Office
- Town Hall
- State Road
- Local / Private Street
- Public Park
- Water Feature
- Parcel
- Town Limits

Final Preliminary Opportunities

- Multi-Use Trail*
- Sharrows
- Widened Shoulder with Bike Lanes
- Pedestrian Sidewalk
- Bike Lane
- Crosswalk & Rapid Flash Beacon
- Crosswalk & Signage
- Refuge Island
- Intersection Improvement
- Trailhead Park / Park & Ride

*Dash vs. Solid Lines Indicate Trail Segments

N

0 300 600 1,200 Feet

Map 7.1 (B)

Final Preliminary Project Recommendations (Central)

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Existing Conditions

- Boat Access
- Beach Access
- Sheraton Hotel
- State Road
- Local / Private Street
- Parcel
- Town Limits

Final Preliminary Opportunities

- Multi-Use Trail*
- Widened Road Shoulder & Bike Lane
- Sharrows
- Existing Crosswalk Improvements
- Refuge Island

*Dashed vs. Solid Lines Indicate Multi-Use Trail Segments

0 250 500 1,000 Feet

Map 7.1 (C)
Final Preliminary Project Recommendations (West)

Division of Bicycle & Pedestrian Transportation

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Comprehensive Bicycle Plan

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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 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. Separated Path construction
    2. Connecting Neighborhoods
    3. General Safety
    4. Connectivity to public beach accesses
    5. Location along major thoroughfares
    6. Proximity to shopping and retail
    7. On-road facility construction
    8. Connectivity to the "Circle"
    9. Number of public requests for project
    10. Connectivity to restaurants
    11. Connectivity to Town Park
    12. Location along secondary roads
    13. Connectivity to public services
    14. Improving existing crash sites

- **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	Atlantic Beach Causeway	27	NCDOT	Multi-Use Trail	Atlantic Beach Causeway	Bogue Blvd.	Old Causeway Rd.	1,300 ft.	$100,000
2	Fort Macon Route	3	NCDOT	Multi-Use Trail	Fort Macon Rd.	Brooks St.	Atlantic Beach Causeway Rd.	2,000 ft.	$120,000
3	Fort Macon Route	1	NCDOT	Multi-Use Trail	Fort Macon Rd.	Town Limits/ Fort Macon State Park	Near Oceana Dr.	8,700 ft.	$652,500
4	Fort Macon Route	2	NCDOT	Multi-Use Trail	Fort Macon Rd.	Near Oceana Dr.	Brooks St.	1,500 ft.	$112,500
5	Atlantic Beach Causeway	28	NCDOT	Multi-Use Trail	Atlantic Beach Causeway	Old Causeway Rd.	Atlantic Beach Bridge Abutment	2,600 ft.	$200,000
6	Fort Macon Route	6	NCDOT	Multi-Use Trail	Fort Macon Rd.	Cedar Ln.	Town Park Entrance	2,600 ft.	$195,000
7	Fort Macon Route	7	NCDOT	Multi-Use Trail	Fort Macon Rd.	Town Park Entrance	Ocean Ridge Dr.	4,300 ft.	$322,500
8	Fort Macon Route	8	NCDOT	Multi-Use Trail	Fort Macon Rd.	Ocean Ridge Dr.	Coral Bay Club area	1,600 ft	$120,000
9	Alleyway Connector (2)	23	N/A	Pedestrian Sidewalk	N/A	West Dr.	Raleigh Ave.	740 ft.	$38,000
10	Alleyway Connector (3)	24	N/A	Pedestrian Sidewalk	N/A	West Dr.	Kinston Ave.	450 ft.	$23,000
11	Fort Macon - Tryon St Connector	38	N/A	Multi-Use Trail	N/A	Fort Macon Rd	Tryon St	200 ft.	$2,000

Table 7.1 Prioritized Projects, Continued									
Priority Rank	**Project / Improvement Name**	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**
12	Multi-Use Trail	57	NCDOT	Multi-Use Trail	Fort Macon Rd.	N/A	N/A	700 ft.	$45,000
13	Multi-Use Trail	58	NCDOT	Multi-Use Trail	Fort Macon Rd.	N/A	N/A	260 ft.	$16,000
14	Island Quay Connector	53	NCDOT	Multi-Use Trail	Fort Macon Rd.	Island Quay dr.	Henderson Blvd.	350 ft.	$22,000
15	Freeman-Club Colony Connector	49	N/A	Multi-Use Trail	N/A	Freeman Ln.	Club Colony Dr.	250 ft.	$20,000
16	Fort Macon Route	4	NCDOT	Pedestrian Sidewalk	Fort Macon Rd.	Atlantic Beach Causeway Rd.	Charlotte Ave.	1,850 ft.	$92,500
17	Fort Macon Route	5	NCDOT	Pedestrian Sidewalk	Fort Macon Rd.	Charlotte Ave.	Cedar Ln.	900 ft.	$45,000
18	Fort Macon Route	9	NCDOT	Multi-Use Trail	Fort Macon Rd.	Coral Bay Club area	Town Limits (at Pine Knoll Shores)	4,850 ft.	$560,000
19	Alleyway Connector (1)	18	N/A	Multi-Use Trail	Town Easement	Charlotte Ave.	Atlantic Beach Causeway Rd.	1,400 ft.	$75,000
20	Town Park Connector	39	N/A	Multi-Use Trail	N/A	Ocean Ridge Dr.	Town Park	450 ft.	$27,000
21	Park and Ride / Trailhead Park	42	NCDOT	Park and Ride / Trailhead Park	Atlantic Beach Causeway	N/A	N/A	N/A	TBD
22	New Bern - Club Colony Connector	47	N/A	Multi-Use Trail	N/A	New Bern St.	Club Colony Dr.	140 ft.	$9,000

Table 7.1 Prioritized Projects, Continued									
Priority Rank	**Project / Improvement Name**	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**
23	Sharrows	60	NCDOT	Sharrows	Fort Macon Rd.	Brooks St.	Cedar Ln.	4,000 ft.	$4,000
24	Charlotte Route	19	Town	Sharrows	Charlotte Ave.	Davis Blvd.	W. Boardwalk	1,200 ft.	$1,500
25	Refuge Island	45	Town	Refuge Island & Rapid Flash Beacon	Fort Macon Rd.	N/A	N/A	N/A	$35,000
26	Intersection Improvement	29	Town	Intersection Improvement	Old Causeway Rd.	N/A	N/A	N/A	$12,000
27	Bogue-Cedar Route	22	Town	Widen Road Shoulder with Bike Lanes	Bogue Blvd., Cedar Ln.	Fort Macon Rd.	Wilson Ave.	4,300 ft.	$200,000
28	W. Boardwalk Route	20	Town	Sharrows	W. Boardwalk	Durham Ave.	Raleigh Ave.	850 ft.	$1,500
29	E. Atlantic Route	44	Town	Sharrows	E. Atlantic Blvd.	East Dr.	Wilson Ave.	1,500 ft.	$3,000
30	Ocean Ridge Route	21	Town	Widen Road Shoulder with Bike Lanes	Ocean Ridge Dr.	Fort Macon Rd	Durham Ave.	6,000 ft.	$270,000
31	E. Boardwalk-Glenn	36	Town	Sharrow	E. Boardwalk / Glenn St.	East Dr.	CAMA rain garden	3,000 ft.	$4,000
32	High-Visibility Crosswalk and Rapid Flash Beacon	46	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$15,000
33	Bogue Sound Route	34	Town	Sharrow	W. Bogue Sound Dr.	E. Fort Macon Rd.	Public Access Ramp	600 ft.	$1,000

Table 7.1 Prioritized Projects, Continued									
Priority Rank	**Project / Improvement Name**	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**
34	Old Causeway Route	30	Town	Sharrows	Old Causeway Rd.	Atlantic Beach Causeway	Caribbean Way Rd.	3,400 ft.	$3,000
35	Pelican Route	14	Town	Sharrows	Pelican Dr.	Fort Macon Rd.	Forest Knoll Dr.	2,000 ft.	$2,500
36	Money Island - Tryon Route	37	Town	Sharrow	Money Island Dr. & Tryon St.	Glenn St.	Tryon St. terminus (east).	1,150 ft.	$2,500
37	High-Visibility Crosswalk and Rapid Flash Beacon	50	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	50 ft.	$15,000
38	Intersection Improvement	16	NCDOT	Intersection Improvement	Fort Macon Rd.	Charlotte Ave.	Fort Macon Rd.	N/A	$60,000
39	Davis-Kinston Route	17	Town	Sharrows	Davis Blvd. & Kinston Ave.	Charlotte Ave.	Bowen St.	1,600 ft.	$2,000
40	High-Visibility Crosswalk and Rapid Flash Beacon	41	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	250 ft	$30,000
41	High-Visibility Crosswalk and Signage	56	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500
42	W. Atlantic Route	35	Town	Sharrow	W. Atlantic Blvd.	West Dr.	Durham Ave.	1,450 ft.	$2,000
43	High-Visibility Crosswalk and Signage	51	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	50 ft.	$5,000
44	Refuge Island and Rapid Flash Beacon	52	NCDOT	Refuge Island	Atlantic Beach Causeway	N/A	N/A	N/A	$35,000

Table 7.1 Prioritized Projects, Continued									
Priority Rank	**Project / Improvement Name**	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**
45	High-Visibility Crosswalk and Signage	59	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500
46	Moonlight Route	31	Town	Sharrows	Moonlight Dr.	Atlantic Beach Causeway Rd	Smith St.	400 ft.	$1,000
47	High-Visibility Crosswalk and Signage	40	NCDOT	Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	100 ft.	$8,500
48	Club Colony Loop	48	Town	Sharrows	Fort Macon Rd., New Bern St., Dunes Ave. and Freeman Ln.	New Bern Ave.	Dunes Ave. & Freeman Ln.	4,000 ft.	$5,000
49	Commerce Route	55	Town	Sharrow	Commerce Way	Fort Macon Rd	Roadway Terminus	1,000 ft.	$1,500
50	Wilson Route	43	Town	Sharrows	Wilson Ave.	Fort Macon Rd.	E. Boardwalk	880 ft.	$2,000
51	Henderson Route	54	Town	Sharrows	Henderson Blvd.	Triple S Marina	Henderson Blvd. Beach Access	1,700 ft.	$3,500
52	Circle Route	25	Town	Bike Lane	Atlantic Blvd., East & West Dr.	Central Dr.	Atlantic Blvd.	2,300 ft.	$2,500
53	Intersection Improvement	26	NCDOT	Intersection Improvement	Fort Macon Rd., Atlantic Beach Causeway	N/A	N/A	N/A	$3,000
54	Existing Crosswalk Improvement	10	NCDOT	Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500

Table 7.1 Prioritized Projects, Continued									
Priority Rank	**Project / Improvement Name**	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**
55	Existing Crosswalk Improvement	11	NCDOT	Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500
56	Refuge Island	33	NCDOT	Refuge Island & Rapid Flash Beacons	Atlantic Beach Causeway	N/A	N/A	N/A	$35,000
57	Refuge Island	13	NCDOT	Refuge Island & Rapid Flash Beacons	Fort Macon Rd.	N/A	N/A	N/A	$55,000
58	Intersection Improvement	15	NCDOT	Intersection Improvement	Fort Macon Rd.	Town Park Entrance	Atlantic Station Shopping Center	N/A	$60,000
59	Existing Crosswalk Improvement	12	NCDOT	Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	N/A	$2,500
60	Refuge Island	32	NCDOT	Refuge Island & Rapid Flash Beacons	Atlantic Beach Causeway	N/A	N/A	N/A	$35,000

Short-term opportunities are those that may be completed or implemented in a timeframe of zero to two years (0-2 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. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft)	Preliminary Opinion of Probable Costs

Table 7.2 Short-Term Projects, Continued									
Priority Rank	**Project / Improvement Name**	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft)**	**Preliminary Opinion of Probable Costs**

Table 7.2 Short-Term Projects, Continued									
Priority Rank	Project / Improvement Name	Map Ref. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft.)	Preliminary Opinion of Probable Costs

Mid-term opportunities are those that may be completed or implemented in a timeframe of three to five years (3-5 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. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft)	Preliminary Opinion of Probable Costs

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

Table 7.3 Mid-Term Projects, Continued									
Priority Rank	Project / Improvement Name	Map Ref. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft)	Preliminary Opinion of Probable Costs

Long-term opportunities are those that may be completed or implemented in a timeframe between six to ten (6-10) 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. #	Road Class.	Type of Project	At / On	From	To	Approx. Length (ft.)	Preliminary Opinion of Probable Costs*

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

Table 7.4 Long-Term Projects, Continued									
Priority Rank	**Project / Improvement Name**	**Map Ref. #**	**Road Class.**	**Type of Project**	**At / On**	**From**	**To**	**Approx. Length (ft.)**	**Preliminary Opinion of Probable Costs**

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

Map 7.2 illustrates the prioritized project schedule.

SECTION 8 – IMPLEMENTATION

Section Outline:

8.0 IMPLEMENTATION STRATEGY

This chapter describes how the recommendations for improving Atlantic Beach'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: <u>Establish a standing Bicycle and Pedestrian Advisory Committee.</u>
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 – 7-9. Projects are listed according to priority rank in **Table 7.1 Prioritized Projects** on pages 7-18 – 7-23. Projects recommended by implementation phase are listed on page 7-24 **Table 7.2 Short-Term Projects**; pages 7-24 – 7-26 **Table 7.3 Mid-Term Projects**; pages 7-27 – 7-28 **Table 7.4 Long-Term Projects**; pages 7-29-7-30.
- Review development plans to identify opportunities for bicycle and pedestrian facilities.

Action: <u>Provide bicycle facilities as part of all transportation and roadway projects.</u>

- Accommodate bicycling as part of all new roadway projects.
- 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 6-10. 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: <u>Establish a bicycle facility grant match reserve fund.</u> 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: <u>Dedicate funding for high-priority bicycle project planning and implementation.</u> 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 Atlantic Beach 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 the Fort Macon and Atlantic Beach Causeway Routes.

Overall Project Goals

1. IMPROVE CONNECTIVITY

To develop a comprehensive bicycle network that connects local & regional destinations while serving as an alternate to motor-vehicle transportation.

2. PROMOTE BICYCLING FOR TOURISM, TRANSPORTATION & HEALTH

To pursue bicycling as a community asset for promoting alternate transportation through Town and as a tool for increasing the health of residents and visitors alike.

3. EDUCATE CITIZENS AND VISITORS ON THE BENEFITS OF A BIKE-FRIENDLY COMMUNITY.

Provide opportunities for community engagement to encourage bicycle use.

4. ENSURE COMMUNITY BIKEABILITY THROUGH POLICIES & PROGRAMS.

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

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

- Atlantic Beach'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. 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: <u>Establish partnerships based on their potential interest or involvement in a project.</u> 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)
- 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.

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

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 January17, 2012 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 Atlantic Beach's Bicycle Plan. Members suggested approximately Thirty (30) comments regarding their vision and/or goals for Atlantic Beach.

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 13-member Steering Committee was created with stakeholders representing a variety of groups in Atlantic Beach. Four Steering Committee meetings were held throughout the project development: January 12, 2012, February 29, 2012, March 14, 2012, and April 15, 2012. The first Steering Committee meeting was held on January 12, 2012 from 5:30-7:00 p.m. at the Town Hall Assembly Room. 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 Atlantic Beach. 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 Atlantic Beach. This exercise provided information about the existing bicycling conditions in Atlantic Beach.

The second Steering Committee meeting was held on February 29, 2012 from 5:30-7:00 p.m. at the Town Hall Assembly Room. 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 Atlantic Beach 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.

The third Steering Committee meeting was held on March 14, 2012 from 5:30-7:00 p.m. at the Town Hall Assembly Room. 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 15, 2012 from 5:30-7:00 p.m. at the Town Hall Assembly Room. 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.

Steering Committee Meeting #1

Steering Committee Meeting #2

MEETING AGENDA

DATE: Tuesday, January 17, 2012 at 5:30 a.m.

LOCATION: Assembly Room
Town Hall
125 W. Fort Macon Road, Atlantic Beach, NC 28512

SUBJECT: Town of Atlantic Beach Comprehensive Bicycle Plan
Steering Committee Meeting #1

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. The cycling basics of a bicycle-friendly environment will be presented and the project team will participate in a discussion identifying existing strengths, weaknesses, opportunities, and threats facing cyclists in Atlantic Beach.

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

AGENDA:

I. **Welcome & Introductions** – Jessica Fiester, Town of Atlantic Beach

II. **Project Overview & Role of Steering Committee** – Ben Williams, Rivers & Associates, Inc.

III. **Visioning** – All

IV. **Bicycle Basics** – Ben Williams, Rivers & Associates, Inc.

V. **Identify Bicycle Destinations / Attractions / Generators** - All

VI. **Identify Strengths, Weaknesses, Opportunities, & Threats facing Cyclists in Atlantic Beach** - All

VII. **Next Steps** – Ben Williams, Rivers & Associates, Inc.

VIII. **Conclusion / Questions** - All

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

Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

Minutes
Town of Atlantic Beach
Comprehensive Bicycle Plan
January 17, 2012

The first meeting of the Atlantic Beach Bicycle Plan Committee was held Tuesday, January 17th at 5:30 p.m. in the Town Hall Boardroom.

Members Present:

Trace Cooper, Mayor
Harry Archer, Mayor Pro Tem
David Cox
Julie Glanzer
Leisa Hain
Christy Harrell
Trish Ide
John Lotspih
Ed Myers
Rick Poillon
Alicia Ragsdale
Rob Will

Rivers & Associates, Inc.:

Mark Garner, AICP
Ben Williams, AICP CEP
Myriah Shewchuk, RLA
Ron Sessoms

NC DOT:

Bob Mosher
Planning Program Manager
Division of Bicycle and Pedestrian Transportation

Staff Present:

David Walker, Town Manager
Jessica Fiester, Planning Director
Kim Tynes, Secretary

The first meeting of the Bicycle Plan was held on January 17th in the Town of Atlantic Beach Town Hall and called to order by Mayor Trace Cooper.

The meeting was led by Ben Williams, AICP CEP Project Planner for Rivers & Associates, Inc. Mr. Williams began by reviewing the scope and purpose of developing a comprehensive bicycle plan. Prior to creating a "Wish List" for the bicycle plan, he noted the plan will address the "Five E's" (Engineering, Education, Encouragement, Enforcement & Evaluation) by identifying the "Three P's" (Projects, Programs & Policies).

Mr. Williams informed the committee that their role is to be the voice of the citizens by offering different vantage points, user needs, information for reports, input on issues, community support and preparing a thorough plan for funding. The committee participated in a goal / visioning exercise offering the following goals and visions of Atlantic Beach relative to bicycling.

Goals/Visions:

1. Create a bike-friendly community for Town citizens as well as visitors.
2. Increase space for biking activities which could include adding trails and marked bike lanes.
3. Create diverse bike networks throughout Atlantic Beach for competitive bikers, cruisers and runners. These networks should address bicyclists' visual experiences (i.e. views), differing skill levels, needs (i.e. signage) and access to bike facilities.
4. Improve north-south access to Morehead City.
5. Develop a bike network that can accommodate a variety of users (high speed vs. cruiser, large groups vs. family outing).
6. Increase road safety both bicyclists and automobile drivers through signage, laws, education and policies.
7. Promote intra-community movement via bicycling. Attractions should be connected to facilitate daily activities such as biking to dining, shopping or going to the post office (The Ocracoke Atmosphere)
8. Utilize existing alley right-of-ways (ROW) for developing bike networks and to avoid Hwy 58.
9. Promote local destinations through the creation of a bike trail from Fort Macon to the Pine Knoll Shores Aquarium. Located between these two regional attractions are the oceanfront and Coastal Reserve.
10. Increase connectivity to beach and water accesses.
11. Market biking as a tourism amenity.
12. Install bike racks at Town Park and Coastal Reserve area.
13. Minimize opportunities for conflicts between drivers and bicyclists.
14. Explore opportunities to use space under the Causeway Bridge for potential bike access to avoid traffic.
15. Develop Highway 58 (Fort Macon Road) into a route that can accommodate bicyclists and pedestrians as well as vehicles. Crossing the Causeway on the north side of the Hwy. 58 intersection must be improved.

During the goals and visioning exercise, Committee Members mentioned that bike riding on sidewalks is currently permitted in Town. Sidewalk bike riding may be a good idea to increase safety for young bicyclists.

To address concerns regarding goals Mr. Garner suggested the planning team will meet with NCDOT to discuss proposed improvements, signage and signals as part of the project work. It was suggested that a few small groups of 2-3 committee members will split up and ride bikes through Atlantic Beach to observe the existing bicycle conditions in Town.

Ms. Fiester agreed to provide maps for the committee highlighting the existing alleys.

Mr. Williams' presentation outlined Bicycle Basics: Laws, Types of Bicycle Facilities, Design Considerations and Benefits of Bicycling.

Using a large map of Atlantic Beach, members were asked to identify destinations / attractions. Numerous locations were recognized from the Sheraton to Ft. Macon, including shopping centers, post office, restaurants, marinas, beach accesses, Town Park and the nature reserve and the circle.

The committee participated in an exercise to identify the strengths, weaknesses, opportunities, & threats as it relates to the comprehensive bike plan. The following were identified:

Strengths:

1. There are minor streets within Town that are safer for bicyclists.
2. Citizens and visitors in Atlantic Beach have an interest in using bicycles as transportation.
3. Atlantic Beach is considered a 'gateway' to the Crystal Coast making it a destination community with beach access and public open space that attracts visitors.
4. Atlantic Beach is an "outdoor community". The citizens enjoy active / outdoor lifestyles.
5. The scale and density in Atlantic Beach makes it bike friendly.
6. A Town Ordinance has been developed that requires new development to install bike racks. Town Ordinances are important to ensuring large redevelopment projects such as 'the Circle' incorporate bike facilities.
7. Atlantic Beach has a relatively flat terrain which encourages bike riding.
8. There are many attractions / destinations that exist within Town for residents and tourists.
9. Some citizens currently use bikes as a primary mode of transportation.
10. Atlantic Beach currently has underutilized alleyways that can be used for bike / pedestrian connectivity.
11. The Henderson Street and New Bern Avenue beach accesses have bathhouses which should be destinations along a bike network.
12. The populations of citizens aged 50+ is growing and with this increase the need for more recreation opportunities are needed. Biking can be used as to improve physical health as low-impact exercise.
13. Citizens are interested in planning for bike facilities in Town.
14. Atlantic Beach has acquired funding to facilitate a comprehensive bicycle plan.
15. Town Council is supportive of the creation of a town Bicycle plan.

Weaknesses:

1. Visitors do not know how to access safe minor streets.
2. NCDOT roads within the center of Town have limited ROW.
3. Many intersections within Town are unsafe for bicyclists and pedestrians.
4. Some sidewalks along Highway 58 have angled faces which are not safe.
5. Street lighting along some corridors in Town is spotty and inadequate.
6. Motorists and bicyclists are unaware of laws that would decrease motor vehicle / bicycle conflicts if practiced.
7. Heavy seasonal traffic.
8. Overall, there is a lack of bike facilities within Town.

Opportunities:

1. Future redevelopment will incorporate bike facilities due to new Town ordinances.
2. Existing Town alleyways and minor streets provide opportunities for bicycle connectivity.
3. There are existing bike facilities along hwy 58 but they are fragmented.
4. Creating bike trails can help change the identity and image of Atlantic Beach.
5. Develop incentive programs to encourage citizens to bike to work, promote more bike activity and to increase available parking space.
6. Incorporate the NCDOT funded Croatan Regional Bike Trail Plan to create connectivity with Atlantic Beach.
7. Two local businesses include bike/scooter sales and rental.
8. Bike Ride events could be used to help promote bike activity in Atlantic Beach while providing fund raising / economic opportunities.
9. A "Healthy Coast Initiative" can be used as a programmatic element to promote bike usage.
10. In some areas where severe bike and motor vehicle conflicts exist, a bike / ped bridge may need consideration.

Threats:

1. High traffic volumes (especially during summer months) and high speed limits create unsafe environments for bicyclists, particularly at street intersections
2. Future Town growth will add to traffic volume.
3. NCDOT and Town funding for new bike facilities could be decreased in the future.
4. Continuing conflicts between competitive and casual / recreational bicyclists create dangerous bicycling environments.

As "homework", Committee Members were asked to complete the Bikeability Checklist and to distribute the 10 marketing cards to residents asking them to complete the biking survey the Town's Facebook page or Town Website.

Bike Plan Committee Meeting Schedule:

All Steering Committee meetings will take place @ 5:30pm in the Atlantic Beach Town Hall. Public Open Houses will begin at 6:00 pm.

- February 21st
- April 17th
- May 15th

Public Open House Meeting Schedule:

- March 20th - Open House #1
- June 19th - Open House #2

Respectfully Submitted,

_____
Kim Tynes, Secretary

Approved by:

_____
Ben Williams AICP CEP, Rivers & Associates, Inc.

Steering Committee Meeting #1
Sign-In Sheet

MEETING AGENDA

BIKE ATLANTIC BEACH

DATE: Tuesday, February 21, 2012 at 5:30 p.m.

LOCATION: Assembly Room
Town Hall
125 W. Fort Macon Road, Atlantic Beach, NC 28512

SUBJECT: Town of Atlantic Beach Comprehensive Bicycle Plan
Steering Committee Meeting #2

At this meeting, findings from previous meeting and existing pedestrian facilities will be reported and an informal design charrette will be conducted to identify goals, mission of plan, and potential corridors for connectivity.

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

AGENDA

I. **Introductions & Recap**

II. **Review of Existing Facilities, Programs, Policies**

III. **Informal Design Charrette**

IV. **Next Steps**

V. **Conclusion / Questions**

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

Division of Bicycle & Pedestrian Transportation

Rivers & Associates, Inc. Since 1918

BIKE ATLANTIC BEACH

Steering Committee Meeting #2 Minutes

Steering Committee Meeting #2 Minutes

MEETING AGENDA

DATE: Tuesday, April 17, 2012 at 5:30 p.m.

LOCATION: Assembly Room
Town Hall
125 W. Fort Macon Road, Atlantic Beach, NC 28512

SUBJECT: Town of Atlantic Beach Comprehensive Bicycle Plan
Steering Committee Meeting #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**

II. **Public Involvement Results & Field Analysis**

III. **Preliminary Recommendations**

IV. **Priority Criteria Exercise**

V. **Next Steps**

VI. **Conclusion / Questions**

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

Division of Bicycle & Pedestrian Transportation

PRIORITY CRITERIA

WHICH ITEM IS AN IMPORTANT CRITERIA FOR PRIORITIZING ATLANTIC BEACH'S PRELIMINARY/POTENTIAL PROJECTS? USE A NUMBERED DOT TO SELECT YOUR CHOICES.

(1 = High, 5 = Low)

CONNECTIVITY TO...

TOWN PARK	
WATERFRONT ACCESS SITES	
SHOPPING / RETAIL AREAS	
FORT MACON	
THE CIRCLE	
RESTAURANTS	
NEIGHBORHOODS	
PUBLIC SERVICE OFFICES (Town Hall or US Post Office)	

OTHER FACTORS:

MAJOR THOROUGHFARES	
SECONDARY ROADWAYS	
IMPROVE SAFETY	
NUMBER OF PUBLIC COMMENTS	
ON-ROAD FACILITIES	
SEPARATED PATH	

TOWN OF ATLANTIC BEACH
COMPREHENSIVE BICYCLE PLAN

Steering Committee Meeting #3 Minutes

Steering Committee Meeting #4

Steering Committee Meeting #4

Steering Committee Meeting #4

Steering Committee Meeting #4

Steering Committee Meeting #4

A.2 PUBLIC SURVEY

The online survey was developed to gather input from the community. The questionnaire was available online from January 12, 2012 through April 2, 2012 (nearly four 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 the distribution of marketing cards. The Consultant received one-hundred nineteen (119) 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.

Atlantic Beach Comprehensive Bicycle Plan

SurveyMonkey

1. How often do you ride a bicycle? (fill in the appropriate space with a whole number)

	Response Average	Response Total	Response Count
Days/Week	3.21	260	81
Days/Month	10.33	599	58
Days/Year	**112.91**	**5,194**	46
		answered question	**109**
		skipped question	**5**

2. When was the last time you rode a bicycle? (check one circle)

	Response Percent	Response Count
Last Week	**54.6%**	**59**
Within the last Month	17.6%	19
Within the last 2 months	6.5%	7
Within the last 4 months	3.7%	4
Within the last 6 months	7.4%	8
Within the last year	10.2%	11
	answered question	**108**
	skipped question	**6**

3. What is the reason you have not ridden your bicycle more? (check all boxes that apply)

	Response Percent	Response Count
Distances to destinations are too far	4.6%	5
Unsafe, due to traffic	**65.1%**	**71**
Unsafe, due to surface conditions	33.0%	36
Too busy, no time	17.4%	19
Lack of interest	0.0%	0
Other	22.9%	25
	answered question	**109**
	skipped question	**5**

4. Why do you ride your bike? (check all boxes that apply)

	Response Percent	Response Count
Shopping trip	34.5%	38
Commute to work	12.7%	14
Physical exercise	**88.2%**	**97**
Family Event	27.3%	30
Recreation	80.0%	88
Commute to school	1.8%	2
Run errands	31.8%	35
Visit neighbor/family/friend	37.3%	41
Other	11.8%	13
	answered question	**110**
	skipped question	**4**

2 of 12

5. When do you usually bike? (check all boxes that apply)

	Response Percent	Response Count
Daytime	**91.7%**	**100**
Nighttime	24.8%	27
Weekdays	62.4%	68
Weekends	75.2%	82
Holidays	51.4%	56
Vacation	51.4%	56
Summer	79.8%	87
Fall	78.0%	85
Winter	37.6%	41
Spring	76.1%	83
answered question		**109**
skipped question		**5**

6. Do you ride your bike regardless of weather? (check one circle)

	Response Percent	Response Count
Yes, any conditions	13.8%	15
No, only when it's not raining	**62.4%**	**68**
No, only when it's warm and sunny out	23.9%	26
answered question		**109**
skipped question		**5**

7. How often during the week do you ride your bike (check one circle)?

	Response Percent	Response Count
Infrequently (a couple times a month)	27.1%	29
1-2 times	26.2%	28
3-4 times	**29.0%**	**31**
5 or more times	17.8%	19
answered question		107
skipped question		7

8. When you bike, where do you typically go? (check all boxes that apply)

	Response Percent	Response Count
Beach Access	45.4%	49
AB Town Park	34.3%	37
Restaurants / Bars	36.1%	39
Shopping Centers	44.4%	48
Fort Macon	50.0%	54
The Circle	**57.4%**	**62**
Town Hall	8.3%	9
Work	12.0%	13
All of the above	8.3%	9
Other	38.9%	42
answered question		108
skipped question		6

9. When you bike, do you wear a helmet?

	Response Percent	Response Count
Yes	51.4%	56
No	48.6%	53
answered question		109
skipped question		5

10. If no, why not?

	Response Percent	Response Count
Don't own one	50.9%	27
Uncomfortable	20.8%	11
Looks silly	5.7%	3
Unnecessary	22.6%	12
answered question		53
skipped question		61

11. Would you like to be able to ride your bike more? (check one circle)

	Response Percent	Response Count
Yes	98.1%	104
No	1.9%	2
answered question		106
skipped question		8

12. Would you ride a bike more if: (check all boxes that apply)

	Response Percent	Response Count
You felt more comfortable on your bike	20.0%	21
You felt safer amongst traffic	84.8%	89
Vehicles moved slower	14.3%	15
There were more clearly marked trails	81.0%	85
You had better places to ride	75.2%	79
You felt motorists respected cyclists and better understood cyclists' rights and responsibilities	60.0%	63
There were better roadway conditions such as smoother pavement, less debris, etc.	57.1%	60
There were wider roads to ride on	59.0%	62
There were designated bike lanes on busy street	**93.3%**	**98**
There were more bike route signage	59.0%	62
There were maps of bike routes	37.1%	39
There were more bike racks at your destination	51.4%	54
answered question		**105**
skipped question		**9**

13. What roads would you most like improved for bicycling? (type your answer in the box below)

	Response Count
	82
answered question	82
skipped question	32

14. Name the facilities or types of places you think bicycle routes should connect. (type your answer in the box below)

	Response Count
	62
answered question	62
skipped question	52

15. Do you support change in bicycle facilities and policies to make Atlantic Beach a more bicycle-friendly community? (check one circle)

	Response Percent	Response Count
Yes	99.0%	104
No	1.0%	1
answered question		105
skipped question		9

16. How do you rate the following ideas for improving bicycling in Atlantic Beach? (check one circle for each statement)

	Very Important	Important	Average	Less Important	Not Important	Rating Average	Response Count
Bike lanes with striping on the pavement	**62.5% (65)**	28.8% (30)	6.7% (7)	0.0% (0)	1.9% (2)	1.50	104
Wide outside travel lane to provide space for bicycle	**69.3% (70)**	18.8% (19)	8.9% (9)	1.0% (1)	2.0% (2)	1.48	101
Removal / repair of hazards such as potholes	**57.0% (57)**	25.0% (25)	16.0% (16)	1.0% (1)	1.0% (1)	1.64	100
Repair or replace high drainage grates	**52.0% (51)**	26.5% (26)	14.3% (14)	7.1% (7)	0.0% (0)	1.77	98
Streets that are signed as bike routes	**33.0% (33)**	30.0% (30)	26.0% (26)	8.0% (8)	3.0% (3)	2.18	100
Bike paths that are separate from the street	**48.0% (49)**	26.5% (27)	17.6% (18)	6.9% (7)	1.0% (1)	1.86	102
Bikeways that go from residential areas to nearby commercial areas	**53.5% (54)**	31.7% (32)	10.9% (11)	3.0% (3)	1.0% (1)	1.66	101
Bikeways that connect to each other for long distances	**59.8% (61)**	23.5% (24)	12.7% (13)	3.9% (4)	0.0% (0)	1.61	102
More bicycle parking at destinations	**40.0% (40)**	32.0% (32)	21.0% (21)	4.0% (4)	3.0% (3)	1.98	100
Bicycle racks available on buses	5.4% (5)	8.6% (8)	**32.3% (30)**	23.7% (22)	30.1% (28)	3.65	93
Lockers and showers at workplace	6.5% (6)	7.5% (7)	25.8% (24)	28.0% (26)	**32.3% (30)**	3.72	93
Removal of curbside parking on local streets to provide more space for bikes	10.4% (10)	15.6% (15)	**27.1% (26)**	**27.1% (26)**	19.8% (19)	3.30	96
Provide local bicycle facility map	21.4% (21)	**30.6% (30)**	27.6% (27)	14.3% (14)	6.1% (6)	2.53	98
Educational materials describing safe bicycle riding	9.9% (9)	23.1% (21)	**38.5% (35)**	18.7% (17)	9.9% (9)	2.96	91

Educating motorists on bicyclists' use of roadways	**43.6% (44)**	21.8% (22)	19.8% (20)	12.9% (13)	2.0% (2)	2.08	101
Bicycle education in elementary and middle schools	**38.1% (37)**	28.9% (28)	21.6% (21)	8.2% (8)	3.1% (3)	2.09	97
					answered question		**105**
					skipped question		**9**

17. What do you perceive to be the major barriers to bicycle transportation in Atlantic Beach? (type your answer in the box below)

	Response Count
	90
answered question	**90**
skipped question	**24**

18. In general, how would you rate the bicycle conditions in Atlantic Beach? (check one circle)

	Response Percent	Response Count
Excellent	0.0%	0
Good	16.2%	17
Fair	**58.1%**	**61**
Poor	25.7%	27
answered question		**105**
skipped question		**9**

19. Do you live within the Town limits of Atlantic Beach? (check one circle)

	Response Percent	Response Count
Yes	53.8%	57
No	46.2%	49
answered question		106
skipped question		8

20. If no, where do you live? Please identify: (type in your answer in the box below)

	Response Count
	53
answered question	53
skipped question	61

21. Are you: (check one circle)

	Response Percent	Response Count
Male	48.5%	50
Female	51.5%	53
answered question		103
skipped question		11

22. What is your age group? (check one circle)

	Response Percent	Response Count
Age 0-5	0.9%	1
Age 6-12	0.0%	0
Age 13-18	0.0%	0
Age 19-29	5.7%	6
Age 30-39	20.8%	22
Age 40-54	31.1%	33
Age 55+	41.5%	44
	answered question	106
	skipped question	8

23. Please list the number of individuals for each age group in your household. (fill in the appropriate space with a whole number)

	Response Average	Response Total	Response Count
Age 0-5	0.83	20	24
Age 6-12	1.04	24	23
Age 13-18	0.96	23	24
Age 19-29	1.14	32	28
Age 30-39	1.16	43	37
Age 40-54	2.57	121	47
Age 55+	2.41	135	56
		answered question	103
		skipped question	11

A.3 PUBLIC OPEN HOUSES

Two Public Open Houses were held throughout the course of the Plan development. On March 20, 2011 the first Public Open House was held from 6:00 – 7:30 p.m. at the Town Hall Assembly Room 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.

Thirteen (13) 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 Town Hall Assembly Room from 5:30 – 7:00 on June 19, 2012. The draft Comprehensive Bicycle Plan including graphics of proposed recommendations was available for public scrutiny, discussion and comment.

Public Open House #1

Public Open House #2

APPENDIX B – IDENTIFIED BICYCLE PROJECT OPPORTUNITIES

PROPOSED OPPORTUNITIES

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. 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.

Table B.0 is the identified listing of preliminary bicycle improvement opportunities. Refer to Section 7 of this plan for Final Project Recommendations. The following definitions apply to the terms as utilized in Table B.0:

- *Project / Improvement Name* – Identified project name
- *From* – Identifies starting point of construction project
- *To* – Identifies ending point of construction project
- *Details / Purpose* – Identifies the need for the project.
- *Constraints* – Any pitfalls to implementation of project.
- *Preferred Treatment* – Identifies recommended project improvement(s).

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Table B.0 Identified Bicycle Project Opportunities

Project / Improvement Name	At / On	From	To	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment
Fort Macon Route	Fort Macon Rd.	Town Limits/ Fort Macon State Park	Near Oceana Dr.	Provide a scenic and accessible off-road route on the South side of Fort Macon Rd., connecting residential and commercial areas to Fort Macon Park and Public Beach Accesses.	Slope (in some areas), existing utilities and driveways.	Not Anticipated	Develop a multi-use trail that replaces the existing 6' sidewalk. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high visibility crosswalks at street crossings.
Fort Macon Route	Fort Macon Rd.	Near Oceana Dr.	Brooks St.	Provide off-road route from the Oceana Drive area to Brooks Street. Will provide access for residential and commercial areas on the North side of Fort Macon Rd. to connect with community destinations.	Limited ROW, encroachment into existing ROW (i.e. boats) and utilities.	Not Anticipated	Develop a multi-use trail on the North side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high-visibility crosswalks at street crossings.
Fort Macon Route	Fort Macon Rd.	Brooks St.	Atlantic Beach Causeway Rd.	Provide off-road route to connect residential and commercial areas to existing and future destinations along Fort Macon Rd. and Atlantic Beach Causeway.	Limited ROW (some structures located nearly adjacent to the existing ROW), utilities and increased traffic.	Anticipated	Develop a multi-use trail on the North side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high-visibility crosswalks at street crossings.
Fort Macon Route	Fort Macon Rd.	Atlantic Beach Causeway Rd.	Charlotte Ave.	Provide a pedestrian connection from commercial areas along Fort Macon Rd. to surrounding residential areas and destinations.	Limited ROW, parking lots located near existing ROW, utilities and grade changes (from curb to Existing ROW).	Anticipated	Develop a pedestrian sidewalk on the North side of Fort Macon Rd. The sidewalk should include lighting and high-visibility crosswalks at street crossings.
Fort Macon Route	Fort Macon Rd.	Charlotte Ave.	Cedar Ln.	Provide a pedestrian connection from commercial areas along Fort Macon Rd. to surrounding residential areas and destinations.	Limited ROW, parking lots located near existing ROW, utilities and grade changes (from curb to Existing ROW).	Anticipated	Develop a pedestrian sidewalk on the South side of Fort Macon Rd. The sidewalk should include lighting and high-visibility crosswalks at street crossings.
Fort Macon Route	Fort Macon Rd.	Cedar Ln.	Town Park Entrance	Provide a scenic and accessible off-road route on the South side of Fort Macon Rd., connecting residential and commercial areas to Town Park and Atlantic Station Shopping Center.	Limited ROW in some areas, utilities and some drainage swales.	Anticipated	Develop a multi-use trail that replaces the existing 6' sidewalk on the South side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation) and trail signage.
Intersection Improvement	Old Causeway Rd.	N/A	N/A	Provide bicyclists safe access to residential and commercial areas as well as local destinations.	Angle of existing intersection and high traffic.	Not Anticipated	Install access ramps and high visibility crosswalks.
Park and Ride / Trailhead Park	Atlantic Beach Causeway	N/A	N/A	Encourage bicycle transportation from the Causeway District to the "Circle and beach accesses. Create a destination at the Town entrance.	NCDOT ROW Encroachment	Not Anticipated	A park and ride facility should include vehicular and bicycle parking, lighting, support facilities (i.e. benches and vegetation), trail signage and high visibility crosswalks at driveway crossings. Destination facilities such as fishing piers and viewing areas should be considered.

Table B.0 Identified Bicycle Project Opportunities, Continued							
Project / Improvement Name	At / On	From	To	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment
Fort Macon Route	Fort Macon Rd.	Town Park Entrance	Ocean Ridge Dr.	Provide a scenic and accessible off-road route on the South side of Fort Macon Rd., connecting residential and commercial areas to Town Park, Atlantic Station Shopping Center and Post Office.	Limited ROW in some areas and utilities.	Not Anticipated	Develop a multi-use trail that replaces the existing 6' sidewalk on the South side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation) and trail signage.
Fort Macon Route	Fort Macon Rd.	Ocean Ridge Dr.	Coral Bay Club area	Provide a scenic and accessible off-road route on the South side of Fort Macon Rd., connecting residential areas and tourist destinations to beach accesses and community attractions.		Not Anticipated	Develop a multi-use trail on the South side of Fort Macon Rd that replaces the existing 6' sidewalk. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high-visibility crosswalks at street crossings.
Fort Macon Route	Fort Macon Rd.	Coral Bay Club area	Town Limits (at Pine Knoll Shores)	Provide a scenic and accessible off-road route on the North side of Fort Macon Rd., connecting residential areas and tourist destinations to beach accesses and community attractions.	Some areas have increased number of driveways. Existing boardwalk is too narrow for multi-use movement.	Not Anticipated	Develop a multi-use trail on the North side of Fort Macon Rd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation), trail signage and high-visibility crosswalks at street crossings. The existing boardwalk should be replaced or widened to accommodate multi-use movement.
Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	Traffic along Fort Macon Rd.	Not Anticipated	Replace existing crosswalk with a high-visibility crosswalk and complimentary signage per NCDOT guidelines.
Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	Traffic along Fort Macon Rd.	Not Anticipated	Replace existing crosswalk with a high-visibility crosswalk and complimentary signage per NCDOT guidelines.
Existing Crosswalk Improvement	Fort Macon Rd.	N/A	N/A	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	Traffic along Fort Macon Rd.	Not Anticipated	Replace existing crosswalks with high-visibility crosswalk and complimentary signage per NCDOT guidelines.
Refuge Island	Fort Macon Rd.	N/A	N/A	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	Traffic along Fort Macon Rd. and roadway curve.	Not Anticipated	Replace and relocated the existing crosswalk with a refuge island including, high-visibility crosswalks and rapid flash beacons per NCDOT guidelines.
Pelican Route	Pelican Dr.	Fort Macon Rd.	Forest Knoll Dr.	Provide bicyclists safe access to a local destination (CAMA water access and small pier).	Narrow existing street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Intersection Improvement	Fort Macon Rd.	Town Park Entrance	Atlantic Station Shopping Center	Provide bicyclists safe access to local destinations (Town Park and Atlantic Station Shopping Center) across Fort Macon Rd.	High traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalks and pedestrian signals per NCDOT guidelines.
Intersection Improvement	Fort Macon Rd.	Charlotte Ave.	Fort Macon Rd.	Improve bicycle and pedestrian connectivity across Fort Macon Rd.	High traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalks and pedestrian signals per NCDOT guidelines.

Table B.0 Identified Bicycle Project Opportunities, Continued							
Project / Improvement Name	At / On	From	To	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment
Davis-Kinston Route	Davis Blvd. & Kinston Ave.	Charlotte Ave.	Bowen St.	Provide access to residential and commercial areas while directing users to a signalized crossing at Fort Macon Rd.	Narrow existing street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Alleyway Connector (1)	Town Easement	Charlotte Ave.	Atlantic Beach Causeway Rd.	Utilize existing easements to provide access to residential and commercial areas as well as local destinations.	Further easement study is needed.	Possible	Install a multi-use trail that incorporates wayfinding signage and high-visibility crosswalks at street crossing.
Charlotte Route	Charlotte Ave.	Davis Blvd.	W. Boardwalk	Provide bicyclists safe access to residential and commercial areas as well as local destinations (beach accesses).	Narrow existing street width and driveways	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
W. Boardwalk Route	W. Boardwalk	Durham Ave.	Raleigh Ave.	Provide bicyclists safe access to beach accesses.	Narrow existing street width, homes located close to existing ROW.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Ocean Ridge Route	Ocean Ridge Dr.	Fort Macon Rd	Durham Ave.	Provide a scenic route from the "Circle" to Fort Macon Rd.	Existing narrow street width.	Not Anticipated	Widen Ocean Ridge Road within the existing right-of-way and include bike lane / roadway striping and roadway resurfacing.
Bogue-Cedar Route	Bogue Blvd., Cedar Ln.	Fort Macon Rd.	Wilson Ave.	Provide a alternate route parallel to Fort Macon Rd.	Existing narrow street width.	Not Anticipated	Widen Bogue Blvd. and portions of Cedar Ln. within the existing right-of-way and include bike lane / roadway striping and roadway resurfacing.
Alleyway Connector (2)	N/A	West Dr.	Raleigh Ave.	Provide pedestrian / bike access from the "Circle" to adjacent neighborhood.	Homes located along alleyway.	Not Anticipated	Install pedestrian sidewalk.
Alleyway Connector (3)	N/A	West Dr.	Kinston Ave.	Provide pedestrian / bike access from the "Circle" to surrounding neighborhoods.	Homes located along alleyway.	Not Anticipated	Install pedestrian sidewalk.
Circle Route	Atlantic Blvd., East & West Dr.	Central Dr,	Atlantic Blvd.	Improve access around the "Circle".	One way streets and high traffic during summer months.	Not Anticipated	Install bike lanes per NCDOT guidelines.
Intersection Improvement	Fort Macon Rd., Atlantic Beach Causeway	N/A	N/A	Provide access across Fort Macon Rd. to connect residential and commercial areas.	High traffic along Fort Macon Rd. & Atlantic Beach Causeway Rd.	Not Anticipated	Install crosswalks along north side of intersection. Program intersection signals to accommodate a 4-way stop to allow safe bicycle and pedestrian crossing.
Atlantic Beach Causeway	Atlantic Beach Causeway	Bogue Blvd.	Old Causeway Rd.	Provide an accessible off-road route on the West side of Atlantic Beach Causeway, connecting residential, commercial areas and tourist destinations.	Narrow ROW in some areas, ROW encroachment with parking lots and driveway cuts.	Anticipated	Install multi-use trail along West side of Atlantic Beach Causeway. Adopt a streetscape master plan to address ROW encroachment and trail design.
Atlantic Beach Causeway	Atlantic Beach Causeway	Old Causeway Rd.	Atlantic Beach Bridge Abutment	Provide an accessible off-road route on the West side of Atlantic Beach Causeway, connecting residential, commercial areas and tourist destinations.	Narrow ROW in some areas, NCDOT ROW encroachment with parking lots and driveway cuts.	Not Anticipated	Install multi-use trail along West side of Atlantic Beach Causeway. Adopt a streetscape master plan to address ROW encroachment and trail design.
Intersection Improvement	Old Causeway Rd.	N/A	N/A	Provide bicyclists safe access to residential and commercial areas as well as local destinations.	Angle of existing intersection and high traffic.	Not Anticipated	Install access ramps and high visibility crosswalks.

Table B.0 Identified Bicycle Project Opportunities, Continued							
Project / Improvement Name	At / On	From	To	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment
Old Causeway Route	Old Causeway Rd.	Atlantic Beach Causeway	Caribbean Way Rd.	Improve connectivity to commercial areas along Atlantic Beach Causeway.	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Moonlight Route	Moonlight Dr.	Atlantic Beach Causeway	Smith St.	Provide bicyclists safe access to a local destination (CAMA water access).	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Refuge Island	Atlantic Beach Causeway	N/A	N/A	Provide bicyclists and pedestrians a safe crossing along Fort Macon Rd. to access retail / commercial destinations.	High traffic along Atlantic Beach Causeway and driveways.	Not Anticipated	Install a refuge island including, high-visibility crosswalks and rapid flash beacons per NCDOT guidelines.
Refuge Island	Atlantic Beach Causeway	N/A	N/A	Provide bicyclists and pedestrians a safe crossing along Fort Macon Rd. to access retail / commercial destinations.	High traffic along Atlantic Beach Causeway and driveways.	Not Anticipated	Install a refuge island including, high-visibility crosswalks and rapid flash beacons per NCDOT guidelines.
Bogue Sound Route	W. Bogue Sound Dr.	E. Fort Macon Rd.	Public Access Ramp	Provide access to local destination (boat access ramp).	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
W. Atlantic Route	W. Atlantic Blvd.	West Dr.	Durham Ave.	Provide access from the "Circle to a scenic route Ocean Ridge Dr. Provides inter-neighborhood connectivity.	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
E. Boardwalk-Glenn	E. Boardwalk / Glenn St.	East Dr.	CAMA rain garden	Provide bicyclists safe access to residential areas as well as local destinations (beach accesses).	Existing narrow street width one-way vehicular circulation (Atlantic Beach Ave. to East Dr.).	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Money Island Dr.	Money Island - Tryon Route	Glenn St.	Tryon St. terminus (east).	Provide access from the proposed Fort Macon Route to residential neighborhoods and beach accesses.	Existing narrow street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Fort Macon - Tryon St Connector	N/A	Fort Macon Rd	Tryon St	Provide bicyclists safe access to residential and commercial areas as well as local destinations (beach accesses).	Easement acquisition needed.	Anticipated	The multi-use trail segment should include lighting, support facilities (i.e. vegetation) and trail signage.
Town Park Connector	N/A	Ocean Ridge Dr.	Town Park	Provide neighborhood access to Town Park and shopping destinations along Fort Macon Road.	Easement acquisition needed.	Anticipated	The multi-use trail segment should include lighting, support facilities (i.e. vegetation) and trail signage.
High-Visibility Crosswalk and Signage	Fort Macon Rd.	N/A	N/A	Connect residential area on the North side of Fort Macon Rd. to the proposed multi-use trail.	High traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines. Install multi-use trail segment on North side of Fort Macon Rd. from crosswalk to subdivision entrance.
High-Visibility Crosswalk and Rapid Flash Beacon	Fort Macon Rd.	N/A	N/A	Connect residential area and post office on the North side of Fort Macon Rd. to the proposed multi-use trail.	High traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage with rapid flash beacon per NCDOT guidelines. Install multi-use trail segment on North side of Fort Macon Rd. from crosswalk to subdivision entrance and post office.

Table B.0 Identified Bicycle Project Opportunities, Continued							
Project / Improvement Name	At / On	From	To	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment
Wilson Route	Wilson Ave.	Fort Macon Rd.	E. Boardwalk	Provides access from Fort Macon Road to residential neighborhoods and beach accesses.	Existing narrow street width and homes located close to the existing ROW.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
E. Atlantic Route	E. Atlantic Blvd.	East Dr.	Wilson Ave.	Connects residential areas to the "Circle".	Existing narrow street width one-way vehicular circulation (Atlantic Beach Ave. to East Dr.).	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Refuge Island	Fort Macon Rd.	N/A	N/A	Creates a safe crossing from neighborhoods and commercial areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	May require driveway consolidation.	Not Anticipated	Install a refuge island with high visibility crosswalks and rapid flash beacons per NCDOT guidelines.
High-Visibility Crosswalk and Rapid Flash Beacon	Fort Macon Rd.	N/A	N/A	Creates a safe crossing from neighborhoods and commercial areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage with rapid flash beacon per NCDOT guidelines.
New Bern - Club Colony Connector	N/A	New Bern St.	Club Colony Dr.	Improve bicycle and pedestrian access from Club Colony Dr. to the New Bern Street Bath House.	Existing boardwalk, sand dunes and possible septic utilizes.	Not Anticipated	Install a multi-use trail segment from Club Colony Dr. to New Bern Street.
Club Colony Loop	Fort Macon Rd., New Bern St., Dunes Ave. and Freeman Ln.	New Bern Ave.	Dunes Ave. & Freeman Ln.	Improves accesses from proposed multi-use trail to adjacent residential areas and beach accesses.	High traffic along Fort Macon Rd.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Freeman-Club Colony Connector	N/A	Freeman Ln.	Club Colony Dr.	Utilize existing easement to provide access to the proposed Fort Macon Multi-Use trail to neighborhoods and beach accesses.	Existing boardwalk and sidewalk too narrow.	Not Anticipated	Install a multi-use trail from Freeman Ln. to Club Colony Dr.
High-Visibility Crosswalk and Rapid Flash Beacon	Fort Macon Rd.	N/A	N/A	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines. Install multi-use trail segment on North side of Fort Macon Rd. from crosswalk to subdivision entrance.
High-Visibility Crosswalk and Signage	Fort Macon Rd.	N/A	N/A	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines. Install multi-use trail segment on North side of Fort Macon Rd. from crosswalk to subdivision entrance.

Table B.0 Identified Bicycle Project Opportunities, Continued

Project / Improvement Name	At / On	From	To	Details / Purpose	Constraints	Right-of-Way / Easement Acquisition Needed?	Preferred Treatment
Refuge Island and Rapid Flash Beacon	Atlantic Beach Causeway	N/A	N/A	Provide bicyclists and pedestrians a safe crossing along Fort Macon Rd. to access retail / commercial destinations.	High traffic along Fort Macon Rd.	Not Anticipated	Install a refuge island including, high-visibility crosswalks and rapid flash beacon per NCDOT guidelines.
Island Quay Connector	Fort Macon Rd.	Island Quay dr.	Henderson Blvd.	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	High traffic along Fort Macon Rd.	Not Anticipated	Install a multi-use trail segment from Island Quay Dr. to Henderson Blvd. The multi-use trail should include lighting, support facilities (i.e. benches and vegetation) and trail signage.
Henderson Route	Henderson Blvd.	Triple S Marina	Henderson Blvd. Beach Access	Connect Triple S Marina and proposed multi-use trail to the Henderson Blvd. Beach Access and Bath House.	Diagonal parking along roadway.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
Commerce Route	Commerce Way	Fort Macon Rd	Roadway Terminus	Connect Fort Macon Rd. and proposed multi-use trail to the Commerce Way Beach Access and Bath House.	Narrow existing street width.	Not Anticipated	Install "sharrows" and shared roadway signage along roadway per NCDOT guidelines.
High-Visibility Crosswalk and Signage	Fort Macon Rd.	N/A	N/A	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines.
Multi-Use Trail	Fort Macon Rd.	N/A	N/A	Connect residential uses on the North side of Fort Macon Rd. to the proposed multi-use trail and beach accesses South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install multi-use trail segment on North side of Fort Macon Rd. in front of residents.
Multi-Use Trail	Fort Macon Rd.	N/A	N/A	Connect residential uses on the North side of Fort Macon Rd. to the proposed multi-use trail and beach accesses South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install multi-use trail segment on North side of Fort Macon Rd. in front of residents.
High-Visibility Crosswalk and Signage	Fort Macon Rd.	N/A	N/A	Creates a safe crossing from residential areas north of Fort Macon Rd. to neighborhoods and destinations South of Fort Macon Rd.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install high-visibility crosswalk and pedestrian crossing signage per NCDOT guidelines.
Sharrows	Fort Macon Rd.	Brooks St.	Cedar Ln.	Increases on-road safety for bicyclists and creates motorist awareness.	Heavy traffic along Fort Macon Rd.	Not Anticipated	Install sharrows along roadway per NCDOT guidelines.

APPENDIX C – EXISTING ROADWAY CONDITIONS/INVENTORY INFORMATION

On March 18, 2010, the consultant conducted an inventory of the roadways identified during the public participation process and Steering Committee meetings. 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. 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 Atlantic Beach Comprehensive Bicycle Plan.

Table C.1 contains data gathered during the roadway inventories.

TABLE C.I: EXISTING ROADWAY CONDITIONS

Roadway Road	From	To	Traffic Volumes (2007 AADT) From NCDOT TSG	Speed Limit	# of Lanes	Center Turn Lane	Pavement Width	Avg. 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	Notes
Fort Macon Road	Town Limits (Ft Macon State Park)	Dunes Club		45 mph 35 mph	3	Y	36 ft	12 ft	CG	N	Continuous center turn lane. Potential wetlands on North side. Some grading changes along South side. Sidewalk on south side.
	Dunes Club	Atlantic Beach Causeway		35 mph	5	Y	60 ft	12 ft	CG	N	Continuous turn lane, many driveways cuts, double right turn lane at Atlantic Beach Causeway. Sidewalk on Southside.
	Atlantic Beach Causeway	Cedar Ln		35 mph	5	Y	50 ft	10 ft	CG	N	Freshly paved section of road, Double left turn onto Atlantic Beach Causeway. No sidewalks within commercial district. Angled retaining walls along street.
	Cedar Ln	Town Limits (Pine Knoll Shores)		45 mph	3	Y	36 ft	12 ft	PS	N	Continuous center turn lane. Sidewalk on south side. Landscaped trail along south side. No crosswalks at Town Park Entrance. 3 ft wide paved shoulder.
Commerce Wy	Ft. Macon Rd	Street Terminus		25 mph	2	Y	20 ft	10 ft	None	Y-Perpendicular	No Center turn lanes. On-street parking. No pavement markings.
Henderson Ave	Ft. Macon Rd	Ocean Blvd		25 mph	2	N	50 ft	10 ft	None	Y-Diagonal	No sidewalks, On-street diagonal parking.
Ocean Blvd	Henderson Blvd.	Street Terminus		25 mph	2	N	20 ft	10 ft	None	Y-Perpendicular	No sidewalks. No pavement markings.
Freeman Ln	Ft Macon Rd	Street Terminus		25 mph	2	N	20 ft	10 ft	None	Y-parallel	No pavement markings. Narrow roadway.
Club Colony Dr	Street Terminus	Street Terminus		25 mph	2	N	18	9 ft	None	N	Narrow roadway with homes located nearly close to street. No pavement markings.
Dunes Ave	Ft Macon Rd	Club Colony Dr		25 mph	2	N	20 ft	10 ft	None	N	No sidewalks. Sand encroachment onto street. No pavement markings.
Tryon St	Street Terminus	Street Terminus		25 mph	2	N	20 ft	10 ft	None	N	No sidewalks. Sand encroachment onto street. No pavement markings.
Glenn St	Wilson Ave	Street Terminus		25 mph	2	N	14	7 ft	None	N	No pavement markings, Narrow roadway. Sand encroachment onto street. No sidewalks.
Ocean Ridge Dr	W Atlantic Blvd	Ft Macon Rd		35 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks. Scenic route.

TABLE C.1: EXISTING ROADWAY CONDITIONS, CONTINUED

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
E Boardwalk	Wilson Ave	Glenn St		25 mph	2	N	16 ft	8 ft	None	N	No pavement markings, Narrow roadway. Sand encroachment onto street. No sidewalks.
Wilson Ave	Ft Macon Rd	East Dr.		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Terminal Blvd	East Dr	Street Terminus		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Atlantic Blvd	East Dr	Street Terminus		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
	West Dr	Ocean Ridge Dr.		25 mph	2	N	18 ft	9 ft	None	N	No pavement markings. No sidewalks. Homes located close to roadway.
Bogue Blvd	Cedar Ln	Wilson Ave		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Pelican Dr	Ft Macon Rd	Shore Line Dr		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks. Roadway widens near intersection.
Mobile Dr.	Ft Macon Rd	Shore Line Dr		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Kinston Ave	Terminal Blvd	Street Terminus		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Charlotte Ave	Davis Blvd	W Boardwalk		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks. Drainage grates in roadway.
Durham Ave	W Boardwalk	Davis Blvd		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Cedar Ln	Terminal Blvd	Ft Macon Rd		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Forest Knoll Dr.	Street Terminus	Lee St		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Hoop Pole Creek Dr	Woodlawn St	Academy St		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.

TABLE C.1: EXISTING ROADWAY CONDITIONS, CONTINUED

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
W Boardwalk	Street Terminus	Street Terminus		25 mph	2	N	18 ft	9 ft	None	N	No pavement markings. No sidewalks. Homes located close to roadway. Narrow roadway.
East Dr	E Boardwalk	Bogue Blvd		25 mph	2	N	20 ft	10 ft	None	Y-parallel	Sidewalks along perimeter and on-road walking area.
West Dr.	Atlantic Blvd	Bogue Blvd		25 mph	2	N	20 ft	10 ft	None	Y-parallel	Sidewalks along perimeter and on-road walking area.
Central Dr	Ft Macon Rd	East Dr		25 mph	4	N	56 ft	14 ft	None	N	Pedestrian markings through surf shop parking lot. No sidewalks. Road "split" at Bogue Blvd.
Davis Blvd	Street Terminus	Kinston Ave		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks. Drainage grates in roadway.
Old Causeway	Atlantic Beach Causeway	Street Terminus		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Atlantic Beach Causeway	Ft Macon Rd	Atlantic Beach Bridge		35 mph 45 mph	5	Y	60 ft	10.5 ft	PS	Y	Sidewalks along West side to near bridge abutment. Sidewalk on East side until near Channel Marker Restaurant.
Moonlight Dr.	Atlantic Beach Causeway	Smith Street		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Bogue Sound Dr	Ft Macon Rd	Ft Macon Rd		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Bayview Blvd	Ft Macon Rd	Street Terminus		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Lee Dr	Ft Macon rd	Forest Knoll Dr		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.
Knollwood Dr	Ft Macon Rd	Forest Knoll Dr		25 mph	2	N	20 ft	10 ft	None	N	No pavement markings. No sidewalks.

APPENDIX D – PROJECT PRIORITIZATION METHODOLOGY

Appendix Outline:

Steering Committee members met on April 17, 2012 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 Atlantic Beach'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 beach accesses, parks, shopping/retail areas, neighboring communities and neighborhoods
- Improve bicycle safety, especially on major thoroughfares and at past vehicle-bicycle crash sites
- Improve areas 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 Atlantic Beach.

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 April 27, 2010 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.

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

a	Facility Type: *Separated Path*	**Is the project a separated path?** yes = 100 points no = 0 points
b	Connectivity: *Neighborhoods*	**Does the project connect neighborhoods?** yes = 50 points no = 0 points
c	Safety: *General*	**Does the project improve safety?** yes = 25 points no = 0 points
d	Connectivity: *Beach Accesses*	**Does the project connect to a waterfront access site?** Yes, between .125 - .25 miles = 15 points Yes, between .25 - .5 miles = 10 points Yes, between .5 - 1 miles = 5 points No (> 1 mile) = 0 points
e	Facility Location: *Major Thoroughfares*	**Is the project located along a major thoroughfare?** yes = 10 points no = 0 points
f	Connectivity: *Shopping Centers / Retail*	**Are shopping / retail located within the project area?** Yes, between .125 - .25 miles = 9 points Yes, between .25 - .5 miles = 6 points Yes, between .5 - 1 miles = 3 points No (> 1 mile) = 0 points
g	Facility Type: *On-Road*	**Is the project an on-road facility?** yes = 10 points no = 0 points

h	Connectivity: *The "Circle"*	**Does the project provide access to the "Circle"?** Yes, between .125 - .25 miles = 9 points Yes, between .25 - .5 miles = 6 points Yes, between .5 - 1 miles = 3 points No (> 1 mile) = 0 points
i	Number of Public Comments:	**Is the project mentioned repeatedly by the public as a need?** Yes, mentioned more than 5 times = 9 points Yes, mentioned at least 3-4 times = 6 points Yes, mentioned at least 1-2 times = 3 points No (> 1 mile) = 0 points
j	Connectivity: *Fort Macon State Park*	**Does the project provide access to Fort Macon State Park?** Yes, between .125 - .25 miles = 9 points Yes, between .25 - .5 miles = 6 points Yes, between .5 - 1 miles = 3 points No (> 1 mile) = 0 points
k	Connectivity: *Restaurants*	**Are restaurants located within the project area?** Yes, between .125 - .25 miles = 3 points Yes, between .25 - .5 miles = 2 points Yes, between .5 - 1 miles = 1 points No (> 1 mile) = 0 points
l	Connectivity: *Parks / Recreation*	**Is a park / recreation facility located within the project area?** Yes, between .125 - .25 miles = 3 points Yes, between .25 - .5 miles = 2 points Yes, between .5 - 1 miles = 1 points No (> 1 mile) = 0 points
m	Facility Location: *Secondary Roads*	**Does the project facility provide a bike facility on a secondary road?** yes = 5 points no = 0 points
n	Connectivity: *Public Service*	**Does the project provide a connection to a public service office?** Yes, between .125 - .25 miles = 3 points Yes, between .25 - .5 miles = 2 points Yes, between .5 - 1 miles = 1 points No (> 1 mile) = 0 points
o	Safety: *Existing Crash Sites*	**Does the project improve an existing crash site?** yes = 5 points 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 (0-2 yrs) implementation schedule. Mid-term (3-5 yrs) projects are those projects with a minimal, low and/or moderate costs and low and high priority ranking. Long-term (5-10 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:

To bring Atlantic Beach'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. Atlantic Beach should seek all funding opportunities for project implementation, including State, Federal, and Private monies where available. 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 Atlantic Beach 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 Atlantic Beach. 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, Atlantic Beach 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 Atlantic Beach.

SPECIAL ASSESSMENT BONDS

Atlantic Beach 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 Atlantic Beach 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.

PEANUT BELT RURAL PLANNING ORGANIZATION (PEANUT BELT RPO)

As a member of the Peanut Belt RPO, Atlantic Beach 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 Atlantic Beach is in the NCDOT Division 1 with headquarters in Edenton.

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 Fit Community 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 Atlantic Beach.

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.

[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

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, inspection, surveying and legal administration. Consideration for professional engineering and installation were given for multi-use trail and road shoulder widening projects. 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.

STONE TRAILS/PATHS

- Concrete trails can cost around $60 per linear foot for installation and engineering. Removing existing concrete sidewalks can cost around $15 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.

- Warning signs with solar rapid flash beacons can cost approximately $10-15,000 for purchase and installation of two units[iii]

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

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

[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/

[iii] Federal Highway Administration (FHWA) Intersection Safety Technologies http://safety.fhwa.dot.gov/intersection/resources/techsum/fhwasa09009/

APPENDIX H – MAPS

All maps contained within the Atlantic Beach Comprehensive Bicycle Plan are found in Appendix H.