Acknowledgments

The development of the New Bern Comprehensive Bicycle Plan was a collaborative process that involved numerous stakeholders, including the Board of Aldermen members of New Bern, the New Bern Bicycle Advisory Committee, Craven County, CARTS, and the North Carolina Department of Transportation (Division of Bicycle and Pedestrian Transportation and Division 2).

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Executive Summary

New Bern has undergone significant changes during its nearly 300-year history. As New Bern prepares for its tercentennial, it is time to look towards the economic, social, and cultural future of the City. Bicycling has the potential to serve an important role in New Bern's future development and progress. In order to realize this role, a vision for the *Comprehensive Bicycle Plan* was developed including establishing connections with Trent Woods, James City, and Bridgeton, updating local ordinances to accommodate bicycles, promoting bicycle awareness, and involving partners such as the NCDOT and the New Bern Police Department to promote education and safety programs in New Bern. From this vision, a set of goals and objectives was created as outlined in **Chapter 1**.

> It is the goal of this plan to chart the future of bicycling in New Bern boldly through specific projects and programs, while committing resources wisely.

In order to truly have a *Comprehensive Bicycle Plan*, aspects such as policies, guidelines, programs, and ancillary facilities must be considered in addition to route improvements. This plan makes recommendations for modifications to the New Bern municipal code and provides sample cross-sections for incorporating bicycle facilities into future road development. **Chapter 3** also provides examples of various roadway treatments such as signing, striping, and roundabouts.

Ancillary facilities such as bike racks, signal clearance loops, bicycle maps, restrooms, and water fountains are important to consider when creating a more bicycle-friendly community. These facilities will make the New Bern area more appealing for both local and tourist bicyclists. These facilities are discussed in **Chapter 3**.

Education, encouragement, and enforcement programs are critical to the success of the *Comprehensive Bicycle Plan*. This plan proposes a wide variety of programs that give the City a range of alternatives. Education programs such as bike rodeos, school-based bike education, and public service announcements are recommended to educate children and adults, bicyclists and drivers. Enforcement programs should be instituted that regulate the behavior of both bicyclists and drivers. Positive re-enforcement such as reward coupons for following the rules of the road are also a great way to make children aware of correct behavior. Encouragement programs such as rideabouts, Safe Routes to School, Walk and Bicycle to School Days, bike mentor programs would promote bicycling in all segments of the population. A rideabout was conducted as a part of this plan with great success. More information on these programs is included in **Chapter 4**.

There are limited existing bicycle facilities in New Bern. 1.5 miles of signed bike routes exist in New Bern today. These routes connect to form a downtown spine network, but do not feature any additional on-road facilities for bicycles and do not connect to

neighboring municipalities or other sections of New Bern. These routes are discussed in **Chapter 2**.

The *Comprehensive Bicycle Plan* seeks to improve upon the existing bicycle network by proposing a recommended set of routes and facility types and establishing priorities and cost estimates for each. In addition, a barrier analysis was conducted for a set of 16 barriers consisting of bridges, major intersections, railroad crossings, and focus areas. This analysis, shown in **Chapter 2**, examines mitigation measures for each area that were ultimately incorporated into the route recommendations and cost estimates.

Using input received from the Bicycle Advisory Committee and a series of public workshops, a set of recommended routes was assembled. These routes and their corresponding facility types are detailed in **Chapter 4**. **Table 4.1**, included here, breaks out each route by facility type, total length, and total estimated cost. This table also includes the total length for each facility type in the network as well as the total estimated cost for the entire network. The routes cover a large portion of New Bern and also make connections with Trent Woods, Bridgeton, and James City. These routes also make connections to major destination points in the area such as schools, commercial areas, parks, government facilities, and neighborhoods. If this plan is implemented, over 90% of the local population would have access to bicycle facilities that would be suitable for basic as well as more advanced riders.

After a comprehensive set of policy, program, and route recommendations was established, the next step was to look at implementation strategies. Route priorities were developed by attempting to maximize the benefits to a range of geographical areas and user groups in the community. Specific projects represent on-road as well as off-road facilities. Bicycling initiatives and program priorities were developed based on their ease of implementation and benefit received by the largest contingent of population. Funding sources for these projects were examined and are outlined in **Chapter 5**.

Three levels are used to classify the priority level of each route: short-term, mid-term, and long-term improvements. The total probable construction cost (in 2006 dollars) of the bicycle projects for the plan is $13,800,000. Short-term improvements are those projects that are recommended for or can be completed within a 5-year period.

Table 4.1 Route and Network Characteristics

Routes	Signed Route	Striped Bike Lane	Wide Outside Lane	Paved Shoulder	Neighbor-hood Connector	Multi-Use Path	Length (miles)	Cost
Airport Loop		✓		✓			3.8	$1,550,000
Bridgeton Loop		✓		✓			5.5	$2,650,000
Downtown-Mall Loop	✓	✓	✓	✓			14.9	$3,500,000
Downtown Neighborhood Loop	✓	✓	✓	✓	✓		6.8	$500,000
Riverfront Loop	✓	✓	✓				5.2	$100,000
Taberna-James City Loop		✓	✓	✓			13.9	$4,000,000
Trent Woods Loop	✓	✓	✓	✓		✓	16.5	$2,500,000
Total (length in miles)	10.2	18.4	7.8	24.7	0.1	0.6	61.8	$13,800,000

The total probable construction cost for the short-term projects is $485,000 (average $97,000 per year). Mid-term improvements are expected to occur between 5 and 10 years into the future for which $2,355,000 in projects is recommended (average $471,000 per year). Long-term improvements are those projects that fall outside of a 10-year horizon for which a total of $12.05 million in projects is presented (this would take more than 20 years spending $602,000 each year).

The North Carolina Department of Transportation is credited for beginning the bicycle planning program in North Carolina and for project participation in this plan.

Chapter 1 – Introduction

Vision Statement

By their nature, cities grow and change over time. With nearly 300 years under its belt, the City of New Bern has certainly seen significant changes – not only in community size and physical characteristics, but also in economic factors, in various types of cultural opportunities, and in transportation. This extensive history gives New Bern a unique perspective on the needs of the community, having been constantly assessing and addressing those needs for so long. As the City prepares for the 300th anniversary of its founding, it is an excellent time to consider how New Bern will look in the future.

The impact of transportation on New Bern will be particularly important to consider in the coming years. As people seek ways to enjoy more of their communities and travel more efficiently, it is valuable to consider the bicycle as an important component in meeting those needs.

This bicycle plan balances several responsibilities. It identifies the specific needs in the community, a vision for the future, the investment opportunities and financial realities, and a disciplined investment strategy.

The City of New Bern's vision for a *Comprehensive Bicycle Plan* includes:

- A safe and convenient system that connects with the three adjacent communities of Trent Woods, James City, and Bridgeton
- Local ordinances and design standards, so that future development is bike-friendly
- An increase in bicycle awareness through strong public outreach programs, bicycle advocacy groups, and educational programs
- The involvement of partners (such as the NCDOT Division of Bicycle and Pedestrian Transportation, the NCDOT Transportation Planning Branch, and the New Bern City Police Department's Bicycle Unit) in education and safety programs like helmet laws, bike laws, and Safe Routes to School programs

History

Bicycling in America

Bicycles became popular in America in the late 1800s as a practical and relatively inexpensive means of short-range travel for work or recreation. Although bicycles were originally intended as transportation only for adults, designers eventually found a market with younger riders and began manufacturing smaller models. People of all age groups and social and economic backgrounds enjoyed cycling. Bicycles soon joined carriages, horses, streetcars, and pedestrians on city streets as regular forms of transportation, and had an important role in civic services such as law enforcement.

As the automobile became more popular and affordable, however, automobiles began to replace bicycles as a major mode of transportation. Yet the bicycle was still widely used for recreation and a popular

means of transportation for children and teenagers. As vehicular traffic increased, bicycle safety became important to cyclists, automobile drivers, police, and highway authorities.

The bicycle reached a new status in North Carolina in 1929 when the General Assembly legally defined the bicycle as a vehicle and gave it the same status as motor vehicles on North Carolina highways.

More recently, in 1974, the North Carolina General Assembly passed the *Bicycle and Bikeways Act,* establishing one of the first statewide bicycle program in the United States. This act authorized the North Carolina Department of Transportation (NCDOT) to carry out comprehensive bicycle planning and programming. The NCDOT continues to promote a positive environment for bicyclists and accomplish goals established by the 1974 Act through efforts of the Division of Bicycle and Pedestrian Transportation.

Federal legislation in the 1990s introduced major changes in transportation planning ideas and methodologies for state and local officials. The federal 1992 Intermodal Surface Transportation Efficiency Act (ISTEA) and the 1998 Transportation Equity Act for the 21st Century (TEA-21) allowed more local involvement in the project planning phases to make sure that federal funding was allocated to the most important community priorities. ISTEA and TEA-21 encouraged the development of safe and efficient multimodal transportation facilities, including bicycle facilities and provisions. The Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) passed in 2005 continues this trend.

The Bicycle's Role in New Bern

Founded in 1710, New Bern is the second oldest city in North Carolina. Bicycles as a means of transportation and recreation have long played a role throughout the City of New Bern's rich history. The *Illustrated City of New Bern, North Carolina, 1914* includes a description of two very successful cycle shops, L.H. Cannon Cycle Company and Gaskins Cycle Company, located in Downtown New Bern.

Looking at more recent history, previous efforts make this bicycle plan more than just a passing whim. The *City of New Bern 2004 Comprehensive Plan* calls for the development of a bicycle plan that includes economic development components and elements of connectivity, and addresses other fundamental elements such as public facilities, greenways, and open space. The City's CAMA Land Use Plan also discusses the necessity of including comprehensive bicycle planning for the city.

Benefits of Bicycling

Today, bicycling as a primary means of transportation is widely popular in densely populated cities around the world. Sometimes commuters find cycling more efficient, affordable, and convenient than traveling by automobile on congested urban streets. Although most people choose to travel by cars and trucks in the United States, bicycling is still the first — and sometimes the only — choice for some people.

Bicycling is recognized to be an appealing alternative to traveling by car because of the benefits it offers, including:

- ***It represents the "livability" of a place.*** Being able to reach a destination via bicycle gives people another alternative

for choosing a travel mode. It combines the functionality of actually getting there with the benefits of exercise and recreation. In places where residents are regularly seen outside walking or bicycling, visitors feel a sense of community and safety there. A city with great "livability" constantly attracts new residents and businesses.

- ***It is efficient and environmentally-friendly.*** Cyclists power the machines themselves and do not use fossil fuels. Since bicycles do not release polluting emissions into the air and run on gears versus engine power, both air and noise qualities are improved.
- ***Bicycling promotes good health practices.*** The United States Surgeon General advises Americans to get 30-60 minutes of exercise 4 to 6 times each week. Bicycling is a low-impact way to exercise and can improve a person's health by lowering blood pressure, strengthening muscles, lowering stress levels, increasing the size, strength, and efficiency of the heart and cardiovascular system, burning fat, and increasing metabolism.
- ***The economics of bicycling make sense.*** According to a study by the Boston Foundation, in 2003, typical American households spent an average of $7,125 on transportation costs, including insurance, repair, maintenance, fuel costs, taxes, and other fees — a significant annual investment. The average cyclist spends only $120 per year on bicycle costs. Choosing to ride a bicycle versus the bus or personal automobile could save one person thousands of dollars in a single year.
- ***Bicyclists can generally avoid traffic congestion.*** Since a bicycle only takes up about a quarter of the physical space that the average car does, cyclists can maneuver more easily through traffic in urban areas. Often, cyclists can use dedicated bicycle lanes or greenways, which allow for an even more efficient trip.

It is the goal of this plan to chart the future of bicycling in New Bern boldly through specific projects and programs, while committing resources wisely.

- ***It is easy.*** According to a 1995 National Personal Transportation Survey, analysts found that approximately 40 percent of all trips made are less than 2 miles in distance from origin to destination. Most bicyclists can make that level of trip in approximately ten minutes.

Types of Cyclists

In order to develop an appropriate bicycle element of a transportation plan, the following "ABCs" of cyclists need to be understood.

Advanced Cyclists — These are usually experienced cyclists who have the ability to safely ride under more typical thoroughfare conditions of higher traffic volume and speed. This group of cyclists generally prefers shared roadways as opposed to striped bike lanes and paths. Although surveys show this group represents only about 20 percent of all cyclists, they also show that these cyclists ride about 80 percent of the bicycle miles traveled yearly. With monthly street sweeping of gutter

debris, advanced cyclists typically accept striped bike lanes.

Basic Cyclists — These cyclists are casual or new adult and teenage riders less secure in their ability to ride in traffic without special accommodations. They typically prefer bike paths and bike lanes on collector or arterial streets with less exposure to fast-moving and heavy traffic. Surveys of the cycling public indicate that 80 percent of cyclists can be categorized as basic cyclists.

This cyclist fails to observe several basic safety measures and rules of the road.

Child Cyclists — This group, which is a subset of the basic cyclists, includes children (aged 12 and under) on bicycles who have a more limited field of vision as they ride. This group generally keeps to neighborhood streets, sidewalks, and greenways. When children venture out onto busier roadways, they typically stay on sidewalks or bicycle facilities that keep them safely away from traffic. Given the comfort level of these cyclists, it is recommended that areas in New Bern lacking bike lanes allow children and other cyclists who are uncomfortable riding in traffic to ride on sidewalks with the requirement that they yield to pedestrians.

Cyclists, not unlike drivers, generally become more experienced over time and miles of riding. As cyclists ride and gain more experience operating in traffic, they eventually graduate from the classification of a basic cyclist to an advanced cyclist more capable of operating under typical roadway conditions.

In New Bern, three distinct groups are representative of the majority of the bicycling population. Captive riders are those without access to a motor vehicle who as a result rely on bicycling, transit, and foot travel to get around. These groups are primarily situated within the city limits in the neighborhoods surrounding the downtown. The next group consists of recreational riders, who may not be long-distance or advanced riders, but are interested in bicycling for exercise or as an occasional outdoor activity. The third group represented in New Bern consists of more serious riders, who ride long distances and often ride in touring groups. New Bern is home to many serious riders due to its favorable terrain and climate. Bicycling groups and focus areas are discussed in more detail in **Chapter 3**.

Goals and Objectives

The old adage "if we fail to plan, then we plan to fail" is certainly true for the development of this bicycle plan. With the end goals in mind, it was easier to develop a plan that will succeed in the context of this community. **It is the goal of this plan to chart the future of bicycling in New Bern boldly through specific projects and programs, while committing resources wisely.**

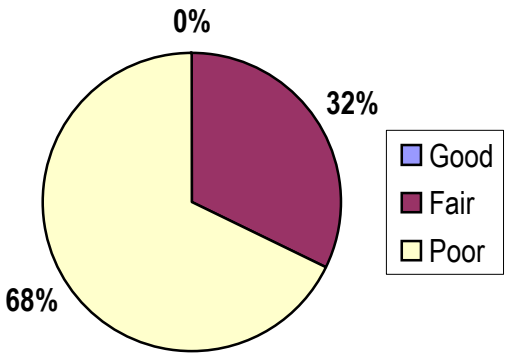
Through regular meetings with an advisory committee and public workshops, the public expressed their interests in the bicycle plan's goals and objectives. Using a survey, participants indicated their concern with several issues related to biking, including:

- Lack of bike lanes, trails, and paths
- Lack of education and awareness on part of both driver and cyclist

- Lack of paved, clean shoulders and safe roadways
- Failure to incorporate biking needs into public/private development standards
- Presence of potholes, road obstructions, broken pavement, and debris

One of the questions drawing an interesting response asked participants to rate bicycling conditions in New Bern as good, fair, or poor. There were no respondents that felt bicycling conditions were good in New Bern. In fact, over two-thirds of the respondents answered that they felt bicycling conditions were poor in this area. This is a clear indication that steps need to be taken to improve the bicycling environment in New Bern. The survey and significant findings are included in the **Appendix**.

Figure 1.1 Bicycling Conditions in New Bern Survey Response



In addition, survey participants were asked what they felt the barriers were to bicycling in New Bern. Responses included such items as a lack of education and awareness of drivers and cyclists; lack of paved shoulders, bike lanes, and dedicated paths; and poorly maintained roadways, bridges, and narrow roads. This plan will seek to address these issues through its recommendations and implementation strategies.

To achieve this goal, these concerns were taken into consideration as several short- and long-range goals were developed for New Bern.

Short-Range:

- Organize periodic events that encourage new riders and promote safety
- Pursue funds to construct high priority facilities

Long-Range:

- Increase the number of people who regularly bicycle
- Increase public awareness of bicycling as a viable mode of travel
    - Promote the rights and responsibilities of bicyclists, pedestrians, and motorists in a shared transportation network while improving safety and enforcement
    - Modify public policy to include provisions for bicycles through design standards, education initiatives, and enforcement and encouragement programs
    - Ensure bicycle accommodations are considered, where consistent with the plan, in a balanced approach to planning and funding transportation projects
- Create additional physical activity opportunities in New Bern, increasing physical and mental wellness, as well as improving air quality for all

- Provide improved opportunity and access for bicycling to all residents
- Encourage the design, finance, and construction of transportation facilities that provide safe, secure, and efficient linkages for bicyclists throughout the City
- Stimulate the local economy by providing safe and efficient bicycle connectivity between neighborhoods, businesses, recreation areas, and tourist sites
- Encourage safe riding practices on roads and trails
- Promote the development of seamless transitions for all bicycle facilities which cross over the city limit

Scope and Purpose of Plan

The *New Bern Comprehensive Bicycle Plan* does not exist in a vacuum, and as a result significant consideration was given to several influential factors. As mentioned previously, this plan addresses several issues. It considers the plans already developed that would impact bicycling in the community, the expectations of current members of the community along with federal and state regulations, and financial constraints and opportunities. It is intended to serve as a master plan for investments of local, state, and federal monies.

The vision of a connected, financially feasible bicycle plan for New Bern can become a reality. This *New Bern Comprehensive Bicycle Plan* is intended to serve as a tool, guiding the future success of implementing New Bern's bicycle facilities.

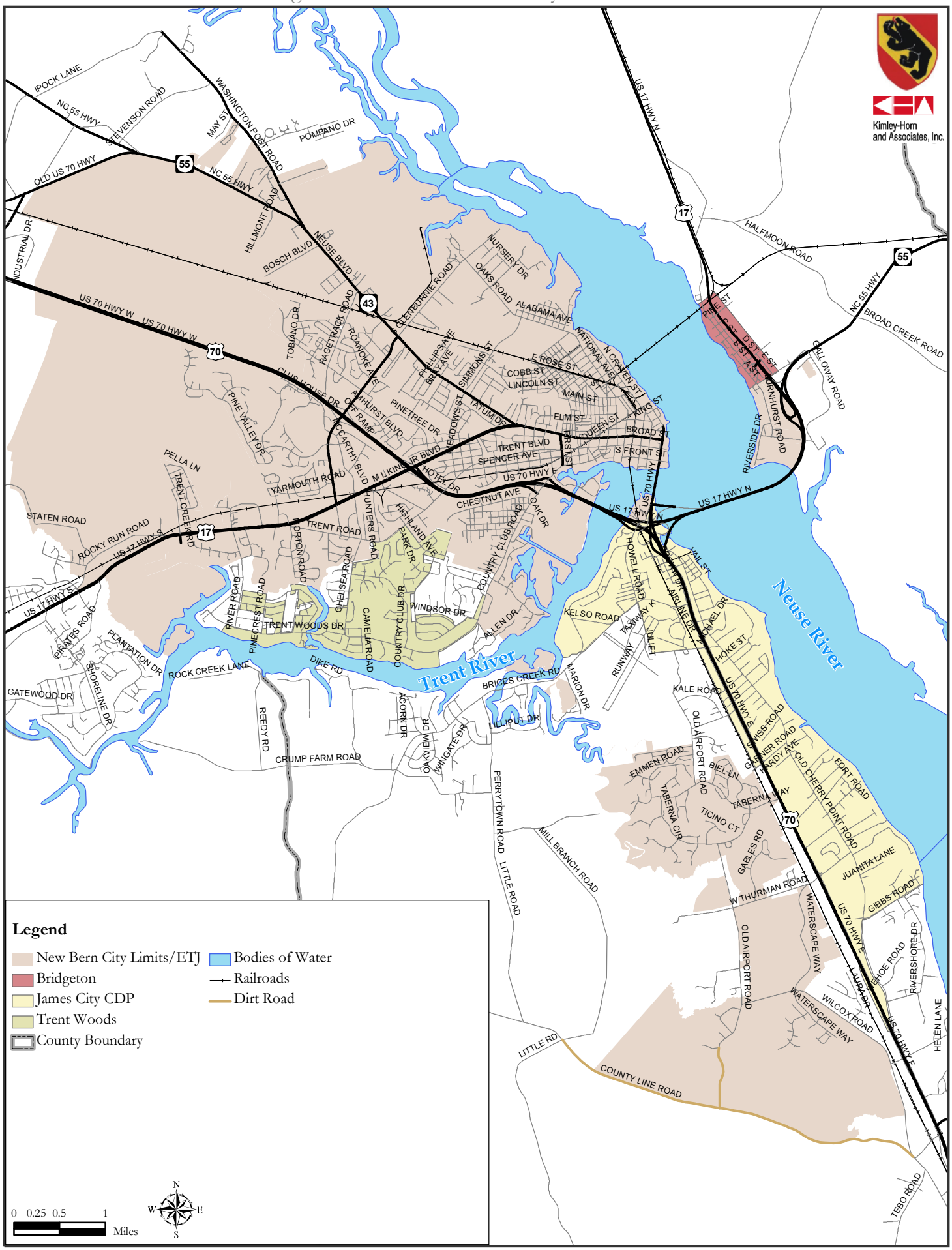
This plan includes descriptions of the development of several key plan components. These components, critical to making a plan successful in terms of being able to be implemented, are addressed within the following chapters:

- Existing Conditions
- Facility Opportunities and Guidelines
- Recommendations
- Implementation

The *New Bern Comprehensive Bicycle Plan* will encompass the Extra-Territorial Jurisdiction of the City of New Bern, as well as addressing connections to the neighboring communities of Trent Woods, James City, and Bridgeton. The study area is shown in **Figure 1.2** on the next page.

New Bern Bicycle Plan

Figure 1.2 - Study Area



Chapter 2 – Existing Conditions

New Bern is ideally suited for bicycle travel. The relatively flat terrain, the scenic views of the Neuse and Trent Rivers, the rich local history of the city, and the location of New Bern as a major city between Kinston and Havelock on the US 70 corridor all contribute to making this an area that would be desirable for bicycle travel. This chapter outlines the existing conditions for bicycling in New Bern, the existing statutes and ordinances, and the current and planned bicycle programs and initiatives.

Existing Bicycle Facilities

New Bern has limited bicycle facilities. Currently, three signed bicycle routes totaling about 1.5 miles in length are located in New Bern, incorporating roads such as Craven Street, River Road, West Street, Fleet Street, Trent Boulevard, and Pollock Street as shown in **Figure 2.1**. These routes are indicated by signs, but do not include any additional amenities. All of these routes connect, however, and form a downtown spine network. The three routes link downtown neighborhoods and businesses with the central business district, waterfront, and municipal center. No connection exists, however, to other sections of the City or to communities such as Trent Woods, James City, and Bridgeton. Two North Carolina state routes also run through New Bern.

An extensive field review was conducted as a part of this project. This field review considered data provided by the city such as roadway width and presence of curb and gutter. The reviewers then looked at factors such as the presence and type of shoulders on the road. This analysis serves to provide a baseline level of information that is used when determining what bicycle facility type is most appropriate and most cost-effective. This analysis concluded that limited facilities exist that are currently amenable to bicycle travel.

Bicycle Statutes and Ordinances

The City of New Bern does not currently have any adopted bicycle, pedestrian, or greenway plans. The *New Bern Regional Land Use Plan* includes a recommended thoroughfare plan but does not make any provisions for bicycles. The Code of Ordinances for the city makes a limited number of provisions for bicycles.

These ordinances state the following:

(a) It shall be unlawful for any person to ride a bicycle on a sidewalk abutting the following streets or portions of streets:

(1) Pollock Street, from Craven Street to Hancock Street.

(2) Middle Street, from Broad Street to Tryon Palace Drive.

(b) In those areas of the city where it shall be lawful to ride a bicycle upon a sidewalk, a person riding a bicycle upon a sidewalk shall yield the right-of-way to any pedestrian upon the sidewalk.

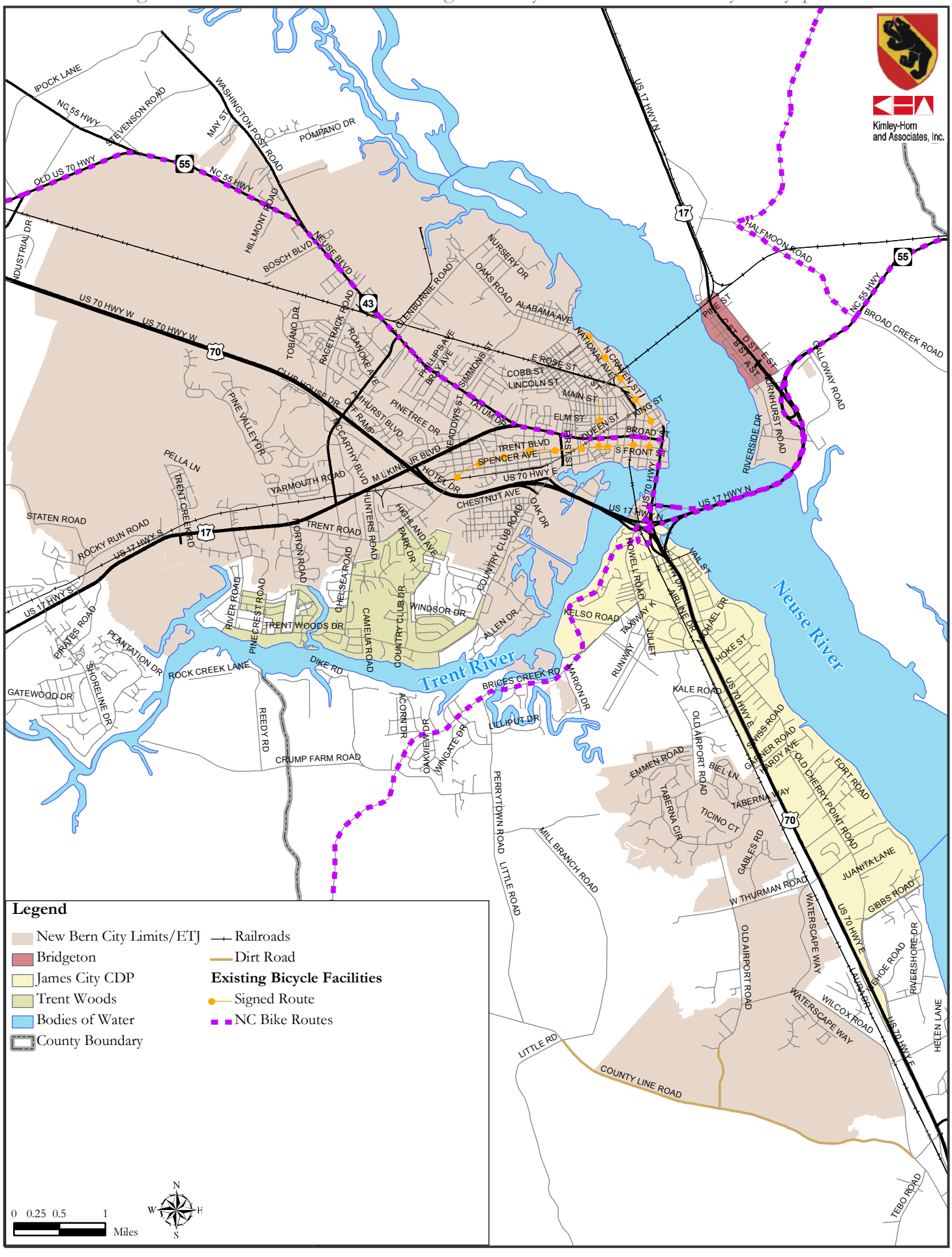
(Code 1971, § 14-10)

The ordinances also outline the designated bike routes in the area, as follows:

(a) Three major legs of a bicycle route system for the city are hereby designated as follows:

New Bern Bicycle Plan

Figure 2.1 - Existing Bicycle Facility Types



(1) *Leg No. 1* begins on River Road at Jack Smith's Creek and traverses River Road and North Craven Streets to its point of intersection with Queen Street; thence, northeastwardly with a portion of Queen Street to Craven Street; thence, southeastwardly with Craven Street to its intersection with Pollock Street, the location of the city hall.

(2) *Leg No. 2* begins on West Street at its intersection with Cypress Street and traverses West Street and Fleet Street southwardly to its intersection with Pollock Street.

(3) *Leg No. 3* begins at the intersection of Trent Road and Simmons Street and traverses Trent Road and Pollock Street eastwardly to the intersection of Pollock and Craven Streets, at which the city hall is located.

(b) Appropriate signs shall be procured and placed along the bicycle route as recommended by the state department of transportation.

(Code 1971, § 14-10.1)

Street design guidelines are also outlined in the Code of Ordinances. Minor, local, subcollector, collector, arterial, marginal access (frontage roads), and limited access (neighborhood roads with no driveway access) streets are all defined. Roadway and right-of-way widths have been stipulated in the ordinances and are identified in **Table 2.1**.

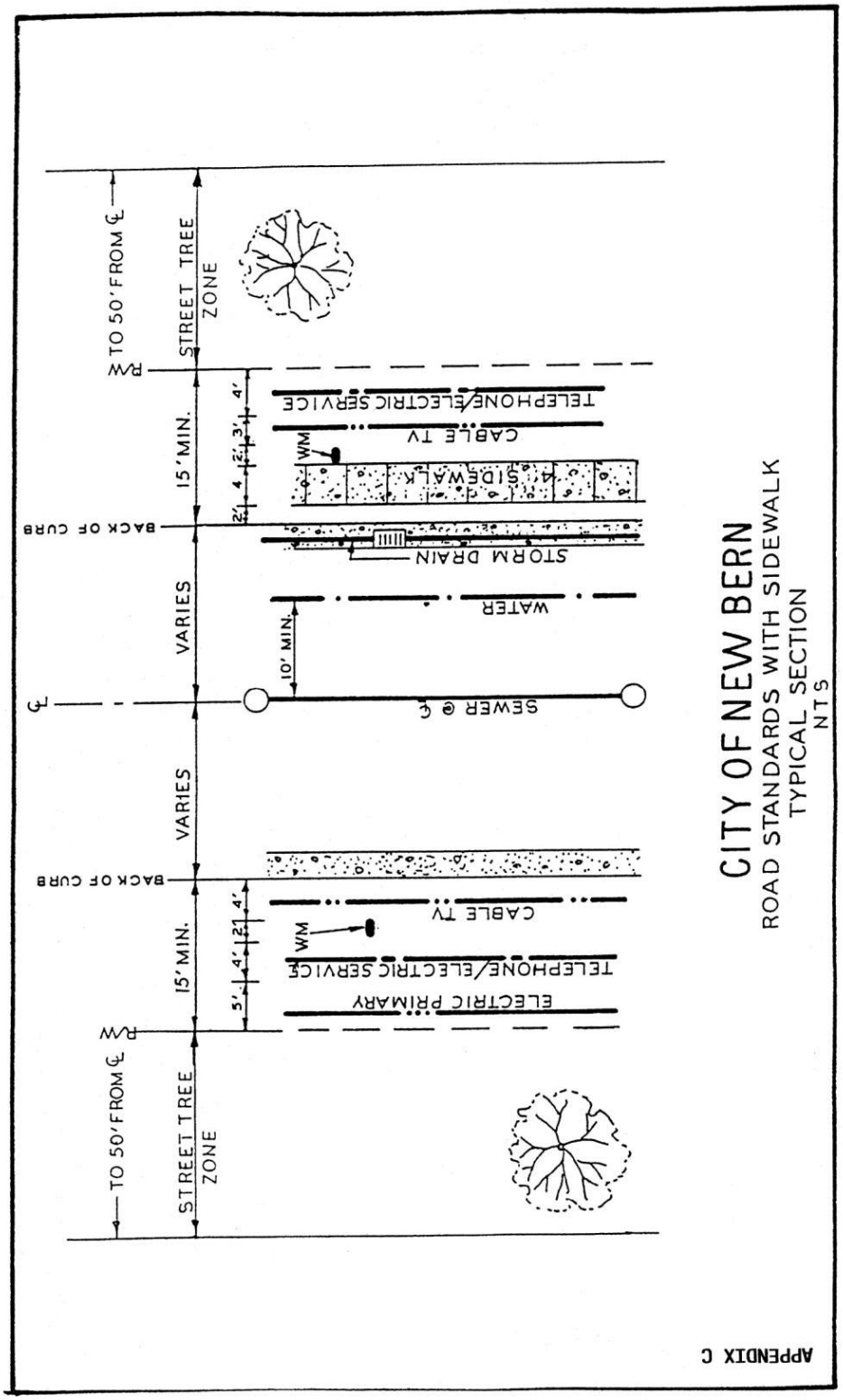
Table 2.1 Road and Right-of-Way Widths

Street Type	Minimum Pavement Width B/C to B/C (feet)*	Minimum ROW Width w/ Sidewalk (feet)*	Minimum ROW Width w/o Sidewalk (feet)*
Minor	25	55	45
Local	31/27	61/57	51/47
Subcollector	31	61	51
Collector	35	65	55
Arterial	44	74	64
Marginal Access	25	55	50
Limited Access	20	50	50

**In cases of planned unit developments, street pavement and right-of-way widths less than those shown above may be allowed if the Director of Public Works, Director of Electric Utilities, and the City Engineer determine that the narrowing of the right-of-way would not create a conflict in the installation and maintenance of street signs and public utilities.*

These stipulations are also accompanied by a general cross-section, as shown in **Figure 2.2**. However, the road width stipulations and this cross-section do not account for bicycles. When examining the 35-foot pavement widths provided in the ordinances (shown in **Table 2.1**), it can be seen that for a two-lane collector with twelve-foot lanes and one foot total for the curb section, there is adequate room to install two five-foot bike lanes. The 31- foot sections provided for subcollectors and local streets, however, only provide an additional three feet on either side. If these sections were modified to 33 feet, there would be adequate room to stripe four-foot bike lanes on these roadways. While a bike lane is not always the preferred option on every road, this modified street section would provide a viable option for on-street bicycle accommodations.

Figure 2.2 General Cross-Section



Current Programs and Initiatives

New Bern has some current bicycle programs that help to promote awareness in the community. The police force conducts bicycle rodeos at schools on a by-request basis. New Bern also served as the local sponsor the MS 150, a fundraising bicycle event, which brought many bikers of a more advanced skill level into the city.

As a part of this study, the City of New Bern held a rideabout on September 25, 2005 that was led by the police force and traveled approximately 4 miles through the city. This event, which drew a crowd of over 100 people, not only brought awareness to the bicycle planning efforts underway but also promoted proper riding techniques and brought different groups of riders together that might not ride with each other normally.

Barrier Analysis and Recommendations

Introduction

In order to develop a safe and convenient bikeway network throughout the City of New Bern, it is critical to remove existing barriers to bicycle travel. This section identifies 16 specific barrier locations, describes the conditions that prevent safe bicycle travel in these locations, and makes specific recommendations to remove these barriers to bicycling. Several of these barriers were identified by the bicycle community as well as by the Bicycle Advisory Committee. Most of the barrier improvements will be included as part of larger route recommendations. However, this should not preclude local initiative to improve spot safety at key intersections such as Martin Luther King, Jr. Blvd. and Trent Road which could be funded using local Powell Bill or NCDOT Division discretionary funding. Recommendations from this section, costs associated with the barriers, and potential mitigation measures for other barriers such as major bridges are incorporated into the route recommendations in **Chapter 4**.

1. Glenburnie Road at the Atlantic and Carolina Railroad Crossing

Glenburnie Road is an important corridor for bicycling on the northwest side of New Bern. This corridor connects neighborhoods near the Neuse River on the north side of the City, commercial businesses on Glenburnie

Current railroad conditions on Glenburnie Road

Road, and Craven Community College. The existing railroad crossing area on Glenburnie Road has deteriorating, debris-filled shoulders, and the railroad tracks cross the road diagonally. The diagonal railroad crossing creates a hazard because bicyclists may catch their wheels in the flangeway gaps (grooves) of the railroad tracks and experience severe crashes. A safe crossing of the railroad tracks is critical to provide safe bicycling conditions along Glenburnie Road.

Recommendations

- Install a bicycle-friendly casing for the railroad tracks at the roadway crossing to reduce the width of the flangeway gaps that bicyclists must cross over. This casing should extend beyond the recommended shoulder of the road.

This new railroad track casing on W. Thurman Road has smaller flangeway gaps, so is safer for bicyclists. A bicycle-friendly casing should also be installed on Glenburnie Road along with wider paved shoulders.

- Add extra shoulder pavement to Glenburnie Road at the railroad crossing to allow bicyclists to cross the railroad with their wheels perpendicular to the tracks.
- Stripe the new shoulder pavement area at the railroad crossing to direct bicyclists to cross the railroad tracks with their wheels perpendicular to the tracks.
- Post high-visibility "Share the Road" warning signs to make drivers more aware of bicyclists and to alert bicyclists to the potential hazards at the railroad crossing.
- Perform regular maintenance to clear debris from the paved shoulder area along the entire length of Glenburnie Road.
- In the future, widen the shoulders on Glenburnie Road to eight feet (from Oaks Road to US 70).

2. Glenburnie Road interchange with US 70

As mentioned above, Glenburnie Road provides connectivity for bicyclists in northwest New Bern. The interchange at US 70 is a particularly important location because it is one of the five locations in the City where bicyclists can cross US 70. To cross this interchange, bicyclists must negotiate freeway on- and off-ramps on the north and south sides of the bridge over US 70. While there are six-foot-wide sidewalks on the bridge, they do not connect to any type of bicycle facility (such as sidepaths, paved shoulders, or bike lanes) on either side of the bridge. Bicycle accommodations are particularly important because the roadway carries between 20,000 and 23,000 motor vehicles per day on this section of the roadway.

Recommendations

- Add high-visibility bike crossing warning signs to the freeway off-ramps and in advance of the signalized intersections on the north and south side of the bridge

to alert drivers to the presence of bicyclists.

- Add 10-foot-wide multi-use paths on both sides of Glenburnie Road between Amherst Boulevard and McCarthy Boulevard to provide off-road facilities for both bicyclists and pedestrians through the interchange area. This will require moving several existing signs and some guardrail sections.
- Provide curb cuts at the north and south ends of the recommended multi-use path sections (at Amherst Boulevard and McCarthy Boulevard) so that bicyclists can transition smoothly from the shared use facility back to an on-road bicycle facility (shoulders on Glenburnie Road to the north of US 70 and bike lanes to the south of US 70). Signage at this location will also need to reflect the change in the location of bicycle traffic in order to make drivers more aware in that area.
- In the future when the bridge over US 70 is replaced, widen roadway to accommodate wide outside lanes or consider widening sidewalks on both sides of the bridge to 10 feet to become multi-use paths.
- Stripe crosswalks across the freeway on- and off-ramps.

Recommended site for crosswalks on Glenburnie Road

- Construct curb ramps at the recommended crosswalks across the freeway on- and off-ramps to accommodate the proposed multi-use paths.
- Provide pedestrian countdown signal heads at the intersections on the north and south sides of the bridge over US 70.
- Provide additional lighting to improve bicyclist and pedestrian visibility at night.
- Prohibit right-turn on red vehicular movements to and from the on- and off-ramps at the interchange. Alternatively, signs could be installed to prohibit right-turn on red when bicyclists or pedestrians are present.

3. Crossings of Martin Luther King, Jr. Boulevard at Academic Drive and Greenleaf Cemetery Road

These crossings are important for bicyclists and pedestrians traveling to New Bern High School. Martin Luther King, Jr. Boulevard is currently a barrier between convenience stores, neighborhoods, the Trent Woods community, and the High School area. This facility carries approximately 29,000 vehicles per day, has three travel lanes in each direction, and has no signals to tell pedestrians and bicyclists how much time they have to complete crossing the road. Improvements to these intersections will improve conditions for both bicycling along and crossing Martin Luther King, Jr. Boulevard.

Recommendations

- Stripe crosswalks across all four legs of each of these intersections.
- Construct two curb ramps per corner at each of these intersections.

- Install pedestrian countdown signal heads at each of these intersections.
- Install pedestrian push-buttons at all four corners at each of these intersections.
- Provide additional lighting to improve bicyclist and pedestrian visibility at night.
- Post high-visibility yellow bicycle crossing warning signs in advance of these intersections.

4. Intersection of Martin Luther King, Jr. Boulevard and Trent Road

Trent Road is a critical connection in the New Bern bicycle network, providing access between Downtown New Bern and the US 17 corridor on the southwest side of the City. In order to make it possible for bicyclists to transition between Martin Luther King, Jr. Boulevard on the west side of Trent Road and Trent Road, the intersection of these two roads should be improved. Currently, bicyclists turning from westbound Trent Road to southwest-bound Martin Luther King, Jr. Boulevard must turn left with traffic across a very wide intersection without designated bike lanes or crosswalks. It is also important to improve this intersection to make crossing from Trent Road to the new development on the other side of Martin Luther King, Jr. Boulevard near Honda Drive more convenient for pedestrians and bicyclists.

Recommendations

- Construct curb and gutter at the intersection to reduce the turning radius at each corner (the reduced turning radii will force drivers to make turning movements more slowly).
- Stripe crosswalks across all four legs of this intersection.
- Install pedestrian countdown signal heads at this intersection.
- Install pedestrian push-buttons at all four corners of this intersection.
- Provide additional lighting to improve bicyclist and pedestrian visibility at night.
- Extend the existing medians on Martin Luther King, Jr. Boulevard so that pedestrians and bicyclists using the crosswalks to travel through the intersection have a refuge and a space to wait between crossing each direction of traffic.
- In the future, stripe a five-foot left-turn bike lane on the right side of the left-turn lane on Trent Road at the intersection. This will provide a space separated from motor vehicle traffic for bicyclists to wait at the signal. Space for the bicycle lane could be provided by narrowing the existing turning lanes and/or widening Trent Road at the intersection slightly.

Design transitions leading up to this treatment will need to be examined prior to its implementation in order to ensure road treatment consistency for bicyclists.

5. Trent Woods Drive Bridge over West Wilson Creek (Trent River Inlet)

Trent Woods Drive is a critical roadway for providing bicycle access between Trent Woods and the City of New Bern. At the west end of Trent Woods Drive, the road meets Greenleaf Cemetery Road, which connects to New Bern High School. The east end of Trent Woods Drive turns into Country Club Road, which provides a direct connection to Downtown New Bern. Much of Trent Woods Drive already has three- to four-foot-wide paved shoulders. Currently, the bridge that crosses West Wilson Creek is a pinch point along this roadway— the shoulders narrow and bicyclists have little distance between the travel lanes and the bridge railings, so bicyclists must use at least part of the roadway travel lane to cross the bridge. The total width of the bridge is approximately 24 feet from railing to railing, and it carries approximately 2,500 to 3,000 vehicles per day.

Current conditions on Trent Woods Drive Bridge

Recommendations

- Clear debris from the shoulders at the base of the bridge railings on a regular basis.
- Post advance warning signs to alert drivers, bicyclists, and pedestrians to use caution when approaching and crossing the narrow bridge. Types of signs that should be used include “Narrow Bridge” warning signs and high-visibility “Share the Road” signs.
- Consider reducing the speed limit on Trent Woods Drive within one-quarter mile of both sides of the bridge to 20 miles per hour.
- In the future when the bridge is replaced, provide five-foot shoulders and five-foot sidewalks on the new bridge. Also, bicycle-safe railings should be added to the new cross-section.

6. Trent Boulevard, Rhem Avenue, and Spencer Avenue

An important link in the New Bern bicycle network is a 10-block section between Trent Road, which provides access to the southwest side of the City, and Pollock Street, which is a direct route into Downtown New Bern from the west. Three parallel streets were considered to provide this east-west bikeway link: Trent Boulevard, Rhem Avenue, and Spencer Avenue.

Trent Boulevard has the most traffic, but it is also the widest street at 44-feet from curb face to curb face. It has one lane in each direction, separated by a centerline, and occasional on-street parking. It is also currently designated as a bicycle route. Rhem Avenue is a low volume neighborhood street with on-street parking that joins Trent Boulevard near Seventh Street at its west

end and meets Trent Boulevard again near First Street at its east end. Spencer Avenue is a low volume neighborhood street with a curbed median separating one travel lane in each direction. From visual inspection, all three of these streets appear to currently have relatively comfortable bicycling conditions.

Recommendations

- Stripe bicycle lanes on Trent Boulevard from Spencer Avenue to First Street. There is adequate width to stripe a 7-foot parking area, a 5-foot bike lane, and a 10-foot travel lane on each side of the street. Marking a bicycle lane would also indicate that bicyclists should ride on the same side of the road in the same direction as motor vehicle traffic. Paved shoulders should extend farther west on Trent Road where the curb and gutter cross-section stops. Shared lane pavement markings should continue east on Pollock Street where the roadway becomes too narrow for both bicycle lanes and on-street parking.

Current conditions on Trent Boulevard with on-street parking.

Trent Boulevard is wide enough to have 5-foot bicycle lanes adjacent to the 7-foot on-street parking.

- Continue to designate Trent Boulevard as the bicycle route in this area.
  - Trent Boulevard has the highest traffic volume of all three alternative roadways, but it is the only one with enough space to stripe bicycle lanes. The designated bicycle lanes will add to the roadway's prominence as a bicycle route, providing a visible indication that bicycles are accommodated on the roadway. In addition, because most of the east-west motor vehicle traffic in this part of the City uses Trent Boulevard, drivers that cross this road or make turns onto it may look more carefully and enter the road more cautiously than the other two low-volume parallel roads. This may create safer conditions at intersections for bicyclists. Also, if this road is a through street, cyclists will not have to stop at every intersection, thereby increasing safety and convenience. Trent Boulevard also provides access to DeGraffenried Park, but the other parallel streets do not.

Rhem Avenue (right side of photo) is a neighborhood street that intersects Trent Boulevard at a diagonal.

  - Rhem Avenue presents difficulties for bicyclists at its west end

intersection with Trent Boulevard. At this location, bicyclists traveling west would need to make a long, wide left-turn across Trent Boulevard because the intersection meets Trent Boulevard at a diagonal angle.

- Spencer Avenue was not selected as a route for several reasons. Because there is not enough space for a bicycle lane, bicyclists should use the regular travel lanes. However, less experienced bicyclists may be inclined to ride closer to the doors of the parked cars when a vehicle approaches from behind, putting them in greater risk of a collision with an opening car door.

The second problem with Spencer Avenue is at its intersection with First Street. This intersection has stop signs for traffic on Spencer Avenue, but it does not have any traffic control on First Street. While this is not necessarily a problem, there is limited sight-distance approaching this intersection from the south on First Street, which could put bicyclists at risk when crossing.

- Consider the option of directing eastbound bicyclists on Rhem Avenue and westbound bicyclists on Trent Boulevard. The most challenging section of Trent Boulevard for bicycling is likely to be immediately west of First Street. This is where Rhem Avenue rejoins Trent Boulevard. Bicyclists traveling eastbound on Trent Boulevard must be careful to avoid traffic coming from Rhem Avenue on their right. One potential solution to this problem is to provide bicycle lane space along with the turning lanes at the intersection (having the bicycle lane immediately to the left of a right-turn-only lane). Another solution is to have eastbound bicyclists use Rhem Avenue instead of Trent Boulevard. Westbound bicyclists would still use Trent Boulevard because this would avoid the intersection conflict at the west end of Rhem Avenue. Note that bicycle lanes should still be provided on both sides of Trent Boulevard, even if eastbound bicyclists are directed to use Rhem Avenue.

7. Country Club Road Interchange with US 70

Country Club Road is an important roadway for bicycling because it is one of five locations where bicyclists can cross US 70. It is also the most direct route for bicyclists to use to ride between Trent Woods and Downtown New Bern. This

Current conditions on the bridge over US 70.

Potential improvements to the bridge over US 70.

roadway currently serves high volumes of high-speed traffic (approximately 8,800 vehicles use the roadway each day on the north side of US 70). It does not have bike lanes, striped shoulder space, or a shared-use path. The travel lanes are currently between 13- and 14-feet wide, which provides an opportunity to restripe the road with narrower lanes and more space for bicycles.

Recommendations

- Narrow the travel lanes (preferably to 11 feet with five-foot striped bike lanes) on the bridge over US 70 so that shoulder bicycle lanes can be striped on both sides of the road. These new bicycle lanes can connect to bicycle facilities on the north and south sides of the bridge.
- Provide additional lighting to improve bicyclist and pedestrian visibility in the bridge area at night.
- Add 4-foot paved shoulders to Country Club Road between the south side of the US 70 interchange and Steeple Chase Drive in Trent Woods. These new paved shoulders could be used to form bicycle lanes on each side of the roadway and could connect with the existing (or widened) shoulders on Trent Woods Drive, resulting in bicycle lanes running up to Chelsea Road.
- Another alternative is to restripe Country Club Road between the north side of the US 70 interchange and Pollock Street so that it has one travel lane in each direction, a raised median with left-turn pockets (or a two-way center turn lane, though the raised median serves as a better refuge for pedestrian/bicycle crossings), and bike lanes on both sides of the road. The existing cross-section should be wide enough to accommodate two twelve-foot lanes, two five-foot bike lanes, and a 16-foot wide plantable median. This type of "road diet" from the current four-lane, undivided roadway cross-section typically works for traffic volumes less than 15,000 vehicles per day, and often improves conditions both for bicyclists and motor vehicle drivers.

8. Intersection of Broad Street, Martin Luther King, Jr. Boulevard, and Neuse Boulevard

Martin Luther King, Jr. Boulevard (left), Neuse Boulevard (right), and Broad Street (behind photographer) meet to form this complex intersection.

This is an important intersection for bicycle access because the three intersecting roadways are main arteries to three different parts of the City. Broad Street provides connectivity to Downtown New Bern; Martin Luther King, Jr. Boulevard serves the southwest part of the City, and Neuse Boulevard is the main commercial roadway in the northwest section of the City. The intersection of these three roadways has been constructed without shoulders or bike lanes. In addition, the multi-lane configuration of the roadways approaching the intersection makes it difficult for bicyclists to turn left in heavy traffic.

Recommendations

- Post high-visibility yellow "Share the Road" and other warning signs to increase driver awareness of bicycles in the vicinity of the intersection.
- Provide additional lighting to improve bicyclist and pedestrian visibility at night.
- Add a 4-foot paved shoulder to the south side of Martin Luther King, Jr. Boulevard. This paved shoulder would be an extension of the existing wide shoulder that extends southwest along Martin Luther King, Jr. Boulevard to the southwest of this intersection. It would connect to the proposed bicycle lanes on Broad Street.
- Construct a paved shoulder and a sidewalk on the north side of Martin Luther King, Jr. Boulevard. This side of the street serves several retail businesses, so the new shoulder and sidewalk would make it easier for bicyclists and pedestrians to access these destinations.
- Add a left-turn bicycle lane to the eastbound turning lanes on Neuse Boulevard. There is enough space to add a left-turn bicycle lane to the immediate left of the right-turn only lane on this approach to the intersection. Dashed lines should be added through the intersection to show cyclists the best path to follow to connect to the bicycle lanes on Broad Street.

The turning lanes on eastbound Neuse Boulevard at Martin Luther King, Jr. Boulevard could be narrowed to provide space for a left-turn bicycle lane.

- Restripe travel lanes on Broad Street to provide a four-foot shoulder bicycle lane on both sides of the street. By narrowing the existing travel lanes to 11-feet wide, bicycle lanes can be provided along the entire length of the roadway between this intersection and Front Street and Neuse Boulevard. While sidewalk bicycling is not encouraged, it provides an alternative method for some less experienced bicyclists to ride along these roadways. In addition, the new sidewalk will improve conditions for the significant number of pedestrians that walk along these roadways (as evidenced by the worn dirt paths beside the roadways).
- Perform a more detailed evaluation of the intersection to determine the most appropriate places to add crosswalks for pedestrians and less-experienced bicyclists who do not feel comfortable making left turns along with motor vehicle traffic. This study should also examine the best way to safely accommodate bicyclists that wish to turn left from westbound Broad Street onto southwest-bound Martin Luther King, Jr. Drive (it is likely that this movement would use the new pedestrian crossings).

9. Downtown Neighborhood Loop

The streets of the neighborhood on the northwest side of Downtown New Bern are narrow with relatively low traffic volumes. This makes them very good for bicycling.

The neighborhood on the northwest side of the downtown area features modest homes and narrow streets. Because these streets are very narrow, traffic speeds are generally low enough to have bicyclists share the road with motor vehicles. This historic neighborhood also has a significant amount of low- to moderate-income households, so a significant population here may rely on bicycling for transportation. Therefore, it is essential to determine the best routes for bicycle access in this neighborhood.

Recommendations

- Designate a bicycle route through the neighborhood to serve trips between the neighborhood and Downtown New Bern. This route could use Simmons Street, Washington Street, Garden Street, Main Street, George Street, Broad Street, and First Avenue. From First Street, the route could turn west on Trent Boulevard and utilize the recommended bicycle lanes until reaching Simmons Street.
- Designate a bicycle route to connect neighborhoods west of Simmons Street. This route would include Grace Avenue, Pinetree Drive, Lori Drive, Elizabeth Avenue, Sunset Road, Cherry Tree Drive, and Neuse Boulevard. This alignment is described in **Chapter 4** and is shown in **Figure 4.6**.

10. Bicycle Route Alternatives North of Downtown New Bern

Many bicyclists would like to bicycle north from the downtown area through the neighborhoods along the Neuse River. A bicycle route in this area would help show neighborhood residents how to bicycle to Downtown New Bern and also show recreational cyclists how to navigate north along the river. North Craven Street, Front Street, Pasteur Street, National Avenue, George Street, and Bern Street were considered for designation as bicycle routes. Currently, North Craven Street is designated as the bicycle route in this area. It might not be the most attractive route for recreational cycling, however, or the most direct route for neighborhood residents to use to reach Downtown New Bern.

East Front Street should be designated as a link in the "Riverfront Bicycle Route" that would highlight both the Neuse and Trent Riverfronts.

Recommendations

- Designate East Front Street as a link in the recommended "Riverfront Bicycle Route." This bicycle route would be oriented toward recreational bicycle touring around the City. This roadway is

the closest road to the river that provides continuous access to bicyclists. North Craven Street should be considered as an addition to this route when this area is redeveloped. Pasteur and Hancock Streets were considered as an alternative to North Craven Street, but this route is interrupted for two blocks by the Atlantic and Carolina Railroad.

- Designate National Avenue and George Street as the most direct route for neighborhood residents to access Downtown New Bern. National Avenue serves approximately 4,500 vehicles per day north of George Street. Traffic calming treatments should be explored on this section of the street to make sure that travel speeds remain low. George Street should also be improved for bicycling. This road should be designated as a bike route with 14-foot wide outside lanes. In addition, George Street should be signed and should also be considered for marking with shared lane pavement markings. Bern Street was considered for this route, but it is a neighborhood street that may have difficult crossings for bicyclists at Queen Street and Broad Street. This route is described in more detail in **Chapter 4** and is shown in **Figure 4.7**.

George Street should be marked as part of the direct route from the north side of the City into Downtown New Bern.

11. National Avenue at the Atlantic and Carolina Railroad Crossing

National Avenue is an important route between Downtown New Bern and neighborhoods on the north side of the City. These railroad tracks are particularly dangerous because there are multiple tracks to cross and the rails cross the roadway

The west side of National Avenue has no paved shoulder or sidewalks at the railroad crossing.

diagonally. In addition, the west edge of the roadway at this railroad crossing is deteriorating. The east side of the roadway at the railroad crossing is at an intersection with Lynn Street, so additional pavement is located on that side.

Recommendations

- Install a bicycle-friendly casing for the railroad tracks at the roadway crossing to reduce the width of the flangeway gaps (grooves) that bicyclists must cross over. This casing should extend beyond the recommended shoulder of the road.
- Construct a sidepath on the west side of National Avenue to connect the existing sidewalk section on the north side of the railroad tracks to the intersection of National Avenue and Bern Street. This sidepath should be designed with a curve so that it directs bicyclists to cross the railroad tracks with their wheels perpendicular to the tracks.

- Stripe shoulder space (and a crosswalk across Lynn Street) on the east side of National Avenue that directs bicyclists to cross the railroad perpendicular to the tracks.
- Move the stop sign on Lynn Street farther east from National Avenue and stripe a stop bar at that new location to provide more space for bicyclists and pedestrians traveling along the east side of National Avenue.

Lynn Street intersects with the east side of National Avenue at the railroad crossing.

- Post high-visibility "Share the Road" warning signs to make drivers more aware of bicyclists and to alert bicyclists to the potential hazards at the railroad crossing.
- Provide additional lighting to improve bicyclist and pedestrian visibility at night.

12. Intersection of Howell Road and Madam Moores Lane

The roadways on the south side of the Trent River provide an excellent recreational route for bicyclists, having been formally identified as North Carolina Bicycle Route 3. The intersection of Howell Road and Madam Moores Lane is a difficult point on this route because it lacks paved shoulders, has steep drop-offs at the edge of the pavement at the corners of the intersection, and its northwest corner has a very wide turning radius that facilitates fast vehicular right turns.

Recommendations

- Add paved shoulders to Howell Road and Madam Moores Lane.
- Redesign the intersection with a tighter turning radius on the northwest corner of the intersection.
- Add a stop sign on the north leg of the intersection (southbound Howell Road) to prohibit free-right turns from southbound Howell Road to westbound Madam Moores Lane.
- Post high-visibility yellow "Share the Road" warning signs on the approaches to the intersection.

The northwest corner of the intersection of Howell Road and Madam Moores Lane (left side of photo) lacks a paved shoulder and allows motor vehicles to make fast right turns.

13. Intersection of Kelso Road and Madam Moores Lane

This is an important intersection in the cycling route on the south side of the Trent River. The intersection is a challenging location because it has wide turning radii, no marked shoulders, and debris at the side of the road.

The intersection of Madam Moores Lane and Kelso Road (right side of photo) lacks shoulders and allows vehicles to make fast right turns.

Recommendations

- Tighten the turning radius on the southeast corner of the intersection by narrowing the travel lane and striping a shoulder area for bicycle use. This should help slow motor vehicles turning right onto Kelso Road.
- Stripe a stop bar in advance of the intersection on Kelso Road.
- Add paved shoulders to Kelso Road and Madam Moores Lane.
- In the future, redesign the intersection with a tighter turning radius on the northeast and northwest corners of the intersection.
- Post high-visibility yellow "Share the Road" warning signs on the approaches to the intersection.

14. Airport Road at the Atlantic and Carolina Railroad Crossing

Airport Road is a key part of an on-road bikeway connection between neighborhoods in James City near the Neuse River with the airport and more rural areas to the west and south of US 70. This railroad crossing currently has deep grooves that may cause bicyclists to lose control of their bicycles. In addition, the roadway has no shoulders for bicyclists to use. Similar improvements are also needed where the Atlantic and Carolina Railroad crosses Williams Road to the north.

Recommendations

- Install a bicycle-friendly casing for the railroad tracks at the roadway crossing to reduce the width of the flangeway gaps (grooves) that bicyclists must cross over. This casing should extend beyond the recommended shoulder of the road.
- Construct paved shoulders on the entire length of Airport Road.
- Stripe the new shoulder pavement at the railroad crossing to direct bicyclists to cross the railroad tracks with their wheels perpendicular to the tracks.
- Post high-visibility "Skewed Tracks" warning signs to make drivers more aware of bicyclists and to alert bicyclists to the potential hazards at the railroad crossing.

15. Intersection of Airport Road and US 70

US 70 serves more than 40,000 vehicles per day, and the six-lane road is extremely difficult for bicyclists and pedestrians to cross. However, it is important for bicyclists to be able to cross at this location so that

people in the neighborhoods near the Neuse River can access destinations to the west of US 70. Similar improvements are also needed at the intersection of Williams Road and US 70 to the north.

The service road intersects Airport Road (foreground), leaving a space of only one to two car-lengths for queuing at US 70 (background) and not allowing space for a crosswalk across Airport Road.

Recommendations

- Require motor vehicles on Airport Road to stop for the traffic signal in advance of where it intersects the US 70 service road. There should not be queuing space for motor vehicles between US 70 and the service road. The space between the service road intersection and US 70 should be used for a pedestrian crosswalk and possibly a bicycle box. A bicycle box provides a designated space for cyclists to cross from the left to the right side of the road as well as to queue in front of vehicles at an intersection. These changes could also help organize motor vehicle traffic flow more efficiently at the intersection.
- Pave shoulder space (or stripe narrower turning lanes and use existing pavement) at all corners of the intersection for bicycle use. This may also require moving utility poles back farther from the corners of the intersection.
- Extend the median on US 70 farther into the intersection and provide a paved pedestrian refuge area where the crosswalk crosses the median.
- Stripe crosswalks across all four legs of the intersection.
- Prohibit right turns on red from Airport Road onto US 70.
- Install pedestrian countdown signal heads for all four crosswalks.
- Install pedestrian push-buttons at both ends of all four crosswalks.
- Provide additional lighting to improve bicyclist and pedestrian visibility at night.

The intersection of Airport Road and US 70 lacks crosswalks and pedestrian signals and also has hazards at the corners of the intersection.

- The intersection of Airport Road and the US 70 frontage road also should be improved. Crosswalks should be provided on the north, south, and west legs of this intersection, and all of the approaching roadways should have paved shoulders for bicyclists.

16. Intersection of Old Airport Road and Wilcox Road

Bicyclists doing longer rides to the south of New Bern use Old Airport Road and Wilcox Road. This intersection currently has hazardous shoulder areas, as shown in the picture at right.

Current hazardous shoulder conditions on Old Airport and Wilcox Roads.

Recommendations

- Pave shoulder areas at the intersection and remove steep drop-offs at the edge of the roadway.
- Perform regular maintenance to clear debris from the paved shoulder area.
- Stripe a stop bar in advance of the intersection on Wilcox Road.
- Post high-visibility bicycle crossing warning signs in advance of the intersection.
- In the future, pave new shoulders on the entire length of Wilcox Road and Old Airport Road.

Chapter 3 – Facility Opportunities and Guidelines

Chapter 3 seeks to build on the existing conditions outlined in **Chapter 2** by identifying options for the future bicycle system. This section discusses bicycle opportunities and focus areas, facility planning and design guidelines, and ancillary facilities and projects.

Bicycle Focus Areas

One objective of this plan is to fulfill the needs of special segments of the population that require bicycling for more than just recreational activity. Captive riders are those who have few transportation options and often turn to modes such as biking or walking for utilitarian purposes. Using U.S. Census 2000 data, the percentage of households owning one vehicle or no vehicle at all was examined within New Bern's extra-territorial jurisdiction. This information is shown in **Figure 3.1.** Many residents in Downtown New Bern, in the James City area, and between US 70 and Neuse Boulevard may be without easy access to a car. This portion of the population must turn to other modes of travel to complete errands and commute to work or school. As a result, an improved bicycle infrastructure would be beneficial to people with limited access to cars.

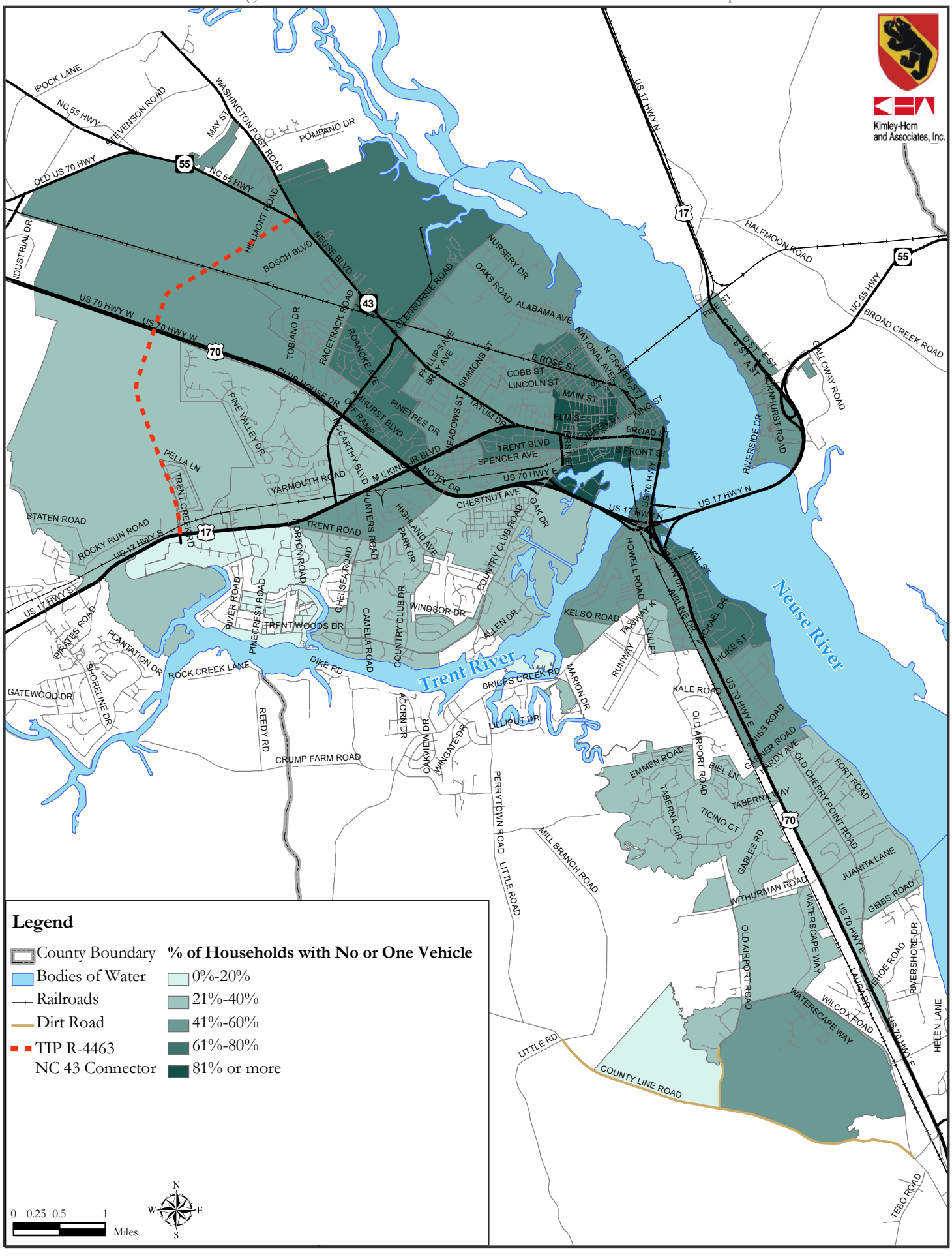
This plan considers connections with shopping areas, municipal buildings, libraries, parks, recreation areas and community centers, and the many schools and colleges in the area — in other words, some of the major destinations in New Bern. A map of these locations is shown in **Figure 3.2**. Connections with the waterfront and downtown areas are also considerations of this plan. The development of a bicycle route system heavily favors the connection of these facilities so that the bicycle routes link citizens with places they want to go.

Trip origins and destinations were investigated as a part of the *New Bern Bicycle Planning Survey*. Many of the connections that respondents desired included natural destination points such as those shown in **Figure 3.2**. Many people sought connections between these destination points and neighborhoods, while a smaller but significant number of respondents desired longer-distance connections between cities, counties, and state routes.

Bicycling Opportunities

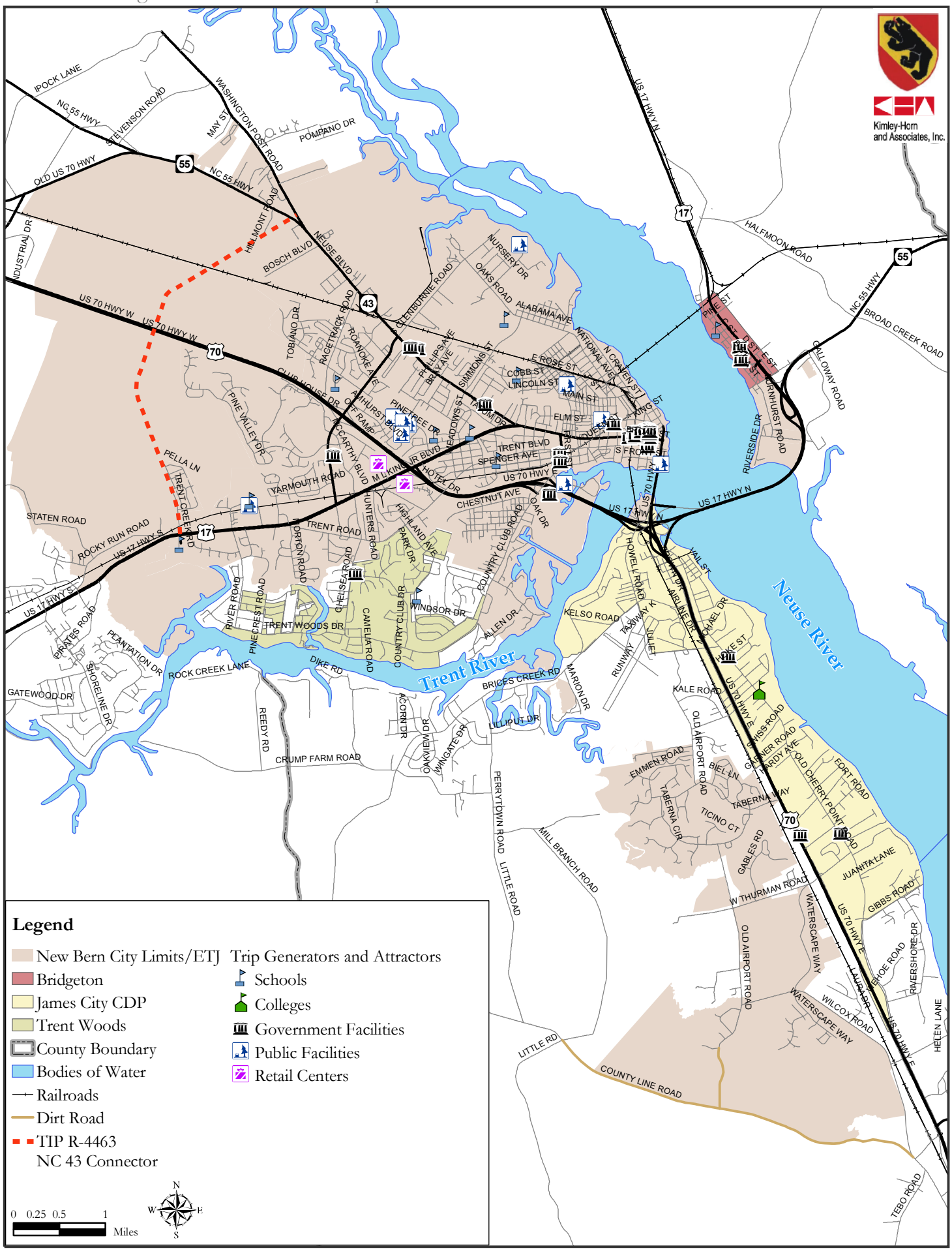
Currently, no bicycle projects are planned for the New Bern area. New Bern has one roadway project, however, in the 2006-2012 State Transportation Improvement Program, or TIP. This project, termed the NC 43 Connector and labeled R-4463, connects NC 43-55 to US 17 and will have an interchange at US 70. Because this facility is intended only to be limited access, there will be no opportunities for bicycling on the road itself. Connecting bicycle routes, however, is feasible as a result of the project providing connections with two major roads and as a result of establishing cross-access across the project. This project has partial funding allocated in the 2006-2012 TIP.

Figure 3.1 - Vehicle Ownership



New Bern Bicycle Plan

Figure 3.2 - Trip Generators and Attractors

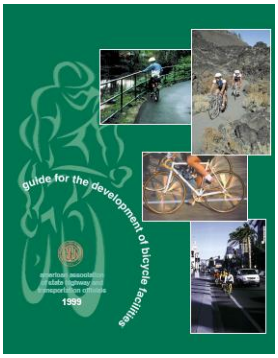


The New Bern Urban Design Plan 2000 outlines several recommendations for improvement. One of these recommendations is to perform a streetscape project on Broad Street. This project is slated to begin in 2007 and is locally funded. This project will consist of three parts. Broad Street from First Street to Queen Street is recommended to become four lanes with a median and enhanced sidewalks. The segment from Fleet Street to Hancock Street is recommended to undergo a "road diet", reducing it to two lanes with a median and on-street parking. From Hancock Street to Front Street, Broad Street is currently two lanes with a median. There may be an opportunity to consider the incorporation of bicycle lanes or other bicycle facilities as a part of this improvement.

Bicycle Facility Design Guidelines

All new and reconstructed roadways in New Bern should be designed to accommodate bicycles[1]. While each roadway construction, paving, or striping project must be appropriate for the topography and land use of the corridor, the guidelines in this section should be utilized as a blueprint for incorporating bicycle facilities in roadway corridors.

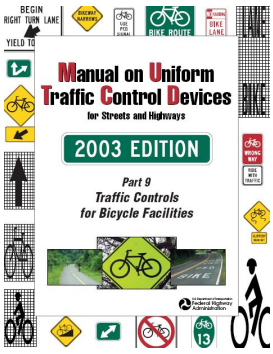
To develop recommended bicycle design standards for the City of New Bern, the Study Team reviewed several existing documents The review included the *AASHTO Guide for the Development of Bicycle Facilities*[2], the *Manual on Uniform Traffic Control Devices*[3], and the *North Carolina Bicycle Facilities Planning and Design Guidelines*[4].



Existing Design Guideline Documents

The section below summarizes the three main bicycle design guideline documents that were reviewed for this plan.

AASHTO *Guide for the Development of Bicycle Facilities.* Referred to as the *Bicycle Guide*, this is a federal document which sets forth the current design practices accepted by FHWA. This document discusses planning, design, operations, and maintenance issues associated with bicycle facilities. With respect to design, it addresses width dimensions, grades, cross slopes, radii, acceleration rates, deceleration rates and sight distances. The AASHTO *Bicycle Guide* is not intended to establish strict standards. It provides "sound guidelines that are valuable in attaining good design sensitive to the needs of both bicyclists and other highway users" (p. 2). It does, however, establish minimum guidelines for many treatments.



FHWA *Manual on Uniform Traffic Control Devices (MUTCD).* Unlike

[1] With the exception of freeways/expressways where bicycles are prohibited. In these situations, bicycles should be accommodated on a multi-use path or another parallel route nearby.

[2] *AASHTO Guide for the Development of Bicycle Facilities*, American Association of State Highway and Transportation Officials, Washington, DC, 1999.
[3] *Manual on Uniform Traffic Control Devices*, FHWA, Washington, DC, 2003.
[4] *North Carolina Bicycle Facilities Planning and Design Guidelines*, NCDOT, 1994.

the AASHTO *Bicycle Guide*¸ the *MUTCD* does constitute a standard. Failure to comply with the *MUTCD* can result in being denied federal funds and opens up non-compliant jurisdictions to additional liability in the event of a crash. The *MUTCD* addresses standards for signing, striping, markings, signals, islands, and traffic work zone devices (e.g., cones and barricades). It provides information on what symbols may be used on signs and when sign text can vary from the signs provided. The color, width, types, and applications of striping are defined in detail. It also provides dimensions and shapes of pavement markings and pavement lettering. All bicycle signage and lane markings should follow the guidelines and regulations outlined in the MUTCD. **Figure 3.3** contains some symbols from the MUTCD. See http://mutcd.fhwa.dot.gov/ for additional information.

North Carolina Bicycle Facility Planning and Design Guidelines. Design standards and guidelines for developing bicycle facility projects in North Carolina are provided in the *North Carolina Bicycle Facility Planning and Design Guidelines*. This document seeks to clarify specific aspects of standards that should be used when designing bicycle facilities. These standards apply to roads within the federal aid system and are consistent with the AASHTO guidelines. Demonstration projects outside the scope of the North Carolina guidelines can be undertaken on municipal streets.

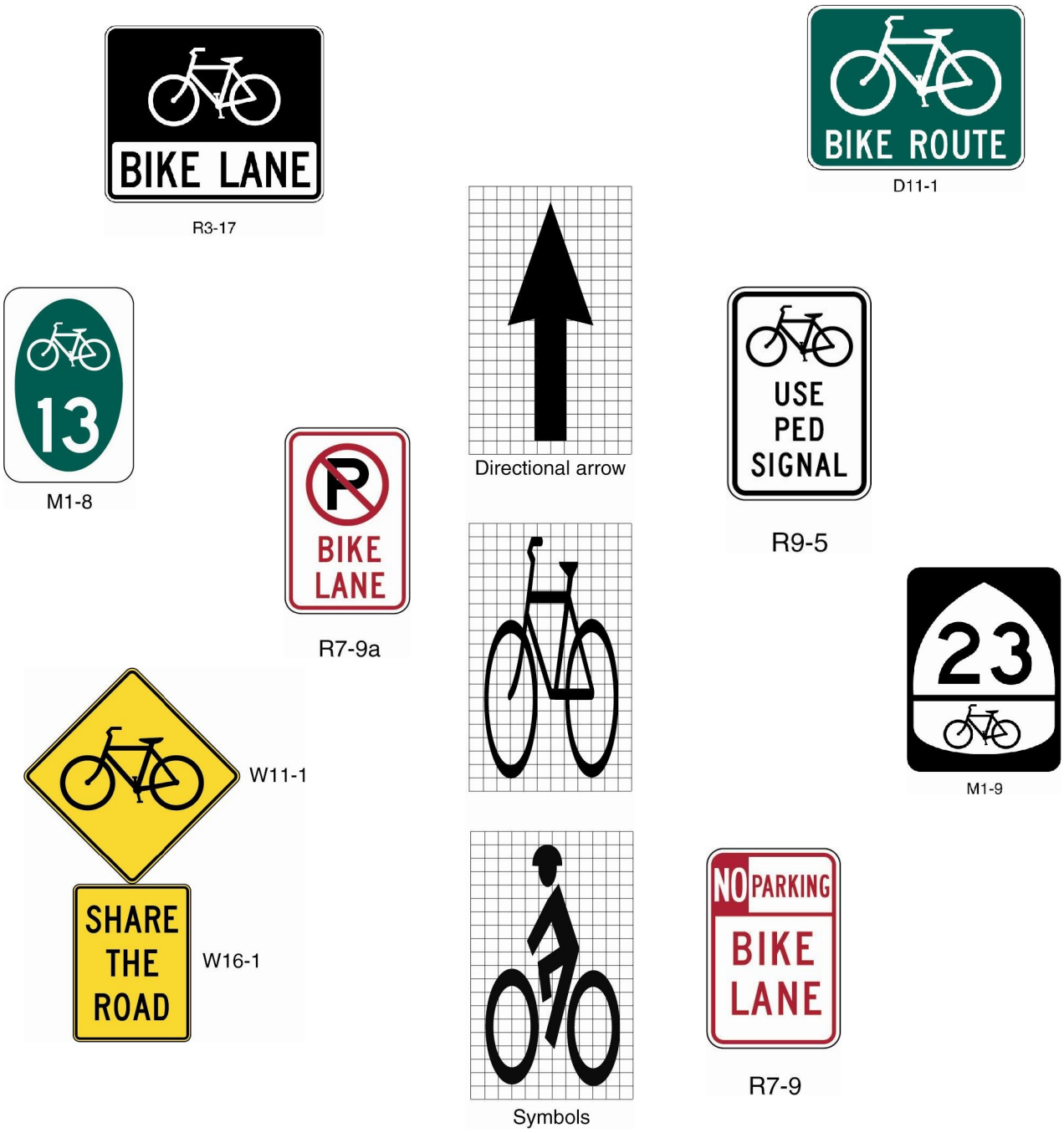
Designing Roadways for Bicyclists

It is important for roadway designers to understand how roadway and traffic characteristics affect bicyclists. Several research studies have suggested factors that influence bicyclist safety and comfort when riding on a roadway segment[5,6,7,8]. These factors include:

- Effective width of the roadway, which includes the width of the outside lane and paved shoulder/bike lane space
- Presence of a bike lane or paved shoulder
- Motor vehicle traffic volumes on the roadway
- Traffic from intersecting roadways/driveways
- Speed of the traffic on the roadway
- Percent heavy vehicles on the roadway
- On-street parking
- Pavement surface condition

[5] Landis, Bruce W., The Bicycle Interaction Hazard Score: A Theoretical Model. *Transportation Research Record 1438*, TRB, Washington, DC, 1994.
[6] Sorton, Alex. Bicycle Stress Level as a Tool to Evaluate Urban and Suburban Bicycle Compatibility. *Transportation Research Record 1438*, TRB, Washington, DC, 1994.
[7] Epperson, Bruce. Evaluating Suitability of Roadways for Bicycle Use: Toward a Cycling Level-of-Service Standard. *Transportation Research Record 1438*, TRB, National Research Council, Washington, D.C. 1994.
[8] Davis, Jeff. *Bicycle Safety Evaluation*. Auburn University, 1987.

Figure 3.3 MUTCD Signage Examples



In the late 1990s, groundbreaking research was performed to quantify the influence of each of these factors on the perceptions of bicyclists. One research study had bicyclists rate the characteristics of roadways in the field[9]; another had bicyclists rate roadway segments from video clips[10]. The former study resulted in the Bicycle Level of Service Model, and the latter resulted in the Bicycle Compatibility Index. All of the factors listed above were found to influence bicyclist comfort.

Both studies identified lateral separation between bicyclists and motor vehicles as one of the most significant factors influencing bicyclist comfort levels. The studies found that bicyclists preferred having wider pavement space to ride on. Further, both studies found that most bicyclists prefer having a shoulder or bike lane stripe provided on roadway segments when compared to the same pavement width without a stripe. In addition, a third study found that motorists give bicyclists more lateral space when bike lanes are striped[11]. These are particularly important findings because bicycle lanes and shoulders can be incorporated during roadway design.

These studies provide the background behind the recommendations to provide bicycle lanes and paved shoulders as preferred bicycle facilities in New Bern.

[9] Landis, Bruce W., et al. Real-Time Human Perceptions: Towards a Bicycle Level of Service, *Transportation Research Record 1578*, TRB, Washington, DC, 1996.
[10] Harkey, D.L., et al. Development of the Bicycle Compatibility Index: A Level of Service Concept: Final Report, Report No. FHWA-RD-98-072, Federal Highway Administration, Washington, DC, August 1998.
[11] Hunter, William W., et al. A Comparative Analysis of Bicycle Lanes Versus Wide Curb Lanes: Final Report, Federal Highway Administration, FHWA-RD-99-034, December 1999.

Guidelines for Specific Facilities

This section describes the types of bicycle facilities that should be incorporated into roadway projects in the City of New Bern.

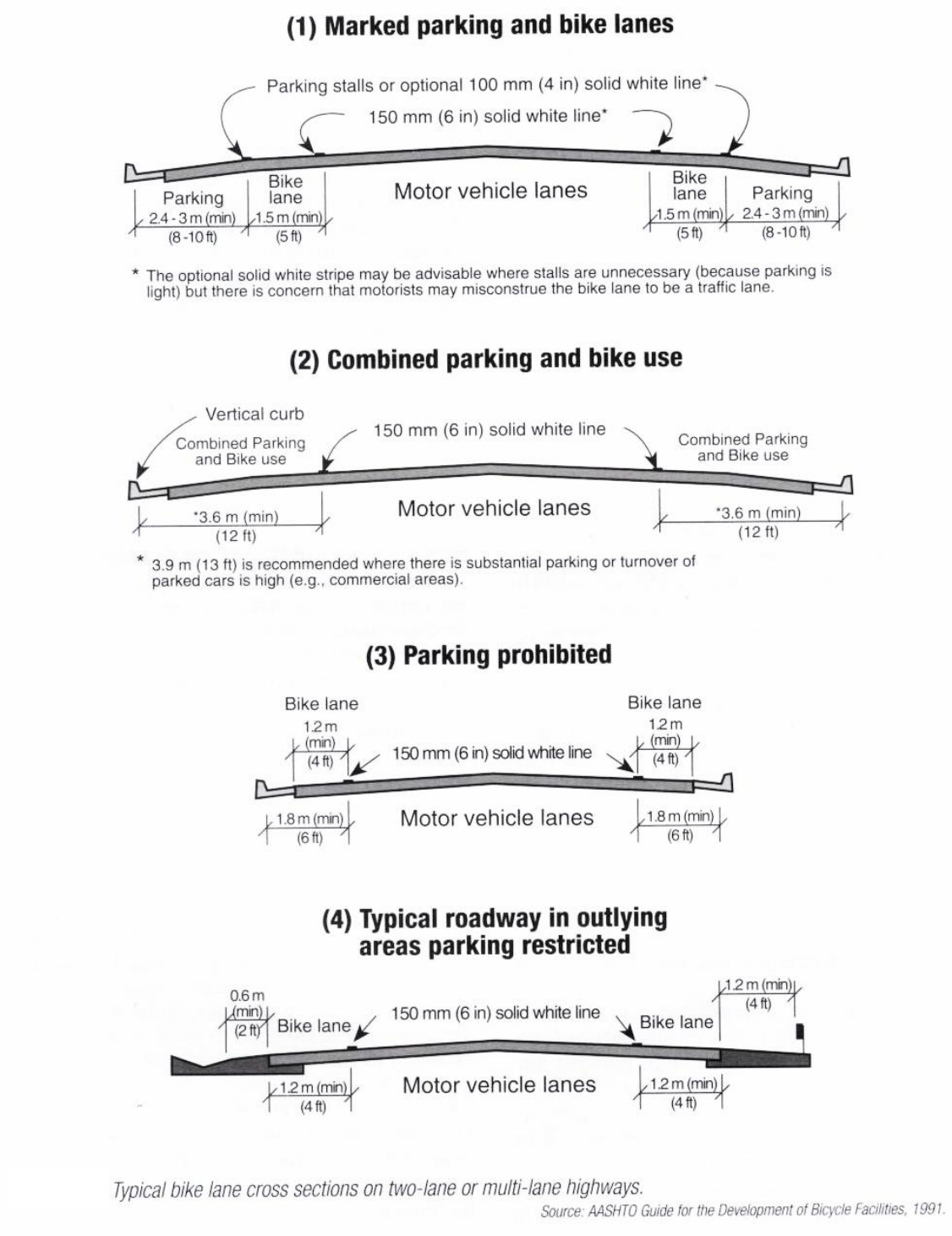
Bicycle Lanes

A bike lane is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. Bike lanes are always located on both sides of the road (except one way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. The minimum width for a bicycle lane is 4 feet; 5- and 6-foot wide bike lanes are typical for collector and arterial roads. Increasing the width of bike lanes provides greater comfort for bicyclists.

The AASHTO *Guide for the Development of Bicycle Facilities* states, "[Bike lanes may be provided] by reducing the width of vehicular lanes or prohibiting parking…" (p. 8). **Figure 3.4**, taken from the North Carolina Bicycle Planning and Design Guidelines (adapted from the AASHTO *Bicycle Guide)*, specifies widths for bike lanes.

NCDOT recommends that bicycle lanes be considered for a roadway based on the demand, connectivity of origin and destination points, surrounding land uses, traffic and geometric conditions, and presence of other route alternatives.

Figure 3.4 Typical Bike Lane Cross-Sections



Typical bike lane cross sections on two-lane or multi-lane highways.

Source: AASHTO Guide for the Development of Bicycle Facilities, 1991.

Paved Shoulders

Paved shoulder space improves the safety and comfort of bicyclists. There is no minimum width for paved shoulders; however, a width of 4 feet is preferred. Even wider shoulders provide greater levels of bicyclist safety and comfort. On many roadways, motor vehicle travel lanes can be narrowed to provide more shoulder space. According to the AASHTO *Bicycle Guide*, "where 4-foot widths cannot be achieved, any additional shoulder width is better than none at all." Facilities striped and signed specifically as paved shoulder bicycle facilities must have a width of at least 4 feet. Paved shoulders improve safety for motor vehicles, prevent pavement damage to the travel lanes, and provide space for pedestrians[12].

While unmarked paved shoulders are generally acceptable for roadway sections without frequent intersections, on those where intersections are frequent, appropriate bike lane marking should be applied.

Wide Curb Lanes

Wide curb lanes (typically 14-feet wide) are used to provide extra space for bicyclists. While wide curb lanes are an effective way to encourage motorists to give cyclists adequate clearance when passing, they are largely unrecognized by casual cyclists as bike facilities. As noted in the research studies above, having a striped bike lane greatly improves cyclists' feelings of safety and comfort. In communities like New Bern that want to significantly increase the number of people riding bicycles, it is strongly recommended that a program to create striped bike lanes be adopted, rather than wide outside lanes. In other words, whenever feasible, striped bike lanes are preferred over wide outside lanes. Wide outside lanes are acceptable when striped lanes are not feasible. These lanes may be the preferable alternative in areas with heavy strip development or with numerous driveway cuts in order to provide bicyclists with an additional comfort level without the untwanted interactions between striped bicycle lanes and driveway and turning movements.

Shared Roadways

Shared roadways are streets and roads where bicyclists can be served by sharing the travel lanes with motor vehicles. Usually, these are streets with low traffic volumes and/or low speeds, which do not need special bicycle accommodations in order to be bicycle-friendly.

Multi-Use Paths on Independent Alignments

Multi-use paths (or shared use trails) are becoming quite popular, not only with bicyclists, but with many non-motorized transportation device users across the country. They can provide a high-quality bicycling experience in an environment that is protected from motor vehicle traffic because they are constructed in their own corridor, often within open-space area. Multi-use paths can be paved and should be a minimum of 10-feet wide. Twelve feet is preferred where heavy usage is anticipated. Multi-use paths may be reduced to eight feet if there are physical or right-of-way constraints.

[12] In addition, AASHTO's *Guide for Achieving Flexibility in Highway Design* (2004) states, "Paving part or all of the shoulder…helps reduce crash rates…and helps to facilitate use of the road by bicyclists. Shoulder paving also reduces maintenance requirements….Where a 'full width' shoulder cannot be achieved, the designer should strive to provide as wide a shoulder as possible that meets functional requirements" (p. 66).

Multi-use paths are, in effect, little roads and should be designed as such. This means there are clearance requirements, minimum radii, stopping sight distance requirements and other criteria just as there are for roadways. Additionally, designers must comply with the *MUTCD* and AASHTO *Bicycle Guide* when designing these facilities.

Though paths should be thought of as roadways for geometric and operational design purposes, they require much more consideration of amenities than do roadways. Shade and rest areas with benches and water sources should be designed along multi-use paths. Where possible, vistas should be preserved. Way finding signs (how far to the library or the next rest area or directions to restrooms) are important for non-motorized users. These types of design considerations can help make a multi-use path more attractive to potential users.

Sidepaths/Wide Sidewalks

A sidepath is essentially a multi-use path that is oriented alongside a road but is separate from the road. The *AASHTO Guide to the Development of Bicycle Facilities* and *North Carolina Bicycle Facilities Planning and Design Guidelines* strongly caution those contemplating a sidepath (or wide sidewalk) facility to investigate various elements of the roadway corridor environment and right-of-way before making a decision. AASHTO provides nine cautions/criteria (pp. 34-35) for designing sidepaths.

In addition to AASHTO's cautions, research from the US and abroad confirm that bicycle/motor vehicle crash rates are higher for bicyclists riding on a sidepath than on a roadway.[13,14,15,16,17] Consequently, designers are advised to be very careful when choosing to design sidepaths.

There are some high-volume, high-speed roadways where sidepaths are the only bicycle facility that can be provided without very costly changes to the roadway corridor. In these cases, it may be preferable to provide a sidepath. This decision must consider the magnitude of intersecting driveway and roadway conflicts. In addition, sidepaths should be provided on both sides of the roadway if possible to encourage bicyclists to ride in the same direction as adjacent traffic. Finally, the long-term strategy on these roadways should be to widen the road or narrow the lanes to provide additional space for bicyclists in on-road bike lanes or shoulders.

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[13] Kaplan, J. *Characteristics of the Regular Adult Bicycle User*. FHWA, U.S. Department of Transportation, 1975.

[14] Moritz, W. Adult Bicyclists in the United States - Characteristics and Riding Experience in 1996. *Transportation Research Record: Journal of the Transportation Research Board, 1636,* TRB, National Research Council, Washington, DC, 1998

[15] Wachtel, A. and D. Lewiston. Risk Factors for Bicycle-Motor Vehicle Collisions at Intersections. *ITE Journal*, September, 1994.

[16] Räsänen, M. *How to decrease the number of bicycle accidents? A research based on accidents studied by road accident investigation teams and planning guides of four cities.* Finnish Motor Insurer's Centre, Traffic Safety Committee of Insurance Companies. VALT. Finland, 1995.

[17] Summala, H., E. Pasanen, M. Räsänen, and J. Sievänen, J. Bicycle Accidents and Drivers' Visual Search at Left and Right Turns. *Accident Analysis and Prevention*. Elsevier Science Ltd., 1996/03, 28(2), pp.147-53, 1996.

One recently completed research study suggests that there may be ways to mitigate some of the safety risks associated with sidepaths.[18] To greatly simplify the results of this research, it finds that crashes occur less often when the speed of the trail user is reduced. This means some sort of "traffic calming" treatment for the trail may be appropriate at intersections. At signalized intersections, it is best to treat the path roadway crossings as crosswalks, bringing the pathway close to the adjacent roadway so its signals can be incorporated into the overall signalization plan. Additional treatments to the typical pedestrian heads may be desirable at these intersections. The most significant of these supplemental treatments is the blank out sign. NO RIGHT ON RED or YIELD TO PEDS IN CROSSWALK signage may increase motorist awareness of individuals riding (or walking) in the crosswalks.

At unsignalized intersections it is best to move the sidepath out of the area of the side street intersection with the adjacent roadway. This allows motorists to deal with one intersection at a time. Additionally, bicyclists are only required to scan in two directions.

[18] Petritsch, Landis, Huang, Challa. *Sidepath Safety Model - Bicycle Sidepath Design Factors Affecting Crash Rates*, submitted to TRB for publication, July 2005.

Signed Bicycle Routes

Signed routes will be an integral part of the bicycling network in New Bern. These facilities are an inexpensive way to guide riders to more bicycle-friendly roads. They can be used with any of the facilities listed above, including roads with bicycle lanes, shared roadways, and multi-use paths. The traffic and geometry of a road are important considerations when determining the location of a signed route. In addition, the functionality of the route for the purpose it was intended (e.g. scenic route or utilitarian connector) is a necessary component in the decision-making process.

BIKE ROUTE signing (M1-8, D11-1, or M1-9 signs with D1-1b or M7-1 through M7-7 subplates) is another treatment which can be implemented to improve conditions for bicyclists. BIKE ROUTE signs help guide bicyclists to preferred routes – roads with lower motor vehicle traffic speeds, fewer trucks, or lower volumes. Typically they are supplemented with destination and distance signing.

Special signs should be designed to guide bicyclists along the recommended Riverfront Route. These signs should incorporate their own colors and logo so that they can be recognized easily and help advertise the route to potential bicyclists. These signs can be used on municipal roads.

SHARE THE ROAD signs (W11-1 warning sign with W16-1 subplate) can be used along bicycle routes to alert drivers to the presence of bicyclists. These signs are not used to designate bicycle routes. They are typically considered when one or more of the following

criteria are met:

- Safety problems exist and the roadway cannot be improved with bicycle lanes
- Bicycling volumes are high
- A conflict or obvious courtesy problem exists between motor vehicle and bicycle traffic sharing the road

Other Bicycle Facilities and Amenities

The *North Carolina Bicycle Facility Planning and Design Guidelines* also provide design considerations and recommendations for other types of ancillary bicycle facilities and amenities. These items, such as bike racks, bikes on buses, and bike-friendly drainage grates and railroad crossings help to complete the bicycle system by eliminating barriers and providing security. In addition, the guidelines also discuss the maintenance of bicycle facilities, which is essential for the continued safe travel of bicyclists. Ancillary bicycle facilities and amenities are discussed in a subsequent section.

Recommendations for Incorporating Bicycle Facilities

When feasible, all new collector and arterial roadways in New Bern should include bicycle lanes when they are constructed. New construction is the easiest and most cost-effective opportunity to include bicycle facilities because they can be integrated as a part of a larger roadway project.

When collector and arterial roadways are resurfaced or reconstructed, the City of New Bern should evaluate the roadway cross-section to identify opportunities for bicycle facilities. This evaluation should consider how much motor vehicle travel lane width can be re-allocated and used for bike lane or shoulder space, given the lane configuration, traffic volumes, and traffic composition of the roadway. Two types of modifications should be considered to provide additional pavement width for bicycling: striping narrower lanes and/or removing travel lanes on roads with excess capacity. Reconfiguring a roadway during a reconstruction project is also more cost-effective than adding shoulders or restriping lanes as an independent retrofit project.

Neighborhood streets and rural roadways with low traffic volumes may be suitable for bicycling as shared roadways (e.g., special bicycle facilities are not needed).

Recommended Changes to New Bern Street and Sidewalk Standards

Land development and redevelopment projects are excellent opportunities to improve conditions for bicycling in New Bern. The City can ensure that bicycle facilities are provided as a part of development projects by updating its municipal code. For example, the current code states that shoulders (minimum 6-foot width) must be provided on all arterial and collector roadways constructed without curb and gutter.

This plan recommends several revisions to the New Bern municipal code.

Article XIV: Streets and Sidewalks

- Require bicycle lanes to be provided on all roadways classified as arterials
- Require bicycle lanes to be provided on all roadways classified as collectors
- Remove the statement that encourages cul-de-sacs (this development pattern increases the total distance that people need to bicycle, walk, and drive to reach destinations)

Article XVIII: Parking

- Add minimum bicycle parking space requirements for different types of land uses

Sample Cross-Sections

A set of sample cross-sections has been developed to reflect road treatments for specific bicycle recommendations. These cross-sections can be adapted to correspond to different road conditions and attributes as necessary. **Figure 3.5** corresponds to a cross-section with striped bike lanes. **Figure 3.6** corresponds to a cross-section with striped bike lanes and parking. **Figure 3.7** denotes a cross-section that has used differential striping to obtain wide outside lanes. **Figure 3.8** shows a cross-section containing a multi-use path on one side of the road.

Roadway Intersections

Intersections should be designed with a balanced level of accommodation for all modes, including pedestrians, bicyclists, motor vehicle traffic, and public transit. Narrow intersections decrease crossing distances for all users, including bicyclists. Narrower intersections can have a shorter traffic signal cycle length than wide intersections (when the intersection is signalized) and are safer for pedestrians and bicyclists, in general.

Special care must be given to bike lane design at intersections. Since intersections represent significant conflict points for bicyclists, appropriate striping, marking, and signing is critical to help ensure the proper behavior of cyclists and motorists.

When designing bike lanes at intersections, the City of New Bern should follow examples in the Pedestrian and Bicycle Information Center's *Bike Lane Design Guide*, which can be downloaded at www.bicyclinginfo.org/de/bikelaneguide.htm.

This document is a summary of the *Chicago Bike Lane Design Manual*. Four example intersection striping treatments are provided at the end of this section.

Signal Loops. Bicyclists frequently have trouble being detected at traffic signals. They often believe the signals are non-responsive and consequently run red lights. However, most traffic signal loops designed for motorists can detect bicyclists if the cyclists know where to place their bicycle. One effective way to address this problem is to mark the location on the pavement where a cyclist would have to stop the bike to be detected by a traffic signal. The sign pictured here and the symbol it shows have been tested for cyclist understanding and are being considered for future updates to *MUTCD*. To implement them before they are included in the *MUTCD* on federal or state-maintained roads would require a request to experiment be filed with FHWA. Another alternative would be to implement these loops as demonstration projects on municipal streets

Specific signal loops for bike lanes (or multi-use paths) can also serve to improve cycling conditions. A typical treatment is a quadrapole loop with overall dimensions of 2 feet by 20 feet.

Figure 3.5 Striped Bike Lanes Cross-Section

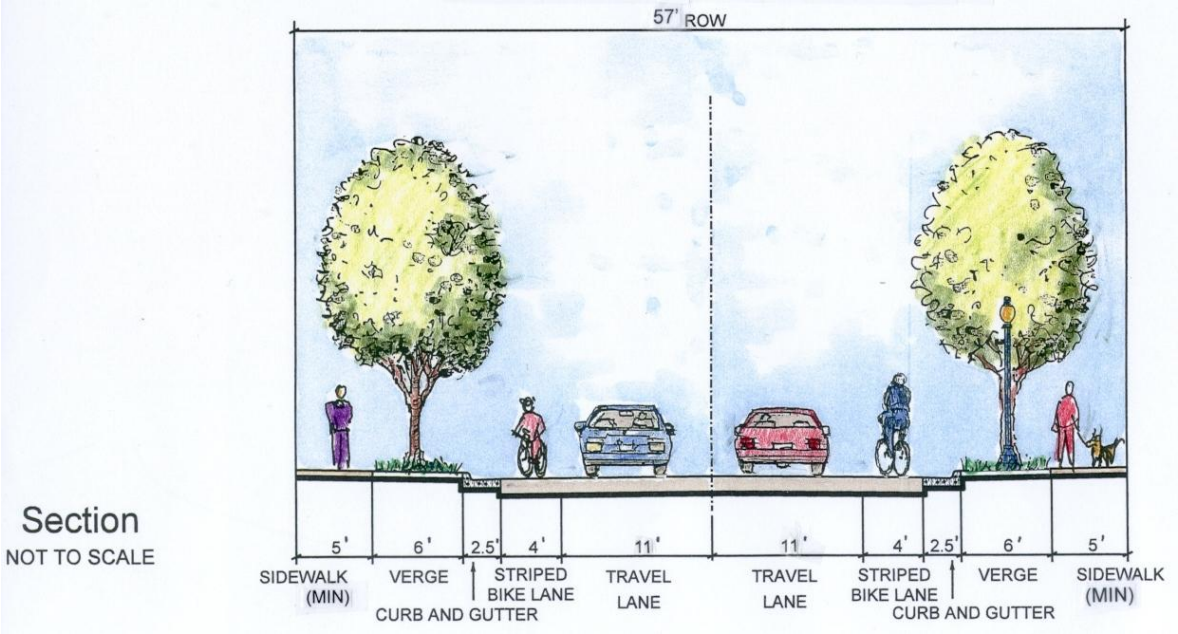


Figure 3.6 Striped Bike Lanes and Parking Cross-Section

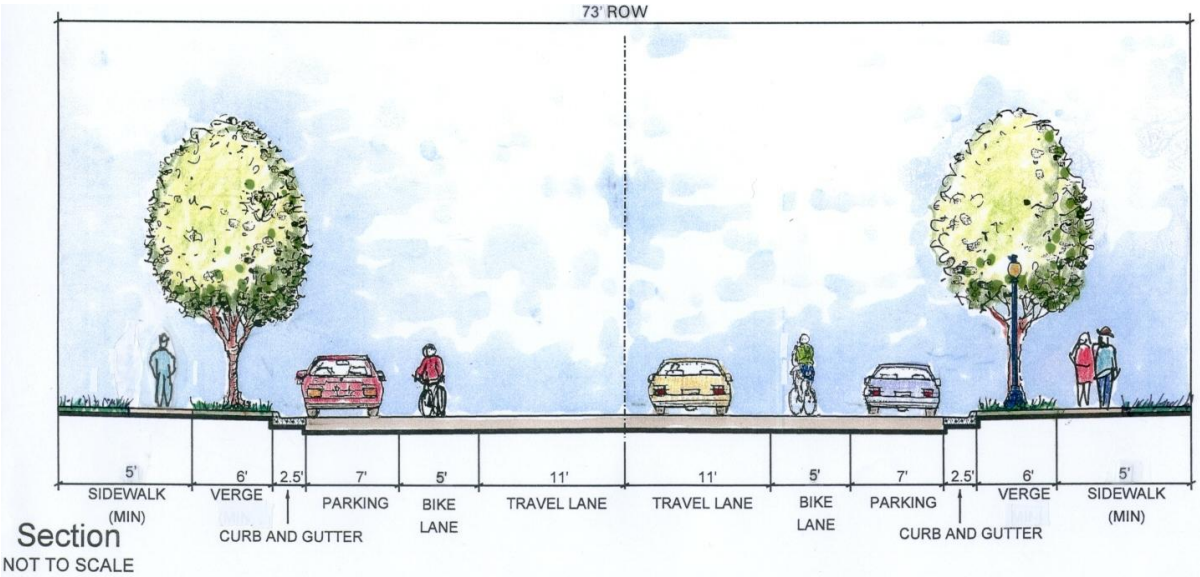


Figure 3.7 Wide Outside Lanes Cross-Section

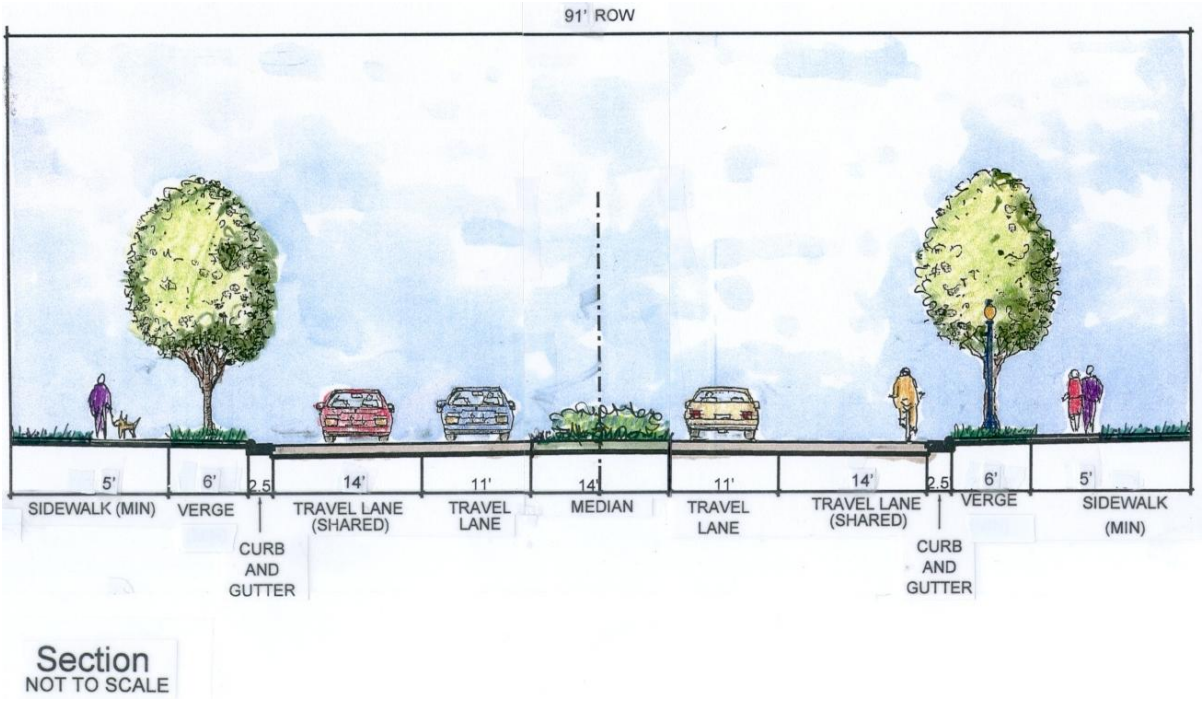
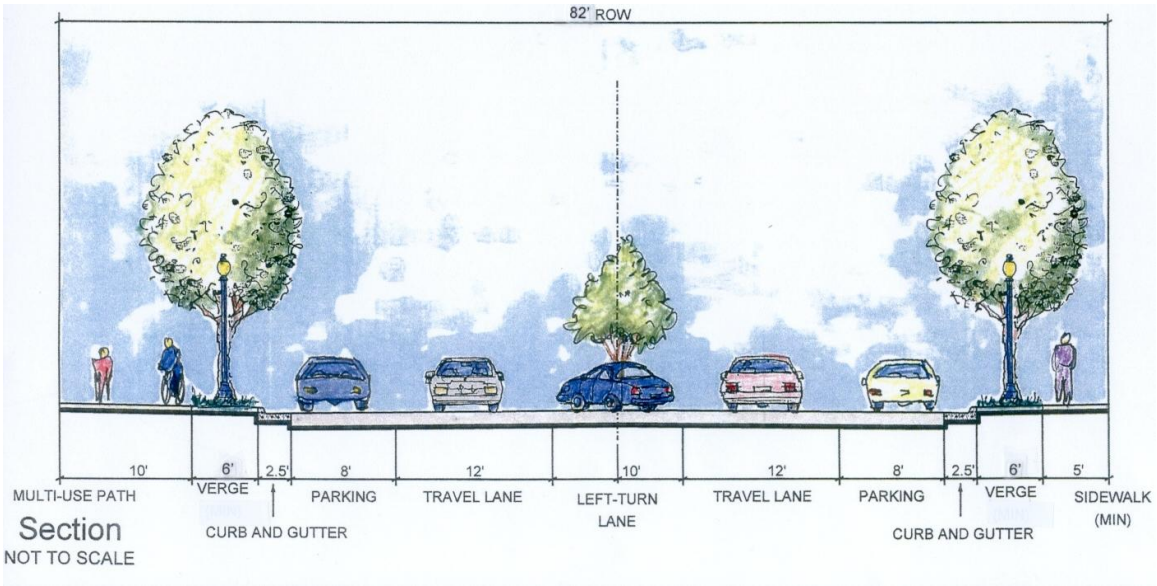
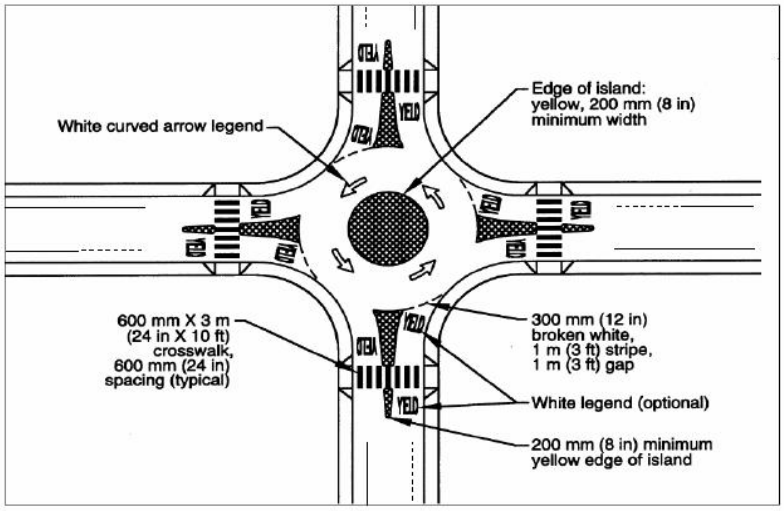


Figure 3.8 Sidepath Cross-Section



Roundabouts. Bicycles fare well at urban compact roundabouts. With low design speeds, minimized conflict areas, and yield upon entry traffic control, well-designed urban compact roundabouts are convenient and safe for bicyclists. The approaches to roundabouts should be treated just as any other unsignalized intersection: the bike lanes should be terminated prior to the roundabout, and cyclists should be allowed to claim the lane in the circulating roadway. An example drawing of this treatment, from the FHWA design guide[19] (with a modification to show approach bike lanes) is shown in **Figures 3.9** and **3.10**.

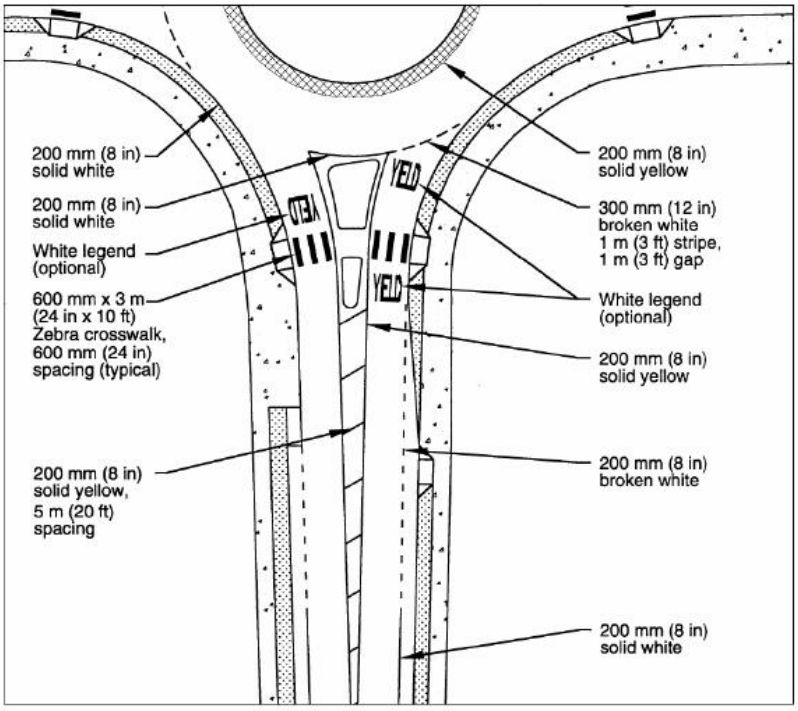
Figure 3.9 Roundabout with Bicycle Accommodations



Roundabouts: An Informational Guide FHWA-RD-00-67, June 2000 (modified)

It should be noted that the MUTCD states, "Bicycle lanes shall not be provided on the circular roadway of a roundabout intersection." This statement is made as a STANDARD and is thus not to be violated. At roundabouts, such as the examples shown in **Figures 3.9** and **3.10**, bicyclists should be given a choice to either claim the lane and ride through the circulating roadway, or to move to a widened sidewalk and traverse the roundabout as pedestrians.

Figure 3.10 Roundabout Detail with Bicycle Accommodations

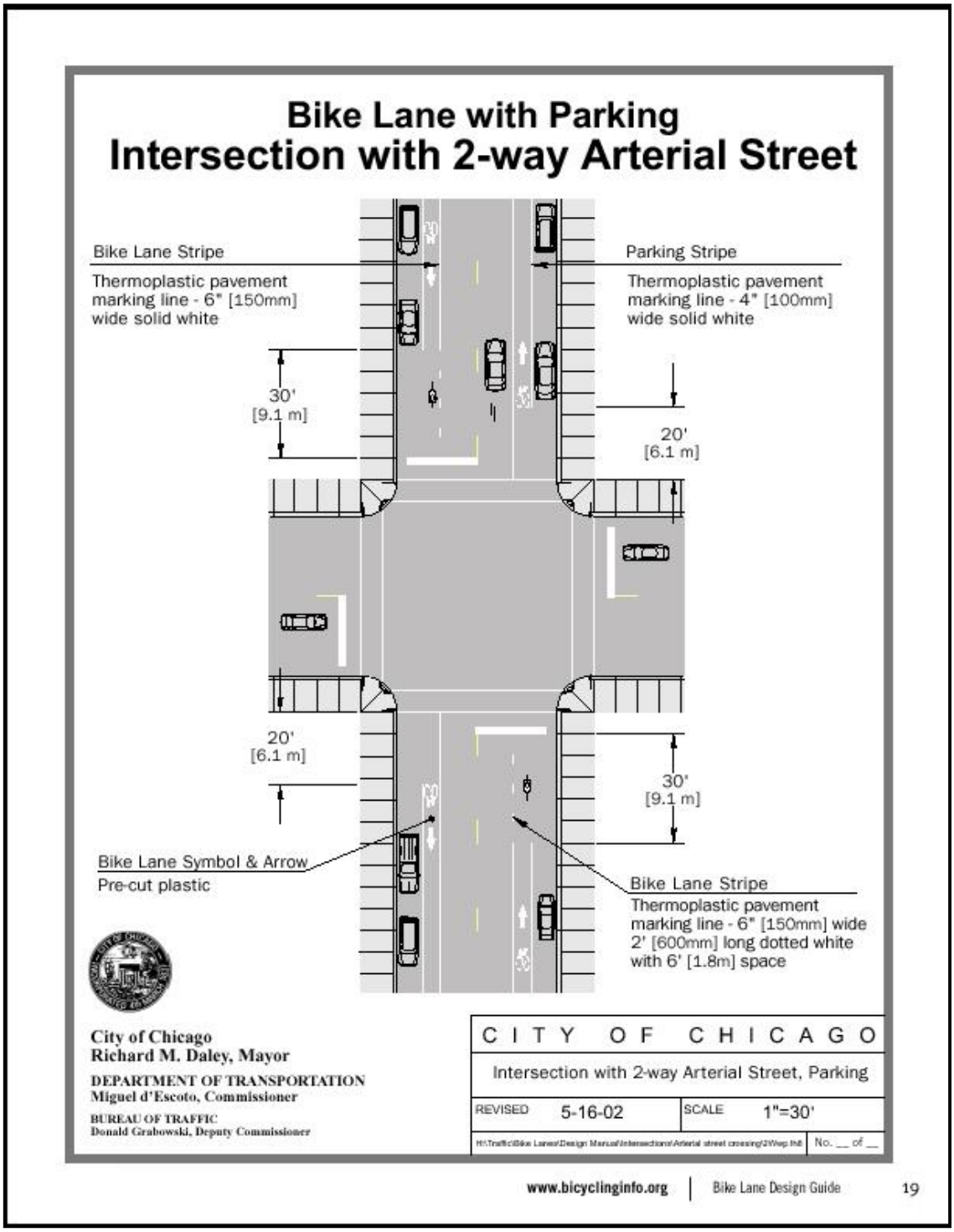


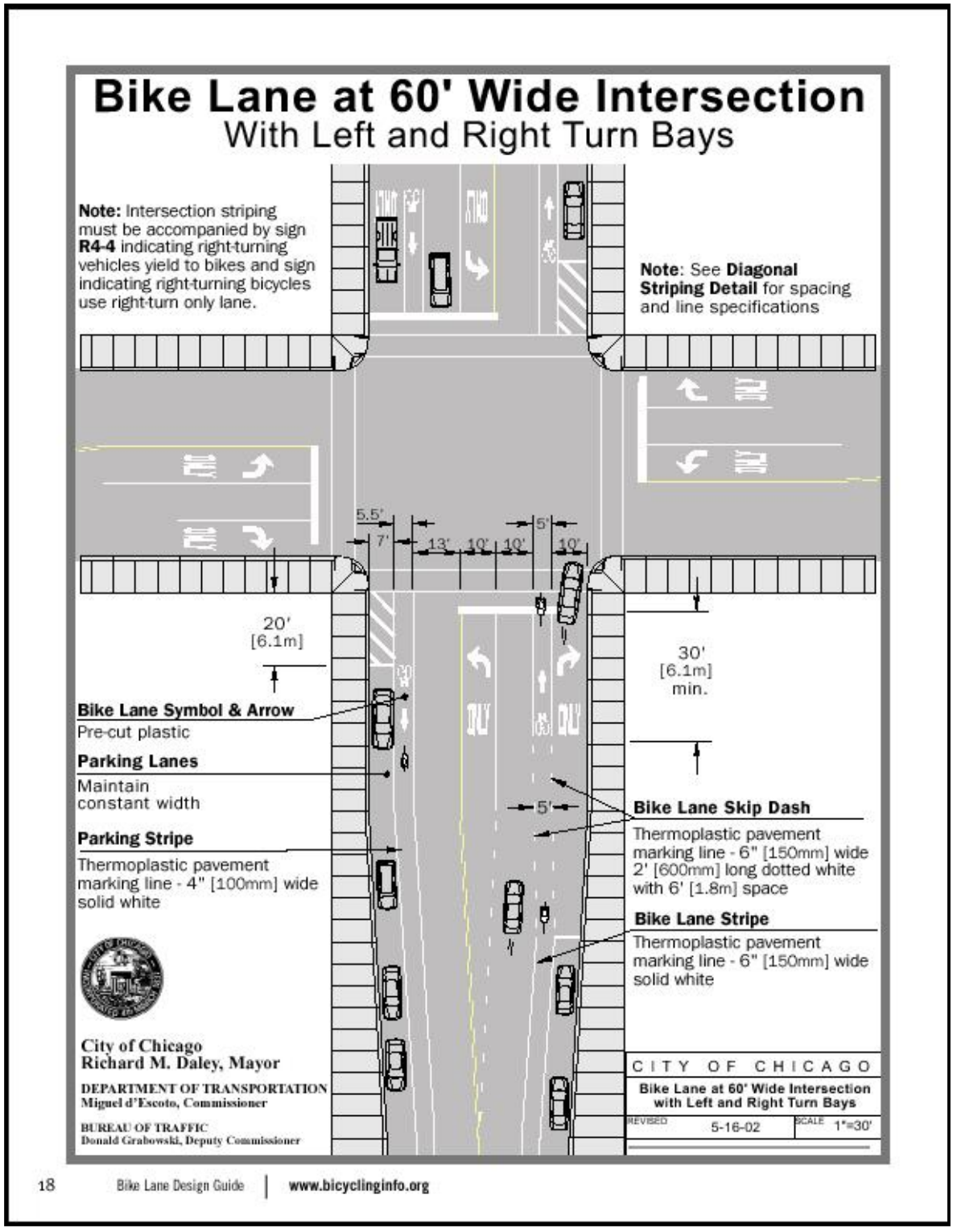
Roundabouts: An Informational Guide FHWA-RD-00-67, June 2000

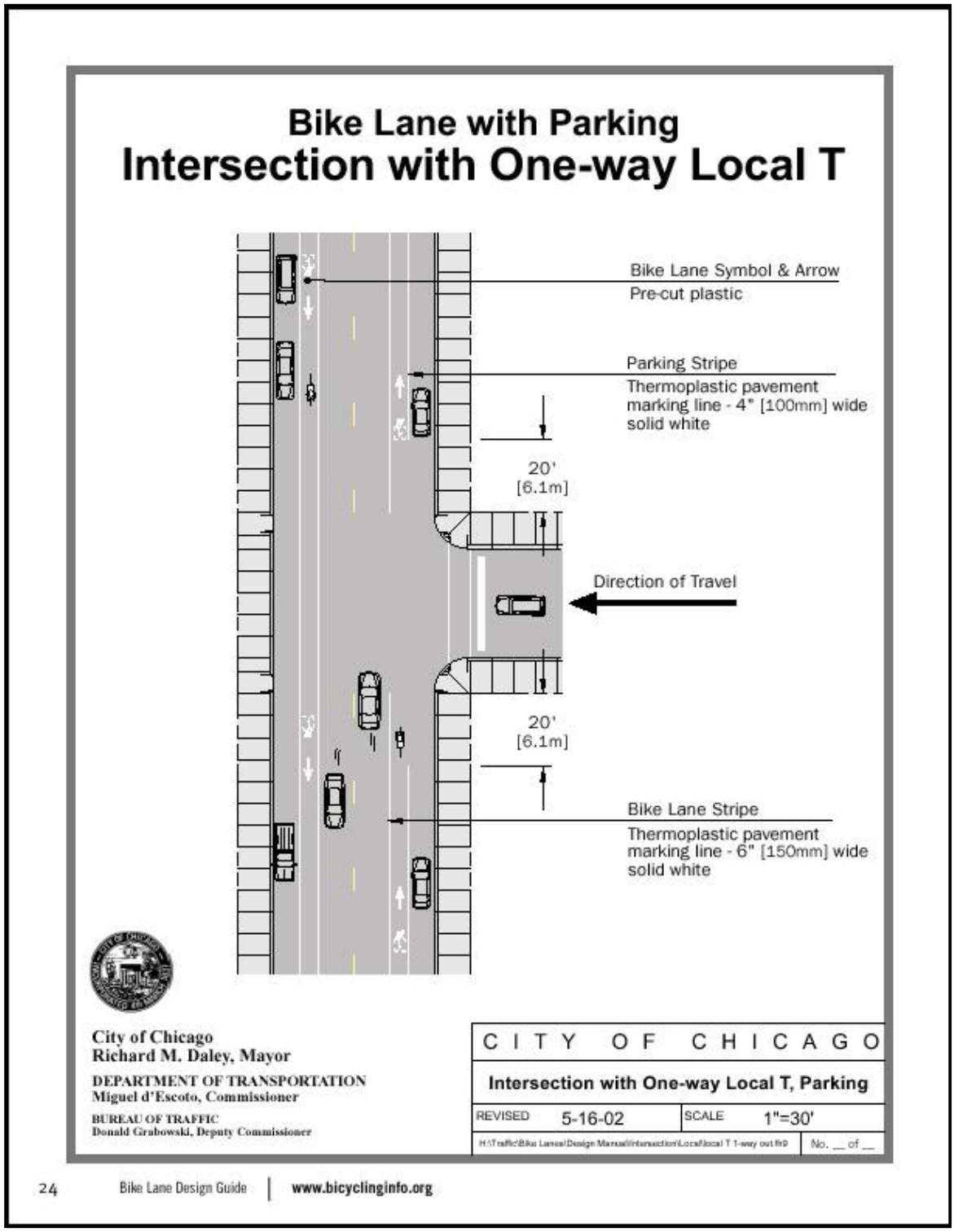
[19] FHWA, Roundabouts: An Informational Guide, FHWA-RD-00-67, McLean, VA, June 2000.

Example Intersection Striping Treatments

Figure 3.11 Example Intersection Striping Treatments




Bike Lane at 60' Wide Intersection
With Left and Right Turn Bays
Note: Intersection striping must be accompanied by sign R4-4 indicating right-turning vehicles yield to bikes and sign indicating right-turning bicycles use right-turn only lane.
Note: See Diagonal Striping Detail for spacing and line specifications
5.5'
7'
13'
10'
10'
5'
10'
20'
[6.1m]
30'
[6.1m]
min.
Bike Lane Symbol & Arrow
Pre-cut plastic
Parking Lanes
Maintain constant width
Parking Stripe
Thermoplastic pavement marking line - 4" [100mm] wide solid white
5'
Bike Lane Skip Dash
Thermoplastic pavement marking line - 6" [150mm] wide 2' [600mm] long dotted white with 6' [1.8m] space
Bike Lane Stripe
Thermoplastic pavement marking line - 6" [150mm] wide solid white
City of Chicago
Richard M. Daley, Mayor
DEPARTMENT OF TRANSPORTATION
Miguel d'Escoto, Commissioner
BUREAU OF TRAFFIC
Donald Grabowski, Deputy Commissioner
CITY OF CHICAGO
Bike Lane at 60' Wide Intersection with Left and Right Turn Bays
REVISED 5-16-02
SCALE 1"=30'
18 Bike Lane Design Guide | www.bicyclinginfo.org


Bike Lane with Parking
Intersection with One-way Local T
Bike Lane Symbol & Arrow
Pre-cut plastic
Parking Stripe
Thermoplastic pavement marking line - 4" [100mm] wide solid white
20'
[6.1m]
Direction of Travel
20'
[6.1m]
Bike Lane Stripe
Thermoplastic pavement marking line - 6" [150mm] wide solid white
City of Chicago
Richard M. Daley, Mayor
DEPARTMENT OF TRANSPORTATION
Miguel d'Escoto, Commissioner
BUREAU OF TRAFFIC
Donald Grabowski, Deputy Commissioner
CITY OF CHICAGO
Intersection with One-way Local T, Parking
REVISED 5-16-02
SCALE 1"=30'
No. __ of __
24
Bike Lane Design Guide
www.bicyclinginfo.org

Sample Cost Estimates

To accommodate the bicycle facilities being considered, a set of sample construction cost estimates were developed. These cost estimates were derived based on unit costs for similar facilities in other areas as well as by referencing the NCDOT cost estimation spreadsheet. Each unit cost is included below, along with a description of how it was obtained. The construction costs do not include right-of-way acquisition or mitigation. Relocation of utility poles is not considered due to the large variability associated with a specific scenario. Potential replacement of drainage grates is estimated between $150 to $500 depending on the necessity of replacing the frame. Railroad flangeway fillers are estimated at a cost of $500 per site, excluding additional crossing mitigation such as concrete pads and other surface treatments. All estimates are provided in 2006 dollars.

Multi-Use Path:
$300,000 to $500,000 per mile

This estimate assumes a 10 foot wide asphalt surface and does not include other potential mitigation such as building a structure over a wetland area.

Wide Paved Shoulder:
$300,000 to $400,000 per mile

This figure assumes a 4 foot wide paved shoulder on both sides of the road being built where there is currently a grass shoulder. Other factors such as extensive ditch work are not considered.

Signed Route:
$250 per sign or $1000 per mile

This estimate for bicycle route signage accounts for four signs to be placed in a mile section, with two signs in each direction. Many bicycle routes in urban and suburban areas require more than four signs per mile.

Striped Bike Lanes:
$15,000 per mile

The estimate for striped bike lanes accounts for striping lanes (thermoplastic) in each direction and signing the route. Also, painting the bike lane on municipal roads with a more visible color may be desired at a cost of $25,000 per mile. This will help to calm traffic by creating a sense of enclosure. These lanes are often created in conjunction with resurfacing projects; however, the cost of resurfacing is not included here.

Wide Outside Lanes:
$15,000 per mile

Wide outside lanes are used here when differential striping can be applied to a roadway. As a result, no additional widening is necessary. The estimate accounts for the cost of restriping and signing the route.

Signed Route with Striped Parking:
$15,000 per mile

These routes are again the result of working within the existing cross-section to create a new facility type. This estimate accounts for striping and signing costs.

Neighborhood Connector:
$50,000 to $85,000 for a prefabricated or removeable bridge.

This estimate assumes that the neighborhood connector would consist of a prefabricated bridge run for a short section over a stream or other barrier.

Ancillary Facilities and Programs

Mapping and Signing Projects

Comprehensive Route Systems

The recommendations shown in **Chapter 4** have been set forth in order to create a comprehensive route system for the City of New Bern linking commercial, recreational, and residential areas. Over the next twenty years, the implementation of these routes will ultimately result in an interconnected set of facilities. To accommodate these facilities, the proposed area-wide Bike Route System should be mapped and signed with bicycle route signs. Potential improvements are identified in this chapter. These recommendations encompass issues from maintenance to design and include but are not limited to:

- Provision of bike lanes on local streets where space is available and on-street parking is not an issue
- Exploration of the use of the shared lane symbol under restricted conditions
- Marking and signing traffic signal loops (and possibly recalibrating them) for bicyclists
- Replacing unsafe utility covers and catch basins within the bicyclists' line of travel
- Marking railroad crossings to improve safety
- Route signage

While the first five items listed above are important for the bicyclist who has decided to use a specific route, the last — route signage — is critical to helping cyclists determine which route to use. Route signage should provide useful information to the bicyclists. When creating a route system signing plan, the destinations being served and the best roadways (or facilities) to access those destinations must be considered. Signing should include information on the direction and distance to destination points, as well as intermittent confirmation that the bicyclist is still on the correct route.

Facilities that can be used to create a comprehensive route system include multi-use paths, bike lanes, shoulders, and wide outside curb lanes.

State/Regional Routes

Any route system implemented by New Bern should consider the existing state routes that run through the area. This plan incorporates the North Carolina Cross-State Bicycling Highways 3 and 7 into its facility recommendations. These routes should also be incorporated into the local comprehensive route system. State and regional routes benefit the local community with support from other jurisdictions, organized promotion, and occasional funding.

Share the Road Signing Initiative

North Carolina has been installing "Share the Road" signage since 1987. Although it was not part of the *Manual on Uniform Traffic Control Devices* (MUTCD) at that time, the sign has since been standardized and included in that manual. The sign, shown here, serves to make motorists more aware of the possibility of bicyclists on high-use roads with potentially hazardous conditions. When this sign is placed along a bicycle route, it

typically denotes a major roadway connecting with less frequently traveled roads. These signs serve as important and cost-effective safety and education tools. In fact, the visibility and impact of these signs has recently been acknowledged by the state by the issuing of a "Share the Road" license plate. The additional funds received through the sale of this license plate will be used to promote bicycle education and safety initiatives statewide.

Suitability Rating System

The bicycle level of service (LOS) methodology allows planners and designers to select a level of accommodation rather than a required specific design treatment to provide for bicyclists along a bike route. What the bicycle LOS methodology does not do is dictate what level of service is appropriate for a given community or user. This means that a community can decide that for one type of bike route system, such as a neighborhood route system, an LOS A or B may be required. Conversely, LOS C may be acceptable for the routes serving cross-town commuter cyclists. In addition to being widely accepted by state DOTs and local jurisdictions, the bicycle LOS method is also being considered as the basis for a national LOS model to be included in the Highway Capacity Manual.

A bicycle level of service analysis was not conducted as a part of this study. However, it is recommended that the city works with neighboring municipalities and Craven County to perform a level of service analysis with a corresponding map component. Ultimately this exercise also could serve as a benchmark for the road system in New Bern during future re-evaluations of the system.

Spot Improvement/Maintenance Programs

General Considerations

All non-Interstate roadways should be maintained so they are safe for bicyclists to use. The surface should be free of debris. Longitudinal cracks should be patched and drainage grates with longitudinal slots should be replaced. Utility covers should be flush with the roadway surface. Paved shoulders should be installed where rutting is occurring on the side of non-curb and gutter roadways. Potholes should be filled and maintained regularly. These items should be addressed through the normal roadway maintenance and Powell Bill program.

The alignment of drainage grates and gutter pans with existing pavement is also an area of concern in New Bern. Over repeated repavings, the pavement level on streets with curb and gutter can become significantly higher than the gutter pan. This poses a safety hazard for bicyclists and cars by creating a dangerous edge of pavement. This situation can be avoided by milling down the pavement so that a repaving will be flush with the

gutter pan or by raising the drainage grates and paving all the way to the curb.

Bicycle facilities, including trails, require an additional level of effort to provide acceptable maintenance. Maintenance issues occur most frequently on the right side of the pavement, where the cyclist is likely to be riding. Consequently, a more frequent maintenance cycle to address these defects should be provided for bicycle routes. Areas such as bridges where excessive debris tends to build up and bicyclists have limited refuge options should be maintained even more frequently. Examples of this include the US 17-Neuse River Bridge and the Trent River Bridge.

Signal Clearance

Traffic signal timing and loops along bicycle facilities require extra attention. According to the *MUTCD*[20],

> "At installations where visibility-limited signal faces are used, signal faces shall be adjusted so bicyclists for whom the indications are intended can see the signal indications. If the visibility-limited signal faces cannot be aimed to serve the bicyclist, then separate signal faces shall be provided for the bicyclist.
>
> On bikeways, signal timing and actuation shall be reviewed and adjusted to consider the needs of bicyclists."

While the former can be easily evaluated, the latter concern (that of signal timing) is a little harder to address. The *AASHTO Guide for the Development of Bicycle Facilities* [21] provides information of clearance intervals and minimum green times for bicyclists. At wide intersections, the clearance interval equation can result in some excessively long yellow-plus-all red periods for signals. If the facility consists of a multi-use path or a bike lane, a signal loop can be placed in the bike lane or on the path in advance of the intersection. When a cyclist passes over the loop, the signal will extend the green time for the intersection approach to accommodate the crossing cyclists. This treatment is in common use for motorists and has been applied in various locations for bikes. The design of the loop is critical; an oversized loop in a bike lane will detect cars in the adjacent lane. An effective loop design for detecting bikes in bike lanes is a quadrapole 2 feet wide and 20 feet long (approximately half the size of a normal 40 foot roadway loop). Such a loop readily detects cyclists, but will not detect a car six inches to the side.

Roadway Symbol Buildup

Thermoplastic buildup is another concern of bicyclists. Bike lane symbols, lane use (directional) symbols, even crosswalks can all build up with repeated application and cause handling problems for bicyclists. More than two layers of thermoplastic (one marking) should not be allowed on bicycle facilities.

The slipperiness of thermoplastic and paints is another concern of bicyclists. One way to mitigate this concern is to add sharp silica sand to the glass spheres that make up the wet thermoplastic or paint. This increases the roughness of the markings' surface, reducing the potential for bicyclists to slip on the thermoplastic.

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[20] FHWA, *Manual on Uniform Traffic Control Devices*, pg. 9D-1, Washington, DC, 2003.

[21] *AASHTO Guide for the Development of Bicycle Facilities*, pg. 65, American Association of State Highway and Transportation Officials, Washington, DC, 1999.

Safety Railings along Bicycle Facilities

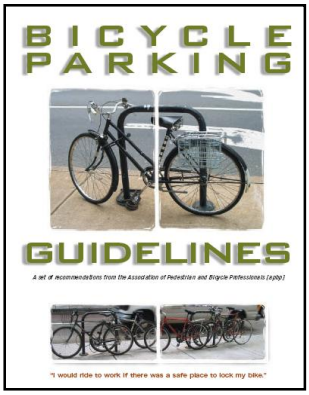
Bridge railing heights have been the subject of recent revisions to the *AASHTO Guide for the Development of Bicycle Facilities* and ongoing debates among bicycle facility design professionals. The current *AASHTO Guide for the Development of Bicycle Facilities* states that railing heights should be at least 42 inches to prevent bicyclists who hit the railing from tipping over the top. However, the current AASHTO Bridge Specifications require a 54-inch railing (this is also referenced in NCDOT's Bridge Policy as found at the following link: http://www.ncdot.org/doh/construction/altern/value/manuals/RDM2001/revpt1ch6-1yel.pdf). In practice, designers have been using the 54-inch railing when a structure is being built to the AASHTO specifications and a 42-inch railing along non-structural locations, such as when protecting bicyclists from embankments.

Bicycle Parking Facilities

Just as motorists need a place to park their cars when they arrive at destinations, bicyclists also need a place to park their bicycles. Consequently, when creating a transportation system to accommodate bicycling, parking must be included in that system. Bicycle parking is critical in areas where there are frequent bicycle riders such as the mall, schools, the YMCA, the marina, and other recreational areas. Bicycle parking should also be considered downtown and near businesses where bicyclists may frequent.

Typically, when parking is installed for bicyclists, the primary consideration is simply the accessibility or the convenience of the parking. While these are significant concerns for bicyclists, they are not the only issues. Bicyclists must also consider the security of the parking and the protection afforded to the bicycle.

The security concerns of bicycle parking can be addressed in several ways. High visibility of the parking rack can improve security. By locating parking near storefronts, or in high pedestrian use zones, the potential for theft or vandalism is reduced. However, placement needs to be carefully considered so as not to become a hazard to pedestrians or to diminish ADA accessibility. Well-lit areas can improve the security in areas where bicycles are parked after dark. Providing racks that support the frame instead of the wheel make it easier to lock a bike without damaging it. Bike lockers also provide good security for bicycles.



The protection required for a bicycle varies with respect to the purpose of the bicycle trip. For short duration trips, such as to the grocery store or the library, U-shaped bicycle racks on a concrete pad in front of the building may be acceptable. At a park and ride lot, or in front of an office building where the parking is for commuters, bike lockers or covered parking is more appropriate.

The Association of Pedestrian and Bicycle Professionals has produced a guidance document on good bicycle parking design.

This excellent document is available on line at the APBP website.[22] The website http://www.bicyclinginfo.org/de/park.cfm also provides information regarding bicycle parking costs and number of spaces recommended.

There are four basic elements to bicycle rack design. First, the bicycle should be supported upright by its frame in at least two places. Second, the rack should enable the frame and one wheel to be locked. Third, the rack should be anchored so that it cannot be stolen with bikes on it. Fourth, the rack should be placed as close to the building it serves as possible.

Bicycle racks can be tailored to reflect the culture or character of an area, or as a form of public art. Bike racks such as the one shown to the right make a statement about the area in which they serve as well as providing parking facilities for bicyclists.

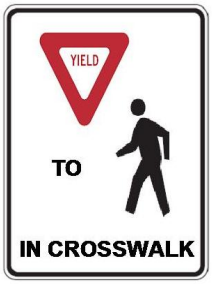
Safety Initiatives to Reduce Bicycle Motor Vehicle Crashes in New Bern

Due to the low number of bicycle crashes reported for New Bern, these crashes were not analyzed in this study. However, the next step for further study could include an analysis of the bicycle crashes in the area with mitigation measures provided at each problem site.

Engineering/Traffic Calming Countermeasures

Intersection Signage

Static signs such as *NO TURN ON RED when Pedestrians Present* or the *Left Turning Vehicles Yield to Pedestrians* have been found to reduce the incidence of pedestrian conflicts at intersections. Consequently, it is reasonable to expect that these signs would also reduce the conflicts between motorists and bicyclists riding on a sidepath. However, they should be used sparingly and only where a problem has been documented and relatively constant pedestrian/bicycle use of the intersection exists. The overuse of signs or the use of the signs where pedestrians or bicyclists are not using the crosswalks dilute the ability of the signs to command the attention of motorists. Eventually this results in the signs being just background visual clutter.



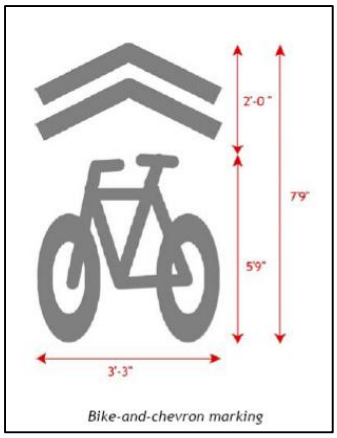
Because they are real time traffic control devices, blank out signs like the one pictured below can continue to be effective at intersections because they are only activated when there is a potential conflict. If motorists see a YIELD TO PEDS sign next to a permissive left turn signal, the motorists will know a pedestrian is crossing the conflicting crosswalk at that time. This "real-time" aspect of blank out signs allows for them to be placed at locations where conflicts are not

[22] APBP, Bicycle Parking, available at http://www.bicyclinginfo.org/pdf/bikepark.pdf.

frequent or constant enough to make a static sign appropriate.

Shared Lane Symbol

The Shared Lane Symbol, or "Sharrow", has the potential to reduce several different types of crashes and is being used in jurisdictions across the country. Because cyclists tend to center over the symbol, it may be useful for reducing door crashes (where a parked motorist opens a door into the path of a cyclist). Additionally, a similar treatment has been found to reduce wrong way riding and riding on the sidewalk, and to improve bicyclists' position in the travel lanes.



Bike-and-chevron marking

Consequently this treatment may actually reduce the incidence of "motorist failure to yield to the bicyclist crashes" and "overtaking crashes". Despite the potential for these collateral improvements, this treatment is recommended only in very selective areas, such as adjacent to on-street parking, or completing a link in a bicycle route.

This treatment is experimental and has not been approved by MUTCD, so its use would require one of two alternatives. This treatment can be used as a demonstration project on a non-state maintained roadway. If there is a desire to use Sharrows on a state or federal roadway, a Request to Experiment must be filed with FHWA prior to implementation. An evaluation plan must accompany this Request to Experiment and this must include measures of effectiveness. The following measures of effectiveness are suggested for New Bern:

- Separation between parked cars and bicyclists
- Percent of bicyclists riding on the sidewalk
- Percent of bicyclists riding against traffic
- Motorists' understanding of the symbol
- Bicyclists' understanding of the symbol

Transit Interface

At this time, no bicycle amenities are included on the vans, mini-buses, and sedans that make up the fleet of the Craven Area Rural Transit System (CARTS). CARTS, a service administered by Craven County, is geared toward elderly and handicapped riders with the service available to the general public on a space-available basis. Bike racks on these vehicles can eliminate a barrier presented to those individuals who need their bicycle for supplemental transportation after they deboard. Amenities for bikes on the CARTS service should be considered as a way to enhance the multimodal riding experience for users by extending the catchment area for the transit service, giving bicyclists more options, and potentially increasing transit ridership. Another amenity that should be considered to more fully integrate bicycle use and the transit system is the installation of bike racks near heavily used bus stops and destination points in town. With features such as bike racks, benches, and shelters, bus stops become more user-friendly environments and can attract additional riders.

Public Amenities

In addition to bicycle parking and provisions for bikes on buses, other amenities should be considered for implementation in order to create a more user-friendly bicycle system. Benches, water fountains, public restrooms, and changing areas provide riders with valuable services. These amenities are especially helpful in high traffic areas such as downtown and by major destination points such as shopping areas and schools. Bicycle rentals, especially within the downtown and near the marina, can also be a great amenity for tourists and residents alike. This service could be provided through a private entity or administered by the parks and recreation department.

Chapter 4 – Recommendations

After considering the bicycle focus areas and opportunities in New Bern, the next step in developing the bicycle plan is to recommend a set of routes and facility types. A set of nine named bicycle loops and connectors is recommended and is shown in **Figure 4.1**. Recommended loops consist primarily of on-road facilities, since terrain and utility constraints make it difficult to construct an off-road greenway system. These loops can be examined from the perspective of individual routes or as an overall interconnected system. The idea is to provide an interconnected system of bike facilities that cater to all levels of experience. Loop routes could even be named or color-coded and displayed at strategic locations throughout the City to provide current information to users and enhance the awareness of cycling in New Bern. The facility types recommended for the segments of these routes are shown in **Figure 4.2**. This chapter describes the attributes of these nine routes in detail and provides a corresponding cost estimate for each. Cost estimates have been developed for each route based on the unit costs outlined in **Chapter 3** and on specific project attributes and are shown in **Table 4.1.** Priorities have been established for these routes and are given in **Chapter 5**.

Proposed Bicycle Routes

Airport Loop (Figure 4.3)

The Airport Loop is a 3.8 mile loop linking the communities of New Bern and James City as a connection from the Trent River and US 17 Bridges while also connecting the northern neighborhoods of James City. A portion of this loop also runs along NC Bicycle Route 3.

Due to the lack of shoulders and often dangerous conditions on the roads in the Airport Loop, four-foot paved shoulders are recommended for most facilities. Striped bicycle lanes are recommended along Williams Road and Airline Drive from Howell Road to Airport Road as a means of connecting with the extensive striped bicycle lane system proposed in the Taberna-James City Loop (described on page 4-3).

The estimated construction cost of the Airport Loop is $1.55 million.

Bridgeton Loop (Figure 4.4)

The Bridgeton Loop is a 5.5 mile loop that connects the heart of the Town of Bridgeton, including Bridgeton's elementary school, post office, and town hall, with the US 17 Bridge. A portion of the Bridgeton Loop also runs along North Carolina Bicycle Routes 3 and 7.

The roads recommended for use in the Bridgeton Loop either have very narrow shoulders or no shoulders. Therefore, four-foot paved shoulders are recommended for this route. However, for the downtown Bridgeton area near the school and the town hall, it is recommended that striped bicycle lanes be constructed.

The estimated total construction cost for this loop is $2.65 million.

Downtown-Mall Loop (Figure 4.5)

The Downtown-Mall Loop, as its name suggests, connects Downtown New Bern with the major shopping

areas of the city. In addition, this 13.5 mile route links schools, government facilities, and neighborhoods. The Trent Woods Loop, the Downtown Neighborhood Loop, and the Riverfront Loop all connect with this route.

The Downtown-Mall loop runs on higher volume roads for most of its length. For this reason, we would expect more experienced bicyclists to utilize this route. Facility upgrades such as wide outside lanes and four-foot paved shoulders are recommended on Glenburnie Road, Trent Road, Simmons Street, Oaks Road, and National Avenue. This route also employs the use of the recommended five-foot bicycle lanes on Trent Boulevard to link it with the heart of downtown. Connectors on McCarthy Boulevard and Lowes Boulevard will provide connections from this route to the multiple shopping opportunities in this area. An additional connector on Elizabeth Avenue is recommended to eventually extend to the proposed NC 43 Connector (TIP # R-4463), thereby opening up this area to bicyclists originating from future developments in this area. When Elizabeth Avenue is extended, it is recommended that four-foot bike lanes be included in the proposed cross-section.

The construction cost estimated for this route is $3.5 million.

Downtown Neighborhood Loop (Figure 4.6)

The Downtown Neighborhood Loop is a 4.2 mile loop that provides connections for four schools, a park, and the city's recreation center while connecting several downtown neighborhoods. This loop connects with the Riverfront Loop, the Trent Woods Loop, and the Downtown-Mall Loop. The Downtown Neighborhood Route provides users with an opportunity to tour many of the historic homes and areas of downtown while also providing a non-recreational function to users traveling between neighborhoods.

As with the Riverfront Loop, the majority of the Downtown Neighborhood Loop is recommended to be signed. This is due mainly to the cost and disturbance associated with retrofitting these streets to include bike provisions. However, on the higher volume roads of this loop such as Simmons Street, Neuse Boulevard, and Trent Boulevard additional roadway facilities are recommended. Simmons Street and Neuse Boulevard should employ differential striping in order to create wide outside lanes. Trent Boulevard is recommended to be restriped to include five-foot bike lanes, as shown by the before and after renderings above. This road is shared by three different routes including North Carolina Bicycle Routes #3 and 7 and is a major cross-town connector.

The Downtown Neighborhood Loop also includes a connection from Lincoln Street to Trent Boulevard via Clark Avenue and Chattawka Lane. These roads are recommended for four-foot paved shoulders. There is currently a small pedestrian bridge that allows users to cross the stream barrier between these two roads. This

bridge should be replaced with a lightweight or removable bridge (shown in picture) wide enough to comfortably accommodate both bicycles and pedestrians.

The total construction cost for this route including the removable bridge is $500,000.

Riverfront Loop (Figure 4.7)

The Riverfront Loop is a five mile recreational and utilitarian loop around the heart of Downtown New Bern. This loop connects city and county government buildings, Union Point Park, and Tryon Palace. In addition, this route connects to the Trent Woods Loop, the Downtown Neighborhood Loop, the Downtown-Mall Loop, the Trent River Bridge, and North Carolina Bike Route 7.

The majority of this route is recommended to be signed, with a small portion of the roads wide enough to restripe with wide outside lanes. The exception to this is the Broad Street connector, which runs from East Front Street to Chatawka Lane. This facility can be restriped to accommodate four-foot bicycle lanes. Crosswalks and pedestrian signals should be implemented at key intersection locations (see below) along the route to enhance safe crossing of roadways.

- Broad Street at Third Street/First Street
- Broad Street at Front Street

The total construction cost for this route is $100,000.

Taberna-James City Loop (Figure 4.8)

The 14 mile Taberna-James City Loop links the current and future communities of Taberna, James City, and Carolina Colors. In addition, this route provides connections to government facilities and to the Craven Technology Center. The Airport Loop connects with this loop to link it into the entire bike network.

The section of this loop connecting Airport Road through Taberna and down to Carolina Colors is recommended to be restriped to include four-foot bike lanes. The Taberna neighborhood lends itself to a recreational ride since it is a loop and the bicycle lanes running north and south will enable other users to access it. The portion of this route through Carolina Colors is recommended to be wide outside lanes, and has already been approved for that development. The remainder of the route (2.3 miles) has four-foot paved shoulders recommended. Old Cherry Point Road is a lower-volume alternative to US 70 and paved shoulders will provide bicyclists a refuge area.

The total construction cost for the Taberna-James City Loop is $4 million.

Trent Woods Loop (Figure 4.9)

The 16 mile Trent Woods Loop connects schools, parks, and municipal buildings for both the City of New Bern and the Town of Trent Woods. Demand for bicycle facilities in this area was considerable. In fact, this route received the highest level of public support during the public outreach sessions. The most significant landmarks connected are Lawson Creek Park and New Bern High School. This route connects with the Downtown-Mall Loop, the Downtown Neighborhood Loop, and the Riverfront Loop.

The Trent Woods Loop serves as a scenic recreational loop or as a functional route for traversing the length of the Town of Trent Woods.

The Trent Woods Loop is recommended to have restriping or additional pavement on most of its route. Country Club Road is a long section of this route and currently has narrow six-inch to one-foot shoulders. This section is recommended to have new four-foot paved shoulders and marked bicycle lanes. A portion of this route near the high school runs along Martin Luther King Junior Boulevard. It is recommended that instead of trying to accommodate bicyclists along this high-volume, high speed US Route, a sidepath should be constructed along the south side of the road. In combination with additional safety features at road crossings, this path will provide a safer route (with few driveway crossings) for students to reach the high school. A connector with striped bicycle lanes in its cross-section is also recommended from Academic Drive to Staten Road. This will ultimately cross the NC 43 Connector and provide a bicycle route for the neighborhoods in the west to reach the school and downtown.

The total construction cost for the Trent Woods Loop is estimated to be $2.5 million.

Trent River Bridge

The Trent River Bridge is a major connector between New Bern and James City, and also serves as a portion of NC Bike Route 7. This bridge is scheduled to be replaced as TIP project #B-2532. This project is expected to be completed by 2010 in time for New Bern's tercentennial celebration. The current plan for this bridge includes a two-foot shoulder on one side of the road and a four-foot shoulder on the opposing side of the road.

It is our recommendation that the uneven shoulders on this bridge be eliminated through restriping, leaving each side with a three-foot shoulder. While this is not adequate room for a dedicated bicycle lane, it will provide an equal refuge area for both sides of the bridge. It is also recommended that "Share the Road" signs be posted along this bridge and at the bridge entrances.

US 17 Bridge

The US 17 Bridge is a part of NC Bike Route 7 and provides a connection to Bridgeton and NC 55. This bridge currently has wide 8-foot shoulders on both sides. Unfortunately, these shoulders are poorly

maintained and filled with debris, making it difficult for bicyclists to use this space.

It is recommended that the maintenance schedule be improved to more frequent intervals for this bridge. In addition, painting the shoulder area should be explored in order to further delineate the bicycle and pedestrian space.

Construction Cost Estimates

Table 4.1 provides a synopsis of the bicycle routes recommended in the *New Bern Comprehensive Bicycle Plan*. Each route is listed along with the presence of the various facility types within that route. The lengths and estimated construction costs for the individual loops are also shown. These values assume that there are no existing facilities that will be shared, so that the cost can be considered for each route as a stand-alone value. In addition to this information, **Table 4.1** provides the total mileage of each facility type estimated as a part of the network, the overall length of all facilities in the network, and the total estimated construction cost for the entire network. This overall cost accounts for overlapping in the network so no facility is considered more than once.

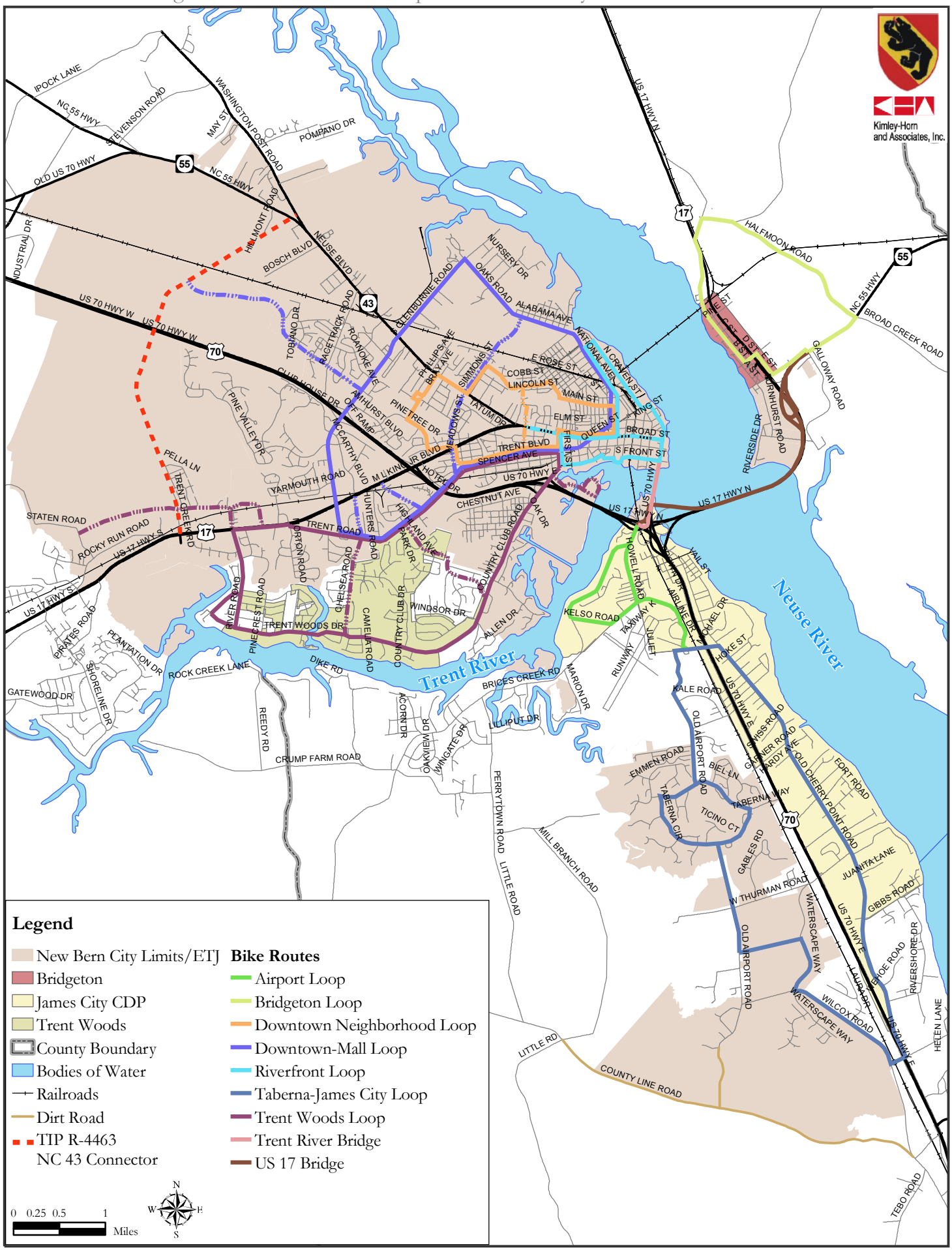
From this table, it is shown that the total estimated construction cost for the proposed 62 miles of bicycle facilities is 13.8 million dollars. Additional cost estimate information including lengths of each facility can be found in **Appendix 1**.

Table 4.1 Route and Network Characteristics

Routes	Signed Route	Striped Bike Lane	Wide Outside Lane	Paved Shoulder	Neighbor-hood Connector	Multi-Use Path	Length (miles)	Cost
Airport Loop		✓		✓			3.8	$1,550,000
Bridgeton Loop		✓		✓			5.5	$2,650,000
Downtown-Mall Loop	✓	✓	✓	✓			14.9	$3,500,000
Downtown Neighborhood Loop	✓	✓	✓	✓	✓		6.8	$500,000
Riverfront Loop	✓	✓	✓				5.2	$100,000
Taberna-James City Loop		✓	✓	✓			13.9	$4,000,000
Trent Woods Loop	✓	✓	✓	✓		✓	16.5	$2,500,000
Total (length in miles)	10.2	18.4	7.8	24.7	0.1	0.6	61.8	$13,800,000

New Bern Bicycle Plan

Figure 4.1 - Proposed Bicycle Routes



New Bern Bicycle Plan

Figure 4.2 - Proposed Bicycle Facilities

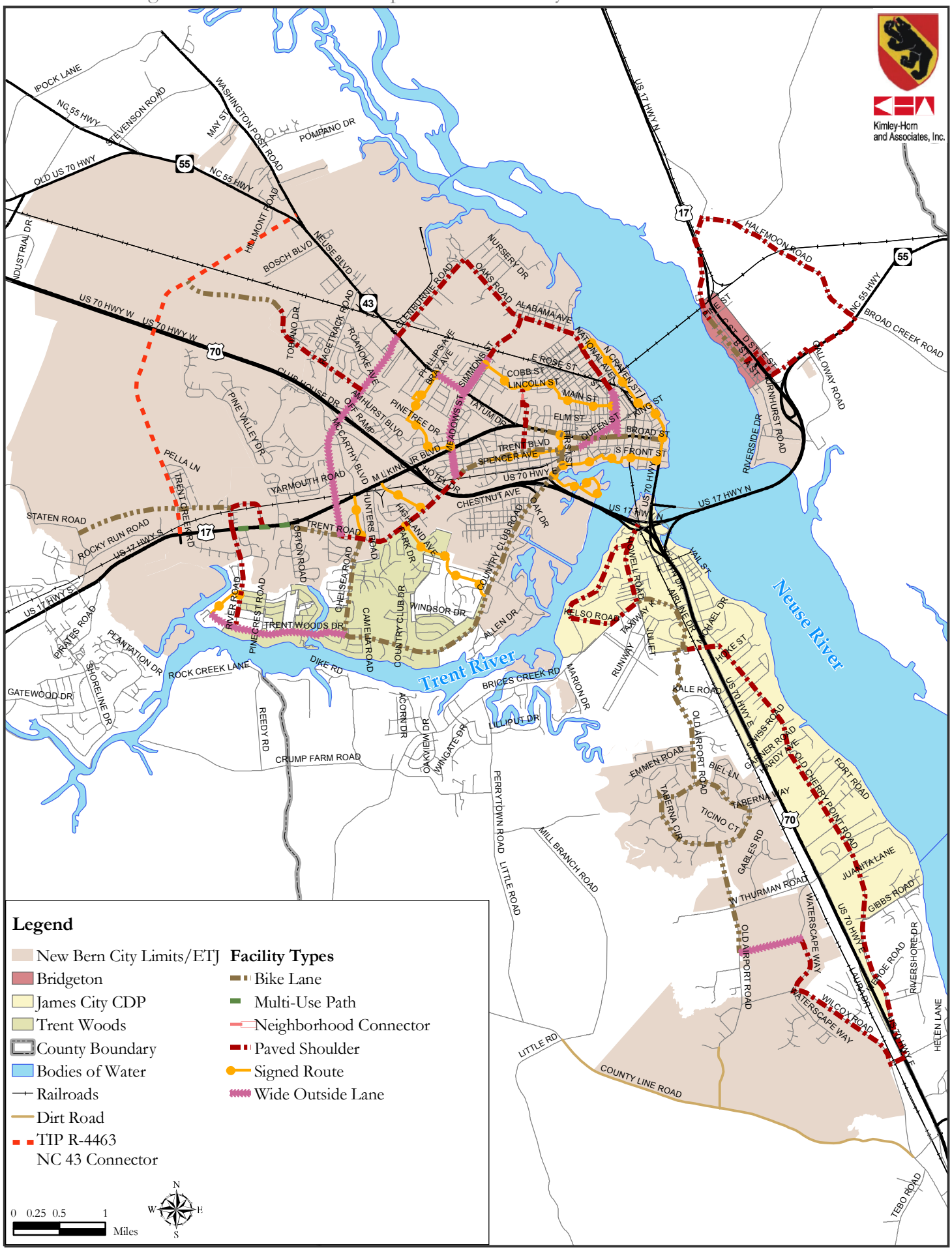


Figure 4.3 - Airport Loop

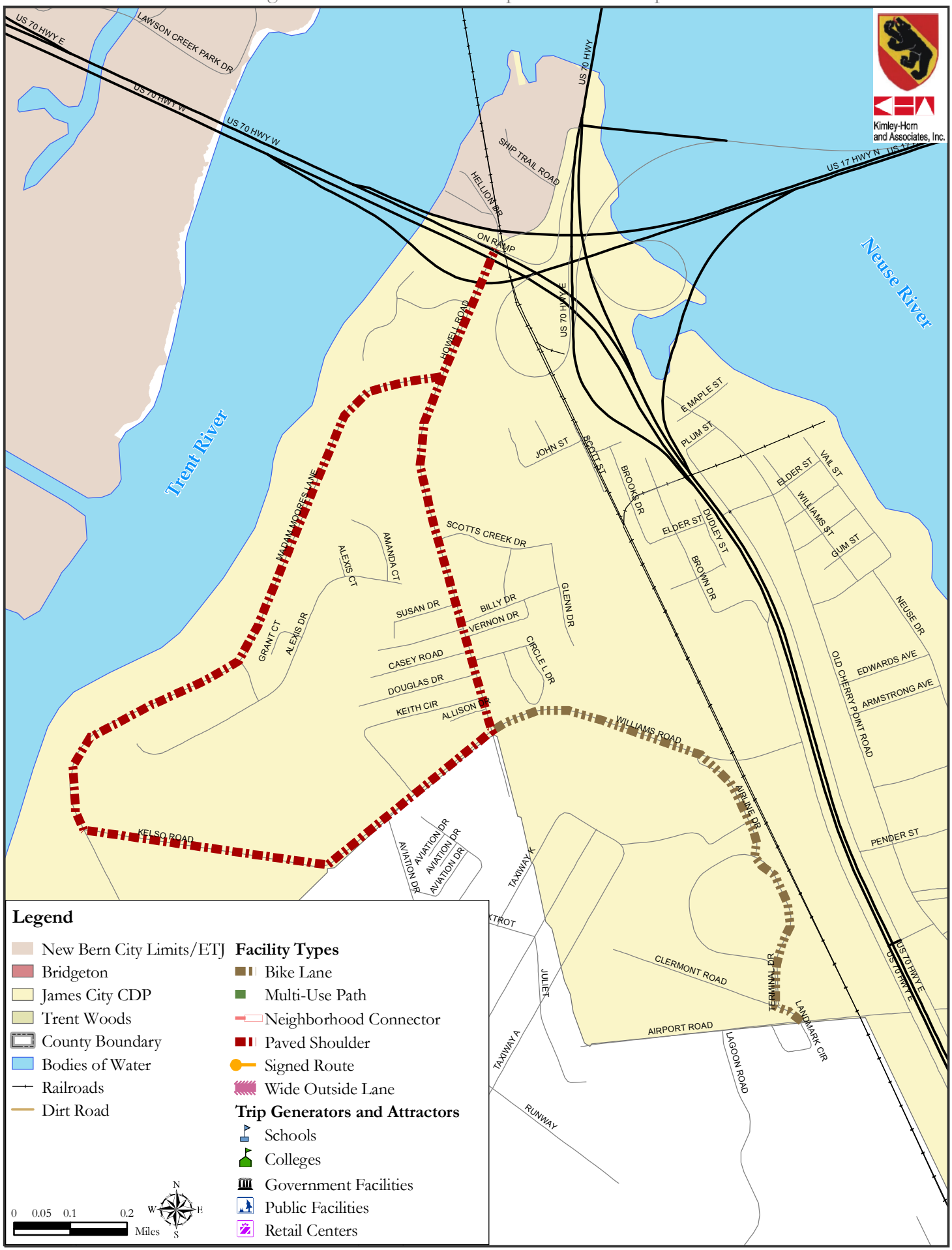
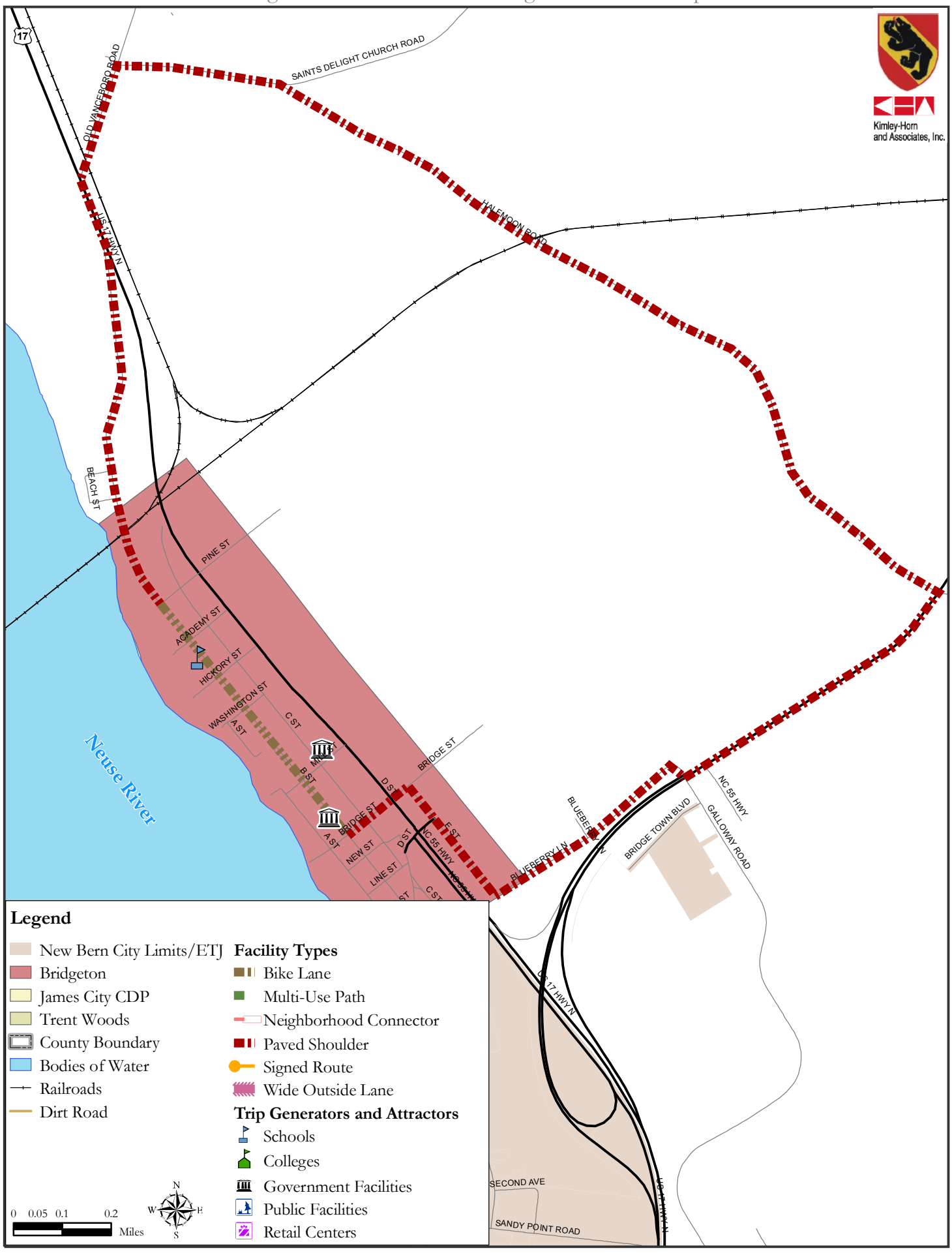


Figure 4.4 - Bridgeton Loop



New Bern Bicycle Plan

Figure 4.5 - Downtown-Mall Loop

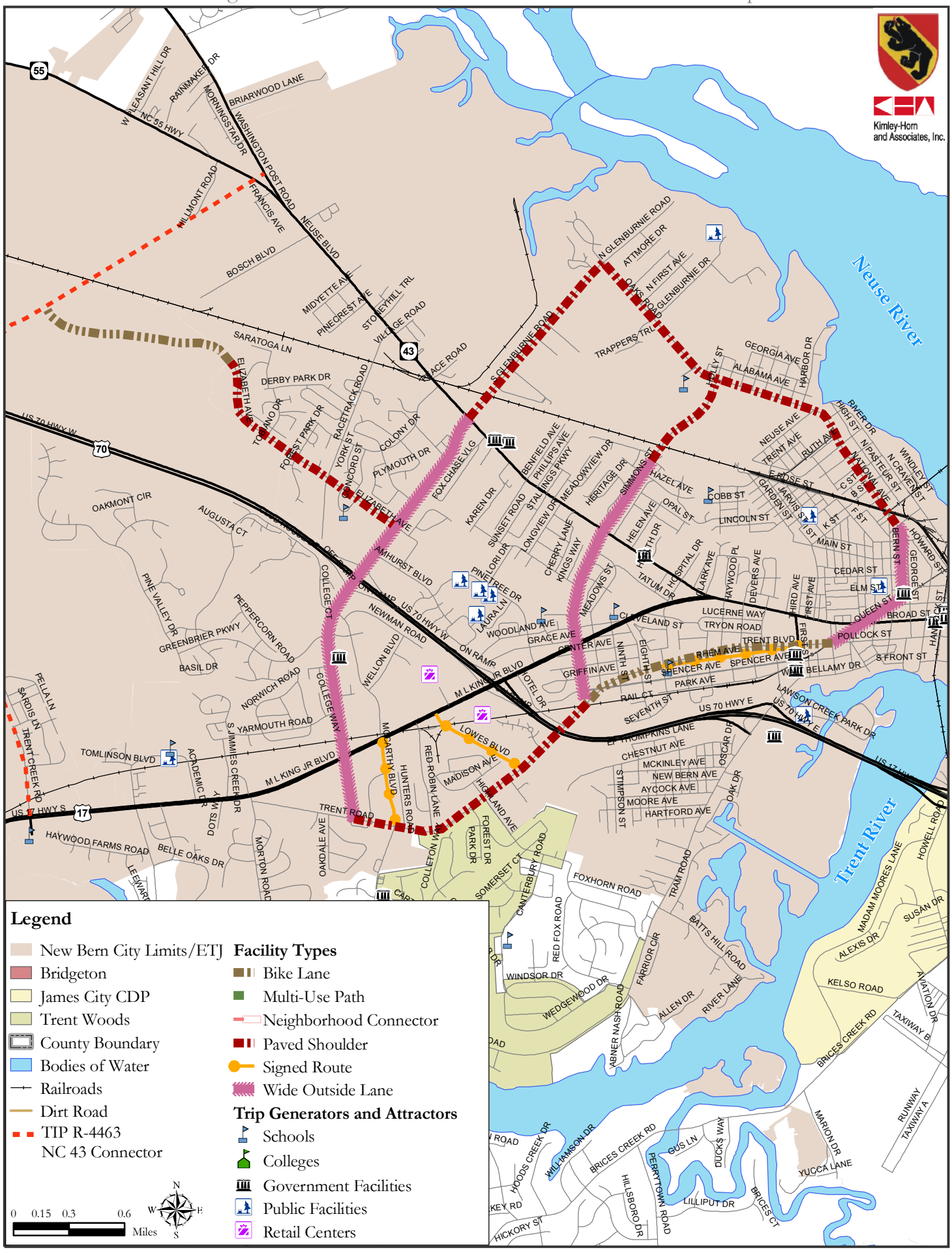


Figure 4.6 - Neighborhood Loop

Figure 4.7 - Riverfront Loop

New Bern Bicycle Plan

Figure 4.8 - Taberna-James City Loop

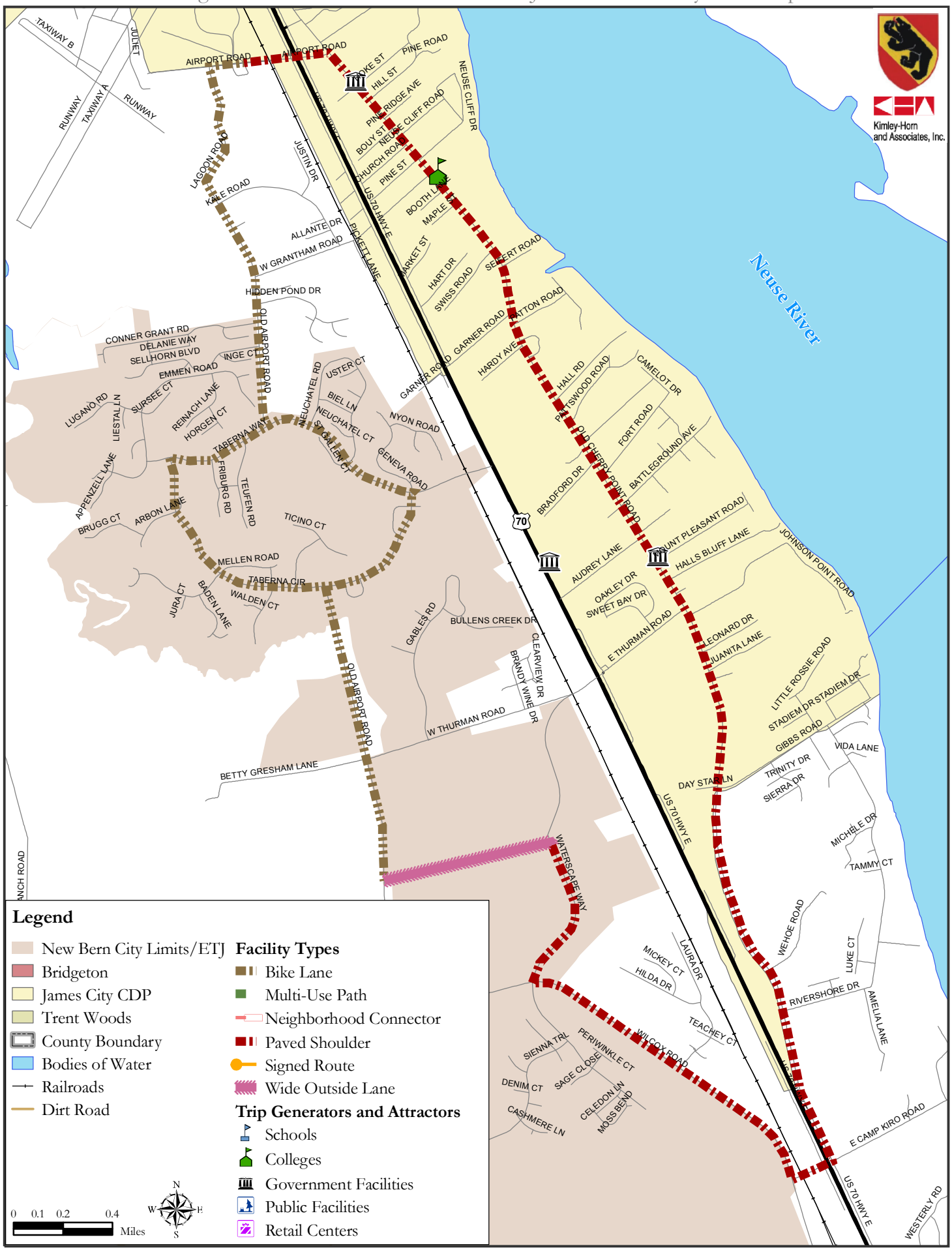
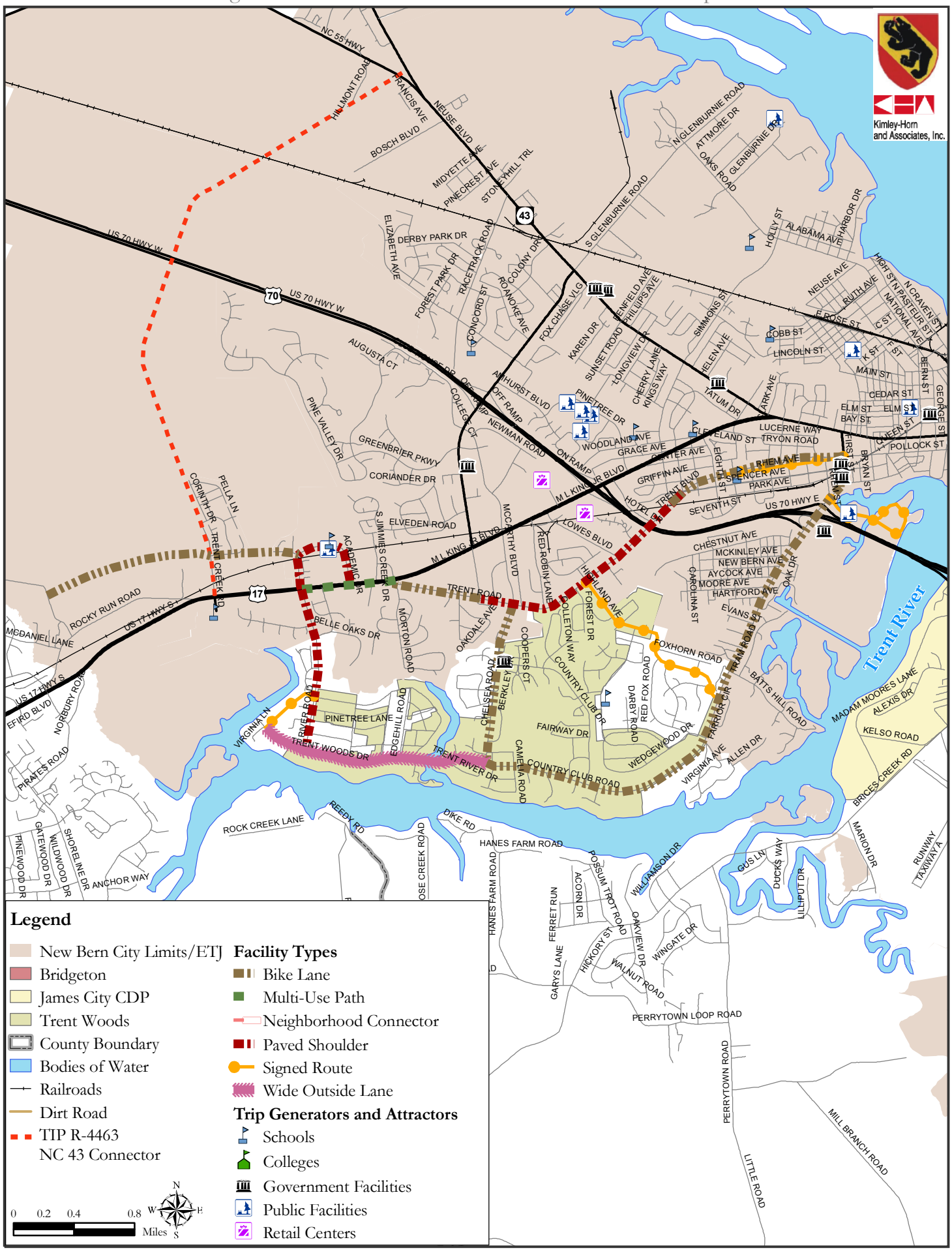


Figure 4.9 - Trent Woods Loop



Education, Enforcement, and Encouragement Program Recommendations

The network of bicycle facilities recommended in New Bern should be complemented by education, enforcement, and encouragement programs. When new shoulders, bike lanes, and pathways are constructed, bicyclists of all skill levels should be educated regarding how to use these facilities safely. In addition, drivers should be expected to treat bicyclists as legitimate users of the road and operate safely around bicyclists. Unsafe behavior by either bicyclists or drivers should be targeted through police enforcement. At the same time, promotional efforts — such as Bike to Work Day and developing a public bicycle map — can help advertise bicycling as a fun, healthy form of transportation and recreation in New Bern.

This section recommends programs to help support New Bern's network of bicycle facilities.

Education Programs

The City of New Bern planning and recreation and parks departments should work with law enforcement officials, local bicycle shops, local bicycle advocacy groups, educators, church organizations, public health professionals, local media, and other community groups to establish a broad-based bicycle safety education campaign. This campaign should target both bicyclists and drivers.

These education programs will allow people of all ages and bicycling abilities to become more informed about bicycle safety. They will also help drivers operate more safely around bicyclists.

Rules of the Road

The core of the New Bern bicycle safety education campaign should emphasize rules of the road for both bicyclists and drivers. A summary of these rules is provided below.

<u>For cyclists:</u>

- Follow the same laws that apply to motorists. Obey all traffic signals, signs, and lane markings. Always yield to pedestrians.
- Ride on the right side of the road with the flow of traffic — never against it.

- Always wear a properly fitting helmet.
- Ride predictably and defensively. Use hand signals before turning.
- Be visible. If it is necessary to ride at night, use lights, reflectors, and bright clothing.
- Avoid riding on sidewalks. If it is necessary to ride on a sidewalk, be aware of risks at intersections.

<u>For motorists:</u>

- Obey speed limits. Higher speeds result in greater injuries to cyclists and pedestrians.

- Obey signs, signals, and markings. Never run red lights.
- Yield to cyclists where required. Always look for bicyclists when turning.
- Pass cyclists with care. Slow down and provide enough space when passing.
- Do not blast your horn in close proximity to cyclists.
- Look for cyclists when opening car doors.
- Watch for children.
- Watch for bicyclists riding at night.

Other Critical Safety Issues

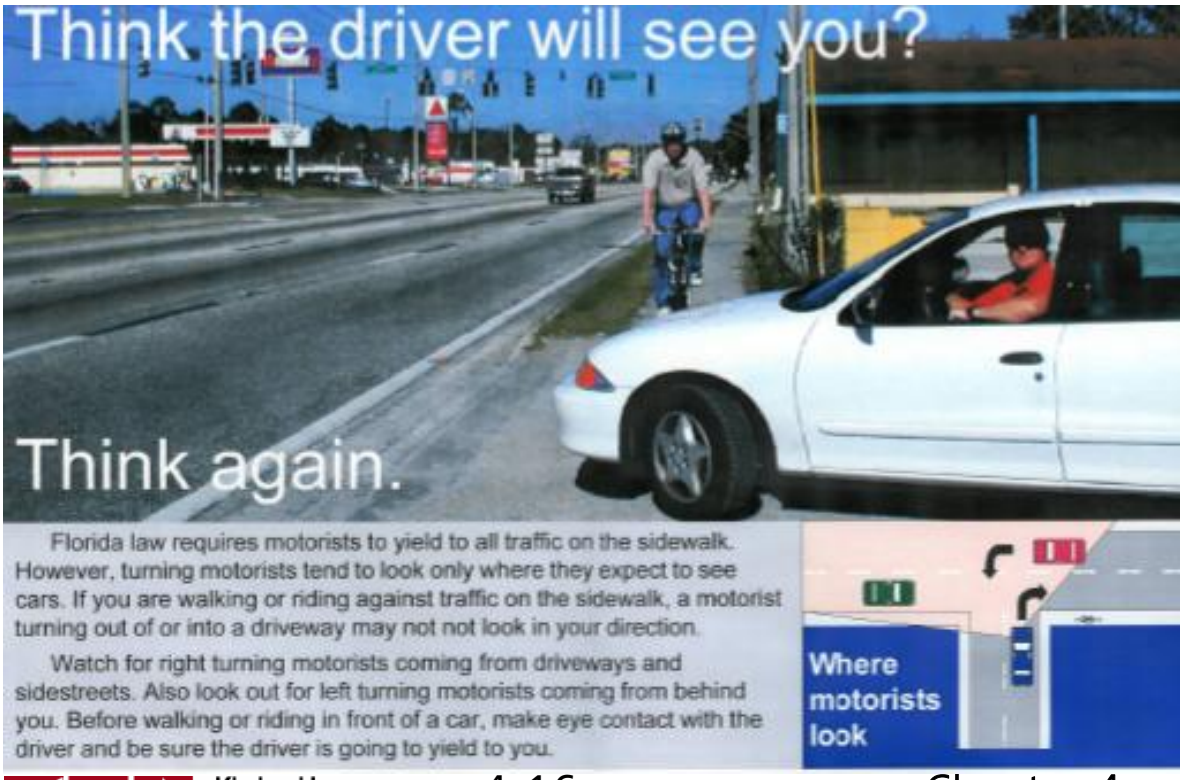
The New Bern bicycle safety campaign should also address the following critical bicycle safety issues:

- Riding against traffic
- Riding on sidewalks
- Riding at night

All three of these behaviors can increase the risk of bicycle-motor vehicle crashes.

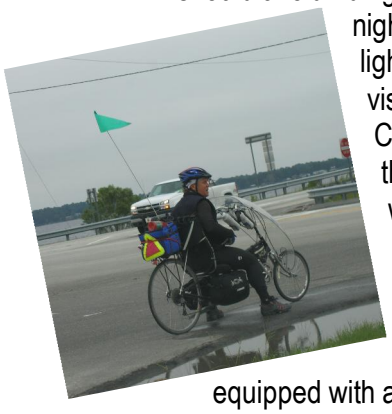
Riding Against Traffic — Riding against traffic, either on the sidewalk or on the roadway, is a common practice in the New Bern area. This behavior increases the risk of being involved in crashes at driveways or intersections because right-turning drivers typically only look left before they turn and do not see bicyclists approaching from the opposite direction. Informational graphics can be used by the City to illustrate this risk (see sample from a Florida campaign below).

Riding on Sidewalks — Many bicyclists ride on sidewalks because they do not feel comfortable riding on the roadway with motor vehicles. However, bicyclists on sidewalks do not approach intersections from the same areas as motor vehicle traffic, so they can be difficult for drivers to see. When cyclists choose to ride on the sidewalk, they should



ride in the same direction as vehicles in the adjacent roadway lanes, whenever possible. In the case where a bicyclist would need to cross a multi-lane roadway to ride in the same direction as traffic for a short distance, this crossing may be impractical and potentially less safe than riding in the opposite direction as traffic on the sidewalk. Thus, it is imperative that cyclists who chose to ride on the sidewalk in either direction be educated about the hazards associated with this practice. In general, adults should not ride on the sidewalk. Studies show that bicyclists on the sidewalk are significantly more likely to be involved in a crash than those riding on the road. A study conducted by Wachtel and Lewiston in 1994 indicated that sidewalk bicyclists are twice as likely to be involved in car-bike crashes as other bicyclists. Cyclists engaging in wrong-way sidewalk riding are about four times more likely to be involved in car-bike crashes than road cyclists.[1]

Riding at Night — If possible, bicyclists should avoid riding at night. When riding at night, bicyclists must ride with lights to increase their visibility to drivers. North Carolina state law requires that bicycles be equipped with a lighted lamp that is visible up to 300 feet in front. In addition, it is required that bicycles ridden at night be equipped with a red taillight or rear reflector visible up to 200 feet in the rear. Even if a bicycle is properly fitted with reflectors and lights, motorists coming from a side street may not see the cyclist until it is too late for the driver to react.



Therefore, bicyclists must be made aware of the dangers they face in the dark. Informational posters showing sight distances for various colors of clothing and illustrating the limitations of reflectors should be distributed by the City as a part of the educational campaign.

While these critical safety issues are important for bicyclists to be aware of, drivers must also be targeted with these educational messages to increase their awareness of bicycle crash risks. Motorists should be instructed to look in both directions for bicyclists when turning at intersections, drive more slowly, and be aware of the potential for bicyclists to be riding at night.

Elements of the Safety Education Campaign

The City's broad-based education campaign should include bike rodeos, bicycle safety education programs in schools, public service announcements, and documents, such as posters, brochures, and websites.

Bike Rodeos

The New Bern Police Department currently offers bicycle rodeos by request only. The City of New Bern should offer bicycle rodeos on weekends or weekdays several times during the year. These rodeos should teach basic bicycling skills and rules of the road. City staff should partner with local law enforcement and local volunteer bicyclists to organize these events. Bicycle rodeos could be a first step toward developing a more comprehensive safety education program for local schools.

[1] Wachtel, A. and Lewiston, D. Risk Factors for Bicycle-Motor Vehicle Collisions at Intersections; *ITE Journal*, September, 1994.

School-Based Bicycle Safety Education

The City of New Bern should work with local elementary schools to develop a bicycle safety education program. Current school curricula devote little attention to bicycle safety. The bicycle safety education program could be offered as a part of regular physical education classes. Children in grades 3, 4, and 5 could be given hands-on bicycle safety lessons about wearing helmets, following the rules of the road, and turning and signaling. The bicycle lessons could be based on the Basics of Bicycling Curriculum that is available from NCDOT or other programs that have been implemented in states such as Maryland, Florida, and Texas. Support for the on-bike lessons could be provided by local bicyclists and law enforcement officers.

While the program should target one or two schools during its first year, it should be expanded to all elementary schools in the City.

Funding for the program could potentially be obtained through the Governor's Highway Safety Program 402 Funds or the new state Safe Routes to School program (Safe Routes to School is described in more detail in the section on Encouragement Programs). The City should also build partnerships with local school systems and public and private schools to obtain additional financial support and educational experience for the program.

Public Service Announcements

Public service messages on the television and radio can be created to inform the public about proper bike riding techniques, the meaning of signed route and "Share the Road" signs, and driver courtesy. The City of New Bern should develop and broadcast public service messages to support the bicycle safety education campaign.

Other Educational Materials

Another component of the City's educational campaign should be to distribute brochures, make posters, and set-up web pages with graphics about bicycle safety to increase awareness of these dangerous situations. These materials can be provided at local businesses, schools, and public buildings.

State Support for Bicycle Education

The City of New Bern should take advantage of state support for bicycle education. The NCDOT Division of Bicycle and Pedestrian Transportation offers educational materials for children to learn the basics of bicycling, safety, and how to follow the rules of the road. Teachers or parents can order posters, pamphlets and brochures, and educational videos online or by calling the Division.

Several sections of the NCDOT Bicycle Policy also support the development of bicycle programs in New Bern:

- State, county, and local law enforcement agencies are encouraged to provide special training for law enforcement personnel with regard to bicycling.
- Education of both motorists and bicyclists on bicycle rights and responsibilities shall be an integral part of the NCDOT Bicycle Program.

- School systems are encouraged to conduct bicycle safety education programs as a part of and in addition to the driver's education program, to the maximum extent practicable.
- The Division of Motor Vehicles is urged to include bicycle safety and user information in its motor vehicle safety publications.

Enforcement Programs

Critical bicycle safety issues identified during the planning process included motor vehicle operators' lack of respect for bicyclists as legitimate users of the roadways and bicyclists riding in an illegal and/or unsafe manner. While education programs should be offered to both motorists and bicyclists, they should be complemented by well-publicized and focused enforcement operations.

The City of New Bern should work with the local Sheriff's Department, Craven County, and the North Carolina Highway Patrol to improve bicyclist safety by establishing a countywide, coordinated bicycle enforcement campaign. This enforcement effort should emphasize that bicycle safety is a shared responsibility between bicyclists and motorists.

In developing this program, it is important to understand state laws related to bicycling.

State Bicycle Statutes

Below are several critical aspects of the North Carolina statute bicycle-related laws:

Laws Addressing Bicyclists

- In North Carolina, the bicycle has the legal status of a vehicle. This means that bicyclists have full rights and responsibilities on the roadway and are subject to the regulations governing the operation of a motor vehicle. Bicyclists also ride on the same side of the road as motor vehicles and adhere to all signals and signs.
- Bicyclists must signal left and right turns by way of hand signals.
- Bicyclists are required to use both a front lamp and rear reflector when riding at night.
- All bicyclists under age 16 must wear a bicycle helmet on public roads, paths, and rights-of-way.
- Bicycles that travel under the posted speed limit shall ride in the right-hand lane or as close as practicable to the right-hand curb or edge of the highway, except when overtaking and passing another vehicle, avoiding a dangerous obstruction, riding on a one-way street, or when preparing for a left turn.

Laws Addressing Drivers

- The driver of a vehicle overtaking a bicyclist shall pass at least two feet to the left of the bicyclist, and shall not drive to the right side of the roadway until safely clear of the bicyclist.
- The driver of a motor vehicle shall not follow a bicyclist more closely than is reasonable and prudent, having due regard for the speed of such vehicles and the traffic upon and the condition of the highway.

Targeted Behaviors

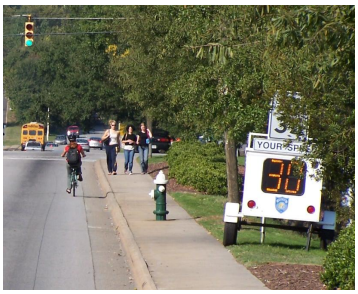
The purpose of the enforcement campaign is to improve safety for bicyclists by upholding the laws related to bicycling. Therefore, the enforcement should target the following bicycle and driver behaviors:

Bicycle Behaviors

- Violating traffic signals
- Riding against traffic on the roadway
- Riding at night without lights
- Failure to signal turns
- Not wearing a helmet

Driver Behaviors

- Not allowing enough space when passing cyclists
- Not yielding to bicyclists when turning
- Speeding



Bicycle Registration and Licensing Program

The City of New Bern should also consider a bicycle registration and/or licensing program as a part of the enforcement effort to improve bicycle safety. This program would require bicyclists to register and affix a license tag to their bicycles. The primary goal of this program would be to improve safety for bicyclists, particularly children, who may be unresponsive after an accident and are not able to be identified quickly. A bicycle license tag may enable rescue personnel to more quickly determine an accident victim's identity, leading to improved decision-making for emergency medical treatment. A secondary goal of a bicycle licensing program is to deter bicycle theft and to increase the opportunity for stolen bicycles to be returned to their proper owners.

Encouragement Programs

The City of New Bern should establish a set of programs to promote bicycling and encourage residents to use the new bicycle facilities that are constructed.

Safe Routes to School

The City of New Bern should work with local schools and bicycle advocacy groups to apply for state funding for a Safe Routes to School Program. The program should combine bicycle and pedestrian facility improvements in the areas around schools with bicycle and pedestrian safety education and encouragement programs to increase the number of students walking and bicycling to school.

The Safe Routes to Schools program should be offered at two pilot schools in the first year after this plan is adopted and expand to additional schools in the future. Note that the 2005 SAFETEA-LU federal transportation bill has apportioned $2.36 million in funding for Safe Routes to Schools Programs in North Carolina in Fiscal Year 2006. NCDOT has a new Safe Routes to School Program Coordinator who can provide advice and help guide the program in New Bern. For more information, see http://www.ncdot.org/programs/safeRoutes/.

Helmet Promotions

The Child Bicycle Safety Act was passed in 2001. As a result of this bill, the NCDOT

awarded over $300,000 to 240 local police and sheriff's departments and the Highway Patrol. The purpose of these funds was to purchase bicycle helmets for use in safety awareness programs in the communities in which funding was awarded. Each law enforcement agency applied for a grant worth up to $2,000 each based on the need, community size, and available funding. New Bern received a grant of $1,400 which was used for helmets given to children at local bicycle safety events. More information on this program can be found at the following website: http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/helmets_helmet.html

More information on helmet initiatives can be found online at http://www.helmets.org/toolkit.htm.

Walk and Bicycle to School Day

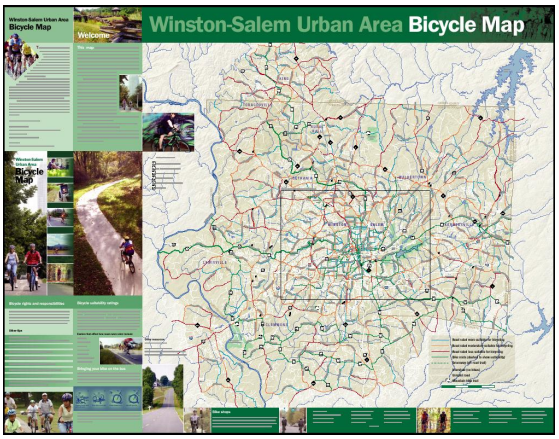
The City of New Bern should work with local schools to increase participation in International Walk and Bicycle to School Day. Walk to school days have been instituted at many schools throughout North Carolina over the past decade. They increase awareness of bicycling and walking as fun, healthy transportation choices that can reduce automobile congestion and pollution near schools. Even a walk to school day can encourage the use of non-motorized transportation and as a result promote bicycling.

Other School-Based Programs

The City should also collaborate with schools to offer activities, such as organizing a "bicycling school bus" or "bicycling train" (a group of students meeting at a specific location and bicycling to school as a group), bicycle scavenger hunt through a Ride 'n' Seek maze, setting up a system for students to earn points and prizes at school through Frequent Rider Miles, and offering bicycle helmet give-aways to classes that have the highest number of students bicycling to school. Bicycle advocacy groups may also be able to assist with these programs. For additional ideas, see the website www.saferoutestoschools.org.

Public Bicycle Map

As a product of this study, the City of New Bern and other public and private organizations are working together to develop a public bicycle map for the New Bern area. These maps can be displayed at public buildings and private businesses and can be made available for use by the general public.



Bike Mentor Program

The City should work with local bicycle advocates and bike shop owners to establish a bike mentor program. This program matches adults who would like to learn more about how to bicycle for commuting with a volunteer who can show them the best route to their work as well as how to bicycle in traffic, in the dark, or in the rain. It is

designed to be a fun and easy way to get adults more comfortable with and excited about bicycling for transportation purposes.

Bike to Work Week

The City of New Bern should work with local bike shops and bicycle advocates to establish a "Bike to Work" week. The week may include activities such as a competition between local employers to see which can have the greatest percentage of employees bicycle at least one day during the week, a bicycle or bicycle helmet give-away, or a bicycle rally in Downtown New Bern on Friday.

The City may want to designate one week in May as "Bike to Work" week because the month of May is typically considered Bicycle Month in the U.S. In fact, May 2006 marks the 50th Annual National Bike Month™ designated by the League of American Bicyclists.

Health Initiatives

The New Bern city planning staff should partner with Craven Regional Medical Center or other local advocacy groups to sponsor a health-based initiative. This campaign can include "be active" programs that encourage healthy exercise and "eat right" programs that promote healthy lifestyles. Bicycling is a natural fit to be included as a part of this initiative. For more information, see the following website: www.beactivenc.org.

Bicycle Friendly Community

Within five years of adopting this plan, the City of New Bern should apply to become a Bicycle Friendly Community. The Bicycle Friendly Communities Campaign is administered by the League of American Bicyclists. This program encourages communities that feel they have made steps towards becoming bicycle-friendly to apply for an award recognizing their efforts. Cary and Carrboro are two cities in the region that have been awarded this honor previously. A Bicycle Friendly Community is one that provides safe accommodations for bicyclists while also encouraging bicycling for transportation and recreation.

Chapter 5 – Implementation

After this plan is adopted, the City must focus on implementing its recommendations. This includes constructing new bicycle facilities, establishing new policy measures, and developing the education, enforcement, and encouragement programs that will promote bicycling for transportation and recreation as well as improve bicycle safety.

The City should start by implementing the Top Priority bicycle facilities (shown on page 5-4) and programs within the first two years after the plan is adopted. These efforts will build momentum for bicycling in the community and should be followed by implementing other recommendations in the plan.

This section discusses three important components of an implementation strategy. These components include institutionalizing the practice of including bicycle facilities as a part of transportation projects, establishing performance measures, and identifying funding sources as key elements of the City's implementation strategy.

Institutionalization

Some of the most cost-effective opportunities to provide bicycle facilities are during routine roadway construction, reconstruction, and repaving projects. The NC Highway 43 extension is a good example of a project that should include bicycle accommodations (at least cross-access facilities) when it is constructed. Another good example is the Broad Street streetscape improvements from Neuse Boulevard to Front Street.

Making sure that bicycles are accommodated in these projects requires institutional awareness of bicycle issues at all stages of project planning and development. City of New Bern transportation staff should attend NCDOT training sessions on bicycle and pedestrian facility design, construction, and maintenance. This will help engineers, designers, and planners in the department be more aware of the needs of bicyclists and pedestrians during all phases of transportation projects.

The City also should continue to work closely with the Bicycle Advisory Committee (BAC) to make sure that bicycle considerations are included in the transportation process. The BAC can help monitor the progress of the City and NCDOT as they develop new facilities and programs. This group also can push for additional improvements to build upon the recommendations of this plan. Coordination with NCDOT, specifically the Division of Bicycle and Pedestrian Transportation, the Transportation Planning Branch, and the Division office will prove critical if this plan is to be implemented successfully.

Performance Measures

The City of New Bern should work with the BAC to establish performance measures to benchmark progress in achieving the goals of this plan. These performance measures should be stated in an official report after the plan is completed. The performance measures should address the following aspects of bicycle transportation in New Bern:

- **Safety** — Measures of bicycle crashes or injuries
- **Usage** — Measures that document how many people are bicycling

- **Facilities** — Measures of how many bicycle facilities are available or the suitability of bicycling on roadways
- **Education/Enforcement** — Measures of the number of people educated or number of people ticketed as a part of a bicycle safety campaign
- **Institutionalization** — Measures of the total budget spent on bicycle projects and programs or the number of City employees receiving bicycle facility design training

The City should set performance measures that:

- Are related to the goals of the plan
- Provide a description of the data that need to be collected
- Utilize data that can be collected cost-effectively
- Are quantifiable and time-constrained (e.g., provide 4 miles of bike lanes by 2008)
- Can be reported at regular intervals, such as in an annual bicycle performance measures report

Project Prioritization

Based on input received during the public workshops as well as information provided by the BAC, a set of project and program priorities were developed. These priorities were developed in an attempt to provide an equitable distribution of projects that would benefit a range of geographical areas as well as user groups in the community. Specific projects represent on-road as well as off-road facilities. Bicycling initiatives and program priorities were developed based on their ease of implementation (including set-up costs) and benefit received by the largest contingent of population.

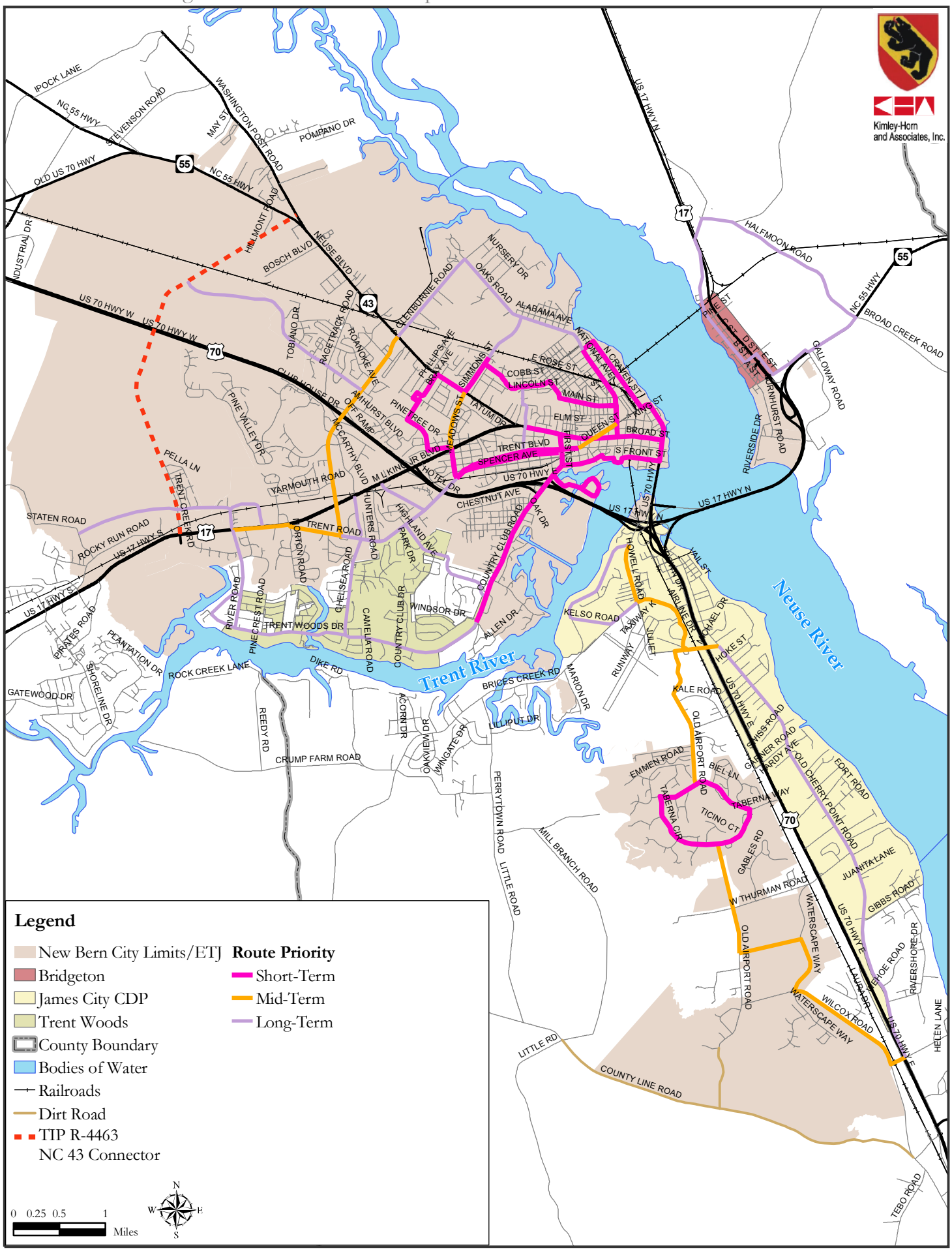
Seven independent bicycle route loops were developed as a part of this plan connecting neighborhood communities, commercial areas and public institutions in New Bern, Trent Woods, James City and Bridgeton. The intent of developing the bicycle loops was to provide bicycle facilities to a greater percentage of population. If this plan is implemented, over 90% of the local population would have access to bicycle facilities, representing all three levels of bicycle users.

Route Priorities

Three levels are used to classify the priority level of each route: short-term, mid-term, and long-term improvements. The total probable construction cost of the bicycle projects for the plan is $13,800,000. Short-term improvements are those projects that are recommended for or can be completed within a 5-year period. The total probable construction cost for the short-term projects is $485,000 (average $97,000 per year). Mid-term improvements are expected to occur between 5 and 10 years into the future for which $2,355,000 in projects is recommended (average $471,000 per year). Long-term improvements are those projects that fall outside of a 10-year horizon for which a total of $12.05 million in projects is presented (this would take more than 20 years spending $602,000 each year). Note that all figures are presented in year 2006 dollars, thus not accounting for inflation or escalation of construction costs. In order to accommodate route segments that can be accomplished more easily in different time frames, some of the routes were split between priority levels. Each route has been classified into one of these priority levels, as shown in **Figure 5.1** and described below.

New Bern Bicycle Plan

Figure 5.1 - Proposed Route Priorities



Short-Term:

- Downtown Neighborhood Loop ($85,000)[1]
- Taberna Loop Bike Lanes striping and signage only ($130,000)
- Trent Boulevard Bike Lanes and Rhem Avenue Signed Route from Simmons Street to Queen Street ($70,000)
- Riverfront Loop ($100,000)
- Country Club Road Bike Lanes from Trent Boulevard to Abner Nash Road ($100,000)[2]

Mid-Term:

- MLK Jr. Boulevard Multi-Use Path and Trent Road Bike Lanes ($400,000)[2]
- Downtown-Mall Loop ($85,000)[3]
- Taberna-James City Loop ($1,400,000)[4]
- Airport Loop ($470,000)[5]

Long-Term:

- Downtown-Mall Loop ($3,300,000)
- Taberna-James City Loop ($2,600,000)
- Downtown Neighborhood Loop ($415,000)
- Airport Loop ($1,080,000)
- Bridgeton Loop ($2,650,000)
- Trent Woods Loop ($2,000,000)

[1] Total cost does not include Downtown Neighborhood Connector

[2] Part of the Trent Woods Loop

[3] Total cost includes facilities along Glenburnie Road, Simmons Street, George Street, and Queens Street

[4] Total cost includes facilities along Airport Road, Lagoon Road, Old Airport Road, Wilcox Road, Camp Kiro Road, and through Carolina Colors

[5] Total cost includes facilities along Howell Road, Williams Road, Airline Drive, and Terminal Drive

Project implementation will be a shared responsibility between multiple agencies. Additional detail on agency participation is provided in the funding section of this chapter.

Incidental Bicycle Projects

As a result of Transportation Improvement Program or Capital Improvement Program funds, certain sections of some of the bicycle routes are scheduled to be funded earlier than the routes of which they are a part. These sections have been prioritized and are listed below.

- **Broad Street Improvements:** City staff should pursue bike lanes to be included in the streetscape improvements from Neuse Boulevard to Metcalf Street.
- **NC 43 Connector (TIP R-4463):** Bicycle cross-access will be vitally important to this growing area of the City. City staff should work closely with NCDOT to ensure that amenities are provided across NC 43 for safe and efficient pedestrian and bicycle travel.
- **Trent River Bridge Replacement (TIP B-2532):** The design for this facility has been completed. However, City staff should work closely with NCDOT to ensure that amenities include high-visibility signage, pedestrian-level lighting and adequate crosswalks at the bridge termini.

Policy and Program Priorities

There are very few existing bicycle-related policies or program initiatives for the City. However, the following initiatives should be pursued in New Bern during the next two years to ensure adequate education, encouragement and enforcement of bicycle awareness for its citizenry. The following items were identified as the highest priority bicycle programs as voted on by the BAC and city staff.

- **Update Design Guidelines:** The City should update their street design guidelines to incorporate the recommendations of this plan (see Design Guidelines – Cpt 3).
- **Route Signage Program:** The City should work cooperatively with NCDOT to develop a route signing plan to improve bicycle awareness and information. Signing should include information on the direction and distance to destination points, as well as intermittent confirmation that the bicyclist is still on the correct route (see Ancillary Facilities and Programs – Cpt 3). Route maps placed on kiosks at destination points or along heavily traveled portions of the routes can also help to publicize the interconnected route system.
- **Traffic Calming Program:** As a part of the City's ongoing traffic calming efforts, bicycle facilities such as striped and painted bike lanes should be incorporated into the program as a viable option for calming traffic.
- **Bicycle Parking and Amenities Program:** One reoccurring comment made at the public workshops was the lack of public bicycle amenities in the New Bern area. Participants were very interested in bicycle accommodations and amenities including parking, restrooms/changing rooms, water fountains, and bike rentals. As a part of this program, the City should dedicate general funds through its CIP to support a bicycle parking and amenities program. Other means of supporting such a program would be to initiate a city-wide competition among private and public agencies to create and implement their own bike amenities supported through private contributions (see Ancillary Facilities and Programs – Cpt 3).
- **Spot Improvements and Maintenance Programs:** The City receives Powell Bill funds for street maintenance and dedicates grant-matching funding through their CIP funds for streetscape projects. If the City is truly interested in becoming a bicycle friendly community, there must be dedicated funding towards bike improvements and maintenance. As a bold initiative, the City should consider creating a set-aside for spot improvements and maintenance of bicycle facilities. It is recommended that $50k - $100k be

allocated to this program on an annual basis. These monies can be used towards small projects like improved signing, drainage grates, intersection crosswalks, pothole repair, shoulder repair, debris removal, railroad flangeway repairs, and repairing edge of pavement seams (see Ancillary Facilities and Programs – Cpt 3).

- **Bicycle Events:** Special community events that reach out to its citizens have always been a huge success for the City of New Bern. The MS-150 event has successfully provided statewide attention to the City of New Bern as a bicycle-friendly community. However, the only active "ongoing" program in the City is a volunteer-based bicycle rodeo sponsored by the police department. The City staff should organize and advocate the following bicycle events on an annual basis: Bike Rodeos for all elementary and middle schools (through actively soliciting school participation) and Ride-Abouts (at different geographical locations). These events can be conducted on their own or in conjunction with local festivals such as Neuse River Day or Kid Fest.

- **Safe Routes to School Program:** One way to stimulate the educational programs would be to introduce a Safe Routes to School program to New Bern. Safe Routes to School was a program started in Marin County, California with help from the National Highway Traffic Safety Administration to promote children walking and biking to school in a safe environment. The Safe Routes to Schools program should be offered at two pilot schools in the first year after this plan is adopted and expand to additional schools in the future. Note that the 2005 SAFETEA-LU federal transportation bill has apportioned $2.36 million in funding for Safe Routes to Schools Programs in North Carolina in Fiscal Year 2006. North Carolina will get approximately $15 million over the next five years. See the website: http://www.saferoutestoschools.org/.

- **Safety Education Programs:** Safety education programs need to be initiated within the next two years targeted to specific audiences and specific road user problems and combined with enforcement activities that are coordinated with the appropriate law enforcement agencies. Education programs at churches, schools, and community centers will allow all age levels to become more informed about bicycle safety. Coordination with the New Bern Police Department Bicycle Unit and the Recreation and Parks Department will allow for this program to be spread throughout the city and to target areas that need it most. Public services announcements on the radio and television should be an integral part of this program.

Funding

It will be important for the City of New Bern to identify funding sources to implement the recommendations of this plan. While some projects and programs will be funded by the City, many other ways are available to provide financial support for improving local bicycling conditions.

Bicycle Facility Funding

Bicycle facility projects can be divided into two types: independent and incidental projects. Independent projects are those that are independent of scheduled highway projects, while incidental projects are bicycle accommodations that are created as a part of a highway project. Both types of projects should be funded to create a well-connected and user-friendly network in New Bern.

The City of New Bern should take advantage of cost-effective opportunities to include bicycle facilities in incidental roadway improvements, such as repaving and reconstruction projects. The City's Bicycle and Pedestrian Coordinator (Planning Department) should coordinate regularly with city and state transportation planners to make sure that upcoming projects in the New Bern area include bicycle facilities.

Bicycle Program Funding

While the City may be able to fund some program activities, it should seek to build partnerships as a cost-effective way to offer comprehensive programs.

For example, the City should partner with county and state law enforcement departments to implement the bicycle safety enforcement campaign. In addition, having local co-sponsors of events such as Walk and Bike to School Day and Bike to Work Week can help fund events and build relationships with other groups that believe bicycling is important in the community. Therefore, the City should build partnerships with local bicycle shops, bicycle advocacy groups, church groups, health professionals, and educators to develop bicycle programs.

State Funding Support

Many of the roadways where bicycle facilities are needed in New Bern are owned and maintained by NCDOT. Therefore, the City of New Bern should take advantage of strong state support for funding bicycle projects and programs. To obtain state funding, the City should take the following actions:

- Send the recommendations of this plan to the NCDOT Bicycle and Pedestrian Program and to the NCDOT Division 2 Engineer immediately after the plan is adopted. This will improve the likelihood that bicycle accommodations will be included during incidental construction and paving projects.
- Check the State Transportation Improvement Program (STIP) on a regular basis to identify opportunities to include bicycle facilities as a part of STIP projects in New Bern. For projects where bicycle facilities are possible, the City bicycle and pedestrian coordinator should notify both the NCDOT Division 2 Engineer and the NCDOT Bicycle and Pedestrian Program to make sure that bicycle facilities are included during the scoping,

design, and construction phases of the project.

- Submit one or two of the plan's Top Priority projects to NCDOT during the first year after the plan is adopted so that they can be considered for the Division of Bicycle and Pedestrian Transportation Program section of the State Transportation Improvement Program (STIP). *The total cost of construction should not exceed $500,000.* Continue to submit one or two additional projects for consideration each year in the future. Projects that do not require the City to purchase additional right-of-way are the best candidates for this funding source. The Bicycle/Pedestrian TIP can include incidental and independent projects. Currently, $6 million is available per year for the entire state through this funding source, and it does not require local matching funds.
- Apply for Transportation Enhancements program funding for an important bicycle project. Bicycle facilities are one of several types of projects that are eligible to be funded by this program. This funding source requires a 20% local match.
- Submit spot improvement projects to NCDOT Division 2 so that they can be fixed with Division Discretionary Funds. This allows the improvement requests to go through an abbreviated TIP process so that they are funded and implemented within one to two years rather than six. Spot improvement projects include short road sections that need shoulders, drainage grate replacements, and improvements to minor intersections.
- Apply for Safe Routes to Schools Program funding. The City should work closely with the new State Safe Routes to School coordinator to apply for funding as the program is established in New Bern schools. Safe Routes to Schools funds do not require a local match.
- Apply for grants from the Governor's Highway Safety Program (GHSP) to fund education, enforcement, and encouragement campaigns. These federal Section 402 Highway Safety funds can be used for bicycle programs.
- Consider applying for state grants to purchase bicycle helmets for low- and moderate-income children so that they can participate in the new Pedestrian and Bicycle Safety Education Program. NCDOT may have funds available for this purpose through its "Share the Road" license plate campaign.
- Take advantage of state planning grant funding to update this plan in five years. In addition, seek state planning grant funding to implement a pedestrian plan. Typically, improving conditions for pedestrians also makes it safer and more convenient to bicycle. In fact, this plan was funded in part by a grant from the Division of Bicycle and Pedestrian Transportation of NCDOT.
- Take advantage of programs similar to N.C. Moving Ahead!, which provided $5 million for bicycle and pedestrian improvements in 2004-2005 (out of $70 million total for multimodal transportation). If a similar program is established in the future, the City should actively pursue having several bicycle projects funded through this source.

Local Funding Programs

- Consider incorporating bicycle facility improvements into future local bond

initiatives. There is a local bond referendum including issues such as parks, open space, and water that is expected to be voted on in April 2007. Incorporating a pilot bicycle project into this bond package would be an effective way to secure short-term bicycle funding.

- Powell Bill or other road maintenance funds can be utilized to create incidental bicycle projects through repaving and restriping roads.

Bicycle Facility Requirements for New Developments

The City of New Bern should include bicycle facilities as a part of new development requirements. This will allow bicycle facilities, such as shoulders, bike lanes, and greenway paths to be added as a part of new housing, commercial, and industrial developments, which will be much less costly than adding the facilities at a later date after buildings, roads, water, and sewer are already in place.

Other Funding Sources

A wide variety of grants and other specific funding sources can be used for bicycle facility projects and bicycle programs in New Bern.

Final Steps

A preliminary review of the draft plan by the Bicycle Advisory Committee (BAC) took place in March 2006. The NCDOT Division of Bicycle and Pedestrian Transportation conducted a preliminary review of the plan in June and July of 2006. In late summer 2006, the City Council is expected to review the draft plan and discuss its recommendations with staff and the consultant. Following City Council approval or adoption, the completed plan with all maps and related materials will be submitted to NCDOT for final review and consideration by the Division of Bicycle and Pedestrian Transportation.

Appendices

Appendix 1 – Detailed Cost Estimates

Appendix 2 – New Bern Bicycle Planning Survey

Appendix 1 – Detailed Cost Estimates

New Bern Comprehensive Bicycle Plan
Unit Cost Estimates

Facility Type	Cost Per Mile
Multi-Use Path	$500,000
Wide Paved Shoulder	$400,000
Signed Route	$1,000
Striped Bike Lanes	$40,000
Wide Outside Lanes	$15,000
Signed Route with Striped Parking	$15,000
Neighborhood Connector	$85,000
Striped Bike Lanes (Additional Pavement)	$440,000

Add a Contingency (20%) to all costs

** Note - construction costs only - no ROW

New Bern Comprehensive Bicycle Plan
Bicycle Route Cost Estimate

Facility Name	Airport Loop
Total Mileage	3.80
Total Cost	$1,268,351
Total + Contingency	$1,522,021
Multi-Use Path	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Paved Shoulder	
Total Meters	4598
Total Miles	2.86
Total Cost	$1,142,727
Signed Route	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Striped Bike Lane	
Total Meters	1171
Total Miles	0.73
Total Cost	$29,113
Striped Bike Lane (Additional Pavement)	
Total Meters	353
Total Miles	0.22
Total Cost	$96,511
Wide Outside Lane	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Neighborhood Connector	
Total Meters	0
Total Miles	0.00
Total Cost	$0

New Bern Comprehensive Bicycle Plan
Bicycle Route Cost Estimate

Facility Name	Bridgeton Loop
Total Mileage	5.45
Total Cost	$2,203,903
Total + Contingency	$2,644,684
Multi-Use Path	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Paved Shoulder	
Total Meters	7785
Total Miles	4.84
Total Cost	$1,934,937
Signed Route	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Striped Bike Lane	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Striped Bike Lane (Additional Pavement)	
Total Meters	984
Total Miles	0.61
Total Cost	$268,966
Wide Outside Lane	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Neighborhood Connector	
Total Meters	0
Total Miles	0.00
Total Cost	$0

New Bern Comprehensive Bicycle Plan
Bicycle Route Cost Estimate

Facility Name	Neighborhood Loop
Total Mileage	7.29
Total Cost	$451,034
Total + Contingency	$541,241
Multi-Use Path	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Paved Shoulder	
Total Meters	1109
Total Miles	0.69
Total Cost	$275,603
Signed Route	
Total Meters	5414
Total Miles	3.36
Total Cost	$3,364
Striped Bike Lane	
Total Meters	2542
Total Miles	1.58
Total Cost	$63,184
Striped Bike Lane (Additional Pavement)	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Outside Lane	
Total Meters	2562
Total Miles	1.59
Total Cost	$23,883
Neighborhood Connector	
Total Meters	105
Total Miles	0.07
Total Cost	$85,000

New Bern Comprehensive Bicycle Plan
Bicycle Route Cost Estimate

Facility Name	Downtown Mall Loop
Total Mileage	14.91
Total Cost	$2,883,975
Total + Contingency	$3,460,770
Multi-Use Path	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Paved Shoulder	
Total Meters	10915
Total Miles	6.78
Total Cost	$2,712,939
Signed Route	
Total Meters	1552
Total Miles	0.96
Total Cost	$965
Striped Bike Lane	
Total Meters	4034
Total Miles	2.51
Total Cost	$100,255
Striped Bike Lane (Additional Pavement)	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Outside Lane	
Total Meters	7491
Total Miles	4.65
Total Cost	$69,816
Neighborhood Connector	
Total Meters	0
Total Miles	0.00
Total Cost	$0

New Bern Comprehensive Bicycle Plan
Bicycle Route Cost Estimate

Facility Name	Riverfront Loop
Total Mileage	5.89
Total Cost	$292,339
Total + Contingency	$350,806
Multi-Use Path	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Paved Shoulder	
Total Meters	862
Total Miles	0.54
Total Cost	$214,201
Signed Route	
Total Meters	5076
Total Miles	3.15
Total Cost	$3,154
Striped Bike Lane	
Total Meters	2699
Total Miles	1.68
Total Cost	$67,076
Striped Bike Lane (Additional Pavement)	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Outside Lane	
Total Meters	848
Total Miles	0.53
Total Cost	$7,908
Neighborhood Connector	
Total Meters	0
Total Miles	0.00
Total Cost	$0

New Bern Comprehensive Bicycle Plan
Bicycle Route Cost Estimate

Facility Name	Taberna James City Loop
Total Mileage	13.90
Total Cost	$3,329,402
Total + Contingency	$3,995,282
Multi-Use Path	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Paved Shoulder	
Total Meters	12227
Total Miles	7.60
Total Cost	$3,038,965
Signed Route	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Striped Bike Lane	
Total Meters	8783
Total Miles	5.46
Total Cost	$218,305
Striped Bike Lane (Additional Pavement)	
Total Meters	225
Total Miles	0.14
Total Cost	$61,516
Wide Outside Lane	
Total Meters	1139
Total Miles	0.71
Total Cost	$10,615
Neighborhood Connector	
Total Meters	0
Total Miles	0.00
Total Cost	$0

New Bern Comprehensive Bicycle Plan
Bicycle Route Cost Estimate

Facility Name	Trent Woods Loop
Total Mileage	16.45
Total Cost	$2,024,636
Total + Contingency	$2,429,563
Multi-Use Path	
Total Meters	1009
Total Miles	0.63
Total Cost	$313,514
Wide Paved Shoulder	
Total Meters	5642
Total Miles	3.51
Total Cost	$1,402,379
Signed Route	
Total Meters	6010
Total Miles	3.73
Total Cost	$3,734
Striped Bike Lane	
Total Meters	11348
Total Miles	7.05
Total Cost	$282,048
Striped Bike Lane (Additional Pavement)	
Total Meters	0
Total Miles	0.00
Total Cost	$0
Wide Outside Lane	
Total Meters	2463
Total Miles	1.53
Total Cost	$22,961
Neighborhood Connector	
Total Meters	0
Total Miles	0.00
Total Cost	$0

Routes	Signed Route	Striped Bike Lane	Wide Outside Lane	Paved Shoulder	Neighbor-hood Connector	Multi-Use Path	Length (miles)	Cost
Airport Loop		✓		✓			3.8	$1,550,000
Bridgeton Loop		✓		✓			5.5	$2,650,000
Downtown-Mall Loop	✓	✓	✓	✓			14.9	$3,500,000
Neighborhood Loop	✓	✓	✓	✓	✓		6.8	$550,000
Riverfront Loop	✓	✓	✓				5.2	$350,000
Taberna-James City Loop		✓	✓	✓			13.9	$4,000,000
Trent Woods Loop	✓	✓	✓	✓		✓	16.5	$2,500,000
Total (length in miles)*	10.2	18.4	7.8	24.7	0.1	0.6	61.8	$13,800,000

* Total accounts for overlapping in the network to produce an overall value

Appendix 2 – New Bern Bicycle Planning Survey

NEW BERN BICYCLE PLANNING SURVEY

The City of New Bern would like to improve the conditions and opportunities for bicycling in our community. Your input will support the work in progress to develop the New Bern Comprehensive Bicycle Plan. Please complete the survey by providing information as it applies to you. Providing your name and contact information is optional; however, it would be helpful to discuss bicycling and to inform you of bicycle plans in the future. (Please print clearly)

Name _____

Mail address _____

_____

_____ Zip code _____

Telephone _____ (home) _____ (work)

Email _____

Age_____ Sex_____

1. Work Status: Employed_____ Work at home_____ Retired____ Student_____

2. Do you ride a bicycle? ____ Do you own a bicycle? ____ How many? _____

3. How many bicycle riders live at your address? _____

4. How would you classify your bike riding skill level?

____ Beginner (Under age 12) ___ Basic ___ Advanced

5. How often do you ride a bicycle?

___ days per week / __ days per month / ___ days per year

6. What is the length of your typical bicycle trip? _____ miles

7. Check ALL the times that you typically ride a bicycle.

___ most everyday	___ daytime	___ night time
___ weekdays	___ weekends	___ holiday
___ vacation	___ summer	___ fall
___ winter	___ spring	

8. Where do you ride? Check all that apply.

__ In the City of New Bern	__ Craven County	__ Vacation sites
__ Other cities	__ Other states	
__ Competitive races	__ Touring events	

9. For what purposes do you ride? Check all that apply.

___ Commute to work
___ Commute to school
___ Shopping trip
___ Run errands
___ Physical exercise
___ Recreation
___ Visit neighbor/family/friend

10. Please check all that would enhance your riding safety and enjoyment.

___ bike rack at your destination
___ striped bicycle lane on the road pavement
___ clean road surface
___ maps of bike routes
___ bike rack on transit bus
___ bike route signage
___ drainage grates flush with pavement surface

11. Do you wear a helmet when riding? _____

12. Have you ever been in a traffic crash on a bicycle? _____ What type?

Bicycle / Car or Truck ____
Bicycle / Pedestrian ____
Bicycle / Motorcycle ____
Bicycle alone ____

13. Please rate the New Bern city streets for bicycle riding by circling one number.

	Not Dangerous				**Dangerous**
Gravel, glass, debris	1	2	3	4	5
Drainage grates	1	2	3	4	5
Cars turning/stopping in front of bicycles	1	2	3	4	5
Cars ignoring or crowding bicycles along the roadside	1	2	3	4	5
Roads too narrow for both cars and bicycles	1	2	3	4	5
Traffic volume	1	2	3	4	5
Harassment from drivers	1	2	3	4	5
Other _____	1	2	3	4	5

14. What roads would you most like improved for bicycling?

_____
_____
_____

15. Name the facilities or types of places you think bicycle routes should connect.

_____
_____

16. Do you support change in bicycle facilities and policies to make New Bern a more bicycle friendly community? _____

17. How do you rate the following ideas for improving bicycling in New Bern?

	Very Important			Not Important	
Bike lanes with striping on the pavement	1	2	3	4	5
Wide outside travel lane to provide space for bicycle	1	2	3	4	5
Removal / repair of hazards such as potholes	1	2	3	4	5
Repair or replace high drainage grates	1	2	3	4	5
Streets that are signed as bike routes	1	2	3	4	5
Bike paths that are separate from the street	1	2	3	4	5
Bikeways that go from residential areas to nearby commercial areas	1	2	3	4	5
Bikeways that connect to each other for long distances	1	2	3	4	5
More bicycle parking at destinations	1	2	3	4	5
Bicycle racks available on buses	1	2	3	4	5
Lockers and showers at workplace	1	2	3	4	5
Removal of curbside parking on city streets to provide more space for bikes	1	2	3	4	5
Local bicycle facility map	1	2	3	4	5
Educational materials describing safe bicycle riding	1	2	3	4	5
Educating car drivers on bicyclists' use of roadways	1	2	3	4	5
Bicycle education in elementary and middle schools	1	2	3	4	5

18. What do you perceive to be the major barriers to bicycle transportation in New Bern?

_____

_____

19. In general how would you rate the bicycle conditions in New Bern?

___ good ____ fair ____ poor

Please return the survey by fax to (252)636-2146 or mail to Annette Stone, City of New Bern, P.O. Box 1129, New Bern, NC 28563.

For more information on transportation planning activities in New Bern visit the Planning and Inspections website or call Annette Stone (252)639-7583. http://www.ci.new-bern.nc.us/PI/index.php

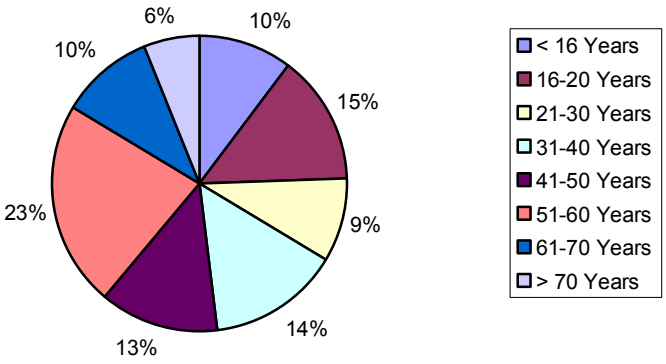
New Bern Bicycle Planning Survey Summary

100 Surveys Completed

Age/Gender

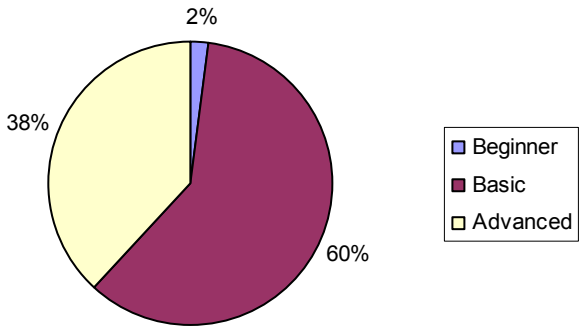
98 Responses

AGE	MALE	FEMALE	TOTAL
< 16 Years	6	4	10
16-20 Years	2	12	14
21-30 Years	6	3	9
31-40 Years	9	5	14
41-50 Years	7	6	13
51-60 Years	13	9	22
61-70 Years	8	2	10
> 70 Years	6	0	6
Total	**57**	**41**	**98**



Bike Riding Skill
100 Responses

Beginner	Basic	Advanced
2	60	38
2%	60%	38%



All elements that enhance riding safety and enjoyment
82 Responses

- Bike Racks – 51 votes (62%)
- Bike Route Signage – 59 votes (72%)
- Maps of Bike Routes – 50 votes (61%)
- Striped Bike Lanes – 63 votes (77%)
- Clean Road Surface – 69 votes (84%)
- Drainage Grates Flush with Surface – 54 votes (66%)

Major barriers to bicycle transportation:
58 Responses

- Time
- Weather
- Lack of dedicated bike trails and paths
- Lack of education and awareness on part of both driver and cyclist
- Driver attitudes
- Lack of paved, clean shoulders, safe roadways, and other surfaces
- Lack of bike lanes

- Failure to incorporate biking needs into public and private development standards
- Right of way
- Surfaces
- Planning at local and state levels have not designed bike paths that are safe
- A lot of effort and work/exercise involved
- Need to connect Taberna to Colors for easier access to downtown; when draw-bridge is closed what will be the safest way into town?
- Railroad Tracks
- Other vehicles/traffic and inconsiderate drivers
- Pot holes
- Tall bridges
- Road obstructions
- Dangerous on country roads
- Narrow roads
- Broken Pavement and debris

Rate the bicycle conditions in New Bern
62 Responses

Good	2	2%
Fair	34	41%
Poor	47	57%