

# Mooresville Comprehensive Bicycle Plan June 2008



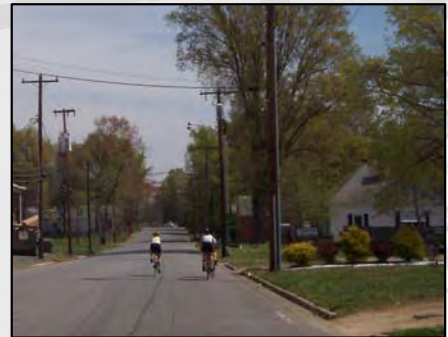




# Town of Mooresville Comprehensive Bicycle Plan EXECUTIVE SUMMARY

## Mooresville's Current Cycling Environment

- 0.32% of Mooresville's citizens commute to work by bicycle, ranking 23rd out of 65 in the state of North Carolina for municipalities with more than 10,000 residents.
- Mooresville and the Lake Norman region is currently a recreational destination for many cyclists.
- Mooresville has no official off-road bicycle facilities but the Greenway Plan and the Comprehensive Pedestrian Plan both identify potential multi-use path corridors.
- Mooresville's downtown core and surrounding areas are reasonably connected and have roadways that are fairly bicycle friendly.



## Bicycle Plan Goals

- Connect important destinations with neighborhood and regional bike routes, bike lanes and other on-road facilities, and various multiple-use paths off of the roadway so that biking becomes a more viable transportation option.
- Support and guide non-motorized conducive land-use decisions and policies such as mixed-use zoning, connectivity, and infill that encourages convenient bicycling for all skill levels.
- Improve safety and accessibility for bicyclists with a special concern for all different types of riders especially children, low income residents, and the elderly.
- Improve environmental conditions and health by reducing air, water and noise pollution resulting from unnecessary vehicular traffic and by increasing physical activity.
- Encourage the addition of amenities in Mooresville that make biking pleasurable and practical such as landscaping, traffic calming, public restrooms and showers, lockers, bicycle racks, and recreational opportunities.
- Create an atmosphere in Mooresville where motorists are familiar with bicyclists, bicyclists are comfortable with motorists, and where many obstacles that bicyclists currently face are corrected.
- Promote awareness of the wide-ranging benefits of bicycling throughout the community.

# Bicycle Needs in Mooresville

## Deficiencies in Bicycle Network

Although Mooresville has a consistent weekend recreational cycling community, bicycle facilities for practical daily use including bicycle lanes, off-road paths, and bicycle racks are virtually non-existent in the Mooresville area. In result, utilitarian bicycling in Mooresville is not common. Connectivity and road design around the downtown area allow for some potential bicycle routes, but most roadways elsewhere in Mooresville are designed solely for motorized vehicles and are unsupportive of safe and practical cycling at all times of the day. In addition, connectivity barriers such as I-77, Lake Norman, and development patterns do not offer low speed and low volume alternatives to major arterial roadways.



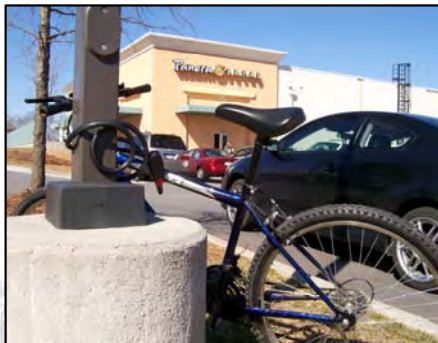
**Development designs have negative impacts on bicycling.**



**Congested / high speed roadways are intimidating.**



**Roadways have hazards to bicycles.**



**A lack of appropriate parking racks discourages bicycling.**



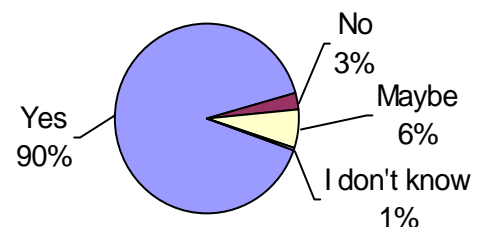
**Public policy and social norms do not yet support bicycle transportation.**

## Summary of Public Input

A total of two public forums were held over the course of this project and an online survey was posted on Mooresville's web site and advertised in the Town utility bill and with the local media. The first forum was intended to introduce the project, present background information, and seek input from the community regarding cycling needs and issues. The second forum presented draft recommendations based on an assessment of needs through mechanisms including public and stakeholder input. Key points raised by the public at these meetings and in the survey results include:

- On-road bike facilities, off-road paths, & traffic calming are desired.
- Heavy & fast traffic on roads and intersections along with aggressive or inattentive motorists make bicycling intimidating.
- Bicycle Parking is desperately needed, especially at schools, shopping, and public service centers.

**I believe that Mooresville will benefit from having better bicycle accommodations**





# General Bicycle System Plan

## System Overview

The recently adopted Mooresville Comprehensive Pedestrian Plan was focused around a series of twenty Pedestrian Oriented Development Zones that identified micro districts of one quarter mile to one half mile in radius that should be developed in a fashion that encourages walking. Since bicycling is affected by many of the same obstacles that affect walking, a similar concept can be applied to generate land use strategies for a bicycle plan.

Urban distances up to 3 miles are most quickly covered by the bicycle compared to other transportation modes such as walking, the private automobile, and public transit. Ideal bicycle trips are in the range from one-half to three miles in distance, providing a great balance between energy and time efficiency. Regardless, US studies show that more than half of automobile commute trips and three out of four automobile shopping trips are under five miles in length. In all, forty percent of all trips are less than two miles in length.

Three obvious bicycle districts that will serve as centralized hubs for practical bicycle accommodations are as follows:

**Downtown Mooresville**, including surrounding neighborhoods of Cascade, Eastern Heights, Harris Crossing, and Mill Village;

**Lake Norman**, including parts of Oak Village, Morrison Plantation, Winslow Bay, the Brawley School Road Corridor, and the racing attractions and industries; and

**Mount Mourne**, including the Medical Center and Lowes campuses, proposed commuter rail station, and the new Langtree Road developments.

## Children

Other than creating the land-use development needed for future bicycling, a top priority of this plan should be to create conditions that are suitable for children to bike. Children of perfect bicycling ages make up a high percentage of Mooresville's residency and are by nature a captive audience because they cannot legally drive. These children are also showing alarming declining health trends due to a lack of exercise, and endanger Mooresville's future adult health as well for when this inactive population matures.



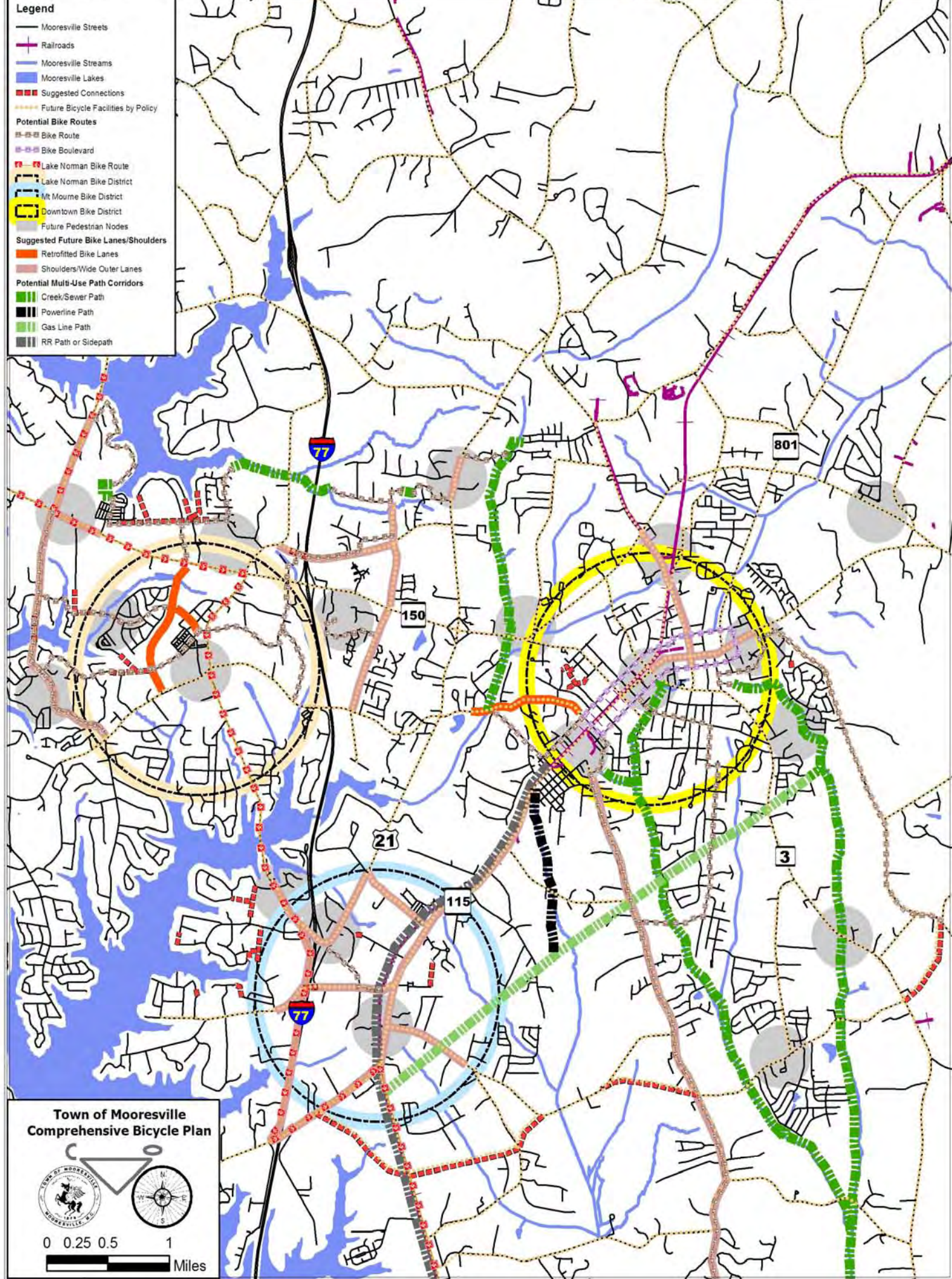
Many current cyclists bicycled as children, but many children of the past couple of decades may never have had the opportunity to regularly bike, and maybe never will as adults. This bicycle plan has the opportunity and responsibility to change that trend.

According to the survey used for this plan, 84% of those surveyed with children in Mooresville stated that their children never bicycle to school. Almost 98% of respondents to this survey stated that they would like for their child to be able to bicycle more often.





- Legend**
- Mooreville Streets
  - Railroads
  - Mooreville Streams
  - Mooreville Lakes
  - Suggested Connections
  - Future Bicycle Facilities by Policy
  - Potential Bike Routes**
  - Bike Route
  - Bike Boulevard
  - Lake Norman Bike Route
  - Lake Norman Bike District
  - Mt Mourne Bike District
  - Downtown Bike District
  - Future Pedestrian Nodes
  - Suggested Future Bike Lanes/Shoulders**
  - Retrofitted Bike Lanes
  - Shoulders/Wide Outer Lanes
  - Potential Multi-Use Path Corridors**
  - Creek/Sewer Path
  - Powerline Path
  - Gas Line Path
  - RR Path or Sidepath



## Town of Mooreville Comprehensive Bicycle Plan

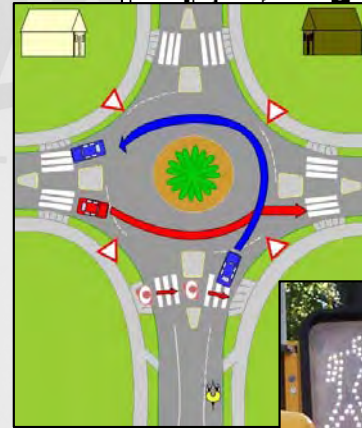
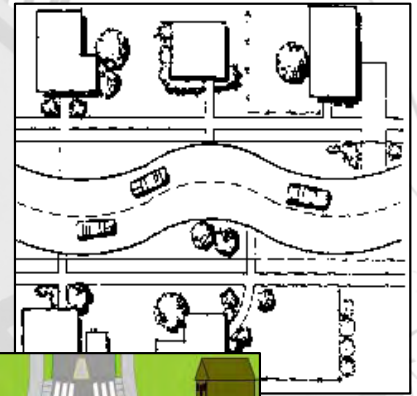


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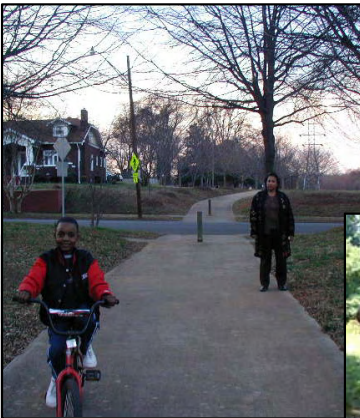
### Bike Lanes & Paved Shoulders



### Traffic Calming



### Multiple-Use Paths



## Projects

### Shared-Roadway Routes



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### Parking

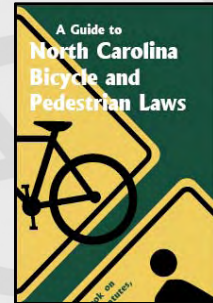


# Programs

A variety of programs are recommended to enhance the overall cycling environment by educating and encouraging citizens, by enforcing laws that protect bicyclists, by increasing transportation options, and by maintaining the safety levels of the roadways to help establish a bicycling “culture” in Mooresville. Examples of beneficial programs are highlighted below:

## Education Programs

Child and adult education programs, maps, wayfinding signs, positive public marketing, and other programs across the United States have been responsible for an increased awareness and an increase in safety for bicyclists. Bicycling requires a certain learned physical skill, and the mix of bicycling with automobile traffic requires essential additional knowledge.



## Encouragement and Promotional Programs

Safe Routes to School programs, “Bike to Work” weeks, shared bicycle programs, and recognition awards could encourage the public to bicycle. One valuable program, Safe Routes to School, can be initiated to help create a better bicycling and walking environment for school children. This program was established in August 2005 as part of the most recent federal transportation re-authorization legislation, SAFETEA-LU. This law provides multi-year funding for the surface transportation programs that guide spending of federal gas tax revenue.



## Enforcement Programs

Continued police enforcement of traffic laws is always necessary. Mooresville’s Police Department should be particularly encouraged to ticket motorized violators in popular pedestrian and bicycling areas, as well as cyclists who violate the law.



## Transit Interface

Providing alternate forms of transportation such as transit can increase the reach of any bicycle trip. Mooresville’s growth increases the need for improved transit service in the future. Each bus in any future Mooresville fleet should have bike racks, and primary transit stops and stations should have bicycle parking and connecting roadway accommodations for bicycles. The proposed commuter train to Iredell County from Charlotte should also offer bicycle accommodations.



## Spot Improvement & Maintenance Programs

Just as potholes, uneven pavement, and visual obstructions irritate automobile drivers, these do the same to bicyclists. Roadway margins should be free of cracks, splits, or crumbled pavement and storm grates should be relatively level with the asphalt and have grates perpendicular to the curb. Annual funding will be set aside for spot improvement maintenance that improve bicycle accommodations and any available state or federal funding will be pursued to correct any gaps in its existing network and to retrofit ADA specific accommodations.





# Policies and Ordinances

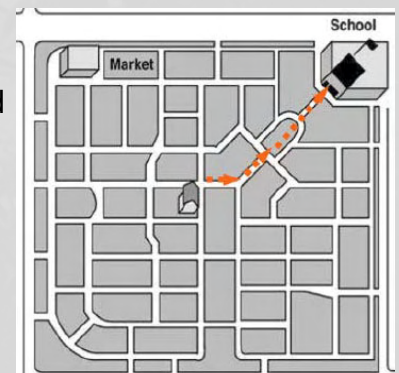
Land use policies and regulations of the last half of the 20th Century have discouraged bicycle and pedestrian-friendly roadways and development and have encouraged automobile use. The recommendations provided in this plan are intended to create more transportation options to Mooresville's residents and create a more complete street system.

## "Complete" Street Design

By policy, Mooresville streets should all be designed to accommodate automobiles, transit, bicycles, and pedestrians. This concept is known as "Complete Streets" because each street completely accommodates all types of transportation users. The provision of transit, bicycle and pedestrian facilities shall be embraced by policy as a primary element in accommodating travel demand and relieving congestion on all new streets in the Town of Mooresville and before street widening projects are undertaken.

## General Policy Recommendations

- New residential development of two dwelling units per acre or greater must have a grid-like or interconnected curvilinear street pattern designed for travel speeds of no more than 25 miles per hour with block lengths preferably no more than 660 feet in distance. These block separations may be streets or 10-12 foot wide paths for pedestrian and bicycle users.
- New commercial development must be oriented to the street and include reasonable connections from the development to the external bicycle network in the public right-of-way.
- Cul-de-sacs will not be permitted unless geographic or other natural barriers exist that make connections unrealistic. A developer may create a cul-de-sac or a close if an acceptable bicycle and pedestrian connection is created with a 10-12 foot wide paved path that is built to standards set forth in this plan for multi-use paths.
- New developments must connect to neighboring developments and provide a future connection option for future developments.
- All new developments and road projects must include bicycle accommodations in street design and construction. Plans for roadway construction must not compromise projects and concepts brought forth in the Comprehensive Bicycle Plan.
- New and refurbished developments should include long term or short term bicycle parking by policy.
- Any new development where there is a bicycle project mapped from the Comprehensive Bicycle Plan must include that project to a functioning level according to guidelines.
- New developments should include public green/open space.
- All new and rehabilitative local, state, and federal road and bridge project planning and construction projects must consider and include any reasonable non-motorized accommodation for both pedestrians and bicycles.
- A policy statement should be made that the preferred method of transportation of children to Mooresville's schools is non-motorized (walking, bicycling, skating, etc.)
- The locations of post offices, health departments, Social Security offices, parks, libraries, police stations, abuse care centers, courts, DMV offices and other civic facilities should be in a location where non-motorized access is a top priority.



# Implementation

## Infrastructure Project Summary

To help narrow the immediate focus for the Town in the implementation of bicycle projects, a subset of “high priority projects” was designated based on the top 10 scores tabulated as part of a prioritization process of each of the 51 identified projects. Focusing initially on this more limited list of infrastructure projects will enable the Town to implement the projects that will have the most benefit to cyclists in the area, while building support for additional development of the bicycle network.

The other projects could be implemented sooner if the resources or opportunities become available.



Project Rank # 3:  
Plantation Ridge Drive Bike Lanes

The *high priority* projects are tabled below:

Rank	Description of Project	Roadway / Location
1	Multi-Use Path with New Shoulders on Roadway	Along Highway 115
2	Bike Lane Striping with Sidewalks	West Wilson Avenue
3	Bike Lane Striping	Plantation Ridge Drive
4	Multi-Use Path	Along Dye Creek
5	Retrofitting of Bike Lanes	Morrison Plantation Parkway
6	Neighborhood Bike Route	Through Southern Neighborhoods
7	Bike Route with New Paved Shoulders	Shearers Road Corridor
8	Bike Boulevard	Academy Street Corridor
9	Bike Boulevard	Church Street Corridor
10	Multi-Use Path Neighborhood Connection to School	Lake Norman Elementary/Middle

Rank	Parking Project	Location
P1	Individual U-Shaped Bicycle Racks	Spread as Needed
P2	Sheltered Rack for Multiple Bicycles	At each Public School
P3	Sheltered Rack for Multiple Bicycles	Downtown - Citizen's Center

## Funding Sources

A combination of funding sources will be needed to construct the proposed infrastructure projects. The Town of Mooresville should seek all viable funding opportunities for project implementation, including federal and state monies where available. Special funding programs for specific types of projects (e.g. Safe Routes to School) should also be pursued. Private foundations should be thoroughly researched to identify possible funding options. Although many funding sources potentially can provide revenues for project implementation, it is likely that local government funding will be a primary component. Therefore, it is recommended that the Town establish a set aside amount in the annual Public Works budget for bicycle infrastructure project implementation, and possibly pursue voter approved bonds as only 3.4% of the citizens surveyed for this plan would **not** support public funding to support bicycle facilities.





THE TOWN OF MOORESVILLE COMPREHENSIVE BICYCLE PLAN  
ADOPTED JUNE 2, 2008



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**ACKNOWLEDGEMENTS**

This bicycle plan required help from numerous agency representatives and citizens, and would have been lacking in substance, quality, and foresight without input from each of these stakeholders.

The following town, county, and state staff members participated in the development of this plan:

- Mitch Abraham, Town of Mooresville Board of Commissioners
- Don Bartell, Iredell County TAB, M-SI Chamber of Commerce
- Christian Bauer, Town of Mooresville Planning
- Helen Chaney, NCDOT Division of Bicycle and Pedestrian Planning
- John Finan, Town of Mooresville Public Works
- Michael Harper, Town of Mooresville Zoning
- Wanda McKenzie, Town of Mooresville Parks and Recreation
- Frank Rader, Town of Mooresville Board of Commissioners
- John Vine-Hodge, NCDOT
- Steve Warren, Iredell County Planning Dept.
- Barry Whitesides, Iredell County Planning Dept.
- Steve Young, Mooresville Graded School District

The following additional community members served on the Steering Committee for this plan:

- Katie Cook, citizen
- Margo Fesperman, citizen
- Joseph Guerrero, citizen
- Bjorn Hansen, Centralina COG
- John Pritchard, citizen
- Mark Sullivan, citizen

The following members of the public attended the public meetings held for the development of this plan:

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Margo Fesperman	Tom Nolan	Dennis & Denise Watson

Bill Clark and Brett Wallace represented the consultant, URS Corporation North Carolina.



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# Section 1

## Introduction







## 1.1. PURPOSE AND NEED



Mooresville is geared up for bicycling. Mild temperatures, easy terrain, a compact town center surrounded by nearby rural roads, and an active population make the area great for cycling and create the opportunity for the Town to grow into a bicycle-friendly community.

Mooresville is known now as “Race City USA” because of its strong connection to auto racing. The Town is home to over 120 NASCAR and motorsports-related teams and suppliers, including Dale Earnhardt, Inc., Penske Racing South, the North Carolina Auto Racing Hall of Fame, the NASCAR Technical Institute, Aero














Dyne Wind Tunnel, and the Auto Research Center (ARC). Americans have a love affair with their cars and Mooresville is no exception. Truly, the automobile defines who we are in this region and in this nation. It has also contributed to much of our growth, success, and freedom but also to most of the land use patterns that make other methods of travel challenging. The bicycle offers a transportation option that may help combat some of the air pollution and suburban sprawl issues that Mooresville and other towns are experiencing. Despite the fact that the bicycle will realistically never again be as common as the private car, it must be accommodated with special planning strategies and efforts.

A great deal of credit for these first paved roads should be given to early bicyclists. Bicyclists, known then as "wheelmen," were challenged by rutted roads of gravel and dirt in the late 1800s. In an effort to improve riding conditions, more than 100,000 cyclists from across the United States joined the League of American Wheelmen to advocate for paved roads. Their success ultimately led to our national highway system.

It is very important to highlight the fact that although popular culture once viewed bicycling as both stylish and as a viable transportation mode, these feelings have somewhat changed. Common perceptions commonly perceive bicycling for one’s transportation needs as either deprived or juvenile and popular culture consequently considers the bicycle to be a toy, or in some cases even an object of ridicule. This leads to the improper impression that bicycles do not have the rights to the roadways as other vehicles do. To a point, adding pathways, increasing safety, and creating pleasurable routes in Mooresville will increase cycling. But societal norms in Mooresville may determine how easily, quickly, and fully this is realized. The Town’s full support of bicycling as a transportation mode would be necessary to invite cyclists to the roadways and to ensure that it becomes a socially acceptable form of transport.



### Quick Bicycling Facts

-  Commuting by bicycle reduces automobile traffic, congestion and pollution.
-  Half of all trips in urbanized area are three miles or less, easy distances for walking and bicycling. (*Clarke, A. National Household Transportation Survey, original analysis, 2001. Data available at [nhts.onl.gov/2001/index.shtml](http://nhts.onl.gov/2001/index.shtml)*)
-  50% of American adults do not get the recommended amount of physical activity for good health and approximately 200,000 to 300,000 premature deaths occur each year in the United States because of physical inactivity. (*Center for Disease Control, 2006*)
-  52% of Americans want to bike more than they do now. (*America Bikes Poll, date unknown*)
-  Because emission rates are high during the first few minutes of vehicle operation reductions in longer trips provide modest pollution emission reductions. Reductions in the number of short vehicle trips can provide relatively large pollution emission reductions. (*Transportation Demand Management Encyclopedia, 2007*)
-  Bicycle friendly communities generally have high property values and residents rate the quality of life higher. (*League of American Bicyclists, [www.bicyclefriendlycommunity.org](http://www.bicyclefriendlycommunity.org)*)
-  While 70 percent of students walked or rode bicycles to school in 1977, only 22 percent of children walked or rode bikes to school in 2002. (*[www.thefutureofchildren.org](http://www.thefutureofchildren.org)*)
-  57% of home buyers rank walking and biking trails as their most desired amenity, ahead of ball parks and outdoor pools. (*National Home Builder Survey, 2004*)
-  Multiple nationwide studies indicate parks, greenways, and trails increase the resale value of nearby properties by 5 to 20 percent. (*Mecklenburg County Park and Recreation web site, 2006*)
-  The average American directly spends around 20% of their salary on transportation. This does not include the numerous extra shared public and commercial costs that occur because of an auto-dependent society. (*AAA, 2005 & Bureau of Labor Statistics, 2003*)
-  45% of people in August of 2005 spent less on other things to pay the increase in gas prices. (*ABC News Poll, 2005*)
-  Regions with transportation choices such as walking, biking and mass-transit are the most economically productive and competitive, while those that are limited to the automobile tend to have reduced regional economic development. (*World Bank, no date*)
-  Traffic calming, mixed-use zoning and pedestrian and bicycle projects can increase private investment substantially along previously automobile-dominated roads. (*Engineering News Record, 1998*)





## Benefits of Bicycling

### **Transportation Benefits**

Bicycling can help to reduce roadway congestion. Gridlocked streets waste time and energy, increase transportation costs, and result in driver frustration. Bicycling requires less space per traveler than automobiles and roadway improvements to accommodate bicycles (such as paved shoulders) can actually enhance safety for motorists. Roadways, bridges and parking lots are constantly a primary concern for municipalities, and a reduction in vehicles on these facilities can save a tremendous amount of resources. A Surface Transportation Policy Project poll found that 55% of Americans would prefer to drive less and walk more, and 40% of U.S. adults say they would commute to work by bike if safe facilities were available. (*Rodale Press Survey, quoted in H.R. 1265-Bicycle Commuter Act, <http://www.bikeleague.org/educenter/hr1265.htm>*)

### **Health Benefits**

According to the Center for Disease Control, 61% of adults in the U.S. are overweight or obese; 13% of kids aged 6 to 11 and 14% of kids 12 to 19 are overweight. Obesity is second behind tobacco in U.S. health risk factors, contributing to 300,000 deaths a year. A twenty-six year Harvard study involving 17,000 Harvard alumni published in 2004 by Ralph Paffenbarger, M.D showed that burning 700-2,000 calories per week is necessary to decrease early mortality chances. In fact, bicycling for 30 minutes each day should be adequate for a person to receive the proper amount of physical activity to be healthy. A round trip of 15 minutes each way (only one to two miles) would burn 1,050 calories in a 7-day week (assuming biking burns 300 calories per hour). Our time constraints make this very difficult, but incorporating physical activity into our daily commute would surely be a solution to this dilemma. Furthermore, recent studies published in the Archives of Internal Medicine and by the World Health Organization found that these health benefits outweigh any roadway risks by such a large factor, that bicycle commuters have a 40% total reduction in mortality compared with their more idle workmates (Lars Bo Andersen, et al, "All-Cause Mortality Associated With Physical Activity During Leisure Time, Work, Sports and Cycling to Work," June 12, 2000).

### **Environmental Benefits**

Reductions in air pollution (emissions and tire wear), water pollution (surface runoff, oil production, and disposal), noise pollution, landfill materials, litter, urban sprawl, and wildlife habitat fragmentation will be a result of each person who chooses to bike instead of drive. Sixty percent of the pollution created by automobile emissions happens in the first few minutes of operation, meaning that shorter car trips (optimum bicycle trips) are more polluting on a per-mile basis than longer trips. A tremendous amount of attention has been given lately to reducing carbon dioxide emissions to decrease negative effects caused from climate change caused from this pollution. Roughly a pound of carbon dioxide per mile driven is emitted into the atmosphere of "new" carbon that was previously hidden under the earth in the form of oil. This is about 14,000 pounds of carbon dioxide per driver per year (the weight of 3½ average automobiles). The majority of a cyclist's energy is made from 'recycled' carbon from above ground biotic sources, but a limited amount may be from any extra cooking fuel and food transport costs it takes to power a bicycle. Nonetheless, an interesting analysis found on a popular cyclists' web page calculated the difference between an automobile's carbon emissions from only the exhaust vs. the biker's total carbon emissions per mile. An average car in the US that gets 19.1 miles per gallon and carries the average 1.4 people contributes over 24 times more carbon dioxide per traveler than a biker of average American fitness level over the same



distance. The car's emissions accounted for only the fuel that it burned to move the car. The bicyclists' emissions accounted for the total energy burned by the biker and the energy taken to grow, process, ship, and cook the cyclist's food. (Ken Kifer's Bike Pages, <http://www.kenkifer.com/bikepages>, 1999)

### ***Economic Benefits***

Direct driving costs include gasoline, insurance, taxes and registration, maintenance, accidents, fines, parking, tolls, and depreciation. In fact, the American family spends about one-fifth of its income on transportation expenses, second only to housing. There are indirect costs of driving that society subsidizes with tax dollars, product pricing, salaries, and housing costs including road infrastructure, environmental mitigation, parking, health costs, and work loss due to traffic, health, or maintenance issues. In addition, gas price increases from 2004 until the completion of this plan in 2008 showed that when people spend more money on gas, they spend less money on other things. (An ABC News Poll found that 45% of people in August of 2005 spent less on other things to pay for the increase in gas costs, and the *Charlotte Observer* reported that vacationers for the Fourth of July weekend in 2006 still packed Myrtle Beach during a summer of high fuel prices, but "spent tremendously less (money.)")

A convincing argument for using a bicycle as your full-time transportation source is derived after calculating the yearly costs of driving for the average American. We would realize that it requires 60 eight-hour work days to pay for these direct automobile costs (not including society-shared indirect costs such as infrastructure tax dollars, environmental, health costs, national defense and others). If we subtract the costs that it would require if that same individual rode a bicycle instead of a car, including estimated additional time requirements, driving would still require 45 work days of that person's salary. Basically, for 2007, a person who does not own a car and bicycles each day to work can spend their salary on whatever they want from the first of the year until March 7, while motorists will be spending that money on their cars.

### ***Quality of Life Benefits***

John F. Kennedy once was quoted as saying, "Nothing compares to the simple pleasure of a bike ride." A ride on a bicycle, whether for utility purposes, recreation, or simply for goofing around gives us a sense of excitement and fun that many of us can still remember from childhood. In addition, removing vehicles from the roads or creating more areas where people are free to be away from automobiles makes life less stressful. Several studies show that children who live near busy roads have higher blood pressure, faster heart beats, and higher levels of stress hormones due to the constant low level noise, and



*Bicycling can be used as a cleaner, cheaper, healthier form of transportation, and it can be fun, too!*

also may sustain permanent respiratory problems from the exhaust (One source is a 2001 Cornell University study and another is a 2007 University of Southern California study.) Designing roadways that are slower and less congested near residential areas, and reducing the number of automobiles on these roads can improve our quality of life.





## 1.2. RECENT HISTORY, TRENDS, AND INITIATIVES

### Past Efforts and Recent Initiatives

The Town of Mooresville recently has been actively involved in several planning efforts containing elements related to non-motorized travel and healthy land use. *The Comprehensive Pedestrian Plan, Downtown Mooresville Master Plan, Cascade Neighborhood Master Plan, Mount Mourne and South Iredell Master Plan, and Parks and Greenways Comprehensive Master Plan* all include recommendations that embrace a more compact land-use structure in parts of Mooresville, and thus enhances non-motorized travel. Each of these plans will have a significant effect on the developmental trends in the area, and thus have a large effect on Mooresville's cycling future. The Comprehensive Transportation Plan and the Land Use Plan have components in them that coincide directly with key aspects of both the Pedestrian and Bicycle Plans.

### Current Trends

In the summer of 2005, Lance Armstrong won a world record seven consecutive Tour de France races. Road bike sales consequently increased 48% in the United States during Lance's run from 1999 to 2005, while the sale of other types of bicycles remained constant. As road cycling climbs in popularity, more motorists can expect to see them on the streets, more communities will try to accommodate them in roadway design, and many of these recreational cyclists will expand on their hobbies to become utilitarian cyclists as well.

This bicycle plan represents Mooresville's first comprehensive study that focuses entirely on improving cycling opportunities. Citizens will look for alternate means of transportation as gas prices climb and as a growing number of studies show links of automobile use to weight gain, air pollution, and other health risks. In fact, a 2006 study by Cambridge Energy Research Associates showed that Americans drove less in 2005 than the previous year. This marks the first time in twenty five years where such a reduction occurred. In addition, the New York Times has recently taken an old California expression of "bicycling is the new golf" into the mainstream with an article that describes the shift of business deals and employee camaraderie being made more on a bicycle seat now than on a fairway.

### North Carolina Department of Transportation Bicycle and Pedestrian Planning Grant Initiative

In 2006, the Town of Mooresville was awarded a \$45,500 grant from the NCDOT Bicycle and Pedestrian Planning Grant Initiative to create a comprehensive bicycle plan. This program encourages the development of comprehensive municipal bicycle and pedestrian plans. The Initiative stipulates that plans may be developed by consultants or by a combination of both municipal staff and consultants and a full time, permanent employee of the municipality must be assigned as project manager to oversee the plan development. URS Corporation North Carolina, based in Charlotte, was selected to develop the plan with Mooresville's Transportation Planner Chris Bauer acting as Project Manager for the Town. The requirements also call for a steering committee made up of relevant local staff, regional planning staff, advocates and representatives of stakeholder groups to oversee development of the Plan. NCDOT has been actively involved with the process of this plan's completion.



### 1.3. GOALS OF BICYCLE PLAN

#### Scope and Purpose of Plan

The scope of the Bicycle Plan is to provide a comprehensive approach to identifying bicycle needs and deficiencies, examining optional improvements, and prioritizing implementation strategies with viable funding sources. The Plan also examines existing conditions, identifies bicycle route networks, conducts needs assessments, identifies design elements, and develops a strategic implementation plan.

The development of this plan was guided by a steering committee comprised of Town staff and local stakeholders, including representatives of the following organizations:

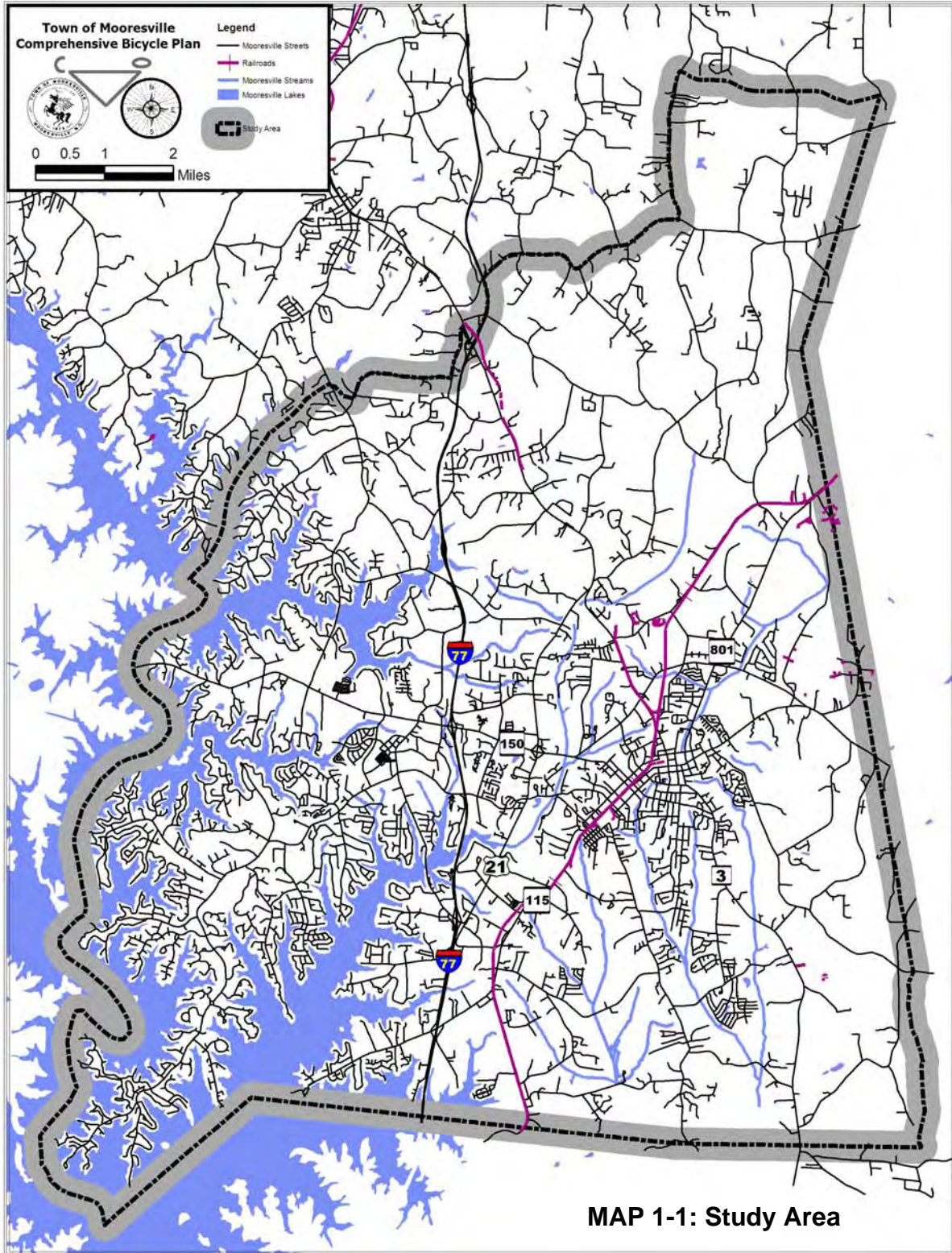
- Town of Mooresville Board of Commissioners
- Town of Mooresville Planning Board
- Town of Mooresville Planning Department
- Town of Mooresville Public Works Department
- Town of Mooresville Parks and Recreation Department
- Town of Mooresville Graded School District
- Mooresville-South Iredell Chamber of Commerce
- Iredell County Planning Department
- Iredell County Health Department
- Iredell County Transportation Advisory Board
- Centralina Council of Governments
- Local citizens

The Steering Committee met four times through the planning process to review interim material and offer guidance on study direction and efforts. As discussed later in this document, it is recommended that the Steering Committee or a similar appointed committee continue (a Pedestrian/Bicycle Committee) to be active after the conclusion of this study as an advisory committee to monitor implementation of the Plan and to advocate for additional bicycle improvements.

The study area includes the town limits of Mooresville and its Urban Growth Boundary. A map of the study area is shown in **Map 1-1**.

#### Overall Goals of Plan

To guide the development of the Plan itself, a series of goals was defined. Goals provide the framework for the entire study, and are needed to ensure that the Plan's recommendations address the true needs of the Town. These goals illustrate the most important cycling concerns to local stakeholders, based on input received from the Steering Committee, the mailed survey, and at the first public forum (discussed later in this report). The goals developed for this plan were also used as a basis for the project prioritization criteria (also described later in this report). Improvements that address these goals will make Mooresville a better community for bicyclists and motorists alike.



MAP 1-1: Study Area





Defining the goals at the beginning of the project ensures that the recommendations are tailored to the needs of the Town, and linking the project prioritization criteria to the goals provides a mechanism for ensuring that the most beneficial projects are ranked highly for implementation. The following are Mooresville's seven goals, based on stakeholder input:

- Connect important destinations with neighborhood and regional bike routes, bike lanes and other on-road facilities, and various multiple-use paths off of the roadway so that biking becomes a more viable transportation option.
- Support and guide non-motorized conducive land-use decisions and policies such as mixed-use zoning, connectivity, and infill that encourages convenient bicycling for all skill levels.
- Improve safety and accessibility for bicyclists with a special concern for all different types of riders especially children, low income residents, and the elderly.
- Improve environmental conditions and health by reducing air, water and noise pollution resulting from unnecessary vehicular traffic and by increasing physical activity.
- Encourage the addition of amenities in Mooresville that make biking pleasurable and practical such as landscaping, traffic calming, public restrooms and showers, lockers, bicycle racks, and recreational opportunities.
- Create an atmosphere in Mooresville where motorists are familiar with bicyclists, bicyclists are comfortable with motorists, and where many obstacles that bicyclists currently face are corrected.
- Promote awareness of the wide-ranging benefits of bicycling throughout the community.

### Benchmark Goals of Plan

A set of benchmark goals is also an important component of a bicycle plan. With these goals, planners, policy makers, and citizens can more easily determine if the cycling infrastructure is improving adequately. Local surveys and the 2020 census can be used to measure the effectiveness of actions taken (or not taken) to implement this plan.

The future Bicycle and Pedestrian Committee should soon determine appropriate benchmark goals by a set date that may guide the development of this plan's recommendations. Benchmark goals might include;

1. The miles of bike lanes
2. The miles of multi-use trails
3. The miles of signed and mapped bike routes
4. The percentage of overall bicycle commuters (2-5% is a good starting number)
5. The percentage of bicycle trips to key areas such as schools and commuter rail stations (10% is a good starting number)
6. The percentage of new and existing businesses that have bicycle parking (by policy, 100% of new businesses should have bicycle parking after this plan's policies are implemented)
7. The funding for bicycle facilities

# Section 2

## Existing Conditions







## 2.1. OVERVIEW OF CURRENT CONDITIONS IN MOORESVILLE

Limited data is currently available from the US Census about the number of residents in Mooresville that currently use a bicycle for transportation. A specific question appeared on the 2000 Census Long Form for a random sampling of the population that asks how they get to work. According to the 2000 census, 0.32% of Mooresville’s citizens commute to work by bicycle, ranking twenty-third (out of sixty-five) in the state of North Carolina for municipalities with more than 10,000 residents.

According to the 2000 US Census, almost 17% of Mooresville’s population is from the age of five to fourteen years old. These ages are prime childhood bicycling years, and have the potential to be the prime targets for this plan. Unfortunately, land use development the last few decades has cost the United States future bikers because students did not learn this skill early. Allowing young citizens to bike to school again will set up the audience needed in the future to create a more cycle-friendly town. Many of these car-chauffeured elementary students of the 1990s are now becoming parents of their own. Will they drive their kids to school as they were or will they try allowing them to bike? A big challenge awaits.

Mooresville is currently the weekend destination for many cyclists. A range of conditions such as scenery, light weekend morning traffic, rural roadways near urban services, and an active bicycling community around Lake Norman make Mooresville a great place for recreational road rides. The anticipation and eventual completion of parts of the Lake Norman Bike Route should bring a heavy increase in riders to this area as well. Routes adjoining Lake Norman on roadways such as Williamson and Bluefield Roads are popular, but bike rides on Shearers Road, Brawley School Road, Wilson Road, and even Highway 115 are common.



*A narrow paved shoulder on NC 115 south of Mt. Mourn; a common bicycling route.*

Mooresville itself has no popular off-road bicycle facilities. The Town’s *Parks and Greenways Master Plan* and the *Comprehensive Pedestrian Plan* both identify potential multi-use path corridors that will certainly add to pleasure biking possibilities throughout the Mooresville area. Local mountain bikers have three popular nearby biking trails at Fisher Farm Park in Davidson, Lake Norman State Park near Troutman, and North Mecklenburg County Park in Huntersville.

Mooresville’s downtown core is compact, vibrant and expected to grow with the addition of some mixed-use projects, retail, and residential. As highlighted in Mooresville’s Pedestrian Plan, these compact urban centers are particularly good for pedestrians and also good for bicyclists. The roadways surrounding these districts usually have lower speeds and are more suited for non-motorized travel. Because of these roadways characteristics and the existence of higher density shopping and housing, cyclists of most skill levels can be comfortable in these areas. Presently, the only other area of Mooresville that has this type of mixed-use high density development with low speed traffic is portions of the Brawley School Road/Morrison Plantation development.



Although having pockets of mixed-use developments such as Morrison Plantation is a vast improvement for creating bicycle-friendly communities, the biggest impact can usually be seen by maintaining, revitalizing, and growing the principal downtown central core. Besides the fact that more vehicle trips can be reduced by land uses that mix housing with workplaces than any other type, continuing to vitalize downtown Mooresville can have other important benefits to the community.



*Main Street in downtown Mooresville had recent pedestrian improvements*

### Downtown Vitalization:

1. Increases the tax base of the community; taking unoccupied or underutilized buildings and converting them to revenue producing businesses.
2. Increases the retail mix; dollars that would be spent elsewhere are circulated locally.
3. Encourages much needed building maintenance and facade rehabilitations.
4. Increases tourism and tourism-related dollars.
5. Promotes the image of downtown as a single entity: a fun, attractive place that serves as the hub of community life.
6. Portrays the image and pride of the entire community. It is an active and attractive downtown image which potential new businesses and industries want when looking for new locations.
7. Instills pride in the community.
8. Creates jobs and investment.
9. Decreases the municipal service costs for an outwardly expanding Town limit.
10. Reduces traffic and its associated health and economic costs.
11. Provides for a self-functioning community where people can live, work, and socialize.

There are several other key sections of Mooresville that will experience tremendous growth that could be developed in a fashion that encourages bicycle travel. The Mount Mourne area is certainly the most prominent of these possibilities. Mount Mourne is proposed to house a new campus for the national headquarters to Lowe's Incorporated, a commuter rail station that serves Charlotte, and several large shopping and housing developments. Many new roads will be built and many improvements to existing roads will be made in the next several years. This will be Mooresville's best opportunity to create a thriving economic center that is accessible for many residents by bicycle.



## 2.2. COMMUNITY CONCERNS, ISSUES, AND NEEDS

The determination of community concerns, issues, and needs is paramount to a successful bicycle plan. The issues described in the following pages were used as the framework to develop strategies and recommendations to improve the cycling environment in and around Mooresville. Specific recommendations resulting from these efforts are described in subsequent sections.

### Public Forums

A total of two public forums were held over the course of this project. The first forum was intended to introduce the project, present background information, and seek input from the community regarding bicycling needs and issues. A second forum was held later in the study to present draft recommendations, based on an assessment of needs through mechanisms including public and stakeholder input, a review of relevant plans and projects, and policies, and field reconnaissance.

The first public forum for the Mooresville Comprehensive Bicycle Plan was held on May 1, 2007 at the Charles Mack Citizen Center from 6:00 PM to 8:00 PM. There was an initial presentation at 6:30 followed by a comment and open house period until 8:00 PM.

The second public forum was held on February 7, 2008 in the Charles Mack Citizen Center. The meeting was also held from 6:00 PM to 8:00 PM, with a 30-minute presentation and a 15 minute question and answer session on the highlights of the plan. The presentation summarized the highlights of the draft plan, including the following elements:

- Purpose of Bicycle Plan / Benefits of Bicycling;
- Bicycle Plan Goals;
- Existing Cycling Conditions and Policies;
- Summary of Public Input;
- Deficiencies in Bicycling Network;
- Bicycle-Friendly Development Patterns;
- Types of Bicycle Projects;
- Overall Recommendations;
- Summary of Projects;
- Policy and Program Recommendations;
- Funding Sources; and
- The Implementation Process.

The participants were invited to comment on the highlights of the draft plan to ensure that public feedback is fully incorporated into the findings and recommendations. A question-and-answer session followed the formal presentation. Detailed summaries of these public forums are included in **Appendix A**.

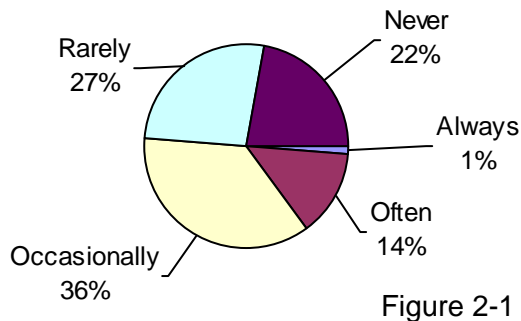
In addition, The Town of Mooresville placed a link to a survey about bicycling conditions in Mooresville on its web page. This survey's link was placed atop each of the Town's utility bills that were mailed out on March 30, 2007, and the link was further advertised in the Charlotte





Observer Neighbors section, The Lake Norman Times, the Mooresville Tribune, and with flyers distributed around town. Paper surveys and drop boxes were also displayed at the library, Town Hall, the Citizen’s Center, the War Memorial, the Chamber of Commerce, the YMCA, Dicks, Target, and Cool Breeze Cyclery. Citizens also had the option of requesting a paper survey. A total of 117 paper surveys were completed and returned, while 290 surveys were completed on-line for a total of 407 surveys. While only a few respondents were suspected to live outside of the Iredell/Mecklenburg region, 54% of the participants stated that they lived inside of Mooresville’s Town limits, while most of the remaining respondents live near the town limits or in the Lake Norman/Charlotte region.

**I choose to bicycle for TRANSPORTATION (not recreation) around my community**



In general, the survey found that 92% of the respondents claim to ride a bicycle at any locale on occasion. Of those, 49% of the respondents never or rarely bike for transportation (Figure 2-1) while 99% of those respondents occasionally or often bike for pleasure or recreation. Of those respondents that do bicycle for transportation, only 3% do so out of necessity, and only 20% have ever used a bicycle to travel to work to or from Mooresville. The number of male respondents was almost twice the number of female respondents, while the most common age group surveyed was 36-45 at 42%.

Of the respondents that stated they do bicycle on occasion, 65% stated that they bike in the Mooresville/south Iredell area several times a month or more. The three most common biking corridors in Mooresville according to this survey are:

1. Shearers Road
2. Main Street and Highway 115
3. Brawley School and Wilson Roads

Of the respondents that stated they do bicycle on occasion, 64% stated that they bike outside of the Mooresville/South Iredell area several times a month or more.

The three most highly enjoyed bike facilities enjoyed by responding bicyclists at any locale were:

1. Roadways with designated and marked bike lanes: 49.4% claimed to highly enjoy these
2. Greenways and other paved off road paths (not sidewalks): 45.7% claimed to highly enjoy these
3. Rural roads with paved shoulders: 42.4% claimed to highly enjoy these

The three least used bike facilities as stated by these bicyclists at any locale were:

1. Main urban or suburban roadways: 60.1% claimed to not use these
2. Sidewalks: 42.9% claimed to not use these



3. Mountain bike trails: 28.2% claimed to not use these (note: 37.2% claimed to highly enjoy and 20.7% claimed to enjoy these facilities, so the number of responders that do not use these are misleading as mountain biking is a subgroup of bicyclists and less inclusive by nature.)

Twenty-six percent of responding bikers stated that they break the laws of the roadway occasionally or more while biking (49% said they rarely break the laws), while 79% stated that they have had motorists treat them with carelessness or aggression occasionally or more often while biking in or around Mooresville (an additional 17.5% said that motorists rarely do this).

All respondents were asked to choose from a list of obstacles that most often have discouraged them from biking in Mooresville. The ten most common obstacles were:

1. Roadways are too narrow or have no shoulders	83%
2. Heavy or fast traffic on the roads and in the intersections	79%
3. Lack of biking areas separated from traffic like bike lanes or paved trails	74%
4. Concern of driver's care (inattention, cell phone use, sobriety, etc)	67%
5. Roadways are poorly maintained or have hazards	42%
6. There are limited places to lock/store a bike	30%
7. Travel areas are not well lit	16%
8. Destination is too far away to bike	14%
9. It seems easier to drive	12%
10. Concern of Crime	10%

Only 2% of the respondents stated that they would *not* bicycle more often if many of the above obstacles they checked were corrected, only 4% of respondents believe that Mooresville has adequate bicycle accommodations, and 90% believe that Mooresville will benefit from having better bicycle accommodations.

In addition, only 3% of all respondents would not favor development polices that encourage bicycling or would not support public funding for bicycle facilities (Figure 2-2).

**Would you support public funding for bicycle facilities such as bike lanes and greenway paths?**

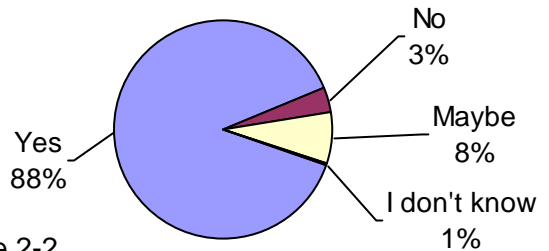


Figure 2-2

**Would you like for your child to be able to bike more often?**

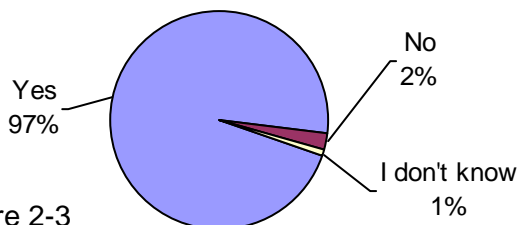


Figure 2-3

Survey responders also had a chance to comment on bicycling conditions for their children aged 5-15 years old. Ninety percent of these parents' children rarely or never bike to school, while 35% of these parents' children rarely or never bike in their community. The strongest reason for this from those who said their children rarely or never bike was that they had traffic related concerns or believe that there are a lack of bike lanes. Seventy-four percent



of parents would feel more comfortable with their child biking to school more often if paved pathways were available, and 71% would be more comfortable with their children biking to school if the school was closer or in their neighborhood. While lowering traffic speeds would not significantly ease parents' minds, 86% said they would be more comfortable with their child biking in their community more often if paved pathways were nearby. Ninety-seven of all parents surveyed responded that they would like their children to be able to bicycle more often (Figure 2-3).

Additionally, 126 people gave further comments on this survey. These selected comments are representative of many of the comments:

*"Provide more roads with bike lanes and/or paved shoulders."*

*"We must encourage non-motorized vehicle-use whenever and wherever we can."*

*"We are in desperate need of bike routes that are safe for the family."*

*"I am pleased that consideration is being given to upgrading the cycling environment in the Mooresville area."*

*"Much more should be done to make the roads safer for bikers."*

*"Having a biking/pedestrian friendly community is something we shouldn't have to ask another's opinion on...to me; it is just plain common sense."*

*"Thanks for putting this initiative together, you have my support."*

*"I desperately want to ride my bike to the post office, library, or to the bank, but it is too dangerous."*

*"Traffic is so ridiculous in Mooresville that it is unsafe to drive a car, much less send yourself or someone out on a bicycle."*

*"The plan to add bikeways and paved trails is one of the best ideas I have heard in a long time."*

*"The Shearers Road corridor is a haven for road cyclists in Mooresville."*

*"There are no shoulders and drivers get very frustrated waiting behind the biker to pull over and let traffic pass."*

*"Area is very unfriendly to bicycle traffic. It is cars or nothing."*

*"I would love to see greenways built like Mecklenburg County!"*

*"Please make developers make people-friendly projects, not car-friendly projects"*

*"Please do something."*



The complete responses to these surveys and public forums are located in **Appendix B**.

## Steering Committee

A Steering Committee was formed to help guide the development of this plan. This committee, which met four times over the course of the study, provided insight and ideas that were incorporated into the planning process. Minutes from the Steering Committee meetings are included as **Appendix C**.

## Media Contacts

Some media coverage occurred in the development of this plan including. Survey links and public meeting dates were advertised in the Charlotte Observer Neighbors section, The Lake Norman Times, and the Mooresville Tribune.

Media and advertisements are included as **Appendix D**.

## Staff and Agency Concerns and Issues

Representatives from Town departments included the Planning, Parks and Recreation, Public Works, and the Graded School Departments. The County was represented by the Health and Planning Departments. NCDOT, the Mooresville-South Iredell Chamber of Commerce, and Centralina Council of Governments also participated in the Steering Committee for this planning process, as well as members of both the Mooresville Board of Commissioners, the Town Planning Board, and the Iredell County Transportation Advisory Board.

The minutes from the Steering Committee meetings, contained in Appendix B, describe the input and feedback received from these stakeholders. In general, the stakeholders had the largest interest in creating a safe bicycling environment for children, but agree that bicycle improvements should also focus on utilitarian cycling for adults. However, suggestions for adult cycling improvements were largely recreation based such as the need for long distance off-road paths.

Planning staff emphasized the need for a bicycle plan that complements the wide ranging plans that have been recently completed or are in the process of being completed such as the Pedestrian Plan, Transportation Plan, Land Use Plan, and the various small area plans. The Town of Mooresville, along with NCDOT, has made the commitment to provide bicycle accommodations on many proposed roadways recently, but this document should provide a framework for further improvements.

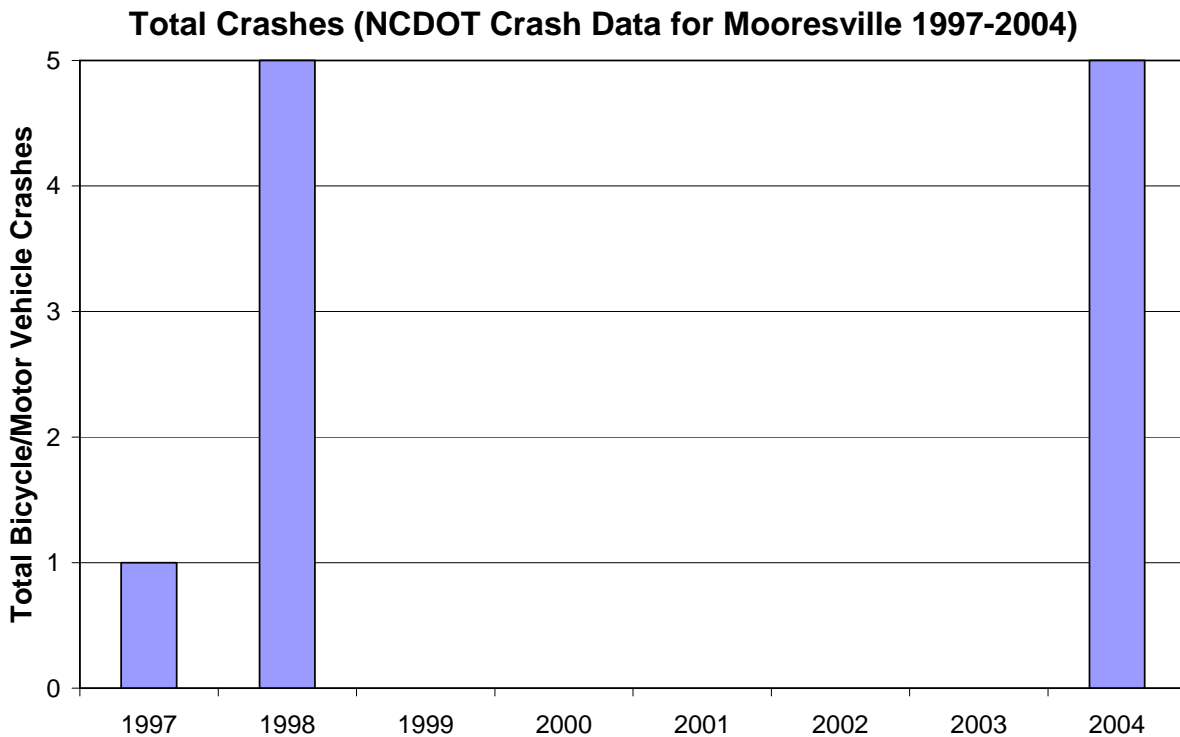




### Bicycle Crash Data

Recent bicycle crash data for Mooresville were analyzed using NCDOT's web-based pedestrian and bicycle crash database (<http://www.pedbikeinfo.org/pbcat/>) to determine safety trends and identify specific areas of concern with regard to motorist / bicycle incidents. Using this database, a total of only 11 bicycle crashes was reported between 1997 and 2004 in Mooresville (more recent data were not available). The distribution by year of these incidents is illustrated in Figure 2-4. Over these past eight years for which comprehensive data are available, the number of bicycle crashes reported per year has widely fluctuated. The possibility exists that there were crashes that may have not been reported or recorded. In addition, NCDOT provided additional, but basic crash data that show four bicycle/automobile injury crashes (all near the downtown area) in 2005 and zero crashes in 2006. This data set did not provide the comprehensive information that is graphed on the following pages, so is not included with these charts.

Figure 2-4



With only a few numbers to examine assuming all of the data has been reported, and no clear trends other than big spikes in two key years, it is not easy to say what factors contributed to this range in the number of crashes each year. Under normal conditions, high crash rates may be the result of poor safety features in the infrastructure, or on the other hand, more crashes might mean that there are more bicycles on the road that year. Some might argue the opposite; that bike accidents decrease with more bicyclists on the roadways because motorists become used to them. Or, more bicyclists one year might be because of safer roadways than the previous year, or it might mean that economic conditions are forcing people to bike more.



A change in roadway congestion because of development patterns may increase accident rates or changes in populations could also influence the numbers of people cycling. It may be possible that important parts of this data are missing or incomplete. It is important to remember that any number of factors can contribute to these statistics, and not to assume anything because of the data unless considerable study has been put forth. What we do know for Mooresville is that 9 out of the 11 reported crashes were children and teenagers, so many economic or roadway conditions can be ignored. The real question is; why is there not a wider range of ages involved in accidents in Mooresville? Is it because it is a safe biking environment, because there are few bikers, or because of a lack of good data?

Crash data were further analyzed to determine specific characteristics of the reported incidents, including aspects related to the incident location, injuries resulting from the crashes, and the circumstances of the crashes. These attributes are illustrated in the following charts.

The next three graphs (Figures 2-5 to 2-7) illustrate where the bike crashes in Mooresville took place. Separately, the graphs might show a picture of bicyclists being hit while biking on main roadways, but looking at them all together, it is clear that the majority happened at intersections on residential roads. The remaining few incidents occurred on a sidewalk or another feature near commercial areas, with one being on a higher speed rural road.

Figure 2-5

**Where Crash Occurred  
(NCDOT Crash Data for Mooresville 1997-2004)**

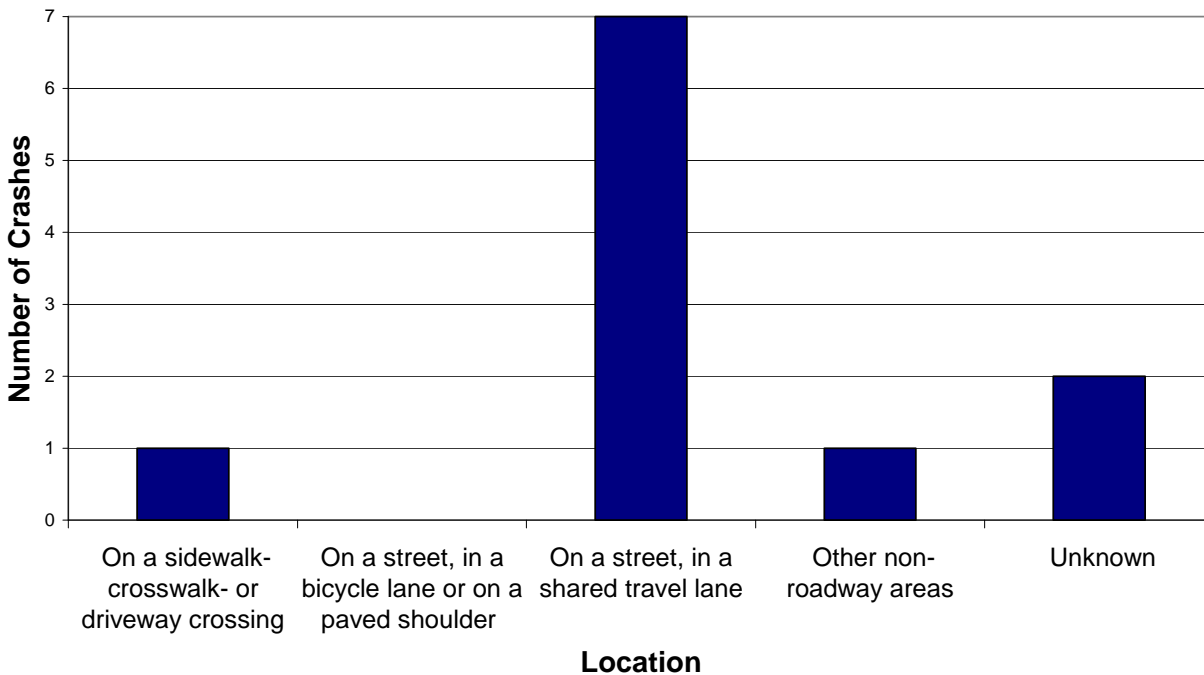




Figure 2-6 **Development Type at Crash**  
(NCDOT Crash Data for Mooresville 1997-2004)

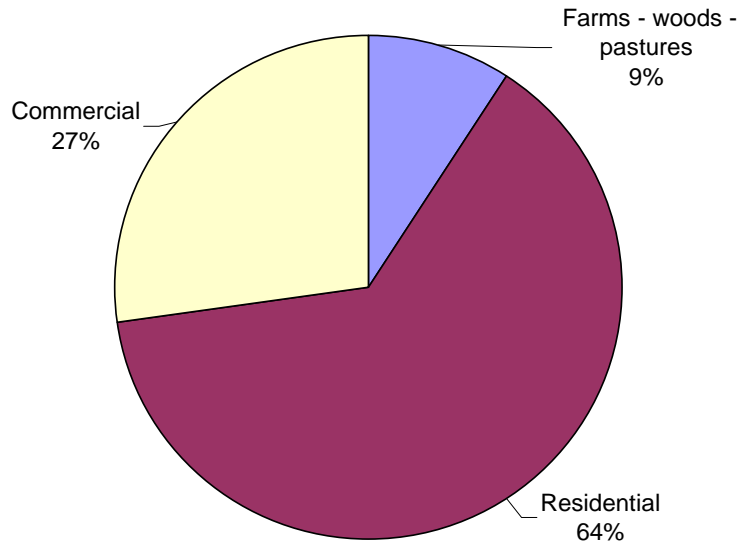


Figure 2-7 **Road Features**  
(NCDOT Crash Data for Mooresville 1997-2004)

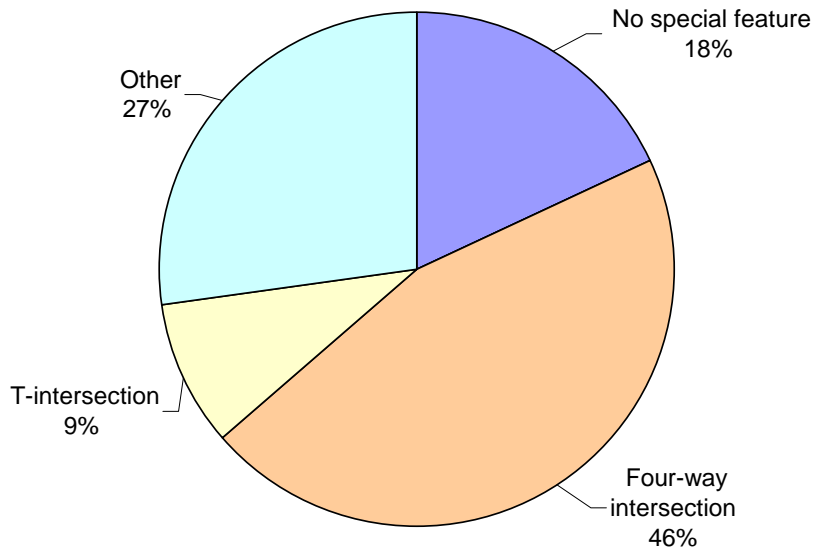




Figure 2-8 highlights the ages of the crash victims. It is apparent here that the victims are primarily minors, making the earlier results more clear. The children were usually hit while on residential streets (Figure 2-9), and as they are least familiar with traffic laws, many had conflicts with vehicles at intersections. Figure 2-10 shows that this age inexperience also lead to other infractions that may have further lead to the crash such as riding on the wrong side of a shared roadway, or even riding on the wrong side of the road on a sidewalk (by a child aged 11-15). Although the two adults involved in crashes were either riding at night without a light or riding the wrong way on the roadway. Nationally, data show that riding on the wrong side of the roadway, riding on a sidewalk, riding through intersections, and riding at night without lights are some of the most common causes of bicycle accidents.

Figure 2-8

**Age of Crash Victims  
(NCDOT Crash Data for Mooresville 1997-2004)**

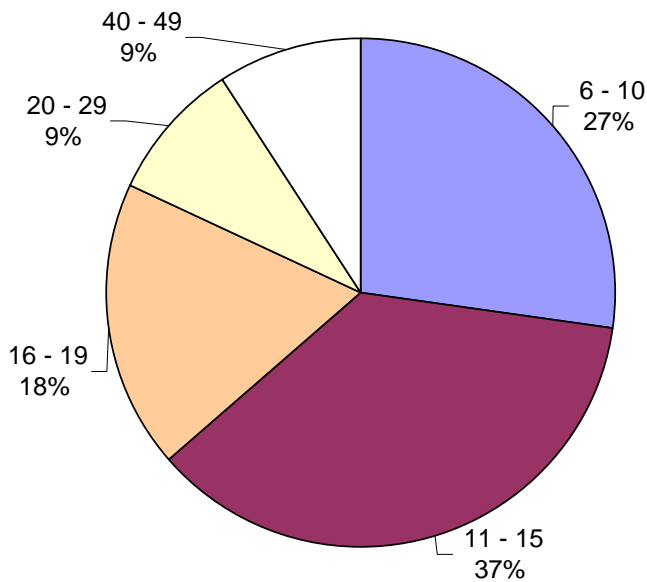






Figure 2-9

**Age by Development Type  
(NCDOT Crash Data for Mooresville 1997-2004)**

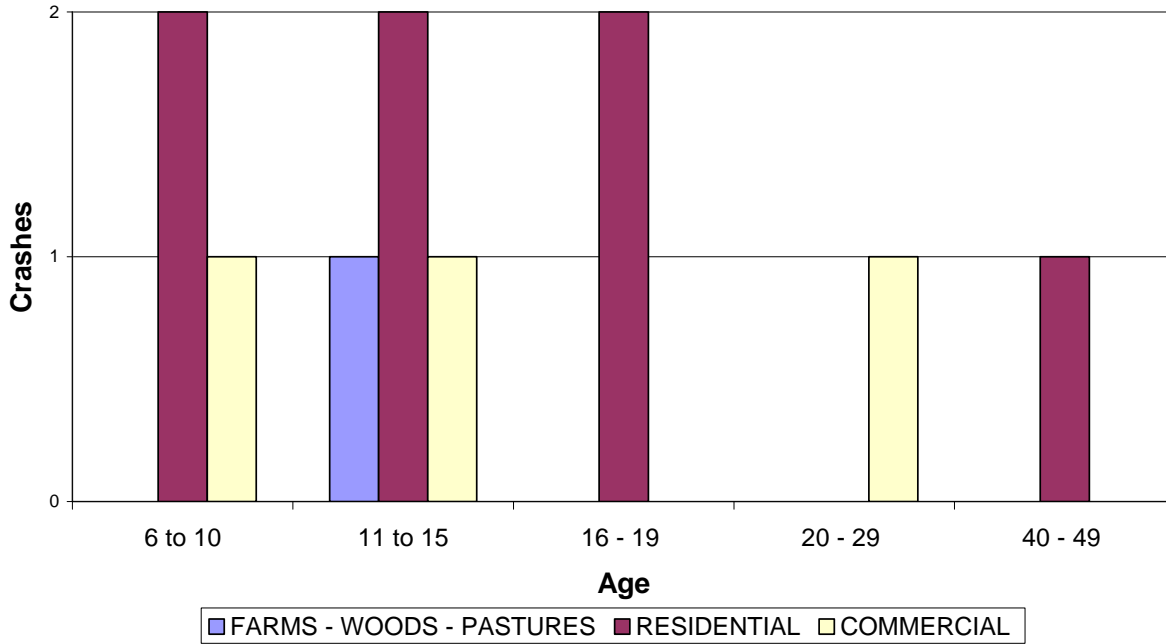


Figure 2-10

**Where Crash Occurred vs. Direction of Biker  
(NCDOT Crash Data for Mooresville 1997-2004)**

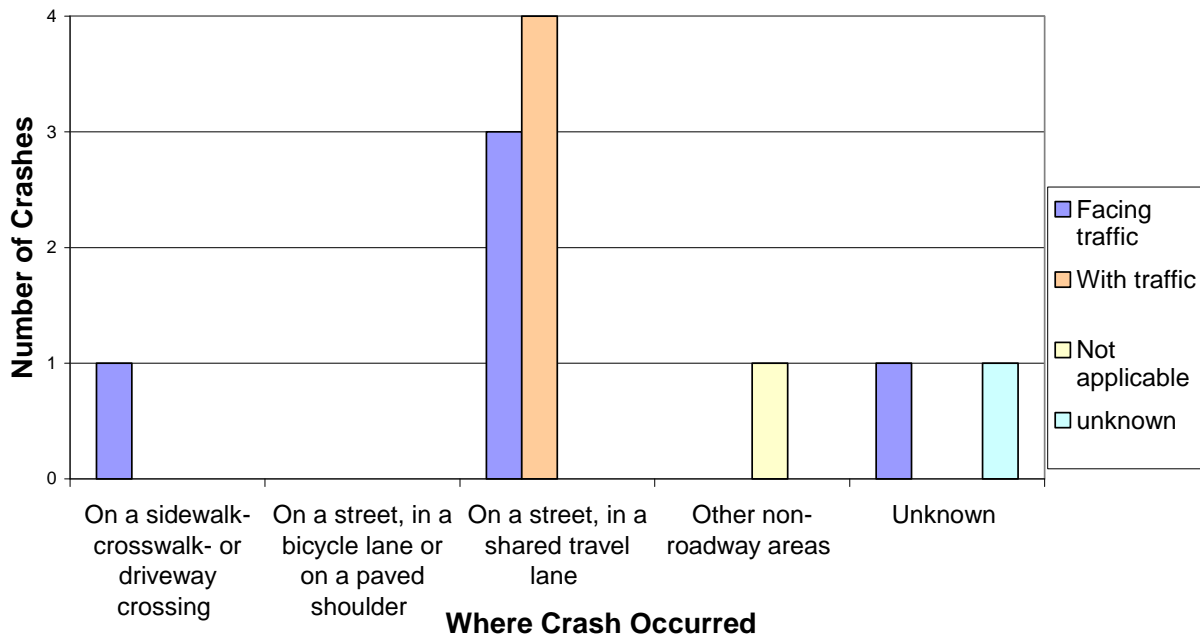




Figure 2-11 shows that the majority of these accidents were reported as being the fault of the bicyclist, while Figure 2-12 shows that the faulted bicyclists were all children with the exception of one. Figure 2-13 shows that many of these crashes occurred in areas with a relatively high speed limit of 35 MPH, while prior figures (2-6 & 2-9) show these to be residential. Lower speed limits on residential roadways could help alleviate biking concerns with children.

Figure 2-11

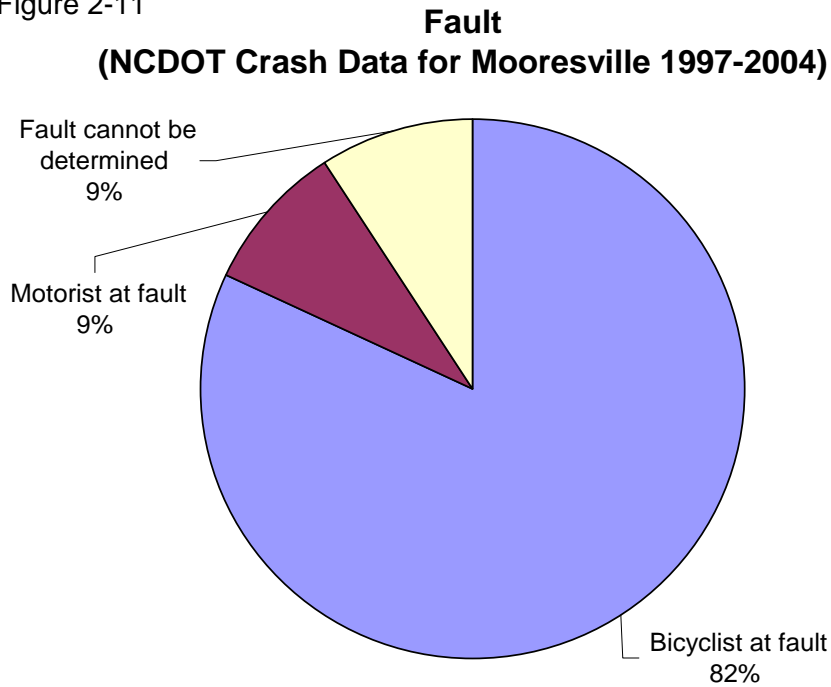




Figure 2-12

**Bicyclists' Ages of the 9 Crashes that were Bicyclists' Faults  
(NCDOT Crash Data for Mooresville 1997-2004)**

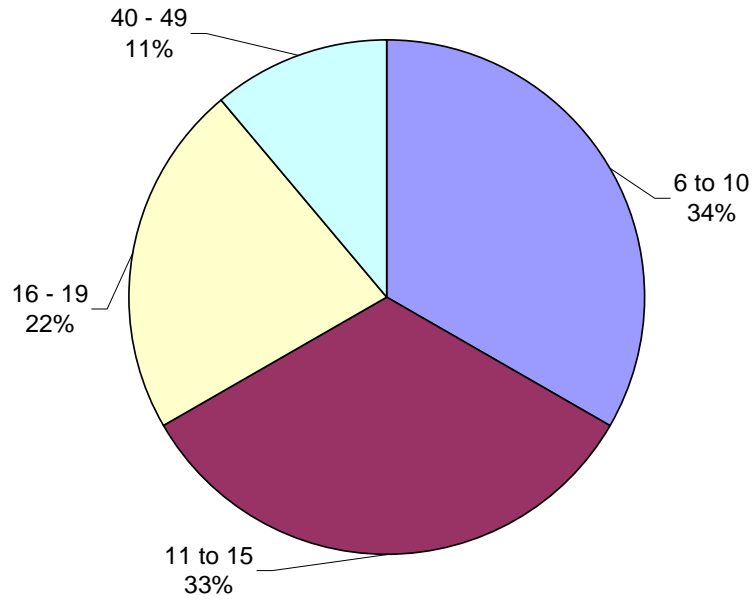


Figure 2-13

**Biker Age and Speed Limit  
(NCDOT Crash Data for Mooresville 1997-2004)**

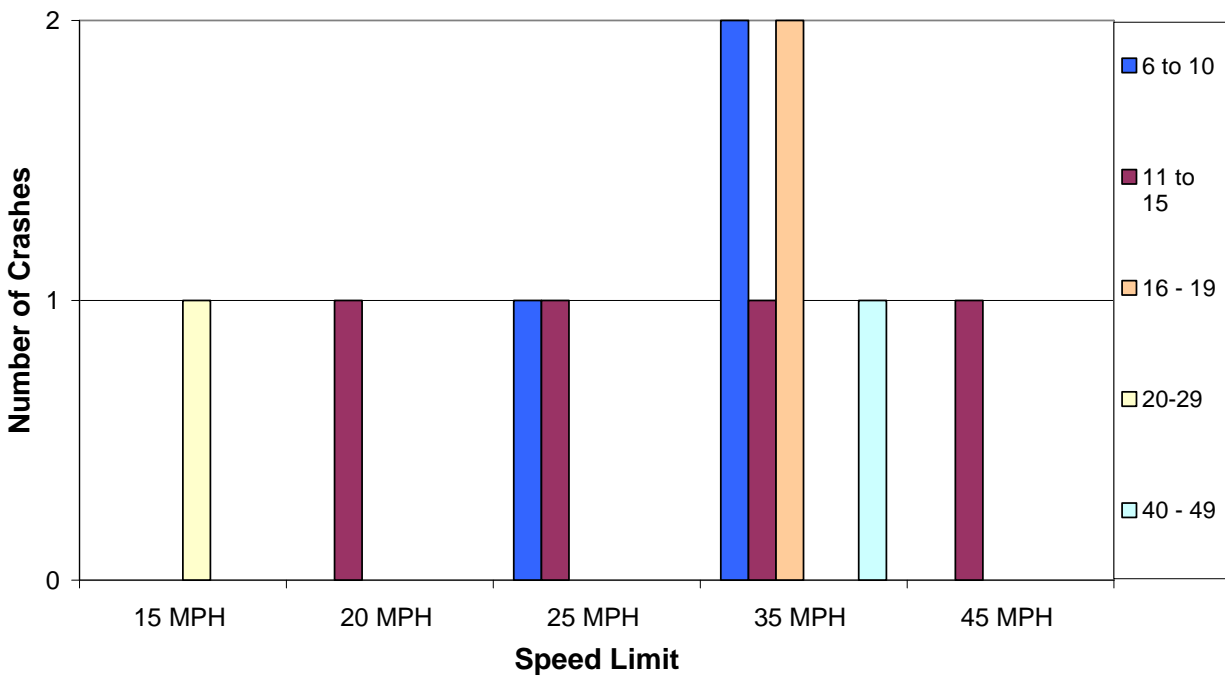




Figure 2-14 shows how the victim's injury was, in most cases, evident. No bicycle crash victim was killed or disabled in Mooresville according to NCDOT data for this time period. Figure 2-15 shows that five out of six of those evident injuries occurred when the bicyclist was not wearing a helmet. The sixth evident injury occurred when the helmeted bicyclist was riding on a 45 mile-per-hour rural roadway and was hit in an intersection. Figure 2-16 shows the estimated speeds each motor vehicle was traveling when it struck the bicyclists, showing the majority of the crashes at a speed higher than 20 mph.

Figure 2-14  
**Crash Severity  
(NCDOT Crash Data for Mooresville 1997-2004)**

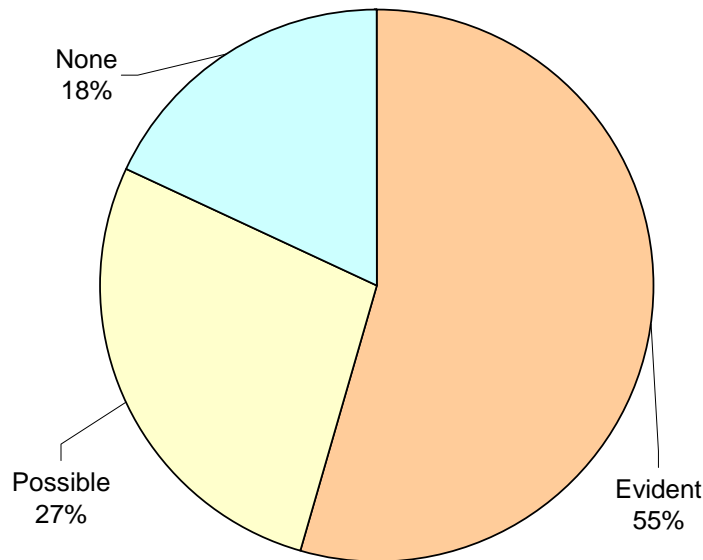


Figure 2-15  
**Extent of Injury where Helmet not Used  
(NCDOT Crash Data for Mooresville 1997-2004)**

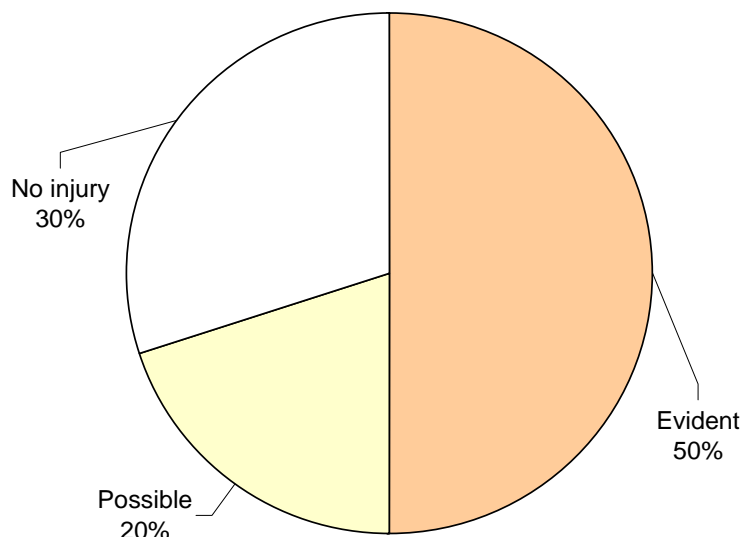






Figure 2-16 **Estimated Speed of Motor Vehicle  
(NCDOT Crash Data for Mooresville 1997-2004)**

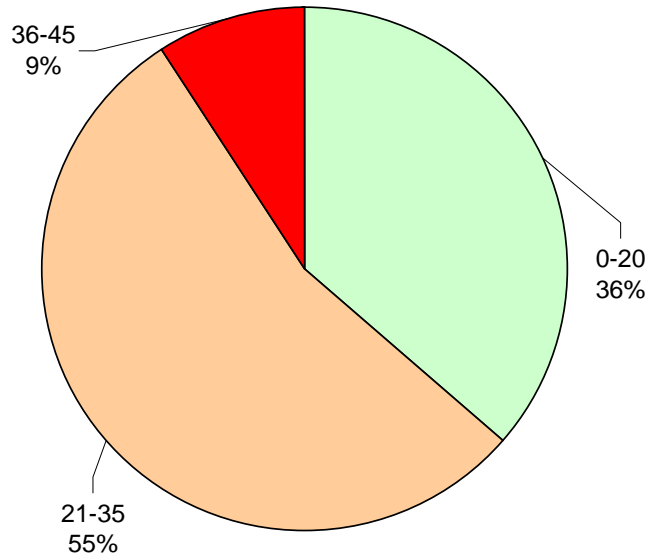


Figure 2-17 **Motor Vehicle Driver Age  
(NCDOT Crash Data for Mooresville 1997-2004)**

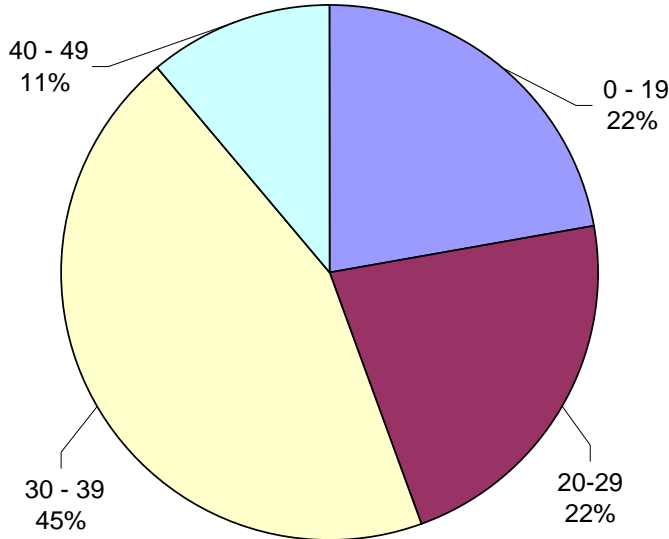


Figure 2-17 shows that around half of the accidents were caused by drivers that are in the first 14 years of their driving experience. This number is typical around the country, and needs to be addressed in driver's education and training.



Figure 2-18

**Injuries from motor vehicle crashes in Mooresville (NCDOT Crash Data for Mooresville in 2004)**

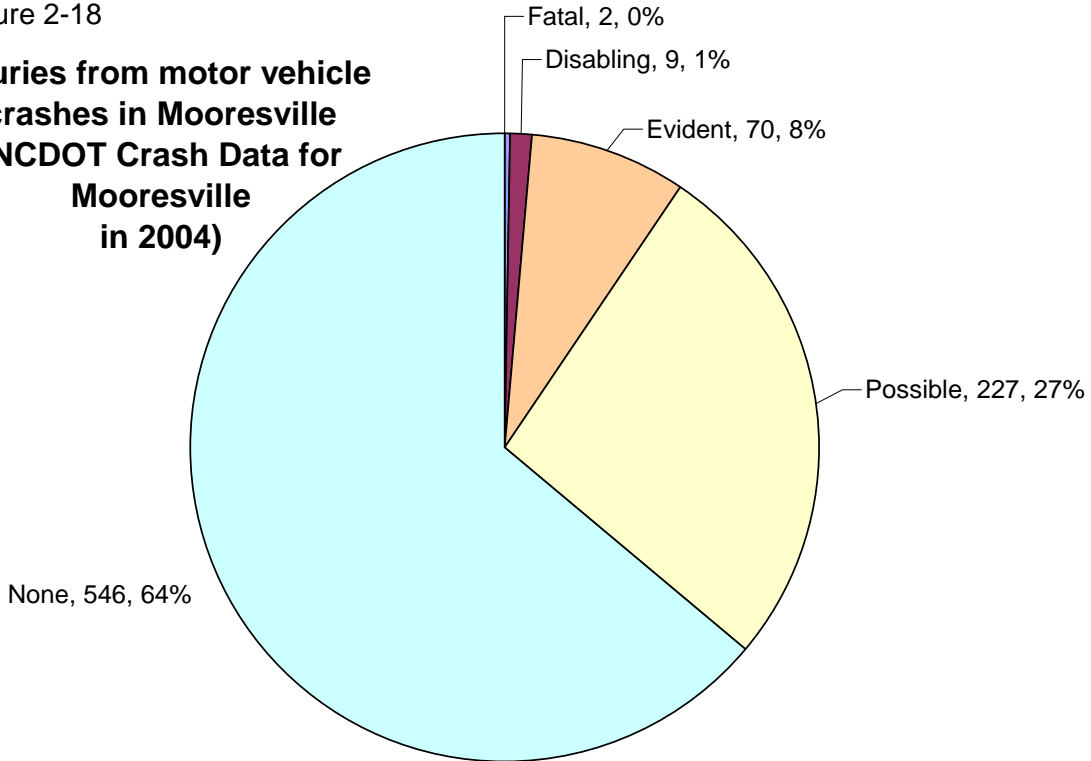


Figure 2-18 shows an interesting graph for comparison purposes that shows the number of automobile-only accidents in Mooresville during the year 2004. 2004 was used because data prior to this year was not readily available. It is important to keep this graph in perspective when completing a bicycle plan. Many people who drive each day feel that they would be in greater danger while bicycling than driving an automobile.



Although studies show that the chances of getting killed in a motor vehicle crash is lower than the chance of getting killed in a motor vehicle to bicycle crash per mile, it is important to consider that the vast majority of these fatalities are caused by the bicyclist ignoring safety rules. Some data suggest that if the motor vehicle numbers filter out typical automobiles from SUVs, the fatalities per mile are more similar to bicycle fatalities per mile because of rollover risk and other factors.

<b>Fatalities Per Mile</b>	
<b>Motor Vehicle Travel</b>	<b>Bicycle Travel</b>
42,000 killed	813 killed
2.56 trillion miles	21 billion miles
0.016 fatalities per million miles	0.039 fatalities per million miles
Data from <i>Traffic Safety Facts 1997</i> and <i>The Environmental Benefits of Cycling and Walking</i>	

In addition, a full-time bicyclist rides considerably less miles per year than a motorist because of practicality. A typical motorist travels 12,000 – 14,000 miles per year because the automobile’s reach is further than a non-motorized vehicle. Their commuting distance, shopping, entertainment, and other traveled miles are naturally higher because it takes very little effort on their part. A typical cyclists’ mileage is considerably reduced because of the need and desire to work and shop near their homes and to reduce and combine trips. This might place the estimated mileage for a full-time cyclist at a high estimate of 3,000 miles per year. Using the numbers above with the 12,000 miles per year typically driven per year by a motorist and a cyclists’ 3,000 miles per year, motorists have a 1 in 87 chance of being killed in their lifetime in a crash, while bicyclists have a 1 in 143 chance of being killed in an accident in their life (assuming 60 years of travel).

A cyclist is apt to spend the majority of their time and mileage on low speed, safer roadways where their increased sense of awareness and better maneuverability can more easily avoid collisions. A motorist will spend significantly more time on more dangerous higher speed and volume roadways, and are restricted to less maneuverability and a decrease in awareness due to restricted visibility and hearing. Looking at the risk of bicycling per hour shows that it is safer than many other life activities, including the multitude of risks that are involved with every hour of the average person’s life span (categorized below as *living*). *In fact, the British Medical Association estimated that the health benefits outweigh any risk factors of bicycling by 20%.*

<b>Fatalities per Million Exposure Hours</b>			
Skydiving	128.71	Snowmobiling	0.88
General Flying	15.58	Driving/Motoring	0.47
Motorcycling	8.80	Water skiing	0.28
Scuba Diving	1.98	Bicycling	0.26
Living	1.53	Airline Flying	0.15
Swimming	1.07	Hunting	0.08
Data compiled by Failure Analysis Associates, Inc.			



## 2.3. EXISTING BICYCLE FACILITIES

### Bicycle Friendliness of State and Local Transportation System

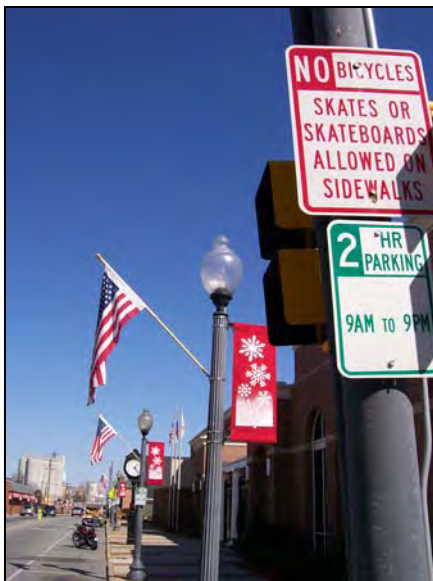
Different skill-levels of cyclists might have different opinions as to the friendliness of Mooresville’s bike network. Weekend riders have several good routes throughout Mooresville and southern Iredell County, and some might say that Mooresville has decent biking. However, those bikers might never be on these same roads on a congested weekday, when those who bike to work might believe that Mooresville’s lack of connectivity of low speed back roads has created a poor bicycle network. A parent might see cars traveling 35 miles per hour or faster on their neighborhood street, and feel that it is simply too dangerous for their child to ever be on a bike in Mooresville.



*West Wilson Avenue*

It is obvious that Mooresville’s street designs were created more for the automobile during the last several decades. The historic downtown area is compact, with a grid-like pattern of minor roads and connections to several different outlets. New developments away from downtown are separate from each other, and connected only by multilane, high speed arterials streets that do not safely accommodate vehicles other than motor vehicles.

It is important to note in this plan that North Carolina law defines a bicycle as a vehicle with all of the rights and responsibilities that are applicable [§20-4.01 (49)]. Although there are a few modifications in state law dealing with bicycles for accommodating both of these very different vehicle types on the same roadways (such as the fact that each of these vehicles can share a single lane and thus pass each other as necessary in that lane), it is generally the case that each traffic law that pertains to an automobile also pertains to a bicycle. Some notable modifications for bicyclists in North Carolina are:



*Downtown Mooresville*

1. There is no minimum age requirement to operate a bicycle on North Carolina roads, although all children under the age of 16 must wear a helmet, and strongly advises all other cyclists to wear helmets as well [§20-171.7(b)]. Local municipalities have the freedom to address more stringent helmet laws.
2. Bicyclists have the freedom to use the roadway or to use designated bike lanes, multi-use paths or sidewalks [§20-146]. Local municipalities have the freedom to address cycling on sidewalks.
3. A bicyclist can legally use the roadways in North Carolina while impaired [§20-138.1(e)]. It is





unclear whether local municipalities have the freedom to address more stringent laws that address cycling while impaired.

4. Bicyclists may not ride on interstates or fully controlled limited access roadways. North Carolina General Statute 143B-350 (f)(1)
5. There is no law that requires bicyclists to ride single file. NCDOT recommends that riders ride responsibly and courteously when riding two or more abreast.

Some laws designed for bicyclists' safety are:

- A motorist overtaking a bicycle must pass at least two (2) feet to the left of the bicyclist and must not move back to the right side of the highway until safely past the overtaken bicycle.[§20-149(a)].
- The driver of a vehicle emerging from or entering an alley, building entrance, private road, or driveway shall yield the right-of-way to any bicyclist approaching on a sidewalk or walkway extending across an alley, building entrance, road, or driveway. [§20-173(c)].

Other than these minor differences between roadway laws for motorized vehicles and bicyclists, there is relatively little difference between the rights and responsibilities of each of these two types of vehicles. It is very important for bicyclists and motorists to both understand that a bicycle has no special right-of-way when being operated on the road. When either the bicyclist or the motorist wrongly assumes that right-of-way exists, collisions can occur.

The existence or absence of particular state laws and enforcement has a big impact on the safety of local cycling. Allowing a cyclist to bike on roadways while impaired is certainly not in the cyclists' best interest, and may not be in motorists' best interest either if that cyclist causes an accident. Also, setting a blanket minimum passing distance of two feet might seem to be in bicyclists' best interests, when in fact this might give motorists and cyclists false comforts where higher speeds or larger vehicles may require a wider safe passing distance. The Town of Mooresville's elected officials would be encouraged to contact state policy makers about modifying laws that may negatively impact its local bicyclists.

### Identification of Deficiencies

Although there are many reasons why Mooresville residents choose not to cycle, several key deficiencies are apparent that would create a big difference if corrected. These deficiencies are categorized as follows:

- Lack of connectivity;
- Congested and fast traffic;
- Unaccommodating land uses; and
- Lack of pleasurable and safe cycling corridors.

#### ***Lack of Connectivity***

As a series of small creeks flow into one large river, so do streets. If water is diverted from those creeks directly into the river, it can become more intense. Bicyclists are smaller and frailer than any motor



*Barricade near Lake Norman Medical Center*



vehicle, and any skill level of cyclist would probably admit to preferring cycling where there is less traffic. With new development styles that create little micro communities that are disconnected from the larger community, daring bicyclists are forced to ride on these congested roadways while more timid cyclists commonly choose to take their cars.

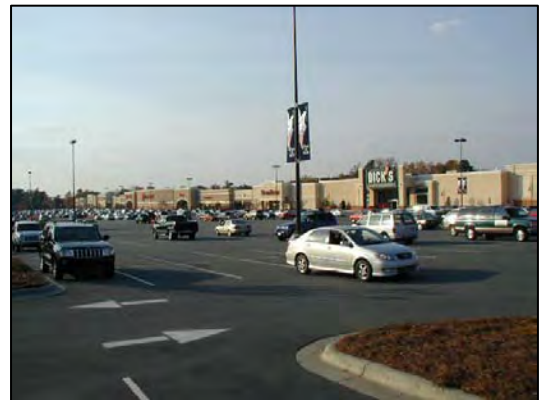
The *Mooresville Comprehensive Pedestrian Plan* recommends increasing the connectivity of both existing and new developments in Mooresville to increase pedestrian potential, and this plan echoes the same sentiment. Connecting neighborhood residential streets would particularly increase the viability of cycling in Mooresville, especially for young or uneasy riders.

**Congested and Fast Traffic**

Although some of the congestion of traffic on main roadways can be helped by increasing connectivity, at the same time, it could potentially increase traffic flow on the neighborhood roads on which bikers prefer to ride. Traffic speeds must be reduced and enforced to provide a safe environment for cyclists. Congested roadways need to be redesigned to accommodate other transportation modes to help reduce this congestion and even to better and more safety accommodate the motorized traffic.

**Unaccommodating Land Uses**

Mooresville is certainly joining a positive trend that creates mixed-use developments that are compact, functional, and livable. Unfortunately, it still has a great deal of commercial and residential development that were designed and built during the last several decades that restrict practical biking because of the distances between destinations. If there were no cars on the roadways to intimidate cyclists, these distances would probably be the only true barrier to biking in Mooresville.



*Typical new Mooresville development on NC 150*

**Lack of Pleasurable and Safe Biking Corridors**

The reality is that there are cars on the roadways, and that they will always be a vital part of our transportation network. More unfortunate is that the cars have grown so big and we have allowed them to become so numerous and so fast that many pedestrians and bicyclists no longer feel safe alongside them. Designing a bicycle system that has a good mix of on and off road corridors is important, and as more parts of the country offer more bike lanes and shared use paths, their popularity and effectiveness in increasing the numbers of cyclists is clear. Children, the elderly, casual bikers, bike commuters, and even



*Share the road on 115 just south of downtown*

recreational road cyclists use these pathways in droves. They serve both as a training facility for children and as a place where adults who have long since placed their bikes in their garages



have rediscovered the sport. Placed near economic centers and residential areas, these pathways are bicycle highways during the workweek and pleasure paths on weekends.

### **Inventory of Notable Existing Conditions in Mooresville from Field Data**

#### A) Roadway Characteristics and Opportunities

##### Roadways with multiple lanes:

- Morrison Plantation Parkway: Width = approximately 24 feet northbound and 24 feet southbound, 2 lanes each with wider inside lanes (13') than outside lanes (11'). This does not include existing gutter pans which are 2 feet wide along the outside curbs and narrower along the inside curb. Occasional left turn pockets exist where there are gaps in median planting strips.
- Highway 150 from Williamson to Statesville/Broad: 60 foot wide pavement, with four 12' wide travel lanes and a 12' wide continuous center turn lane.



*Morrison Plantation's four-laned residential roadway*

##### Notable Roadways with wide pavement widths due to turn lanes:

- Brawley School Road from Williamson to Oak Tree: 12' wide center turn lane with 11' wide travel lanes for a total of 34 feet of width.
- Fairview Road from the hospital to the future I-77 overpass location: 12' travel lanes with a continuous 12' wide center turn lane for a total of 36 feet of width.

##### Roadways with paved shoulders:

- Highway 115, south of Mt. Mourne to Davidson has a three-foot wide shoulder
- Highway 21, in between W. Wilson and Cypress Landing.

##### Notable roadways with wide pavement corridors:

- West Wilson: 33 feet of pavement (16.5 foot wide travel lanes)
- Church Street east of Iredell: Approximately 32 feet of pavement plus 1 ½ foot wide gutter pans (16 foot travel lanes). On street parking is permitted.
- Center Avenue: 36 feet of pavement and 2 foot wide gutter pans for 18 foot wide travel lanes. On street parking is permitted.
- Oak St Neighborhood downtown: Most roads approximately 27 feet wide not including gutters.
- Pine Street: Travel lanes are 12-14' wide with on-street parking permitted on the wider roads.
- Plantation Ridge: Approximately 36 feet for two travel lanes (18 feet for each direction of traffic)



Connectivity gaps:

- Ervin/Lynbrook/Marantha/Lakeshore area connectivity is missing.
- Morrison Plantation connectivity to Lake Norman High School area is missing.
- East-west connections through Wiggins, Cascade, Shepards, Winslow Bay and the Lakeshore area are missing.
- East West connectivity from Kistler Farm/Shearers area is missing.
- The connectivity between new developments is lacking or non-existent through the study area.
- No off-road multiple-use paths currently exist in Mooresville.

Notable roadways with narrow widths:

- Langtree Road, Approximately 21 feet
- Highway 115, 22 feet
- Oak Tree Road, 20 feet
- Williamson south of Brawley School Road, 23 feet
- 150 between Target Shopping Center and Water Oak, 23 feet
- McClelland Avenue, 20 feet
- Iredell Avenue, 22 feet
- Shearers Road, 21 feet

B) Existing and Potential Bicycle Facilities

Observed bike parking:

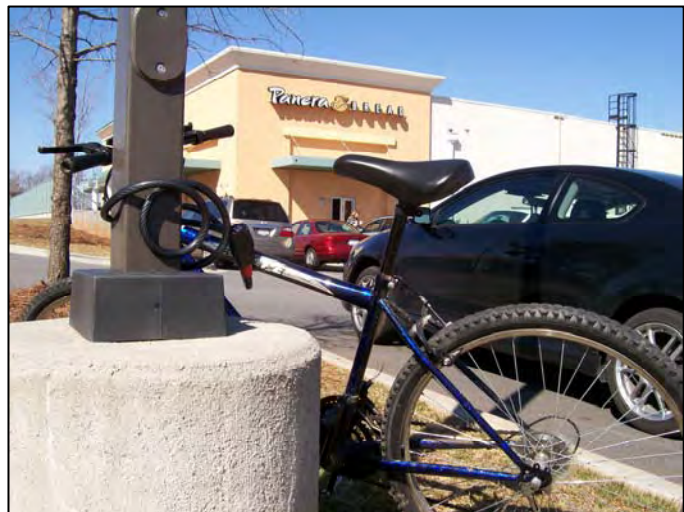
- Library
- War memorial
- Mooresville Middle School

Major shower/locker facilities:

- Citizen Center
- Morrison Plantation YMCA

Major mass transit stops:

- CATS Mooresville Express # 83 currently stops at Williamson Chapel Church on Williamson Road near Brawley School Road. Service only exists for commuters who leave Mooresville each day to work in Charlotte and it does not provide service for reverse commuters. The locations of CATS bus stops in Mooresville have changed according to parking availability and the future of this route is not definite. Every CATS bus has bicycle racks that will fit two bikes.
- At the time of this plan, there is expected to be a future CATS commuter rail from uptown Charlotte to Mount Mourne. The first phase of the project is expected to be complete by 2013 while the second phase should be complete by 2019. This rail service is expected to allow bicycles inside the trains at all times, similar to the existing CATS LYNX Blue Line Light Rail.



*Acceptable bicycle parking on 150 and Williamson?*





### Bridges, culverts, etc:

- All I-77 interchanges need safe bicycle accommodations or navigational improvements.
- There are roadways that dead end because of water features or drainage ditches in Mooresville that could benefit from the installation of small bridges, and many of these locations are proposed with multi-use paths in the Comprehensive Pedestrian Plan.
- Certain culverts and underpasses can be retrofitted to provide the necessary water flow and an additional space for a multi-use path. Many pathways under roads might require a redesign of the bridge to accommodate such a path.

### C) Obstacles

#### Intersections of note:

- All suburban intersections need considerable improvements for bicycles.
- Downtown intersections might only need to deal with bicycle recognition at stop lights.
- All intersections within the Pedestrian Oriented Development Zones (developed with the Mooresville Comprehensive Pedestrian Plan and summarized in Section 4 of this plan) need to be modified to allow for safer bicycle crossing.

#### Dangerous objects – grate, manholes, cracks, etc

- Occasional “tire eater” drainage grate
- Some pavement issues, overall good quality



*A “tire eater” on Church Street can cause injury*

Existing roadway characteristics can somewhat easily be converted, in many cases, to better accommodate bicyclists. Multiple-laned roads and roads with center turn lanes can have their inside lanes or all of their lanes narrowed to provide safer driving for motorists and space for bicyclists in the paved shoulders, bike lanes, or with wider outside lanes. In some cases, speed limits can be decreased after various traffic calming measures are put in place. Roadways can be repaved with shoulders or bike lanes during routine repaving, or sometimes a roadway with multiple travel lanes and few turn lanes can be restriped to reduce one motor vehicle travel lane to a bike lane and creating turn lanes. Sometimes, no physical change to the roadway is needed, but the addition of signs can remind drivers that bicyclists will be common. **Table 2-1** describes the characteristics of select sections of arterial roadways in the Mooresville study area that currently are or will be located on preferred bicycling corridors in the future. Traffic speeds, traffic volumes, and paved widths of each roadway are noted. Existing paved shoulders, continuous center turn lanes, roadways with widths that are good for bicycling, and multi-laned roads are mapped in **Map 2-1**. Areas of interest such as business and government centers, schools, mixed-use developments, land-use nodes, and major shopping centers are also identified, as well as the locations of some bike facilities such as bike racks, bus stations, bike shops, and possible shower and locker stations.

# Mooresville Comprehensive Bicycle Plan

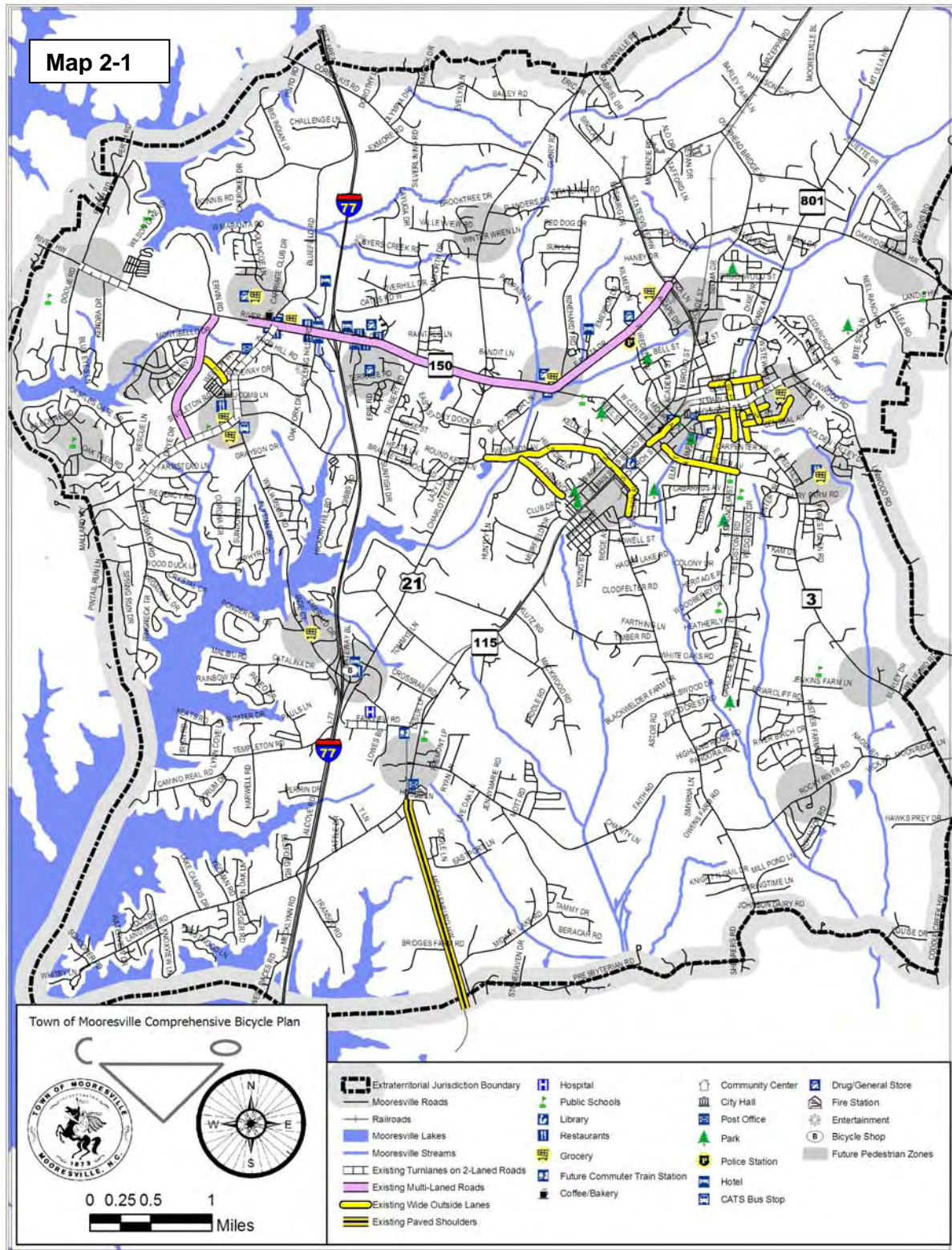


**Table 2-1: Select Existing Roadway Conditions**

Roadway Name	From	To	Traffic Volumes (Vehicles per Day)	Speed Limit (MPH)	# of Travel Lanes	Center Turn Lane Width (ft)	Total Pavement Width (asphalt) (ft)	Average Width Per Travel Lane (ft)	Existing Paved Shoulders (PS), Bike Lanes (BL), Wide Outside Lanes (WOL) or Curb & Gutter (CG)?	Other Notes
Academy Street	Wilson	Center	-	25	2	-	24	12	*	*paved gutters
Bluefield Road	NC 150	North	9200, 4700	45	2	*	22	11	-	* Turn lanes start at Target Shopping Center
Brawley School Road	Williamson	Oak Tree	24000	45	2	12	34	11	-	
Center Avenue	Church	Statesville	-	35	2	-	36	18	CG: 2'	on-street parking allowed
Church Street	Stewart	Iredell	-	35	2	-	32	16	CG: 1.5'	
Church Street	Iredell	McLellend	-	35	2	-	25	12	*	*paved gutters, parking wells
Doolie Road	NC 150	High School	-	35	2	-	20	10	-	
Fairview Road	Future Bridge	Hospital	*	35	2	12	36	12	-	*5800 E of Hospital
Faith Road	all	-	2600, 4500	45	2	-	20	10	-	
Iredell Avenue	Main	Plaza	8900	35	2	-	22	11	-	
Langtree Road	all	-	2600	45	2	-	21	10	-	
Main Street	Iredell	Pine	6900, 7200	35	2	12	36	12	CG: 2'	
Main Street Downtown	at Community Center	-	5300	35	2	-	48	17	*	*paved gutters, 7' wide marked on-street parking
Main Street Downtown	at Ped X at Iredell Light	-	5300	35	2	-	51.5	15.5	*	*paved gutters, 7' wide marked on-street parking
Main Street Downtown	at Iredell Light	-	5300	35	2	12	45	15	*	*paved gutters, right turn space
McLellend Avenue	Academy	Plaza	7300	35	2	-	20	10	-	
Morrison Plantation	NC 150	Brawley School	-	35	4	MS	48	*12	CG: 2'	*Inside lanes: 13', Outside: 11'
NC 115	Fairview	Main	9500	45/35	2	-	22	10.5	-	
NC 115	Mt Mourne	County Line	11000	45	2	-	30	10.5	PS - 3'	
NC 150	Doolie/Perth	Water Oak	-	45	2	12	36	12	-	
NC 150	Water Oak	Bluefield	37000	45	2	-	23	11	-	4 lane begins @ Target
NC 150	Williamson	Statesville/Broad	37000, 34000, 39000, 37000, 22000	45	4	12	60	12	CG: 2'	
Perth Road	NC 150	Normandy	6900	45	2	-	23	11	-	
Pine Street	Main	Cook	-	35	2	-	24	12	CG: 2'	
Pine Street	Cook	Culp	-	35	2	-	27.5	13.75	CG: 1.5'	on-street parking allowed
Plantation Ridge	Williamson	Morrison Plantation	-	35	2	-	36	18	CG: 2'	+ 8.5' Parking slots
Presbyterian Road	all	-	2500	45	2	-	20	10	-	
Shearers Road	College	Rocky River	3200	45	2	-	21	10	-	
Talbert Road	Brawley School	NC 150	6700	35	2	-	21	10	-	
US 21	in study area	-	17000, 18000	45	2	-	varies	varies	-	
Waterlyn Road	US 21	NC 115	5500		2	*	*	12	-	*occasional center turn lanes
West Wilson Avenue	Main	Golf	7000	35	2	-	33	16.5	*	*paved gutters
Williamson Road	Brawley School	I-77	16000, 21000	45	2	-	23	11	-	
Williamson Road	NC 150	Brawley School	13000	45	2	12	36	12	-	Rt turn lanes & some shoulder



# Mooresville Comprehensive Bicycle Plan



# Section 3

## Existing Plans, Programs, and Policies







### 3.1. REVIEW OF RELEVANT PLANS

Several recent, relevant plans have been prepared that include findings that can be incorporated into this bicycle plan. Projects recommended in these other efforts have been integrated as recommendations in this bicycle plan, and the inclusion of projects in other relevant plans is considered in the prioritization of projects specified in this plan. Highlights of these relevant planning projects are presented below.

#### Other Bicycle Plans

The Centralina Council of Governments is leading the planning efforts for an on and off-road bicycle route around Lake Norman. The bicycle route will utilize low-volume roads, improve higher-volume roads through techniques such as adding / expanding paved shoulders, and provide off-road connections where necessary to create a 150-mile bicycle loop around Lake Norman. Potential connections into the downtown Mooresville area are also being studied, which could tie into proposed bicycle improvements as part of this Comprehensive Bicycle Plan. The map for this route is included in **Appendix E**.

#### Pedestrian Plans

The Town of Mooresville completed the *Mooresville Comprehensive Pedestrian Plan* in the summer of 2006. The community and town staff worked together to build a plan that is based on pedestrian-friendly public land use and development policies, and also a plan that will be a huge part of the current planning process for their new zoning, transportation, and bicycle plans. Since the Plan's adoption, proposed developments have incorporated requirements to include shared-use paths, better connectivity, mixed land uses and other components of the Pedestrian Plan that would also benefit bicycle access. Twenty high-density mixed-use Pedestrian Oriented Development Zones were identified that would create small micro-communities that are ½ to 1 mile across. Paved multi-use pathways link these communities together for pedestrians and also provide a corridor for bicycles to use in substitution of roadways.

#### Greenway Plans

Although Mooresville does not have any developed greenways, the Town completed a *Parks and Greenways Master Plan* with a horizon year of 2010 several years ago. This planning effort identified several potential greenways, but did not focus on providing implementation details. The greenways identified in the *Parks and Greenways Master Plan* are incorporated into the recommendations for the *Mooresville Comprehensive Pedestrian Plan*, and some are already in the initial planning stages. Several additional opportunities for potential multi-use paths are also identified as part of this bicycle plan in Section 7.

#### Comprehensive Plans

Mooresville is currently preparing a Comprehensive Land Use Plan that should be completed in 2008. The land use strategies addressed in the plan will likely include discussions of pedestrian and bicycle-friendly land development patterns and action items to encourage new developments to be more accessible to non-motorized transportation.



### Transportation Plans

A Comprehensive Transportation Plan for Mooresville is also currently under development, examining all modes of transportation in the area. This bicycle plan will ultimately serve as the bicycling component to the Comprehensive Transportation Plan. In addition, the Comprehensive Transportation Plan will discuss the role of pedestrian and bicycle transportation as part of a complete multimodal transportation network.

Mooresville completed a *Thoroughfare Plan* in 1997. This plan outlined proposed locations for new major and minor thoroughfares and interchanges, including new east-west and north-south connectors in the Mount Mourne area and new I-77 interchanges at Langtree Road and Brawley School Road. Several of the projects identified in the thoroughfare plan have been advanced to more detailed stages of planning. The initial thoroughfare plan addressed roadways only, and did not specifically identify bicycle enhancements associated with the proposed roadways. However, bicycle lanes are now included in the plans for the NCDOT widening project of Brawley School Road. In addition, Langtree Road's I-77 interchange bridge will be built with the width needed to stripe the lanes for bicycles in the future.

### Roadway Project Plans

Several roadway projects in the Mooresville area are currently being designed. As these plans are advanced, appropriate bicycle accommodations should be incorporated into the design. On-going roadway design projects that should account for bicycle travel include the following:

- TIP Project Number I-4411: New interchange at I-77 and Langtree Road;
- TIP Project Number R-3833: New interchange at I-77 and Brawley School Road; and
- TIP Project Number R-3833: Widening of Brawley School Road.

Other unfunded projects or projects in the early planning stages include:

- TIP Project Number U-4914: Widening of NC 150 from NC 115 to NC 150/152 split;
- TIP Project Number R-4757: Relocation of Alcove Road;
- TIP Project Number R-2307, NC 150 widening;
- TIP Project Number R-5100 Williamson Rd. widening;
- TIP Project Number C-4944; sidewalks
- TIP Project Number B-4767, SR 2382 bridge replacement;
- I-77 overpass at Alcove Road and Fairview Road; and
- North-South and East-West Connectors in the Mount Mourne area.

The widening of Brawley School Road (from Talbert Road to Chuckwood Road) is proposed to have bicycle lanes to increase accommodations for bicyclists.

Iredell County Commissioners requested that NCDOT include bicycle lanes on the new Langtree Road interchange at I-77. NCDOT agreed to include the width necessary to stripe this road for bicycle lanes in the future when the connecting pieces of Langtree Road are widened.



### Small-Area Plans

In recent years, several small area land use plans and master plans have been developed for specific areas within the Mooresville region. The *Mount Mourne and South Iredell Master Plan* utilized public and stakeholder input to create a framework for development in the rapidly-growing Mount Mourne area. The transportation elements of this plan focused primarily on street connections and circulation; however, several of the recommendations included provisions for increased pedestrian and bicycle accommodations, including a recommendation to “require new developments to have an internal roadway network that encourages pedestrian and bicycle trips within the neighborhood” (page 28). In addition, Article 16 (Mount Mourne Planning Area) provides specific regulations pertaining to biking.

In addition, the Plan recommends a greenway to be constructed within new residential neighborhoods east of NC 115. A similar facility is proposed to provide pedestrian connectivity as part of the recently-completed Pedestrian Plan. A developer has completed a master plan for a large tract east of NC 115, including the greenway in the design. Many of the projects described in other plans will be replicated in this plan, especially if they feed directly into other recommended bicycle corridors.

The *Cascade Neighborhood Master Plan* was published in March 2003. This planning process defined specific strategies to redevelop the historic Cascade neighborhood located just north of Mooresville’s downtown. One of the ten specific recommendations is to “increase the street and sidewalk network within the neighborhood to allow for connections and appropriate infill development” (page 5). Furthermore, potential greenways are identified to connect to adjoining neighborhoods.

The Town is expected to have completed its update of its zoning ordinances in 2008. The update of the zoning ordinance will be largely based off of the Pedestrian Oriented Development Zone concept from the *Comprehensive Pedestrian Plan*, creating activity center and neighborhood “nodes” that are intended to develop into higher density communities that are ideal for walking and biking and that create a sense of place.

This plan is expected to serve as a stand-alone plan and therefore emphasizes projects already defined in past plans that may serve as appropriate bicycle projects. However, not all projects from other plans are identified in this bicycle plan. This does not necessarily mean that those projects would not make decent bicycle projects.

### Capital Improvement Plans

The *Downtown Mooresville Master Plan* was completed in 2000, and places a strong emphasis on increasing the pedestrian friendliness of downtown Mooresville, which can also improve bicycle conditions to an extent as both of these travel modes depend on similar conditions such as traffic calming and compact development. It also recommends the construction of a greenway through Liberty Park to neighborhoods south of downtown (page 11). These connections are also proposed in the Comprehensive Pedestrian Plan, and in this bicycle plan.



### 3.2. CURRENT PROJECTS AND INITIATIVES

#### Programs and Initiatives

No formal bicycle safety and/or encouragement programs have been implemented in the Mooresville area. As the Town continues to grow, the establishment of such programs will play an important role in increasing the level of cycling activity. Safety and encouragement programs can be oriented to all segments of the population, and suggested initiatives are described in Section 6 of this document.

### 3.3. EXISTING POLICIES AND INSTITUTIONAL FRAMEWORK

#### Existing Funding Sources

There is currently no dedicated funding source for bicycle projects, and the Town has not funded bicycle projects in the past. The currently planned facilities on Brawley School Road and the Langtree Road/I-77 overpass will be state funded.

#### Existing Local Ordinances

Section 8.3 details a critique of these ordinances and provides recommendations to improve each of these ordinances so that they positively affect cycling in Mooresville.

#### ***Zoning Ordinance***

The Town of Mooresville's *Zoning Ordinance* is being updated at the same time as this Bicycle Plan is being written. A zoning ordinance greatly impacts the bicycling environment just as it impacts the walking environment because it sets rules that govern land-use types, building setbacks, and densities. Article 9 of the Zoning Ordinance requires off street parking for every new use or enlargements, expansions, or alterations of existing uses. This ordinance defines off-street parking, sets guidelines for widths, states potential provisions, and sets required numbers of spaces for different uses. While this ordinance well addresses mixed use development, its setback and density requirements need to be adjusted for a better bicycling environment, and most parking lot requirements have large land use and transportation repercussions.

#### ***Subdivision Ordinance***

The 2003 *Subdivision Ordinance of the Town of Mooresville* is a comprehensive set of rules for new residential subdivisions in Mooresville that include guidelines for connectivity and sidewalk design. Most of the provisions of this ordinance are conducive to bicycle travel, with a few exceptions.

#### ***Code of Ordinances***

Mooresville has numerous local ordinances that deal specifically with bicycles, many of which are outdated and contradict state laws that define the bicycle as a type of vehicle deserves the rights and responsibilities as ay other vehicle.





## Staffing and Committees

The Town of Mooresville's Transportation Planner is responsible for addressing all transportation-related issues in the Town, including the development of this bicycle plan. As described in Section 1, a Steering Committee comprised of agency representatives, local citizens, and other stakeholders was established to provide input to this planning process. The Town's Transportation Planner leads this committee.

There is currently no pedestrian or bicycle advisory committee in Mooresville. After completion of this bicycle plan, a bicycle / pedestrian advisory committee should be created to work toward implementation of the plan and help continue to build momentum for bicycle projects. A similar recommendation was proposed in the Comprehensive Pedestrian Plan.

The Town of Mooresville works closely with other local, regional, and statewide agencies as needed for all transportation projects, including pedestrian and bicycle improvements. Partnerships with Centralina COG and NCDOT will be particularly important as the Town implements additional projects.



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# Section 4

## General Bicycle System Plan





## 4.1. SYSTEM OVERVIEW

What makes an area attractive to bicyclists? Seeing that each of the different types of cyclists are very different, it would seem helpful to look at what communities have adopted bicycle-friendly practices, and find commonalities between Mooresville and these towns.

According to a June 2007 US Census report, the top five large cities for bicycle commuting include Portland, Minneapolis, Seattle, Tucson, and San Francisco. Nearby Charlotte ranked with the bottom ten large cities out of fifty. This list shows that weather is not a huge decider as to how many commuters choose to go by bicycle as most weather conditions are easily dealt with proper dress. Mooresville could be considered as having perfect weather, but would not be considered perfect for bicycling in regards to land use and facilities. These large cities show that the most important factors to insuring high bicycle use include proper land use trends and the correct political/social environment.

Regionally, there are few towns that rank nationally as being bicycle friendly, but Carrboro, NC is a town of similar population as Mooresville that ranks number 21 nationally according to the 2000 US Census for the number of residents that commute by bicycle (5.37%). Carrboro is also one of two towns in North Carolina that are listed as Bicycle Friendly Communities by the League of American Bicyclists. Other cities in the region that have significant percentages of bicycle commuters include Chapel Hill, NC, Charlottesville, VA, Blacksburg, VA, Myrtle Beach, SC, and Hilton Head SC.

These cities' primary economic centers are in single compact areas, and most of these listed have a major college or university. University or tourist communities bring policies and markets that create high volume housing tightly clustered around an economic and social center, a certain type of social norm, and limited parking. In addition, when the bicycle infrastructure of each city is examined in detail, it is obvious that cyclists there have good, safe, and convenient bikeways and amenities that make biking practical and enjoyable.

Although Mooresville is lacking some of the principal factors that make many of the above mentioned municipalities prime bicycling towns, it still has many of the core attractions that could serve in Mooresville's bicyclists' favor. The prime factor that can help implement a good bike plan is that Mooresville has several economic "centers" that can serve as hubs. According to the 2000 US Census, the top five job categories in Mooresville are as follows:

1. Manufacturing	22.4% of all jobs
2. Education/health/social service	16.2% of all jobs
3. Retail trade	11.5% of all jobs
4. Arts, recreation, accommodation, food	8.9% of all jobs
5. Construction	7.2% of all jobs

Some of these job categories are clustered in regions of Mooresville, and identifying these popular work "hubs" where bicycle accommodations can be provided at, to, and from will be the simplest way to mimic the college campus-type economic centers of the successful U.S. bicycle towns. In fact, Mooresville has been named the country's top micropolitan for the last two years in a row (2005 & 2006) by *Site Selection* magazine:





Formerly called "Top Small Towns," the Micropolitan Awards honor those communities of 50,000 people or fewer for their ability to secure new and expanded corporate facility projects. Of the 3,142 counties in the U.S., the Census Bureau classifies 674 of them as micropolitan areas because their local economies are largely self-sustaining. Since 1999, no micropolitan in America has done the job of economic development any better than Statesville-Mooresville. The biggest (in 2006) were Lowe's Companies' new \$110-million, 500-job announcement at its corporate headquarters; NGK Ceramics USA's \$60-million, 50-job expansion of its manufacturing plant; and Polymer Group Inc.'s (PGI) \$40-million, 49-job expansion of its nonwoven materials factory.

Because of strong local job centers, downtown's government district, the Morrison Plantation area, and the Lowes' Corporate Headquarters campus near the proposed commuter rail station are all great potential hubs that can be focal points of a bicycle plan.

### 4.2. CORRIDOR IDENTIFICATION

The recently adopted *Mooresville Comprehensive Pedestrian Plan* was focused around a series of twenty **Pedestrian Oriented Development Zones** that identified micro districts of one quarter mile to one half mile in radius that should be developed in a fashion that encourages walking. Providing walking paths, compact residential and retail centers, and pleasant environments are expected to increase the viability of walking in these areas. Since bicycling is affected by many of the same obstacles that affect walking, a similar concept can be applied to generate land use strategies for a bicycle plan. A principal difference between bicycling and walking is that bicycling is somewhat more efficient than walking. A common estimate is that a bicycle can cover three times the distance as a walker using the same amount of energy. For an interesting way to understand this energy requirement, the international bicycling fund estimated that it takes the energy equivalent of one egg for a person to bicycle one mile, while it takes the energy from three eggs to walk that same mile.

It is also recognized by many that urban distances up to 3 miles are most quickly covered by the bicycle compared to other transportation modes such as walking, the private automobile, and public transit (*Ontario Ministry of Transportation, Bicycle Policy review, 1992*) but US studies show that more than half of automobile commute trips, and three out of four automobile shopping trips are under five miles in length. In all, forty percent of all trips are less than two miles in length (*National Personal Transportation Survey data, 1990.*)

These facts have helped bike planners determine that ideal bicycle trips are in the range from **one-half** to **three miles** in distance, providing a great balance between energy and time efficiency. This range can easily fit directly into the existing pedestrian plan, extending the reach of the non-motorized transportation network from a half-mile to three miles. In some areas of the Town, the pedestrian zones are so closely huddled that they can form together to become single bicycle districts that have strong economic centers surrounded by a mix of retail and residential. Three obvious bicycle districts that will be the backbone of this plan are as follows:

1. **Downtown Mooresville**, including surrounding neighborhoods of Cascade, Eastern Heights, Harris Crossing, and Mill Village;



2. **Lake Norman**, including parts of Oak Village, Morrison Plantation, Winslow Bay, the Brawley School Road Corridor, and the racing attractions and industries; and
3. **Mount Mourné**, including the Medical Center and Lowes campuses, commuter rail station, and the new Langtree Road developments.

Bicycle facilities added to isolated Pedestrian Zones can connect them to surrounding bicycle districts in Mooresville. Using and expanding on greenway, land-use, and streetscape projects set forth in the pedestrian plan can act to create a functional cycling connection between each of the Pedestrian Zones and to the newly identified Bicycle Districts.

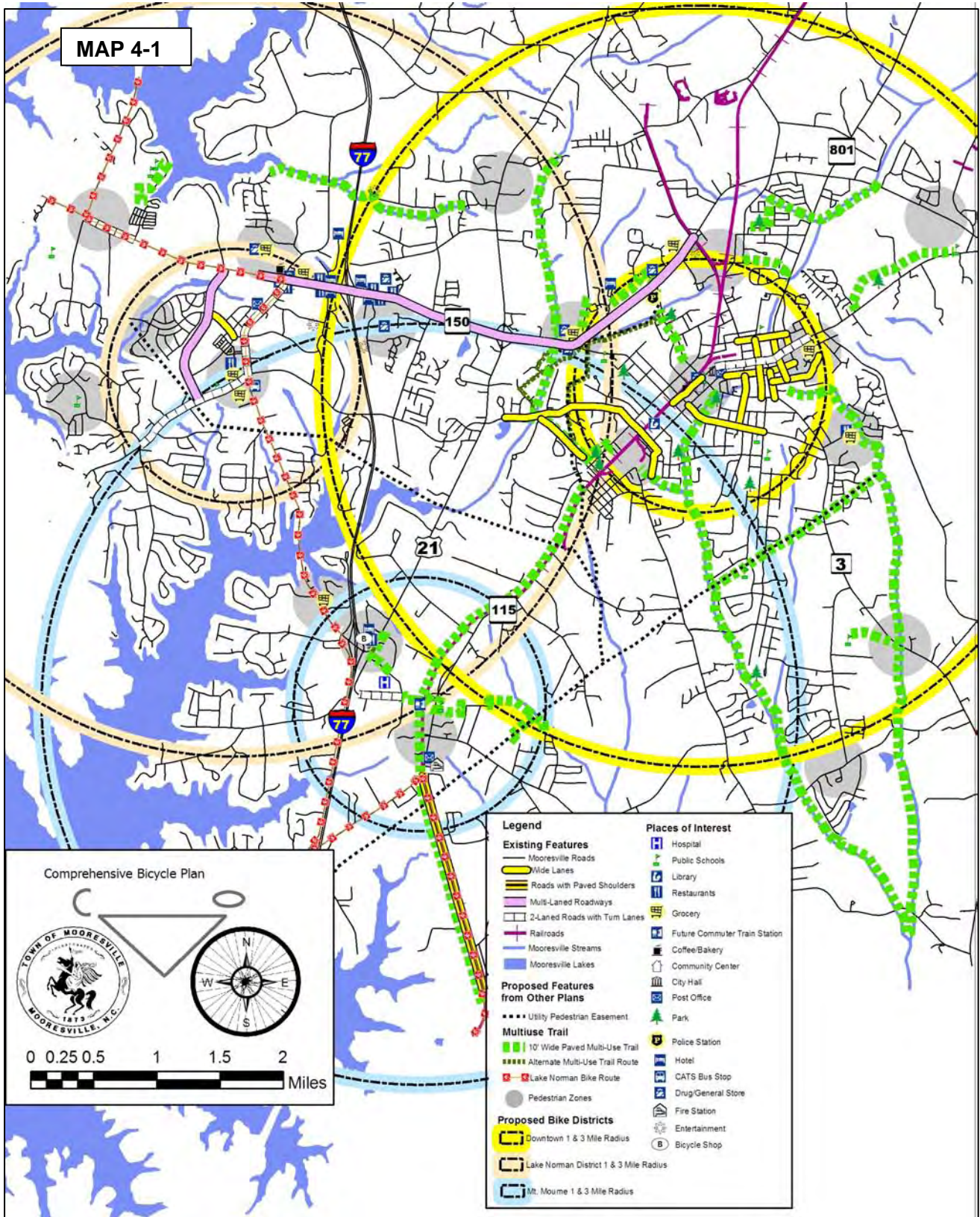
**Map 4-1** illustrates opportunities for bicycle improvements in the Mooresville area, focused on these Bicycle Districts. Major pedestrian and bicycle destinations are also identified on the map.

Descriptions of the opportunities that exist in each of the districts are provided on the following pages, referenced by the district areas as mapped in Map 4-1.



# Mooresville Comprehensive Bicycle Plan

MAP 4-1







## 1. Downtown

Downtown Mooresville is the historical center of Mooresville and is still an important location for Mooresville’s workforce. Primarily the center of Mooresville’s Town governance, downtown is still alive with shopping, restaurants, public services, and residential uses. Some of the Town’s larger enterprises are now outside of this Town Center, but its municipal workforce keeps the area vibrant. Planned mixes of residential units and retail continue to revitalize sections of downtown.



The vibrant and compact Town Center, good connectivity, numerous nearby schools and public services, and potential off-road corridors along sewer, power, and gas easements provide good arguments to plan downtown Mooresville as a Bicycle District. With the Charles Mack Citizen Center as the center of this district, an optimum radius of one mile would include parts of seven other Pedestrian Zones: Downtown, Mill Village, McLelland, Cascade, Eastern Heights, Harris Crossing, and Magnolia. Increasing this radius to three miles will add five more zones: Talbert, Shepards, Wiggins, Coddle Creek, and Kistler Farm.

## 2. Lake Norman

This section of town west of Interstate 77 and east of Lake Norman is an emerging residential center of Mooresville. Numerous large housing developments such as Morrison Plantation, Winslow Bay, Oak Village, and the neighborhoods around the Lakeshore schools have materialized in recent years, and are destined to become larger. The Williamson Road corridor is also packed with retail stores such as Target, Harris Teeter, Lowes Foods, and others. Coffee shops and upscale chain eateries also are common, as well as an increase in the development of high density housing such as condominiums. Mixed use development centers such as Morrison Plantation and Mooresville Town Square are driving the growth of this area. This section of town will certainly be a center of employment for retail jobs, but will also be an area where many commuters are leaving each day to work at job locations more typical in professional fields.

The new Brawley School Road Harris Teeter mixed-use development could serve as an excellent high density center to this proposed bicycle district. An optimum radius of one mile from this point would include major parts of four Pedestrian Zones: Brawley School, Morrison Plantation, Oak Village, Lakeshore, and Winslow Bay. Increasing this radius to three miles and utilizing off-road corridors along existing sewer and electric lines will include the Lakeshore Pedestrian Zone and incorporate seven other Pedestrian Zones that are more closely tied to the Downtown and Mount Mourne Bicycle Districts, creating a link between each.





### 3. Mount Mourne

Mount Mourne is likely destined for some of the most significant growth in Mooresville. The Lake Norman Medical Center (LNMC) and the Lowes Corporate Headquarters will combine to possibly create the largest economic center of the Mooresville area, and potentially the most likely bike-accessible district of town. A large amount of mixed-use and residential developments combined with the future commuter rail station to Charlotte and the two major campuses of Lowes and LNMC can help the possibility of non-motorized transportation flourish here.

An optimum radius of one mile from the commuter train station would include major parts of two Pedestrian Zones: Mount Mourne and Centre Church. Increasing this radius to three miles will include the Diamondhead Pedestrian Zone and major parts of the Brawley School Pedestrian Zone and Mill Village Pedestrian Zone. Besides being a hotbed of development for projects such as the Langtree Road development and Legacy Village, this district has easy access to both of the other two districts by motorized vehicle and is a good candidate for being a major transit hub. Sewer lines, gas lines, electric lines, and an active rail line in this district could be ideal opportunities for longer distance multi-use paths.



### 4.3. OPPORTUNITIES

The best opportunities to develop bicycle facilities exist with future infrastructure. Road repaving, intersection improvements, bridge replacements, sewer/utility work, and new private developments offer the easiest means to retrofit and add bicycle facilities. Acquiring abandoned railway and utility corridors and redefining easements are also steps toward the development of future bicycle routes. Routes defined in the Greenway Plan and the Comprehensive Pedestrian Plan can be utilized for bicycle travel as well.

### 4.4. SPECIAL FOCUS AREAS

Other than creating the land use development needed for future bicycling, a top priority of this plan should be to create conditions that are suitable for children to bike. Children of perfect bicycling ages make up a high percentage of Mooresville’s residency and are by nature a captive audience because they cannot legally drive. These children are also showing alarming declining health trends due to a lack of exercise, and additionally, behavior that one exhibits as an adult is often learned as a child. Many current cyclists bicycled as children, but many children of the past couple of







decades may never have had the opportunity to regularly bike, and maybe never will as adults. We have the opportunity and responsibility to change that trend.

It was once common for children to bike to school. Memories of a school yard throughout most of the 1900s will surely include racks and fences full of hundreds of bicycles. This drastically took a hit after the 1950s and certainly from the 1980s to the present. Land use patterns are mostly to blame, disconnecting communities and spreading them out so that biking is impractical for children. Roadways are engineered now to increase the speed of motorized vehicles while schools, parks, libraries, and other popular childhood places of interest are built not in neighborhoods but on busy roadways. Today's world of air-conditioning, front garage doors instead of porches, and a never ending list of electronic entertainment options to keep us all indoors has also certainly restricted us from getting to know and be comfortable with our neighbors.

This unease with our fellow community members and the increase in media sensationalism of kidnappings and child molesters has created a state of fear among parents. Adam Walsh's disappearance from a Florida mall and eventual murder in 1981 made national headlines and eventually led to his father hosting *America's Most Wanted*. Since then, the media has been quick to report on these stories as they certainly both interest and frighten the public. Additionally, media fails to report that the vast majority of kidnapping cases



and child molesting by far is perpetrated by members of the child's own family and friends of the family (a study entitled *National Incidence Studies of Missing, Runaway, and Throwaway Children*, October 2002 found that 82% of abducted children were taken by family members, with an additional 11.3% taken by a friend of the family or child). Americans are 7 times more likely to be killed by lightning and 122,000 times more likely to be killed by

heart disease than is the likelihood of a child to be kidnapped by a stranger in the US. It is actually four times more likely that a *child* will die of heart disease than be kidnapped by a stranger (still a very small likelihood), and that many parents are more concerned about the over-hyped dangers of strangers than they are of the real dangers facing children's health.

Regardless, it is hard for parents today not to have a great deal to be concerned about, whether or not all of these fears are justified by current data. To exacerbate the issue, new parents this decade and the next couple decades to come will be less likely ever to have ridden a bicycle or walked to school than in previous generations of parents. In turn, they will find it foreign to teach this skill on to their children, and prefer to chauffeur their children around as they were chauffeured by their parents in the 80s and 90s. Our children are becoming sedentary and obese, and planning proper bike accommodations for them and educating the public can do a tremendous amount of good.



## Mooresville Comprehensive Bicycle Plan

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Parents can all be excited to know that as more children (and adults) walk and bicycle in their community, the safer that community becomes. More citizens outside in the neighborhood bring more eyes on the street and a familiarity among neighbors that helps keep their community safer from crime. Motorists expecting to see pedestrians and bicyclists may habitually keep speeds more reasonable. Children who are outside exercising are staying mentally and physically healthy, creating good habits that can stay with them their entire lives.

According to the survey used for this plan, 84% of those surveyed with children in Mooresville stated that their children never bicycle to school. Although most (73%) of those stated that crime would at least somewhat be a concern, the vast majority of respondents (99%) believed or strongly believed that a lack of safe bike routes away from traffic concerns them. Almost 98% of respondents to this survey stated that they would like for their child to be able to bicycle more often.

# Section 5

## Facility Standards and Guidelines





## 5.1. GENERAL BICYCLE FACILITY GUIDELINES

Several overall guidelines for facility development are highlighted below.

- Give transportation priority to the completion of bicycle routes to schools, Bicycle District centers and Pedestrian Oriented Development Zone centers.
- Ensure that the safety and convenience of cyclists are not compromised by transportation improvements aimed at motor vehicle traffic.
- Bicycle parking areas should be required as part of the transportation system.
- Establish cycling links between bike lanes, greenways, bike routes, other bike accommodations on roadways and even on some sidewalks in limited situations.
- Retain public access when considering private right-of-way requests.
- Support changes to existing policies that would enhance bicycle travel.
- The bicycle system should make it possible for cyclists to access the same places that motorized vehicle users can access, particularly and especially inside the one-mile radius of each Bicycle District (with an exception of controlled access highways such as I-77).
- Off-site street improvements or enhanced bicycle and pedestrian facilities may be required as a condition of approval for land divisions or other development permits.
- Aesthetics and landscaping shall be a part of the transportation system.
- Coordinate transportation planning and efforts with neighboring municipalities.

Some basic principles for incorporating bicycle accommodations in a transportation system include the following:

- It should include corridors that are safe and free from external factors such as noise, motorized traffic, and hazardous objects.
- It should be accessible.
- It should connect to the places where people want to go.
- It should be easy to use and convenient.
- It should make an effort to be appealing to the senses.

NCDOT adheres to the design guidelines provided in the American Association of State Highway and Transportation Officials' Guide for the Planning, Design, and Operation of Pedestrian Facilities (AASHTO, 2004), the American Association of State Highway and Transportation Officials' Guide for the Development of Bicycle Facilities (AASHTO, 1999) and the Manual on Uniform Traffic Control Devices (MUTCD). These guidelines will thus apply to all state-maintained roads. The Town of Mooresville should be familiar with these publications and design guidelines.

## 5.2. SPECIFIC BICYCLE NETWORK DESIGN RECOMMENDATIONS

Design considerations for a variety of types of bicycle facilities are highlighted on the following pages. These design considerations are not intended to serve as "standards", since the most appropriate design will vary from project to project. However, suggested minimums and guidelines are addressed for the following types of facilities:





- Sidewalks;
- Multi-Use Paths;
- Bicycle Lanes;
- Paved Shoulders;
- Shared Travel and Parking Lanes; and
- Bicycle Routes.

## A. OFF-ROAD ACCOMODATIONS

### 1. Sidewalks

Sidewalks in Mooresville are not terribly common or reliably connected. These sidewalks were also built before ADA compliancy was mandatory, so with many sidewalks lacking appropriate planting strips, there are frequent dips to street level that the bikers who choose to use a sidewalk must endure as the walkway crosses driveways and other intersections. Curb cuts are also rare, making it necessary for these bikers who choose to use sidewalks to lift the front and rear wheel after each intersection to remain on the sidewalk.

Cyclists on sidewalks also add to the annoyance, inconvenience, and dangers to pedestrians, but most notably, are a danger to themselves. Vehicles approaching driveways and intersections rarely stop before approaching a sidewalk; pulling all the way up to the roadway before stopping is typical. Someone moving at the speed of a pedestrian can more easily assess and deal with approaching automobiles at these intersections, but a bicyclist can not. Moreover, an automobile is not expecting anything faster than a pedestrian to be approaching from anywhere other than the roadway. This is particularly the case when the bicyclist is traveling against traffic, which is a common mistake because some bikers unfortunately feel more comfortable seeing approaching traffic rather than having it come from behind. If a bicyclist would be quickly approaching an intersection on a



sidewalk (or even a roadway) while riding against traffic, motorists on a perpendicular roadway stopped at the intersection ahead of them in preparation to make a right turn will never instinctively look to their right before making that turn, as their focus is to approaching traffic to their left. Neither the bicyclist approaching from the motorist's right nor the motorist can react in time, causing a high percentage of bicycle collisions.

Nonetheless, this plan can not ignore the fact that many people ride bicycles on sidewalks, in some cases even if a perfectly good neighborhood road or bike lane is adjoining the sidewalk. Some will never be convinced to ride on the street and for those people proper education on how to best avoid a collision is best.

In many cases, providing alternate safe riding corridors is the solution. Paved pathways, bike lanes, connecting neighborhood bike routes, even some shared roadway lanes to some extent can help sidewalk bicyclists choose a safer path. But realistically, it would be next to impossible



that every destination is located on a bikeway that is perceivably safe enough for every biker. Our road network is too large, and our land and resource availability is limited. It would be necessary to use the road right-of-way eventually for most bike trips into the foreseeable future in Mooresville. To some extent, the road system can be engineered and built to create a safer environment for most bikers, but young children, the elderly, and the timid or rare cyclist may very well choose never to ride on a roadway, and to always choose the sidewalk. Proper planning and education would be necessary to make sidewalk bicycling a safer option. *Nevertheless, most urban sidewalk riding is never a safe enough option for this plan to ever encourage over other options.* The following is AASHTO's policy regarding sidewalks serving as bikeways: "Sidewalk bikeways should be considered only under certain limited circumstances, such as: to provide bikeway continuity along high speed or heavily traveled roadways having inadequate space for bicyclists, and uninterrupted by driveways and intersections for long distances; and on long, narrow bridges."

Sidewalks that ramp down to driveways and roadways (or when there is no existing curb cut at all) gives the false impression to the pedestrian and to the driver that this section of the sidewalk is the drivers' territory, plus it makes conditions difficult for the disabled, child strollers, and common walkers and runners. Sidewalk and driveway standards that require new and maintained driveways to ramp up to greet a level sidewalk make the driver more aware that they are crossing into the pedestrians' territory, and makes the sidewalk more agreeable to the user. Any sidewalk and road intersections should include proper curb cuts, ramps, and crosswalks. New and refurbished driveways should greet the sidewalk and the street at right angles to adequately slow and stop the vehicle and to improve their line of sight. All of these construction guidelines that create safer sidewalks for walkers would also make safer sidewalks for those that are tempted to bike on sidewalks.



*The social norm and the average person's comfort level in traffic occasionally forces bicyclists to ride on the sidewalk.*



There are, however, roadways in town that need to be designed in a way so that the sidewalks are not tempting to bicyclists. These roadways are those that are primarily located in the Central Business District and the center of each of the twenty Pedestrian Zones. These areas are expected to be popular and dense walking areas, and the combination of bicycles and sidewalks together in this environment is both dangerous to the cyclist and damaging to people's conception to bicycling.

In these business districts only, appropriate ordinances that restrict cycling on sidewalks should



be considered (as the rules currently state downtown), but only if appropriate safe access is still granted on adjacent streets to all levels of cyclists (See discussion on page 8-10). This access can be one or a mix of the other bicycle facilities described in this section such as multi-use paths, bike lanes, or shared roadway lanes with traffic calming. But laws banning riding on sidewalks should never be applied before creating a suitable safe substitute for all users. In addition, encouraging anyone to ride on any sidewalk by not providing safe alternatives is also highly discouraged. Laws restricting bicyclists from riding on sidewalks where safe alternatives do not exist only decrease the amount of cycling on that corridor.

According to the survey conducted for this plan, 57% of respondents use sidewalks for bicycling.

## 2. Multi-Use Paths



*Multi-use paths are for a variety of users*

Multi-use paths are intended to serve walkers, wheelchairs, runners, bicyclists, or any other non-motorized mode of transportation. These facilities may also be referred to as “greenways,” or “rail trails” and should not be confused with sidewalks that share the right-of-way with vehicular roads, nor with “Greenbelt Buffers” that are not necessarily intended to accommodate for public access. Multi-use paths can act both as bikeways and walkways and as vegetative buffers with an ecological function. Private motorized vehicles of any kind (besides motorized wheelchairs for legally disabled citizens) should never be allowed access to these pathways.

According to the survey conducted for this plan, 70% of respondents enjoy or highly enjoy bicycling on these paths and the third highest deterrent to bicycling in Mooresville is a lack of bicycle paths and bicycle lanes separated from traffic.

### Path Composition

Multi-use paths need to be a minimum of 10 feet wide; with minimum 2 foot wide graded shoulders on each side (AASHTO recommends 5 foot shoulders) to protect users from grade differences. These shoulders can be grass, sand, finely crushed rock or gravel, natural groundcover, or other material. Sections of the trail where shoulders are not possible because of stream crossings or other elevated grade issues should have protection such as rails, fences, or hedges. Bridges need to have a 54” railing to permit safe bicycling, whether on an independent bike/pedestrian bridge or a bridge shared with auto vehicles. Parks and urban corridors tend to be popular sections of these trails and should possibly be wider. If it is not possible to increase the width in these popular sections, consider including a divider line down the center for bi-directional traffic, especially around sharp curves.





It is recommended that these paths should be surfaced with a hard material that allows for easy walking and bicycling. Asphalt is cost effective and practical in most terrains, while concrete and boardwalks are best suited for flood prone (culverts and underpasses) or wet areas (wetlands and creek borders). Finely crushed stone or Granite Screening (rock dust) is a cost effective alternative that may be used outside of high traffic urban areas.

### Path Alignment

Abandoned rail beds, sewer easements, or other utility corridors are frequently used in the alignment for greenways and other multi-use paths. The alignment of these corridors typically has minimal conflicts with the road right-of-way and intersection and driveway crossings can be fairly infrequent.



*Incorporating these paths into future land use and transportation plans is crucial*

Multi-use paths should keep the contour of the land for aesthetic and environmental reasons, but for practicality reasons should not be unnecessarily curved. The minimum radii or curvature recommended by AASHTO is 30-50 feet, and the cross slope should typically be less than 2%. The grade should not be more than 5%, but could reach 11% for short distances according to ADA and AASHTO guidelines. Right angles should be avoided for safety reasons, especially when considering bridge and road crossings.

### Intersections of Roadways and Multi-Use Paths

Generally, the largest safety concern when developing a multi-use path is the conflict with intersections. Motorized vehicles do not typically look for or notice bicyclists that are not on the roadway until it might be too late to react. Therefore, proper marking of intersections must be done and these intersections must offer visibility for both the bicyclist and the motorist. Proper crossings should be included in all design for these paths and should be considered immediately with any plans that include outside state and federal transportation agencies.

Because multi-use paths typically do not cross roads at signalized intersections, they could include accommodations such as mid-block crosswalks, underpasses, converted culverts, or bridges. Vertical clearance of 8 feet is required for safety of all users, and structures and shrubbery should not extend horizontally into the corridor. A vertical clearance of 10 feet is recommended for underpasses and culverts. Whenever possible, a multi-use path should cross roadways above or below grade so that conflicts with motorized vehicles are minimal. If this option is not practical, at grade mid block crosswalks should follow guidelines set forth later in this section regarding non-signalized crossings. For cost or safety purposes, it might be the best option to take the path's alignment to the intersection for crossing purpose, and then move it back to its original alignment. If this is done, the intersection must be modified to safely accompany the bi-directional bicycle traffic here. Restricting turns, tightening turns, widening the intersection to accompany the path, creating a separate light cycle for path users or other treatments would be necessary to limit the turning conflicts that would be inevitable without such modifications. Using existing sidewalks is discouraged unless they are widened to a minimum of 10 feet to accompany the multi-directional/multiple types of users.



*Crossing under grade is an attractive alternative to crosswalks*

### Environmental Protection

Environmental protection should be a priority with the planning and construction of a trail. Trail design, construction type, and construction schedule should all reflect environmental considerations. For example, a trail offers some leniency with its alignment compared to a sidewalk, offering opportunities for selective clearing of vegetation. Also, asphalt may not be considered a good surface material in wet areas because of its petroleum base, and construction during certain months of the year may disrupt wildlife nesting.

The benefits to a multi-use path may outweigh any detriments that its existence may cause on the surrounding ecology. Besides encouraging the reduction of all of the harmful environmental effects of automobile use, these trails can also stimulate the acquisition and conservation of wildlife corridors, be associated with stream improvement projects, and may give people a healthy respect for their natural surroundings by making public open space more accessible. In many cases, placing urban streamside lands into the public's view reduces the likelihood of harmful dumping of litter and pollutants and creates a cleaner looking and functioning waterway.

### Lighting

These trails should be open at all hours so that it can serve as a reliable transportation route. Lighting is not necessary or recommended in many situations. Places where the trail has major intersections such as roadways, underpasses, culverts, railroads, creeks, and other trails are good locations for appropriate lighting. Lighting should also be considered near safety hazards such as curbs, sharp directional changes, obstacles, or ending points if ambient light is limited. High-use areas such as parks and urban locations often already have existing light sources, but may require additional lighting on some parts on the trail. A reflective stripe or markers would help to make this trail navigable in limited light. Lighting the trail itself in very low light areas can restrict the visibility of areas beyond the trail. Existing street and structure lighting in urban areas can effectively and adequately light the adjacent trail. For safety reasons, a requirement that states that all bicycles and skaters carry lights and all pedestrians wear reflective clothing during non-daylight hours would be useful.

### **Sidepaths**

A sidepath is essentially a type of multi-use path that is aligned immediately parallel to a roadway. Sidepaths attract a broader range of users with different cycling capabilities. Commuters, utilitarian cyclists, children, bicycles towing child strollers, the elderly, and recreational cyclists all feel comfortable on these designated and separated bike paths.

The United States has some roadway characteristics that make the implementation of sidepaths more challenging with an expanding suburban road system that allows motor vehicles to move fast and to make turning movements quickly. Additionally, drivers in the United States and more particularly in Mooresville, are not very accustomed to seeing many bicyclists. Collisions





between turning motor vehicles and bicyclists tend to be common when a cyclist is on a parallel path divided from the roadway such as a sidewalk or sidepath. The inclusion of a sidepath must be done with great care and attention given to the safety and visibility of the cyclist at driveways and intersections, and finding the ideal sidepath location is challenging.

Some agencies and municipalities choose to remove sidepaths completely from their options, but ignoring the benefits of sidepaths entirely is not recommended. Our roadway system is a large connected transportation corridor allowing travelers to freely move from place to place. Automobiles are large, fast, and intimidating to a majority of the population if they were to be on a bicycle. A cyclist must have a certain amount of skill, fitness, and comfort to be able to maneuver in a shared roadway with motorized traffic, even with divided bicycle lanes. Many cyclists who can consistently travel at speeds over 15 MPH are quite comfortable and very safe on most roadways. Cyclists who consistently travel from 10 – 15 MPH are fairly comfortable on many roadways, especially those equipped with bicycle lanes. However, a majority of the residents in Mooresville, if placed on a bicycle today, would probably consistently stay at cruising speeds of less than 10 MPH. They are less comfortable in mixed traffic at those speeds and may also not be comfortable in a bike lane. A sidepath is a potential option for this population if they are to get to the same destinations by bicycle as their car could reach.

Essentially, a sidepath is a cross between a bike lane, sidewalk, and a multi-use path. It runs immediately parallel to the roadway in the Right-of-Way, it is paved (usually 10 feet wide or more), and it is divided from the roadway by an unpaved buffer strip and/or curb and gutter. Some sidepaths may be designated for bicycle use only (more common in urban centers - see cycle track discussion later in this section) while many are intended for a mix of pedestrians and bicycles.



*A sidepath in Durham, North Carolina*

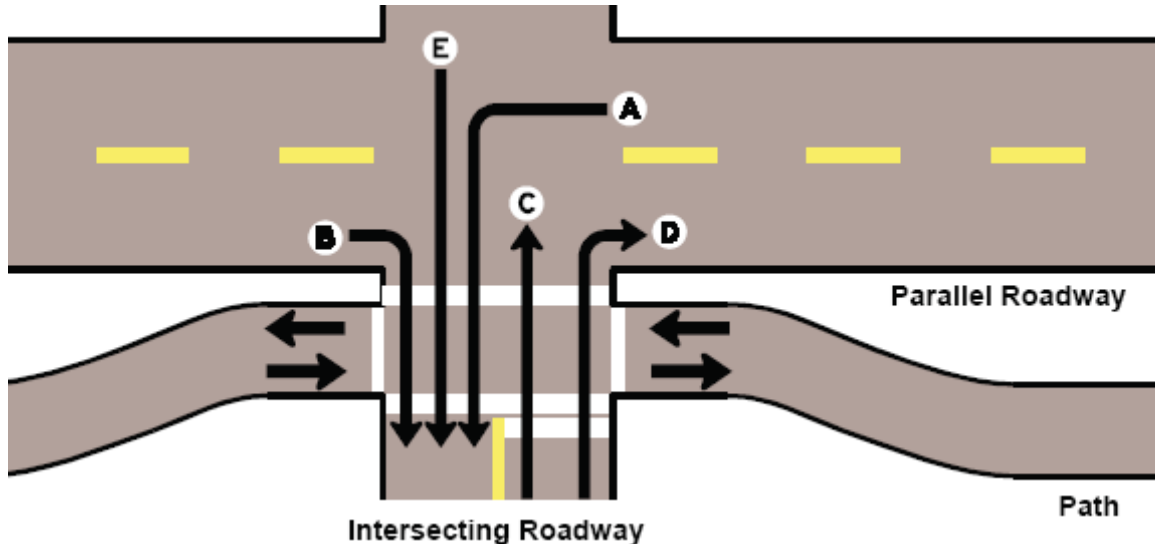
### The Problems:

1. The intersection of a sidepath and a roadway is where the potential for collisions are apparent. A motorist, by nature, is not accustomed to seeing a fast moving vehicle on their right side as they make a right turn unless it is immediately in their field of view (as in a bike lane). A bicycle approaching on a sidepath that is just outside of the roadway may come as a surprise to a motorist.
2. When a path along a roadside has two-way bicycle traffic, one direction of bicycle traffic will be traveling opposite the adjacent motor vehicle traffic. A motorist is not likely to expect a vehicle to be facing them on their right, with vehicles turning into the cyclists' path being the biggest concern.
3. AASHTO also notes some concerns of sidepaths including the potential for bicyclists to use the wrong side of the roadway after the terminus of the trail, and that motorists would incorrectly assume that a bicyclist must use the sidepath instead of the roadway.



Several solutions exist for designing a safer intersection where the path meets the road:

1. Place the biker into the motorist's field of view. At intersections and major driveways, direct the path closer to the roadway, with the stop bars being placed behind the path. Once through the intersection, the path can again move to its original distance from the roadway, as shown in the illustration below.



*An illustration of a sidepath at an intersection from the Guide for the Development of Bicycle Facilities, Copyright 1999, by the American Association of State Highway and Transportation Officials, Washington, DC. Used by permission.*

2. Intersection treatments can also be done to allow for safer turn movements through the intersections. Tightening the turn radius, and placing stop bars will force right-turning vehicles to face cyclists and pedestrians before they complete their turn, and will force them to turn more slowly. A left turn arrow should be available for those turning left towards the path while they should have a red light phase while through traffic has the green light. This will eliminate the danger of left turning vehicles colliding with a bicyclist or pedestrian crossing on the path. Right turn on red should not be permitted for the motorists that will be turning into approaching cyclists that are on the side of the path that is facing traffic.
3. Popular paths may be equipped with a video camera system that will detect cyclists and pedestrians, and give traffic priority on that side of the road to the path user(s) through the intersection (while still allowing through traffic to move on the other side of the road).
4. Include proper signage to let the motorist and bicyclist know that they will all be crossing together at the intersection.
5. Make certain that the sidepath delivers and guides bicyclists to a safe facility on both ends of the path including intersection treatments and corridors such as bike lanes, bike routes, and other safe roadways and paths.

### Directing the Sidepath to a Mid Block Crossing:

A suitable location for a sidepath would be along Highway 115 in Mooresville, which positions the path between a roadway and an active railroad, limiting the number of intersections and driveways. A sidepath may have the option of leaving the Right-of-Way when approaching



some intersections, and crossing the roadway 300 feet or more from the intersection at a midblock crossing. Three-hundred feet is considered an acceptable distance away from a signalized intersection where a driver might be expecting to stop again for another crossing. This method mitigates the dangers of turning vehicles, but puts the bicyclists in the position where they must cross an unsignalized intersection. This option might not be available at most intersections along this corridor because of the narrow width between the roadway and the railroad.

## Cycle Tracks:

A discussion about sidepaths is not complete without mentioning cycle tracks. These sidepaths are common throughout Europe, especially urban communities in the Netherlands where utilitarian bicycling rates exceed 60%. Cycle tracks are grade-separated from the street, as a sidewalk is, but designated solely for one-way bicycle travel on each side of the road. Supplemental sidewalks are provided for pedestrians. Extensive intersection treatments are included to increase the safety of cyclists as they cross the paths of motor vehicles.

Although being physically separated from the roadway has shown to attract extremely large amounts of bicyclists of all skill levels, there are conflicting studies that do not certainly show whether or not these paths are more or less safe than bicycle lanes in the roadway. Because cycle tracks are not yet a part of common bicycle planning options in the United States, because of the high costs of these pathways, and because of the safety uncertainties, these paths are not a part of this Comprehensive Bicycle Plan. This should not exclude their use in the future if the Town of Mooresville decides that cycle tracks are desired on certain roadways within high density urban districts.

## ***A summary of our recommendations for multi-use trails is below:***

- Minimum 10 feet wide. (12 feet is preferred in high use areas)
- A cross slope of 2% is recommended.
- Grades of less than 5% are required, with occasional grades up to 11% for short distances.
- Minimum 2-foot graded shoulder on each side with 5 feet preferred.
- Asphalt is best surface for multiple users such as bicycles and skates. Concrete is a good alternative in flood-prone areas such as culverts, while boardwalks are best in frequently wet parts of the trails. Very fine gravel or *Granite Screenings* (rock dust) is a cost-effective substitute in rural areas and can accommodate pedestrians and most bicyclists.
- Motorized vehicles (excluding wheelchairs, maintenance staff, and emergency vehicles) should never be permitted.
- Intersection crossings must be highly visible to motorized traffic, following mid-block crosswalk guidelines or by incorporating special traffic calming methods at intersections such as restricted turn signals.
- Trail design, construction type, and construction schedule should all reflect environmental considerations.
- Lighting should only be included where necessary such as in high use areas, at intersections or at other hazardous locations.



Examples of typical multi-use path cross sections from NCDOT and Mecklenburg County Park and Recreation are in **Appendix F**.

### 3. Off-Road Dirt Trails

Although this plan primarily focuses on bicycle facilities that serve primarily as transportation routes, bicycling is, by nature, an entertaining mode of recreating. Multi-use paths, bike lanes, rural roadways, neighborhood roads, and mountain bike trails are all used by residents to get outside and play. The more opportunities that cyclists have to use and become familiar with their bicycle, the easier it is for them to use their bicycling skills as a gateway to becoming comfortable on a roadway that they would need to use for transportation. Since most children and adults may not immediately feel comfortable sharing a roadway with automobiles when on a bicycle, they will first choose to become accustomed to riding a bicycle on a sidewalk, on a multi-use path, on an off road trail, or not at all.

This plan recommends that the Park and Recreation department study the feasibility of creating some “single track” and other off-road trail networks on its existing and future park lands. Creating these trails on parks located immediately on a proposed bike route, multi-use path, or a street with bike lanes would provide a transportation and recreation connection as well.

Additionally, multi-use path corridors that do not yet have a paved pathway can serve as excellent off-road bicycling paths, as well as transportation links for those equipped with the correct type of bicycle. It is also recommended in this plan that easements for multi-use pathways are assembled quickly and that access is permitted for the public and advertised for bicycle and hiking use even before a permanent pathway is constructed.



*This sewer easement is a future multi-use pathway in Mecklenburg County, but is used currently for off-road cycling.*

According to the survey conducted for this plan, 58% of respondents enjoy or highly enjoy bicycling on off-road trails.

## **B. ON-ROAD ACCOMODATIONS**

A bicycle transportation network that does not fully enable bicyclists to use roadways does not encourage cycling. Unfortunately, the average person simply will not be comfortable riding alongside motor vehicles unless certain enhancements are made to the roadways. These enhancements may include obvious bicycle improvements such as designated bicycle lanes, paved shoulders, or shared parking/bike lanes. Some roadway bicycle accommodations might not be as obvious such as wide outside lanes, neighborhood bike routes, or traffic calming methods on standard roadways. Traffic volumes and speeds primarily determine what level of accommodation is required for bicyclists on shared roadways. **Table 5-1** highlights guidelines for selecting bikeway facilities for all new or reconstructed streets, based on criteria from the City of Portland, Oregon’s Comprehensive Bicycle Plan. This table should serve only as a guide, while each facility’s needs should be addressed on a case-by-case basis.



TABLE 5-1

Average Daily Traffic (ADT)	Speed Limit	Recommended Bikeway Facility
< 1,000	≤ 25 MPH	Street as is, and may be designated as a <i>Bicycle Boulevard</i> if it meets additional standards on page 5-21.
≥ 1,000 – < 3,000	≤ 25 MPH	Street as is, and may be part of a <i>Bicycle Boulevard</i> if lane widths exist that can accommodate both cars and bicycles or can be designated as part of a <i>standard bicycle route</i> .
≤ 3,000	> 25 MPH	<i>Wide outside lanes</i> . Where not possible due to width constraints and parking needs, traffic calming improvements are acceptable*. This street may be designated as a <i>standard bicycle route</i> .
≥ 3,000 – <10,000	≤ 25 MPH	<i>Wide outside lanes or bicycle lanes</i> . Where not possible due to width constraints and parking needs, traffic calming improvements are acceptable*.
≥ 3,000 – <20,000	30-35 MPH	<i>Bicycle Lanes</i> . Where not possible due to width constraints and parking needs, wide outside lanes or traffic calming are acceptable*.
≥ 10,000 – <20,000	25-45 MPH	Bicycle Lanes. Where not possible due to width constraints and parking needs, wide outside lanes are acceptable*.
≥ 20,000	<55 MPH	Bicycle Lanes. Where not possible due to width constraints, a parallel alternative bikeway facility should be developed within ¼ mile. *Speed limits from 45 MPH to 55 MPH require no less than 6-7 foot-wide bicycle lanes from stripe to curb, with 7-feet being preferred on 55 MPH roadways (or paved shoulders if no curb and gutter exist) with special attention given to intersection safety.
Rural Road Volumes	All speeds	5-7 foot-wide paved shoulders should be standard on every rural roadway. Roadways with speeds greater than 55 MPH require an alternate bike corridor that is completely separated from the motorized vehicle travel lanes and intersections.

\*Traffic calming or wide outside lanes are acceptable where any of the following conditions exist:

- It is not possible to eliminate lanes or to reduce lane widths;
- Topographical constraints exist;
- Additional pavement would disrupt the natural environment or character of the natural environment;
- On street parking is essential to serve adjacent land uses or to improve the character of the pedestrian environment.
- There are numerous commercial driveways that can create hazards when combined with bike lanes without proper access management techniques.

### 1. Bicycle Lanes

On arterial roads, bicycle lanes offer a perception of safety to bicyclists, and make many drivers more comfortable with sharing the road with a cyclist. Some data suggest that while motorists regularly give the bicyclist safe passing distances while in bike lanes, many do not know what is appropriate space to give when they are sharing a vehicle lane. Some cars come dangerously





close to a biker while passing, sometimes coming within inches, or simply come too close for the speed or mass of their vehicle. The air motion associated with a fast or large vehicle can cause a bicyclist to lose control. Many cars feel that bicyclists need more room than they really do, and cause traffic to build behind the cyclist because of the fear of passing too closely. These cars may come too close to oncoming motorists in order to give the bicyclist unnecessary extra space. Striping bicycle lanes can alleviate some of these uncertainties. According to the survey conducted for this plan, almost 75% of respondents enjoy or highly enjoy bicycling on roadways with designated and marked bicycle lanes.



Typically, neighborhood roadways are the only urban roadways that would normally not benefit from bicycle lanes. These roads have safer traffic volumes and speeds where cyclists of most skill levels feel comfortable biking in the travel lanes with other vehicles.

Arterial roadways, or even some “neighborhood” roads that serve more as arterials because of lack of appropriate connectivity, make the best candidates for bike lanes. Speed limits on these roadways usually range from 25 to 45 miles per hour, with 35 MPH being the most common on Mooresville roads. New striped bicycle lanes should be a

minimum of 5 feet from the curb to the stripe, including the gutter pan. NCDOT typically recommends a minimum 4' bicycle lane from the edge of the gutter pan. An 8" thermoplastic fog stripe is recommended, with a 4" fog stripe being the minimum width, and 6" is common. A bike stencil with a directional arrow should be placed in the bicycle lane after each intersection and then periodically as needed. Since bike lanes tend to accumulate debris swept over from the traffic lanes, a method to occasionally sweep and clean bike lanes should be determined, and unpaved roadways that intersect bicycle lanes should have paved bibs.



Bicycle lanes can be implemented on existing roadways by:

1. Narrowing existing travel and turn lanes;
2. Substituting motor-vehicle travel lanes for turn and bicycle lanes;
3. Removing or modifying on-street parking;
4. Shoulder widening.

These practices should be standard in every road resurfacing or widening projects, but should also aggressively be done independently of these projects to realistically get any bike accommodations completed. All options should be

considered and evaluated carefully before determining the best solution for each situation. Environmental concerns or topographical constraints may restrict shoulder widening, or traffic crippling may restrict lane removals. Posted speed limits may cause safety concerns for narrowing travel lanes, or the necessity of on-street parking may make its removal unwise. These problems can, in some cases, be avoided if it is determined that extra pavement width might protect nearby ecologic features, or if traffic congestion is minimal or reduced from lane



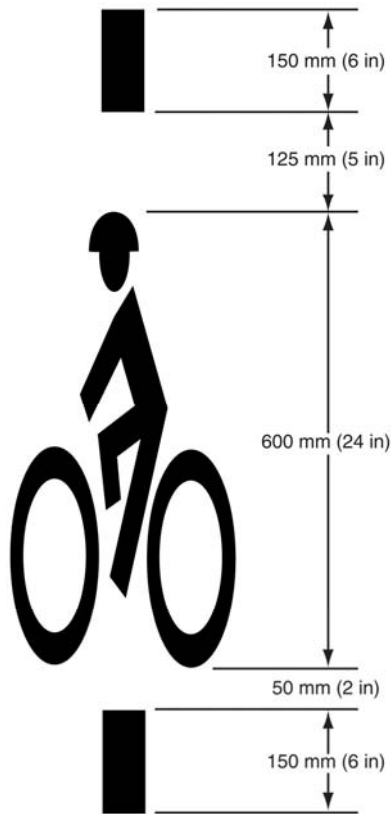
reductions if proper turn lanes are improved. The reduction of posted speed limits might make lane width reductions possible and safer, and a combination of lane width reductions and a shared biking and parking lane might allow both to be accommodated.

**Bike Lane Installation:**

- Thermoplastic is typically used for line markings and preformed thermoplastic is common for bike symbols and arrows. Depending on traffic volumes, thermoplastic can last 10 years or more.
- Applied thickness is typically 90 mm -120 mm with 100 mm being preferred.



*Careful placement of bike lanes away from the door zone adjacent to on-street parking is required*



*A common bike lane symbol*

- Properly installed thermoplastic chemically bonds to the pavement. To remove it, you have to remove the top layer of asphalt by grinding out the markings. If the product is not heated to the appropriate temperature before application, the thermoplastic may “peel.”
- One of the two bicyclist symbols approved by the MUTCD is illustrated here with its proper dimensions. This symbol should be placed in the bike lane after each intersection to remind the driver of the shoulder’s designated use. It can be placed as needed after that, usually after main driveways.
- A through bicycle lane should never be placed to the right of a designated right-turn only lane.
- Bicycle lanes can be accompanied by signage, and these signs can inform when a bike lane begins or ends ahead.

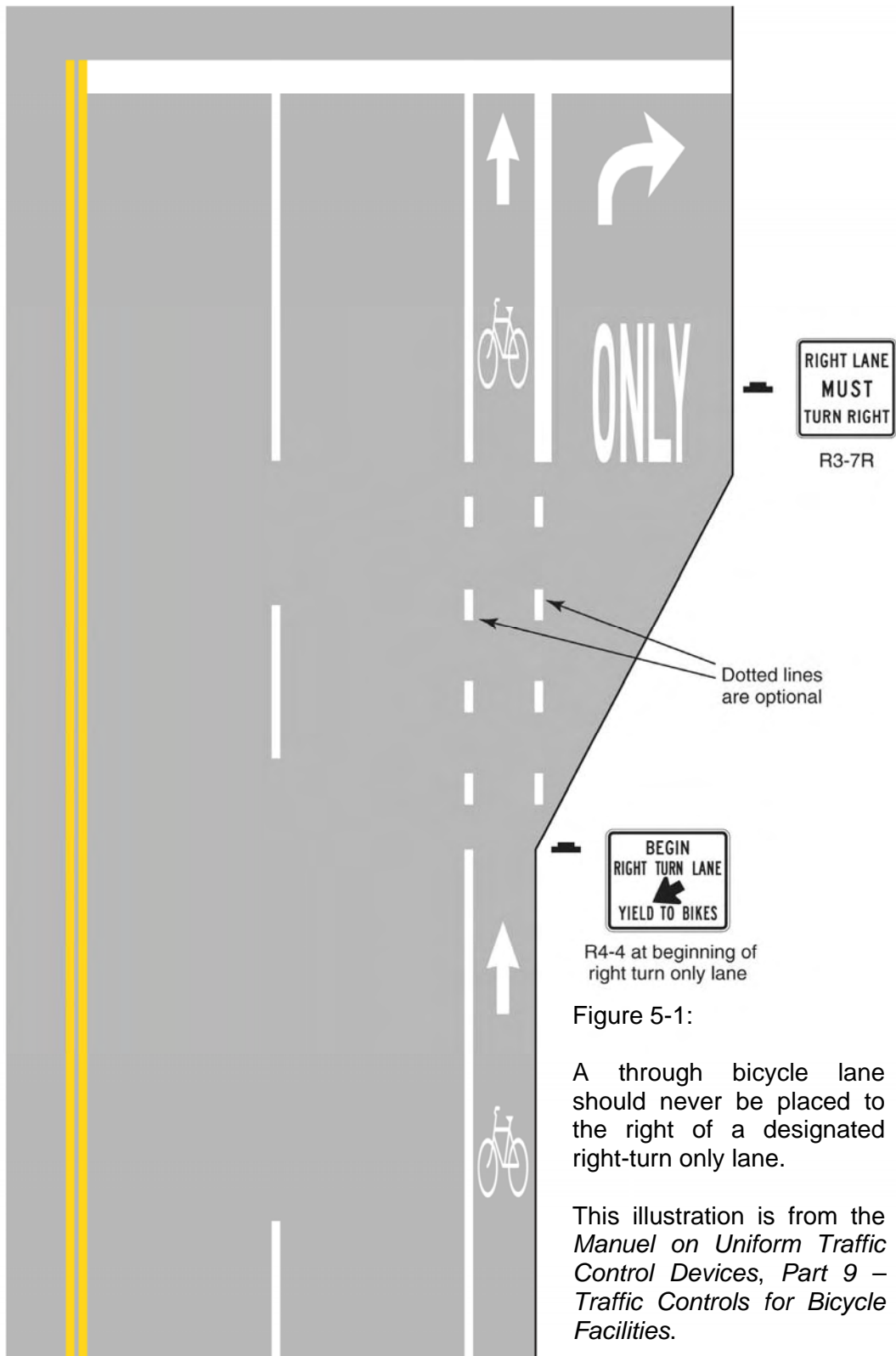


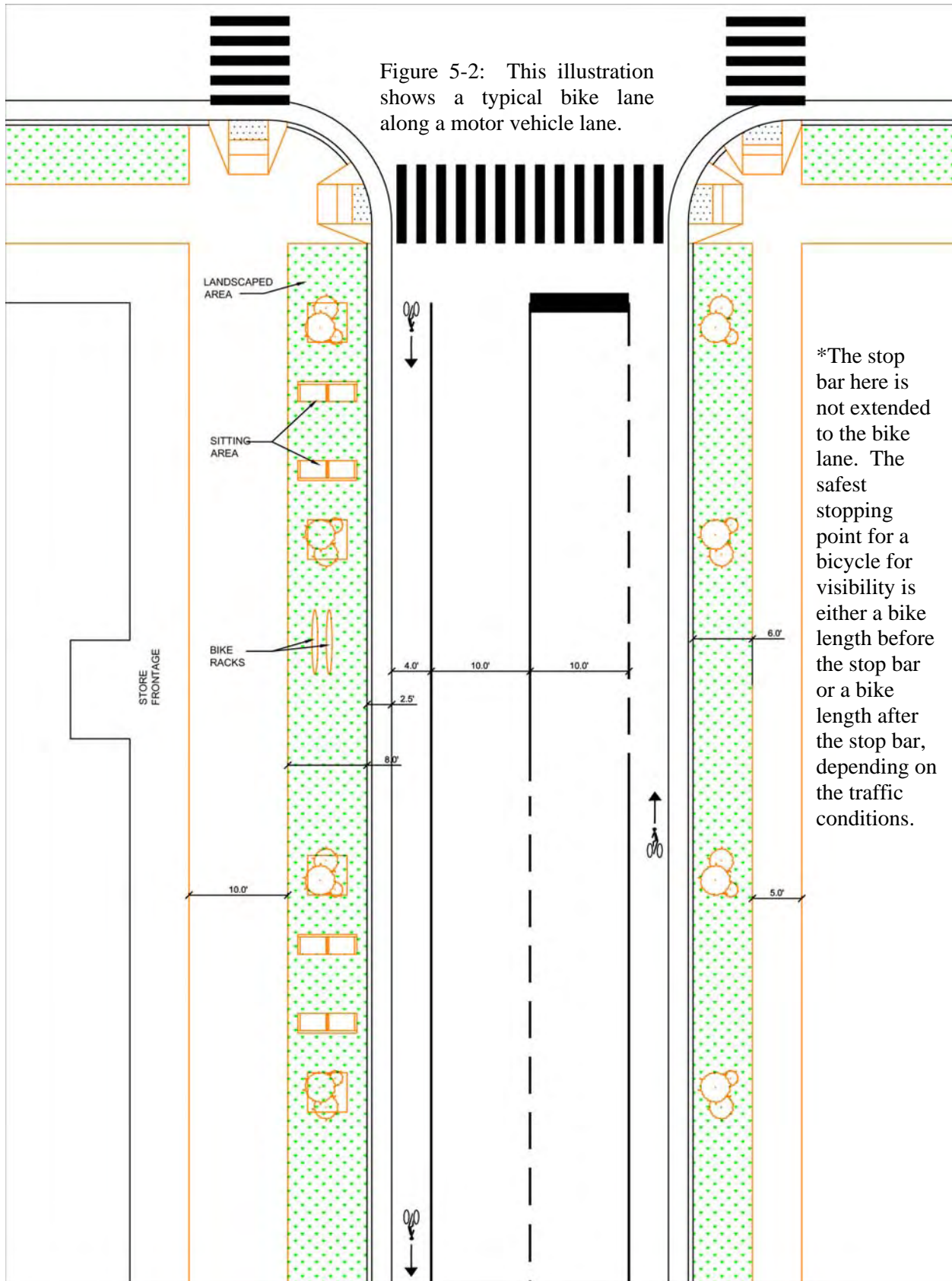
Figure 5-1:

A through bicycle lane should never be placed to the right of a designated right-turn only lane.

This illustration is from the *Manual on Uniform Traffic Control Devices, Part 9 – Traffic Controls for Bicycle Facilities*.



Figure 5-2: This illustration shows a typical bike lane along a motor vehicle lane.



\*The stop bar here is not extended to the bike lane. The safest stopping point for a bicycle for visibility is either a bike length before the stop bar or a bike length after the stop bar, depending on the traffic conditions.





- For specifics on the placement of bike lanes, reviewing the full *Manual on Uniform Traffic Control Devices* is recommended, with an emphasis on *Part 9 – Traffic Controls for Bicycle Facilities*.

A typical roadway cross section with bike lanes from NCDOT's design guidelines is shown in **Appendix F**.

### 2. Paved Shoulders



*This photo was taken on 115 just south of Mount Mourne. This shoulder is approximately 3 feet wide, but a minimum of 5 feet is preferred.*

Non-urban roadways that typically do not have curb and gutter are prime locations for paved shoulders. One reason for their necessity is that rural roadways are the most probable roadways where a bicyclist will be hit from the rear. The combination of narrow roads with high speeds make the inclusion of two vehicle types of two very different speeds and sizes on the same roadway more dangerous than on urban streets where traffic speeds are typically lower and the traffic patterns are more stop and go. Paving these roadways with a minimum of 5-7 extra feet of pavement on each side, and divided by paint from the travel lanes, act as safer areas for bicycles to travel and also increases the safety of motor vehicles. Allowing automobiles to pass bicyclists without

moving into oncoming traffic has obvious safety benefits. The extra pavement can give automobiles a safety zone in case objects or other vehicles unexpectedly appear in their lane. This paved shoulder also acts as a level place where broken down or damaged vehicles can sit or as an area that emergency vehicles can use when the roadway is congested. These paved shoulders also have been attributed to lower maintenance costs than on narrower roadways where vehicle tires more typically run along the more-fragile margins. Shoulders should *never* be less than 5 feet wide as it will force the cyclist to use a facility that is too narrow (NCDOT allows 4 foot shoulders on roadways where speeds are 40 MPH or less). If a narrow shoulder exists, motorists will assume that it is wide enough for a bicyclist, and usually not give sufficient passing distance or might be angered if a bicyclist encroaches in "their" travel lane.

According to the survey conducted for this plan, almost 64% of respondents enjoy or highly enjoy bicycling on rural roadways with paved shoulders and the number one deterrent to bicycling in Mooresville is a lack of these shoulders on Mooresville's roadways.

A typical roadway cross section with paved shoulders from NCDOT's design guidelines is shown in **Appendix F**.





### 3. Shared Travel and Parking Lanes

#### A. Wide Outside Lanes

To keep speeds safe, residential 20-25 mph zones should have 9.5' – 10.5' lanes. Bicyclists and automobiles share these low speed roads, while the low volume creates numerous opportunities for safe passing. Thirty to forty mph shared-use roadways could have 10'-11' inside travel lanes and 14' outside lanes, although planning for roadways with speeds of 35 miles per hour or less with these widths should also consider bicycle lanes. Roadways that are 45 mph or greater should have 11'-12' travel lanes with 14' wide outside lanes. Most urban collectors and arterials that have the space for a 15' outside lane may also consider striping 4' of it as a bicycle lane. These streets should all have “Share the Road” signs (discussed later in this section) periodically to remind drivers that bicycles could be present in the roadway.

A typical roadway cross section with wide outside lane from NCDOT’s design guidelines is shown in **Appendix F**.

#### B. Sharrows<sup>1</sup>



*A sharrow in Portland, Oregon*

Narrow, low speed streets with low to high volumes (typical streets found in Central Business Districts or on certain neighborhood bicycle routes) might not have the width required to accommodate bicycles and cars easily in one lane. Or, planners may wish to attract bicyclists to these streets and remind motorists to expect their presence. One technique that involves stenciling “sharrows” in the roadway that tell the automobiles and the bicyclists that they share an entire lane is becoming popular. Many high volume roadways downtown have numerous intersections, driveways, and pedestrians. Most bicyclists can keep pace with traffic speeds on these roadways, and giving them the right to take up an entire lane

makes them most visible and is sometimes the safest way to let them travel. A sharrow might serve to remind both bicyclist and motorists on neighborhood roadways that the street is shared, or might position a bicyclist safely away from hazards such as car door zones.

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<sup>1</sup> The approved-use of sharrows is currently being finalized by MUTCD, but is not formally approved as of the completion date of this plan. Thus they are not yet supported by the NCDOT as of the development of this plan.



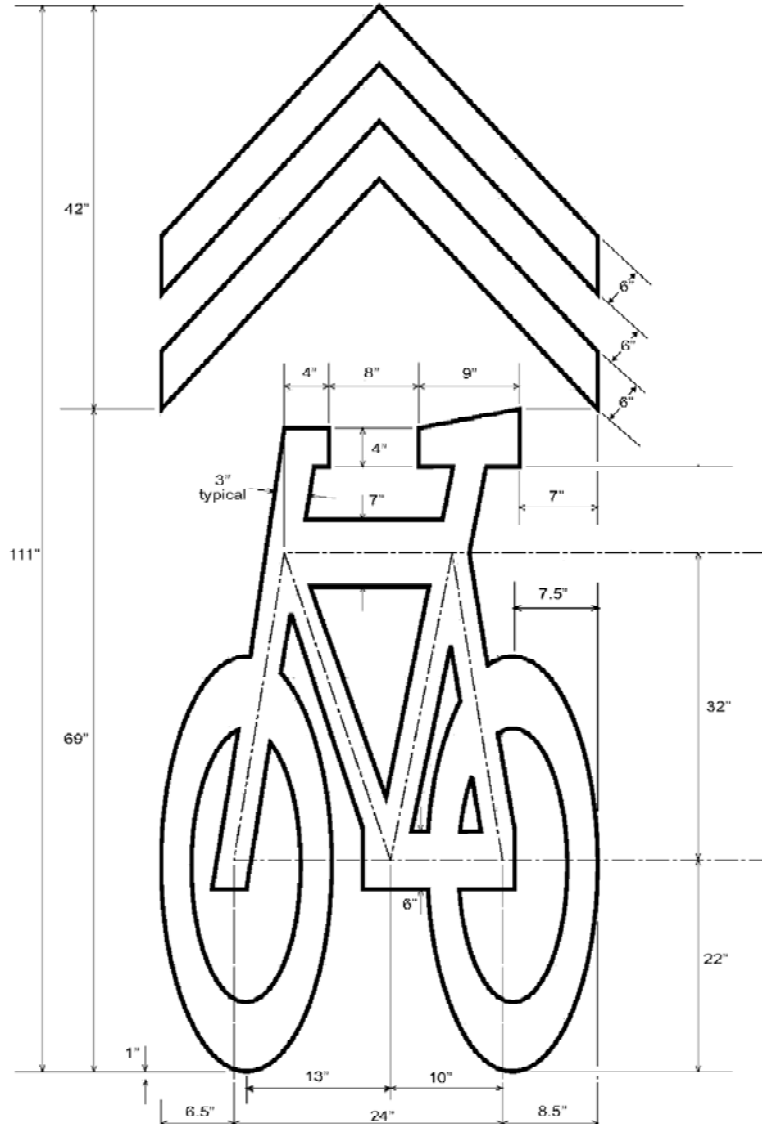
The Shared Lane Marking is intended to:

1. Help bicyclists position themselves in lanes too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane;
2. Encourage safe passing of bicyclists by motorists;
3. Reduce the chance of a bicyclist impacting the open door of a parked vehicle in a shared lane with on-street parallel parking;
4. Alert road users of the lateral location bicyclists may occupy; and
5. Reduce the incidence of wrong-way bicycling.

The Sharrow symbol may be used to assist bicyclists with positioning in a shared lane with on-street parallel parking and to alert road users to the location a bicyclist may occupy within the traveled way.

Standards:

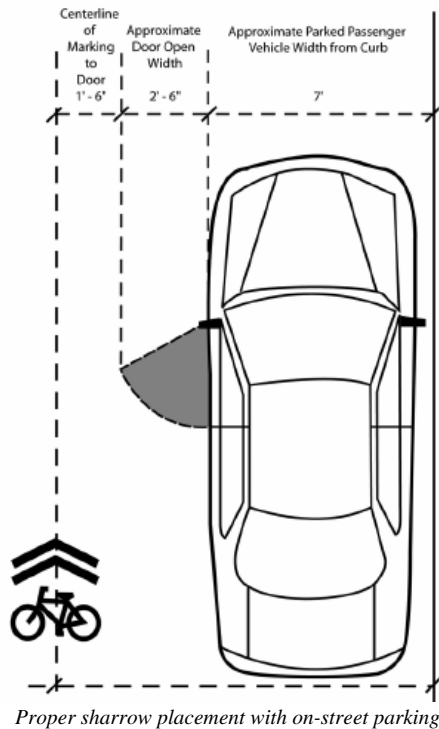
- If used in a shared lane with on-street parallel parking, Shared Lane Markings shall be placed so that the centers of the markings are a minimum of 3.3 m (11 ft) from the curb face, or from the edge of pavement where there is no curb.
- Shared Lane Markings shall not be used on shoulders or in designated bicycle lanes.
- The Shared Lane Marking should not be placed on roadways with a speed limit above 55 km/h (35 mph).
- When used, the Shared Lane Marking should be placed immediately after an intersection and spaced at intervals not greater than 75 m (250 ft) thereafter.



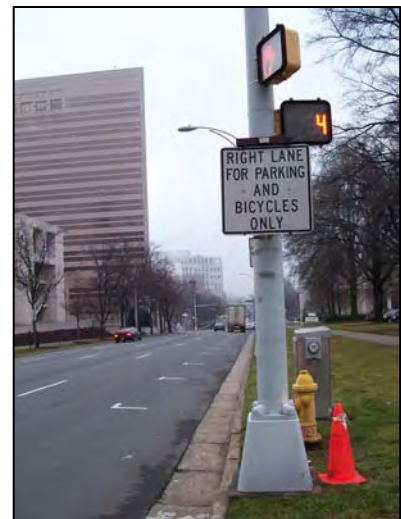
This sharrow symbol is currently being considered for adoption by the MUTCD



**C. Shared Bicycle/Parking Lanes and “Cinderella” Bike Lanes**



Many municipalities are being creative with their roadways to better accommodate bicyclists. In many instances, there simply is not the space, resources, or demand to include bike lanes on every roadway, but planners realize that the more opportunities bicyclists have to safely use our roads, the more will come. Since many of our streets are designed and constructed to accommodate the volume of traffic that will be on them at peak times, Central Business Districts have long been allowing motorists to park their vehicles in the right lane of multiple-laned streets any time other than the morning and afternoon rush hours. A 12 foot wide outside travel lane could be converted to a lane that accommodates both a parked automobile and a moving bicycle. Automobiles park to the far right 5 feet of the lane plus the 2 foot gutter pan near the curb, allowing almost 7 feet to the left of the vehicle for a bicycle lane and a door zone. Many cities designate these lanes for “parking and bicycles only” during assigned non-peak hours, but this concept can be used for permanent on-street parking lanes as well.



*A shared parking and bicycle lane in Charlotte, NC*

and bicycles only” during assigned non-peak hours, but this concept can be used for permanent on-street parking lanes as well.

However, the fear of being “doored” for a bicyclist in a bike lane shared with on-street parking is real and it does kill bicyclists every year. Providing a 2 ½ foot “door buffer” between a marked 7 foot wide parking space (including gutter pan) and a 4 foot wide bike lane would certainly be a safer alternative than placing on street parking immediately adjacent to a bicycle lane. For shared travel lanes, a Sharrow stencil centered four feet from the edge of the parking space (or 11 feet from the curb) will guide a bicyclist safely past an opening door. See “Back-in Diagonal Parking” on Page 5-31 for safer parking options with bike lanes.

The concept of Cinderella bike lanes can be expanded more. A seven foot-wide parking-only lane on an urban roadway during the work day might be dedicated as a bike lane during rush hours and weekends, and at other times when the parking might not be in high demand. Future and existing multiple-laned roadways throughout Mooresville can designate their right lanes for bicyclists on weekends, or even during non-peak weekday hours, while they allow all vehicles during the peak travel times. This action can motivate many people to ride their bicycles for the first time in the streets, or to ride more frequently. These weekend lane conversions create miles of recreational bikeways at minimal to no costs, while weekday non-peak lane restrictions provide some alternatives that will otherwise not be possible. Of course, educating the public



that cyclists and motorists must share an outside lane during peak hours might be necessary to clarify that bicycles can still legally be on the roadways during these times.

### 4. Bicycle Routes



*A neighborhood bike route in Charlotte, NC*

Some of the most pleasurable roads for bicycling are low traffic and low speed neighborhood streets. Streets such as these designed before the mid 1900s are also good routes to get to schools, churches, some shopping, and many homes. Children might learn to first ride a bike on streets like these, and then use them to spend the summer exploring the neighborhood. Adults might use these roads for a pleasure bike ride, a ride to the nearby store, or for a bicycle ride into a workplace. These roads usually require no or few new modifications to make them comfortable for bicycling, and most cyclists feel secure on these streets without separate pathways like greenways or sidewalks. The greatest part about these roads is that they can take the rider places outside of their neighborhood without riding on busy streets. The curving or sometimes maze-like nature of these roads usually divert motorized through traffic to more popular arterials, and slows the speed of some of the existing traffic. This offers a more comfortable, although longer alternative for bicyclists. Similarly, since these roadways do not support high traffic volumes, they also support very few destination points. Bicycle routes should always be used with other bicycle facilities that ensure practical connectivity to the places that the cyclists need to go.

Today, many of these routes are hard to discover as new residential developments are built with cul-de-sacs connected by a single high-speed and high volume arterial road. This seriously restricts the number of low speed and low traffic roads that a cyclist can take to get to a destination. Most of these preferred cycling roads now dead-end into cul-de-sacs and the connecting roads are now as intimidating as thoroughfares.

Because there are different types of bicycle riders, it might be worth designating different types of bike routes. Standard bicycle routes tend to have low traffic volumes, and speed limits that may range from 20 to 55 miles per hour. Because of the low traffic volumes, these are attractive to cyclists who are fairly comfortable bicycling on roadways, but they may not be attractive to bicyclists who are not comfortable mixing with these higher traffic speeds. Designating a street as being a part of a bike route should be able to tell a timid rider or a parent that this roadway is acceptable for beginning cyclists. Neighborhood bike routes that have traffic calming measures in place to keep speeds less than 25 miles per hour are ideal for this purpose, and are becoming known as Bicycle Boulevards. Bicycle Boulevards can be created that are intended to serve all bicyclists, including children, senior citizens, and the average beginner cyclist.







**A. Standard Bicycle Routes:**

Bicycle routes are fairly low volume streets ( $\leq 3,000$  ADT) and low speed ( $\leq 25$  MPH) that can serve as a more comfortable alternative for a bicyclist than higher volume and higher speed roadways. In some select instances, regional bicycle routes can be created on higher speed roadways (up to 55 MPH) that tend to have very low volumes or on streets with up to 5,000 ADT that have speed limits of 45 MPH or less or that offer other traffic calming. These routes connect destinations through neighborhoods, little-used commercial streets, or low volume rural roadways.



Because these bicycle routes are already acceptable for many levels of cyclists, little needs to be done to transform it into a bicycle route. However, many current and future bicyclists will never realize the route’s existence unless it is advertised. Signs along the route and route maps will show bicyclists and motorists that these routes are official bike routes. This will attract the bicyclist to the roadway, and even help them navigate through it. Speed limits can also be reduced to create a more acceptable bicycle route designation. Traffic volumes can be controlled by specific planning or zoning techniques to guide future growth or by traffic-calming measures. If speed limits and traffic volumes cannot be controlled to a comfortable level, adding paved shoulders or bicycle lanes is highly encouraged on roads designated as bicycle routes. Naming or numbering each route on an occasional sign helps give it an identity. Referring to the routes with names such as the *Shearers Road Bike Route*, the *Magnolia Bike Route*, or the *Raceway Bike Route* make it easier to associate these roads as ways to get around by bicycle.

**B. Bicycle Boulevards:**

There should be an obvious distinction between a standard bicycle route and a street that can be used by any level of bicyclist. Certain neighborhood bicycle routes should be designed, created, and designated as *Bicycle Boulevards*, to benefit the amateur cyclist without incurring a great amount of infrastructure cost. To be designated as a Bicycle Boulevard, a street must:

1. Offer acceptable connectivity and be reasonably continuous;
2. Have a speed limit of 25 MPH or less and have the street design or traffic calming measures in place to make certain that the cars consistently travel no faster than the posted speed limit;
3. Be a local street which is not a truck or transit route or has a preferred daily traffic volume of 1,000 ADT or less (traffic calming techniques can be used to limit these street volumes to local traffic only) but some Bicycle Boulevards may have up to 3,000 ADT if wider lanes exist to accommodate both bicyclists and automobiles without noticeably increasing average speeds;



*Pavement markers remind both bicyclists and motorists that the street is a Bicycle Boulevard*





4. Be marked with special street signs and/or pavement markers that designate the street as a Bicycle Boulevard and directs users through the route;
5. Have very little commercial frontage, but still provides reasonable access to major destinations;
6. Be within  $\frac{1}{4}$  mile of a major street or a high-traffic collector street;
7. Have few directional changes with main segments of at least  $\frac{1}{2}$  mile long;
8. Be on streets with priority at most of its unsignalized crossings (do not have stop signs) or these intersections are controlled by yields or roundabouts;
9. Have traffic signals at major intersections, or cross major intersections where future signals are feasible; and
10. Connect to other bicycle routes, bicycle lanes, or multi-use paths.



*A special street sign on a Bicycle Boulevard*

A Bicycle Boulevard can be the result of a standard bike route that has evolved over time to become a Bicycle Boulevard that is inviting to all levels of bicyclists. It is very important, however, to reserve designation of a bicycle route as a Bicycle Boulevard until it reasonably adheres to the criteria listed above. A Bicycle Boulevard that has consistently high speed or high volumes of motorized traffic will not create the association of bicycle friendliness that the name Bicycle Boulevard is intended to generate. Techniques to implement a Bicycle Boulevard include:

- A. Some traffic calming may be warranted on many roadways to ensure a low speed limit, and in some cases, to help divert some unwanted non-local motorized traffic volumes to other roads. On-street parking and/or chicanes are very affective for this, along with roundabouts, traffic chokers, or even motorized vehicle diverters at select intersections (These treatments are discussed later in this section).
- B. Some devices may need to be installed to help bicyclists cross main intersections. Remove all possible stop signs on the Bike Boulevard street, as stop and go motions can quickly wear down a cyclists' energy just as it requires more fuel for an automobile. Any cross streets with high volumes should be considered for a roundabout. Removing stop signs on these streets may encourage higher speeds and volumes, so an occasional traffic choker or traffic diverters for automobiles are recommended to ensure that the traffic on these roads continues to attract mostly local traffic.
- C. The street should be well marked as a Bicycle Boulevard with pavement markings (sharrows or another unique marker), special street-name signs with a particular color, wayfinding signs, and possibly with a unique pavement material when repaving is done. These Bicycle Boulevard routes should be named and mapped on a bicycle facility map.
- D. Adding connectivity for pedestrians and bicycles can help to create or link Bicycle Boulevards to other bicycle facilities. Retrofitting connections between existing cul-de-sacs or dead end roads can make a bicycle trip possible that was otherwise too long.



### 5.3. TRAFFIC CALMING FOR SAFE STREETS

#### A. INTERSECTION TREATMENTS

##### 1. Signalization

- Countdown style pedestrian signals should eventually be incorporated into each signalized intersection in Mooresville. Because of the different rates of speeds of cyclists and motorists, these countdowns are helpful for cyclists to determine how much time they have to get through a large or distant intersection. Many bicyclists, once past the stop bar, cannot safely cross many large intersections in the time that it takes for the light to change from yellow to red. To check the clearance interval, a bicyclist's speed of 10 mph and a perception/reaction/braking time of 2.5 seconds should be used. Besides allowing cyclists to determine if they have time to cross before entering the intersection, countdown signals also tell riders the time they have while stopped to adjust their helmet, remove or add clothing, or to take a drink of water. While traffic engineers are occasionally hesitant to install countdown signals because of the fear that they will perpetuate red-light running by motorists, this fear has been found to be unnecessary. Motorists usually cannot read the countdown's numbers from long range, and some early studies show that those that can read the signals tend to maintain a consistent flow through intersections or tend to more readily stop for a yellow light when they know the exact time remaining on the cycle.
- Countdown signals can be installed 7 – 10 feet high at intersections with a timed signal change or at intersections that are controlled by loop detectors, video detectors, or push-buttons. Timed signals should display the entire countdown phase until it reaches zero, when all pedestrian and vehicle traffic should get a red light together in that direction. Signals should display a walk symbol at all times when the pedestrian has the right of way, and include the countdown as soon as the signal is scheduled to change.
- Bicycles should have a way to trip loop detectors at intersections that are not phased on a timer. The distance to the pedestrian activation button and the impracticality of crossing over a traffic lane, curb cut, planting strip and sidewalk to press the button seriously decreases the chances of a cyclist ever making this effort. This lack of signal recognition is one reason why even normally law-abiding cyclists choose to run red lights. Special bicycle loop detectors in a marked bike box on popular bike routes are becoming common solutions in this country. Some currently installed loop detectors for automobiles can be adjusted to pick up the existence of some types of bicycles, but this requires some knowledge on the biker's part to know how to place their bike within this loop and also loop detectors cannot detect many of the modern bicycles that are not made of conductive metal frames. Some roads are designed adequately for a special bike-activation button to be placed on a pole over the curb that is accessible to waiting bicyclists, and some detectors are triggered by a video camera which can be set to detect a bicycle. It is important that countdowns be installed at each of these loop detected and timed intersections to let the bicyclist know that they were detected.





- A displayed automatic *Walk* signal with a countdown is recommended at all intersections when pedestrians have the right-of-way to cross, whether or not the button was activated. This helps pedestrians as well as bicyclists because in many cases, pedestrians will not take the time to push the button if there is already a green light for the traffic, and might find themselves dashing across the remaining width of the street as the light turns to red. Bicyclists may find themselves in a yellow light situation in the middle of a wide intersection, being too late to stop and not having the speed to make it through safely before it turns red. The countdown allows bicyclists, pedestrians, and some motorists to better determine if they can safely cross through an intersection before the light turns yellow.

Detection of a cyclist at an intersection is a complicated but important matter that usually gets ignored by traffic engineers. Loop detectors primarily for automobiles present many problems for the cyclist:

1. The small metal frame of an upright bicycle is not large enough to be detected by the loop.
2. The location of the bicyclist (the far right side of the travel lane) is usually not within the loop's perimeter.
3. In order to be detected by the loop, the bicyclist needs to be within the loop (in the center of the lane) and typically needs to lay their bike down on its side, sometimes even needing first to align their bicycle perpendicular to the lane.
4. Loop detectors are often set to detect automobile-sized metal objects, and will often not recognize a bike, even one laid down in the middle of the loop.
5. Many modern bicycles are no longer made of steel but made with light weight materials such as aluminum or carbon fiber. Aluminum does not conduct metal well and will therefore be harder to detect, while carbon fiber contains no metal and will never be detected by a loop.
6. Most bicyclists have no idea how to be detected by a loop, or the difference between lights activated by timers or activated by loop detectors. They do know that they can sit at most lights for a very long time and never receive a green signal, and thus are likely to simply ride through signalized intersections.



*Multi-use trails can have loop detectors at intersections*

Some solutions may be:

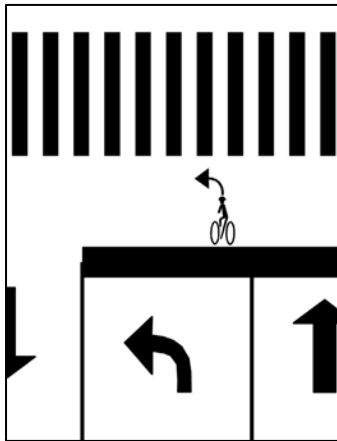
1. Many communities are beginning to install bicycle loop detectors that are located on the right side of travel lanes or in bicycle lanes. This is certainly an option, but the technology of carbon fiber bicycle frames is becoming so specialized that metal frames might completely disappear within the next few decades.
2. Create timed signalization at intersections on popular bike routes or intersections that have consistent vehicular traffic of any type. Timed signals ensure that bicyclists will not



have to trip a sensor to receive crossing permission. Install countdown style signals at these intersections as cyclists are not accustomed to being detected at most lights and would often assume that they will not receive a green light. The countdown shows cyclists that the green light is triggered and they need to only patiently wait.

3. For loop-detected signals, special bicycle push buttons could be installed that are raised over the curb at the bicycle stop bar. Standard pedestrian push-buttons are usually not within reach of a cyclist in the roadway and if intended for bicyclists, should be placed in a location specifically intended for a bicycle in the roadway.
4. Infrared detectors and video detection devices are becoming more common and affordable. This method of detection may be a wiser detection mechanism than loop detectors as steel bicycles become rarer.
5. For all methods of detection, a means of alerting the bicyclist that they have been detected should discourage most red-light running. Countdown signals work well, and some push button signals are equipped with lights that notify the user that they have activated the signal.
6. The sensitivity of existing loop detectors should be adjusted to detect a bicycle without sensing passing vehicles in adjacent lanes. This can be facilitated by using a short length (under 15 m or 50') quadrupole loop. This minimizes sensitivity outside the loop while increasing it within.

## 2. Bike Box

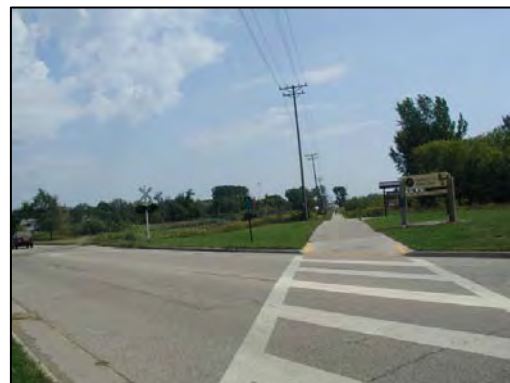


*A bicycle box allows bicyclists to position themselves for turns*

Bicyclists, because of their slower speeds, may be negatively impacted by street features that require them to queue with automobiles at stop lights in the far right lane and in left turn lanes. A bike box a bicycle length ahead of the motor vehicle stop bar in the left turn lane would give bicycles a defined waiting location for the light. A bike box in right lanes where right turns are not permitted on red would position the bicyclist ahead of the traffic while waiting for the light to turn green and place them in view of other vehicles, reducing the likelihood of being clipped once the signal changes. Bike boxes should be positioned between the automobile stop bar and the crosswalk.

## 3. Non-Signalized Crossings

Not every intersection can have a signal, and it is important that the motorized vehicle have appropriate warning to be able to react to a bicyclist or a pedestrian crossing a roadway. In addition, although some cyclists feel comfortable crossing roadways as a vehicle would by moving to the left in a lane and making turns, many bicyclists do not feel comfortable doing this as it requires moving and accelerating into traffic. Therefore, marked crosswalks at these intersections or midblock crossings are important for all



*This rail trail intersection is more noticeable to motorists with this crosswalk*



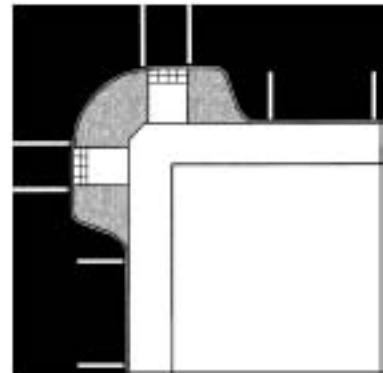
cyclists to safely cross roadways and also for many beginner-level cyclists who prefer not to merge into traffic. In addition, crosswalks also increase the visibility of bicyclists who choose to ride on sidewalks as they cross intersections, where collisions are most probable. Guidelines for non-signalized crosswalks include:

- Install marked crosswalks at any non-signalized intersection, particularly those frequented by pedestrians.
- Install midblock crosswalks 300 feet or more from another marked crossing point or signalized intersection. These crossings are especially recommended near schools, retail areas, recreation, and residential areas.
- Provide where a multi-use path crosses roadways with a speed limit of 45 MPH or less.
- Require advance auto-warning signs and good visibility for both the driver and the bicyclist. Placing a stop bar with signage ahead of the crosswalk will ensure better visibility.
- Include a refuge island on wide streets where:
  - There are fast vehicle speeds or large vehicle or pedestrian traffic volumes.
  - There is more than one travel lane in any direction.
  - Children, people with disabilities, or elderly people would cross.
  - There are complex vehicle movements.
  - There may be insufficient time to cross the entire road because of traffic demands.

#### 4. Curb Modifications

Tightening turns at intersections will force motorists to come to a complete stop, give drivers a better angle-view on approaching vehicle and pedestrian traffic, and decrease the length of the crosswalk for pedestrians. This design will benefit bicyclists as they approach an intersection alongside or approaching a motor vehicle that intends to make a right turn. A high speed right turn can seriously endanger a bicyclist before they have time to react. Designing tight turns or adding curb extensions to existing intersections would provide some safety for bicyclists at intersections.

- The tighter turn will force the automobile to slow considerably before turning.
- Bicycles alongside turning vehicles will be able to advance ahead of the intersection before the car moves into the turn.
- Bicycles approaching a turning vehicle will have more time to react.



*With curb extensions, cars are forced to slow down to make right turns.*





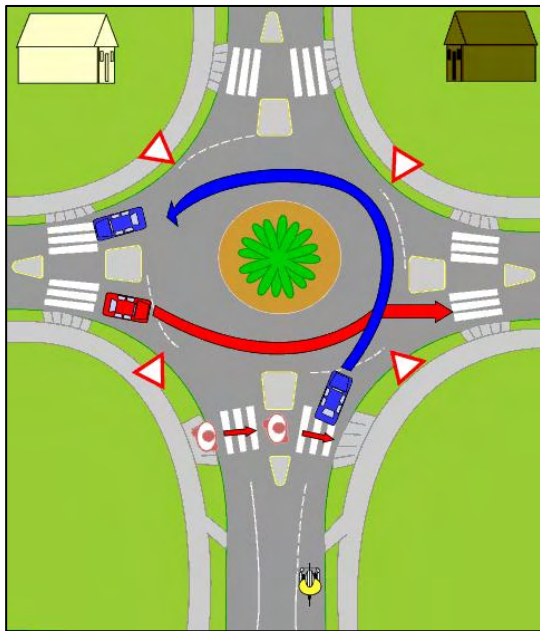
## 5. All-Way Stops and Yields



*Four-way yield intersections save energy for vehicles traveling on low-speed streets.*

Neighborhood road intersections that currently have a stop in one direction can be modified to have a stop or a yield in all directions, if other speed controls are already in place. However, stop signs at too many intersections on a bicycle route can leave a cyclist exhausted from accelerating and decelerating and may instigate law-breaking on the part of the cyclist. Four-way yields are a solution to this, but NCDOT is not typically comfortable with recommending these unless they are made safer for bicyclists and pedestrians by including a mini-roundabout.

## 6. Roundabouts



*This roundabout image from Yorkton, Canada shows crosswalks, safety islands, and optional bike exits for inexperienced cyclists who prefer not to take the lane.*

Roundabouts are effective for pedestrians, bicycles, and automobiles, despite the fears from those who are unfamiliar with these traffic control devices that are popular worldwide. Roundabouts limit potential conflict points because the automobiles and bicyclists are unable to make left turns. Instead, the vehicle moves in a counter-clockwise direction around the circle, and exiting right at their chosen road. Vehicles get through the intersection more quickly, even though their speed is lower. Since these traffic speeds are slow, bicyclists can move into the travel lanes as if they were a larger vehicle. Pedestrians and novice bicyclists use sidewalks and crosswalks (sometimes with pedestrian refuge islands) on the outside of the roundabout. It has been shown that roundabouts have fewer collisions than conventional intersections.

Seattle, Washington has installed over 700 neighborhood mini traffic circles, which have shown to be responsible for an 80% reduction in all types of crashes. This includes a 30% reduction in bicycle crashes as well. Universally, bicyclists need not stop, since they can see the vehicle in their conflict path, and simply increase or lower their entry speed.



*A roundabout on a Bike Boulevard in Berkeley, CA*



## 7. Traffic Diverters

It may be necessary to divert non-local traffic from a roadway specifically meant for low volumes to a roadway that better supports regional traffic. This is particularly useful while designing Bicycle Boulevards because some features about these streets might attract unwanted motorized traffic.



*A traffic diverter on a Bike Boulevard in Berkeley, CA*

Select intersections on neighborhood streets with other access points may have barriers put in place that allow only bicycles to move forward, or that may allow access to motorized traffic from intersections from one direction only. Incorporating a barrier at one exit in a roundabout would be an affective traffic diverter on a roadway where slower speeds and lower volumes are desired.

## B. STREET TREATMENTS

### 1. Road Diets (Lane Conversions)



*A lane conversion creates bike lanes and a new center turn lane from motor vehicle lanes.*

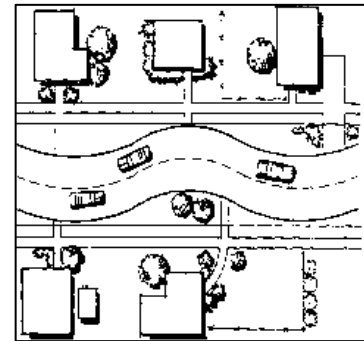
Roads with two or more wide travel lanes in each direction (or one very wide travel lane) and no or limited designated left turn lanes may be evaluated for the possibility of applying a “road diet”. This lane conversion typically reduces the widths of and/or the number of motor vehicle travel lanes in each direction, includes designated center left turn lanes with occasional median strips for pedestrian crosswalks, and adds bicycle lanes. This configuration will allow through traffic to keep a constant pace without stopping for turning vehicles, supports alternate forms of transportation, provides buffers for pedestrians on the sidewalks, slows traffic to the posted speed limit, and may give bicyclists and pedestrians safer crossing

opportunities. According to Dan Burden at Walkable Communities, Inc., this configuration could be safer and can be more efficient as a traffic mover than some other roadway configurations. The ideal roadway for this conversion is often a four-lane road carrying 12-18,000 auto trips per day, but upper limits of 20-25,000 ADT are also achievable on some roadways without decreasing their carrying capacity. Although Morrison Plantation Parkway is considered for this practice in this plan, no study has been conducted on traffic models. It may be a conceivable alternative in the future for conversion plans that meet specific objectives.



**2. Alternate On-Street Parking and Chicanes**

High traffic speeds are a deterrent to cycling as it makes many bicyclists feel unsafe. Where there is space for on-street parking on only one side of the street on roads intended for lower speeds, consider striping the travel lanes so that the parking spaces alternate from one side of the street to the next with each block or half block. This will give the road a serpentine shape and naturally reduce the speed of traffic. Chicanes can also be artificially created by adding landscaping, changing lane striping, or by creating pedestrian refuges with crosswalks. (This picture and other traffic calming techniques can be found on the Federal Highway Administration’s Web Site at <http://www.ite.org/traffic/tcdevices.htm>)



*Chicanes can be developed on wide streets to help maintain a desired traffic speed*

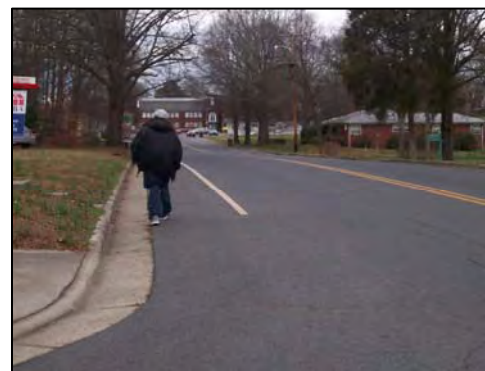


**3. Chokers**

A choker placed mid block on a residential roadway of a speed limit of 25 MH or less can be an effective addition to a chicane and further reduce traffic speeds. A planter or other permanent fixture can be constructed in the roadway that is wide enough to let only one vehicle and one bicycle through at a time. A designated waiting spot is created at either end of the choker for cars to wait to pass. This photo (courtesy of [pedbikeimages.org](http://pedbikeimages.org)) shows a traffic choker.

**4. Narrowing Residential Streets with Striping**

Standard 9½ to 10½-foot lanes can be established on residential streets by installing outside boundary lines with either paint or thermoplastic striping. While thermoplastic striping costs more, it will last significantly longer than will lines of standard paint, although standard paint will likely last for years on lower-volume streets. This practice should reduce traffic speeds on these neighborhood roads so that the streets are more usable for walkers and bicyclists and is best on roadways with speed limits of 25 miles per hour or less, and with an ADT of 3,000 or less.



*A striped shoulder in Albemarle*

Pedestrians who choose to use the areas outside the painted lanes must still comply with local and state law. North Carolina General Statute § 20-174 specifically states that pedestrians must use sidewalks where they are provided. When no sidewalks are provided, pedestrians should walk facing traffic and must yield right of way to vehicular traffic, while vehicles must use due care to avoid pedestrians on the roadway. The presence or the expectation of pedestrians on a street may also slow traffic on these neighborhood roadways.

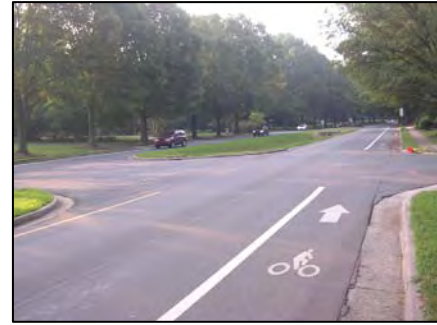




Experienced bicyclists should use, and be expected to use, the vehicle lanes. Young and inexperienced bicyclists may wish to use the shoulder with the pedestrians, but should ride in the same direction as traffic and must be prepared to avoid walkers or parked cars by merging into the vehicle lane.

### 5. Bicycle Lanes

The previous paragraph describes lane striping specifically for traffic calming, but bicycle lanes are functional lanes for bicycles that also serve to slow traffic and as traffic buffers for pedestrians on the sidewalk. Although neighborhood roads typically have low enough automobile speeds and volumes for cyclists to ride in the vehicle lanes, bicycle lanes on arterial roads can slow traffic and offer a separated riding area for cyclists. NCDOT guidelines require designated bicycle lanes to be a minimum of 4 feet from the edge of the gutter pan to the stripe.



*A bike lane in Charlotte, NC*

### 6. Narrow Vehicular Lanes

Roadways in the core of the Bicycle Districts and in residential areas should keep traffic speeds at a maximum of 20-25 mph. Keeping motor vehicle lanes at a width of 9.5' – 10.5' with other traffic calming features could naturally keep speeds limited. Thirty-five MPH roadway lanes can be as narrow as 10' if separate bicycle lanes exist, and outside lanes should be 14' if they are meant to be shared travel lanes for bicycles and automobiles. Urban roadways that are 45 mph or greater require wider lane widths for safety, but these should be kept to 11 or 12 foot wide and should include separated bicycle lanes or paved shoulders.

Designing “Complete Streets” that provide complete accommodations for pedestrians, bicycles, and motor vehicles on every street provides the optimal means for motor vehicle traffic, bicycles, and pedestrian traffic to coexist. The Federal Highway Administration states that, “Bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist.”<sup>2</sup> Mooresville and NCDOT need to adopt a *Complete Streets* policy as well. A good resource that should be obtained from the North Carolina Department of Transportation Operations Department is their *Traditional Neighborhood Development (TND) Street Design Guidelines* from July 2000. These guidelines are available for proposed TND developments and permits localities and developers to design certain roadways according to TND guidelines rather than the conventional subdivision street standards. The guidelines recognize that in TND developments, mixed uses are encouraged and pedestrians and bicyclists are accommodated on multi-mode/shared streets. This manual goes into further detail on design speeds, street widths, on-street parking, sidewalks and other street features and can be found on-line at: <http://www.ncdot.org/doh/preconstruct/altern/value/manuals/tnd.pdf>.

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<sup>2</sup> FHWA Design Guidance - Accommodating Bicycle and Pedestrian Travel: A Recommended Approach. A US DOT Policy Statement - Integrating Bicycling and Walking into Transportation Infrastructure; <http://www.fhwa.dot.gov/environment/bikeped/design.htm>



## 7. Back-in Diagonal Parking

On-street parking has some features that could be hazardous to cyclists. A bicyclist has little chance avoiding a collision with a suddenly opened car door and a bicyclist is naturally less visible to a motorist backing out of a diagonal parking space. A new method of on-street diagonal parking has some positive benefits to bicyclists. By arranging the angling of the parking slots, motorists must pull forward of the parking space and then reverse into it. When they leave the spot, they have a clear view of approaching cars and bicycles approaching on their left and can easily maneuver into traffic.



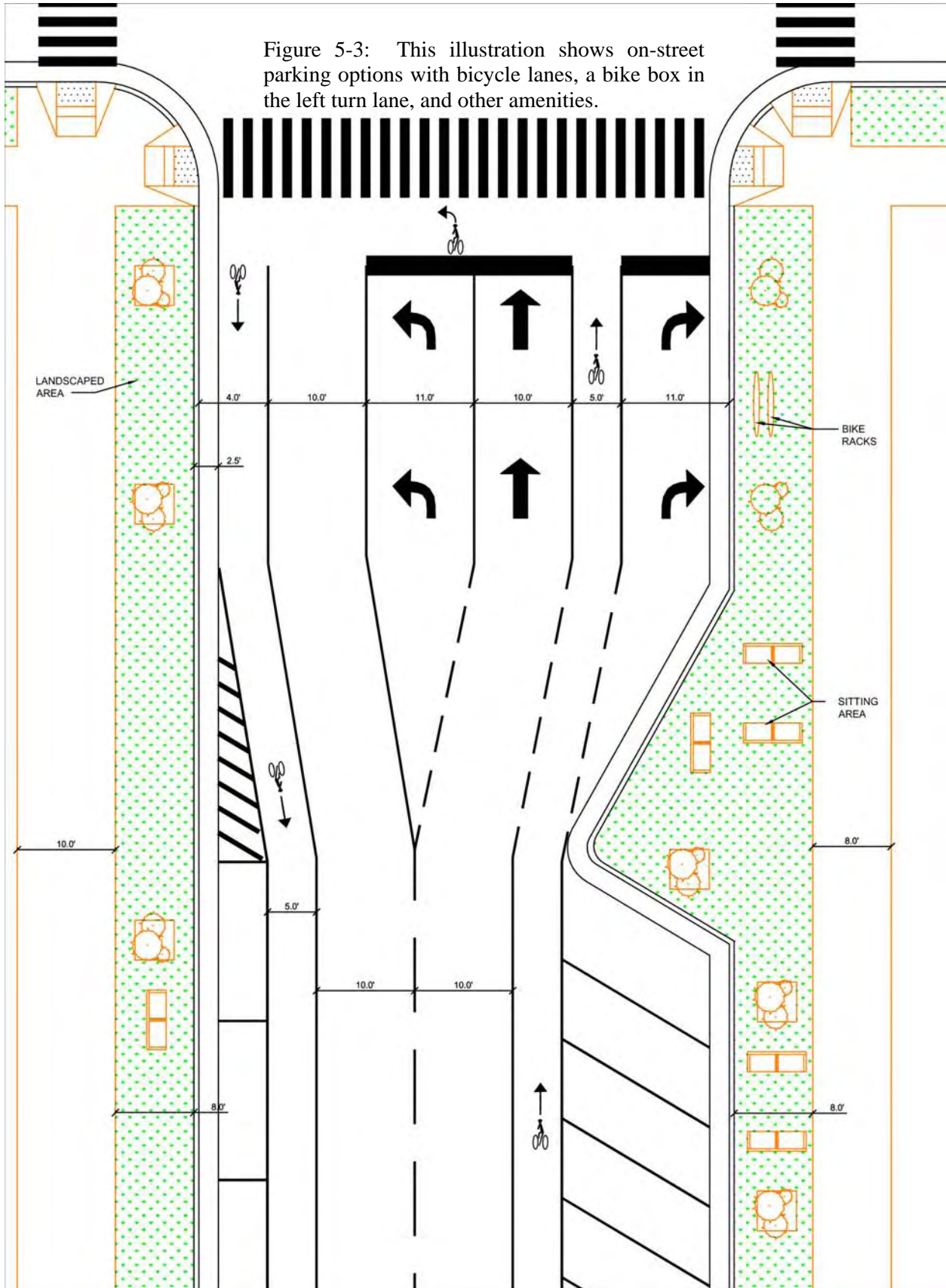
*Back-in diagonal parking has benefits for bicyclists  
(Photo by Michael Ronkin)*

This also benefits the pedestrian by giving easy access for the driver, the passengers, and the car's payload to the sidewalk without having to first shut the door. The open door also acts as a buffer to keep small children from moving towards the roadway when they exit the car. In addition, blind and fast turns into parking spaces that may have pedestrians blocked from view are eliminated.





Figure 5-3: This illustration shows on-street parking options with bicycle lanes, a bike box in the left turn lane, and other amenities.





## 5.4. BICYCLE PARKING, SIGNAGE, LIGHTING, AND LANDSCAPING

### A. Bicycle Parking



*Signs and poles in Mooresville offer the only reliable bicycle parking in the Town. These are inadequate for most preferred locking systems*

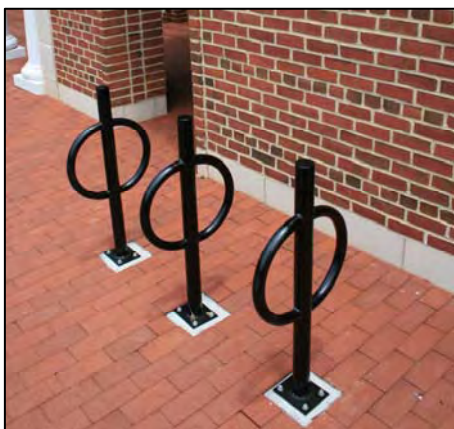
One of the biggest deterrents for people who want to bike is the lack of places to lock or store a bike securely at the destination or even at their residence (in general and also according to the survey completed for this plan). Just as we have accommodated motorists by providing ample parking at all destinations, we should encourage more bicycle use by providing more bicycle parking.

A single motor-vehicle parking space can cost thousands of dollars in construction and land costs, as well as add to annual property taxes and maintenance costs. Ten or twelve bicycles can be parked in the space that it requires for only one motorized vehicle.



*Mooresville's existing bike racks are both hard to find and of inadequate quality*

Unfortunately, precipitation can have drastic effects on a bicycle over time. A bicycle can usually stand the drenching powers of the rain longer than its rider, but several hours or more left parked in a downpour can create the need for the owner to spend more time on maintenance than they might think is worth it. Rain can be forced into sealed bicycle components, remove protective lubrications, and rust parts. It can also destroy accessories on bicycles that many bicyclists have now such as odometers, lights, and the extras inside of attached handlebar bags or panniers. Placing bike racks under the building's roof, at a covered parking deck, or under its own structure would make these racks more practical to bicyclists. If immediate or practical shelter is not available, some bike rack styles are even equipped with a removable hard shell that can be placed over the bicycle.



*These racks at Mooresville's library are of the right type and placed in a good location.*

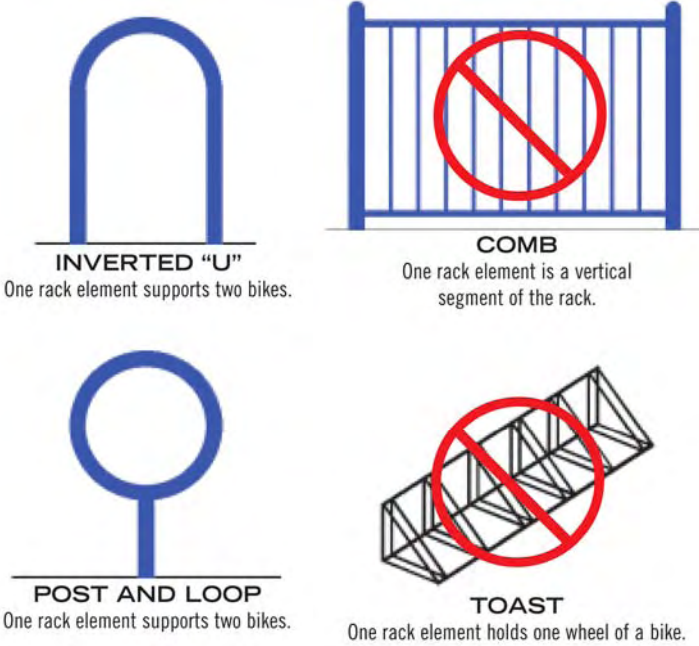
A bicycle parking ordinance should be adopted requiring the provision of off-street bicycle parking for new developments, expansion of existing developments, and changes in use that would require additional parking.

- The number of bicycle spaces required may vary according to use, but generally is 1 or 2 bicycle accommodations for any residence or business that requires less than 20 parking spaces or one bicycle accommodation for every 20 motor-vehicle parking spaces.
- These bicycle parking requirements can be fulfilled



by lockers, racks or an agreed upon location designated for securely storing bicycles.

- The ideal rack is one that accommodates U-shaped locks, which are designed to allow the user to lock one or both wheels (if the front wheel is removed) and the bicycle frame to the rack. Many common bicycle parking racks do not work with this type of lock and result in bicycle damages and thefts, however, so should be considered unacceptable.



This illustration, provided by the Association of Pedestrian and Bicycle Professionals, shows the acceptable rack shapes to the left and unacceptable rack types to the right.

- Short term bicycle parking should be located within close proximity to the entrance to the destination and in a safe and secure location. Long term parking can be further away from the business or residence, but should be secure and well marked.
- Businesses that require mostly short term parking should offer some covered parking for long term employees, but it is acceptable to have the majority of its spots uncovered. Residential structures and businesses that expect more long term parking expectations should have all of its bicycle parking sheltered from precipitation.

For regional consistency, samples of the City of Charlotte’s and Town of Davidson’s bicycle parking ordinances are located in **Appendix G**.

There are many opportunities to create better bike parking with creative and practical ideas such as:

- Make it policy to purchase and install special parking meters that are specially adapted with a metal loop designed for a bicycle lock. This will save space and money and show that bicycles are a welcome addition to the transportation network.
- The Town and existing businesses can share the costs of purchasing and installation of bicycle racks. Many municipalities have a plan where they purchase the racks for any existing business that would install it. The rack may have advertising on it for the sponsoring business.
- Bicycle parking facilities that are covered and strategically placed are becoming popular and may encourage bicycling. These are commonly located near a popular economic



Bad bicycle racks can cost someone their bike or cause a wheel to be bent





center and would provide covered short term secure bicycle racks. Larger facilities, known as “Bike Stations” may include long term bike lockers and/or shower and locker facilities.

In addition to the adoption of a bicycle parking ordinance for new or renovated development, the following minimum bicycle parking facilities should be initiated by the Town:

- Bike Station
  - At the proposed Mt. Mourne Commuter Rail Station
- Covered, short term bicycle decks with approximately 10 inverted “U” shaped racks that will fit 20 bicycles
  - At the Citizen Center downtown
  - At the YMCA in Morrison Plantation
  - At each of the 13 public schools in the study area
  - At major shopping centers such as the Target Shopping Center, the Wal-Mart Shopping Center, and the future Mill Village
  - At the Lake Norman Medical Center
  - Possibly at Lowes Corporate Headquarters if the proposed commuter rail station in Mount Mourne fails to materialize.
- Individual inverted “U” shaped bicycle racks
  - 24 racks to be purchased and installed as needed throughout the town
- Individual bicycle lockers to be purchased and installed downtown



*On-street automobile parking (shown here in Portland, OR) can easily and inexpensively be converted to on-street bicycle parking.*



*This drawing shows a covered bicycle parking deck in Portland, Oregon known as a Bike Oasis. [Rendering by Browning Shono Architects]*



*Long-term covered parking may be a good option for some locations.*



*Good bicycle parking attracts users as shown to the right in Tampa, Florida.*



**B. Signage**



- Signage is typically used for regulatory, warning, or wayfinding purposes. (Wayfinding signage is discussed in Section 6.)
- Signage should be minimal.
- Signage should be aesthetically appealing.
- Signage should be maintained to be readable.



*Creative Sign Design*

Signage is governed by the Manual on Uniform Traffic Control Devices (MUTCD), which provides specifications on the design and placement of traffic control signs installed within public rights-of-way. The MUTCD encourages a conservative use of signs (Sections 2A-1, 2A-6, 2B-1, and 2C-1). Signs should only be installed when they fulfill a need based on an engineering study or engineering judgment. In general, signs are often ineffective in modifying driver behavior, and overuse of signs breeds disrespect. Used judiciously and located with consistency, signs and markings can be effective.

The MUTCD outlines guidelines governing signs and pavement markings. At the same time, it does not prohibit creative regulatory design. Colors for signs and markings should conform to the color schedule recommended by the MUTCD to promote uniformity and understanding from jurisdiction to jurisdiction. For the background color of signs, use:

- YELLOW - General warning.
- RED - Stop or prohibition.
- BLUE - Service guidance.
- GREEN - Indicates movements permitted, directional guidance.
- BROWN - Public recreation and scenic guidance.
- ORANGE - Construction and maintenance warning.
- BLACK - Regulation.
- WHITE - Regulation.



*Reflective pavement markings can serve as signage*

Warning signs are used to inform about unusual or unexpected conditions. When used, they should be placed to provide adequate response times. Warning signs are generally diamond-shaped with black letters or drawings on a yellow background and shall be reflectorized or illuminated. Overuse of warning signs breeds disrespect and should be avoided.

Regulatory signs, such as STOP, YIELD, or turn restrictions require certain driver actions and can be enforced. Warning signs can provide helpful information, especially to motorists and pedestrians unfamiliar with an area. Some examples of signs that affect bicyclists include Share the Road signs, motorist warning signs, NO TURN ON RED signs, and guide signs.

Share the Road signs are posted to remind motorists and bicyclists that each of these vehicle types will be sharing the same lane. A new fluorescent yellow/green color is approved for pedestrian, bicycle, and school warning signs (Section 2A.11 of the MUTCD). A Share the Road internet site is located at:

[http://www.ncdot.org/transit/bicycle/safety/programs\\_initiatives/share.html](http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/share.html)





*These Mooresville signs photographed above help portray the bicycle as a toy and may discourage lawful bicycling.*



R3-17

R3-17a

R3-17b



R4-4



R4-7

**Figure 5-4: Common MUTCD-Approved Signs that Pertain to Bicycling**



R5-1b

R5-3

R5-6

R7-9

R7-9a



R9-3a

R9-5

R9-6

R9-7

R10-3

R10-22



### C. Lighting

- Typically, street lighting that is adequate for automobiles is also adequate for bicyclists, except on designated bicycle paths, where pedestrian-scale lighting is more appropriate. Areas of concern such as wide grates, drop offs, steep slopes, and other hazards should be considered for lighting. Although it is required by law that bicyclists carry a front headlight, most of these headlights are only bright enough for other vehicles to see them. Bicyclists rarely carry (particularly because of the cost) headlights that are bright enough to illuminate hazards in the roadway, and many bicyclists unfortunately carry no light at all.
- Well used cycling areas such as Central Business Districts, Neighborhood Business Districts, and multi-use trails inside of parks should have appropriate lighting.
- Determine a need for lighting before installing it. In many cases, lights can make visibility poorer in areas beyond an off road path or decrease a bicyclists natural vision that modifies for low light situations. Lighting should be standard in underpasses and bridges, or when the path has obstacles such as roadway crossings, low limbs, or abrupt directional changes.
- Lighting standards
  - Major arterials: illumination level (Average initial lux) = 16, Uniformity ratio: avg./min. 4:1 or less, max./min. 10:1 or less
  - For all other roadways: illumination level (Average initial lux) = 11, Uniformity ratio: avg./min. 4:1 or less, max./min. 10:1 or less



*Lighting on paths may be to a smaller scale*

### D. Landscaping

Summer bicycle rides or bicycle routes to the workplace may be dependent on available shade. Just as shade trees are valuable to pedestrians, it makes a bicycle trip more appealing and comfortable during warm southern days or even during inclement weather. Scenery is also important to a bicyclist. Shrubs and flowers along planting strips and yards create pleasurable routes, and landscaping with trees and shrubs has been shown to slow traffic speeds of motor vehicles.

- Native vegetation should be used to minimize maintenance and long term costs.
- Use low height shrubs near intersections or transit stops.
- The limbs of large canopy trees should not encroach within the bicycling area.
- Some tree species have more damaging root systems than others and should not be planted in tight planting strips or without root barriers.
- Planting strips should be wide enough to accommodate the vegetation planted. Large canopy trees need 5 – 8 feet, with 8 feet being preferred.
- Space large canopy trees evenly to provide adequate shade (25-50 feet apart). Small canopy trees might be spaced 20-25 feet apart.
- Utilize smaller canopy trees when conflicting overhead utilities are present.
- Consider trees that are low maintenance. Evergreen or tardily deciduous trees that continually drop too many leaves or acorns throughout the year would need constant attention. Deciduous trees that only drop leaves once in the year are easier to maintain.

Sample costs for these items in Section 5 are given in **Appendix H**.



## 5.5. AMERICANS WITH DISABILITIES ACT (ADA) FACILITY TRANSITION PLAN



*Lack of non-motorized planning and high speeds in this North Carolina neighborhood disadvantages the disabled population as well as bicyclists.*

Title II of the Americans with Disabilities Act of 1990 (ADA) requires that local governments complete a Transition Plan that describes how that municipality will upgrade its existing public right of way facilities so that they are compliant with ADA. This plan was scheduled to be complete for states and larger municipalities by July of 1992; with modifications done by January of 1995. The US government and the disabled community realized that this goal was lofty, but now, over

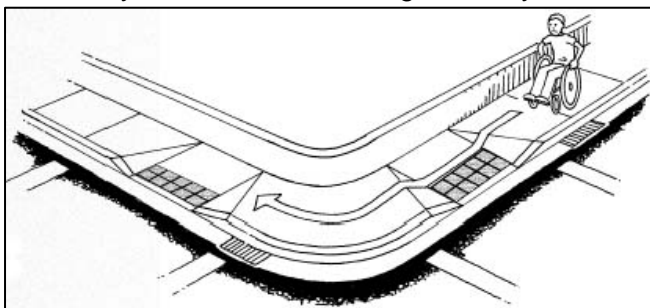
ten years later, it is likely that its provisions will be expected to be completed as infrastructure is built and updated. In some

instances, comprehensive transportation plans have served as the Transition Plan for municipal and state governments around the country. The ADA guidelines for public rights-of-way can be found at <http://www.access-board.gov/prowac/alterations/guide.htm>.

This plan recommends that the Town of Mooresville takes special care to make certain that each and every right-of-way project done in the Town incorporates upgrades to its existing features such as curb ramps, sidewalk maintenance, and crosswalks that will satisfy ADA guidelines. This includes, but is not limited to: sidewalk/multi-use path intersection cross slopes, sidewalk and path widths, surface, grades, curb cuts, ramps, landing areas, gaps, obstacles, detectable warnings, and signals. The illustrations here show some of the problems, issues and solutions that are involved with the proper planning for disabled citizens. Placing curb ramps out of the travel area, making sure to accommodate all users once they are in the vehicle right-of-way, and



*This wheelchair ramp at the Carolina Panther's stadium also benefits other users like bicyclists and parents with baby strollers.*



*Curb cuts and ramps without a minimum 6 foot buffer from the curb create dips that result in hazards for wheelchairs, bicyclists, and strollers.*

providing detectable warnings on the ramps for the visually impaired are some of the many improvements that can be done. Additional information and guidance on curb ramps are located on the United States Department of Transportation's web site at: <http://www.fhwa.dot.gov/environment/sidewalk2/sidewalks207.htm>



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# Section 6 Programs







This section highlights programs that can be implemented in Mooresville to help encourage bicycling as a recreational and utilitarian activity throughout the town. This is not a completely comprehensive list of every feasible program, but provides a good starting point. Further information and ideas can be found at the following organizations' internet sites:

- The North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation has a wealth of information on their web site: [http://www.ncdot.org/transit/bicycle/safety/safety\\_programs.html](http://www.ncdot.org/transit/bicycle/safety/safety_programs.html)



This web site includes information on programs such as the *Basics of Bicycling Curriculum*, *Bicycle Helmet Initiatives*, *Bike Repair*, the *North Carolina School Crossing Guard Training Program*, the *Share the Road Initiative*, the *Safe Routes to School Program* and the *Walk a Child to School Initiative*. The web site is also a good source of resources and materials.



- <http://www.bicyclinginfo.org> also has a great amount of information and program ideas, including design and engineering guidelines, programs, facts, news, outreach and solutions to problems.

- <http://safety.fhwa.dot.gov/> offers ideas for a variety of bicycle-safety focused curricula.

## 6.1. EDUCATION PROGRAMS

### A. Child Cyclist Education

#### Beginner Cyclists

Children should be taught the basics of cycling techniques early. Knowing which side of the street to ride or what to do at intersections are vital skills that will make them safe and independent cyclists throughout their childhood. Children younger than nine-years old do not yet have the cognitive skills that could help them make the right decisions when biking in traffic conditions unsupervised. This creates a greater need for traffic



*A child learning safe bicycling: Photo by John Ciccarella of Bicycle Solutions*

calming for neighborhood bicycle routes and off-road bicycle paths. Organized bicycle training programs known as “Bicycle Rodeos” are popular and educational activities.

Elementary school Physical Education classes should play a role in bicycle education for young bicyclists in primary school.



### Pre-Teen and Teen Cyclists



*A young cyclist biking to school: Photo by John Ciccarelli of Bicycle Solutions*

Children in their pre-teen and teen years are developing the cognitive abilities to understand how to safely bicycle on the road, but still lack the ability to completely understand the full consequences of a collision with an automobile. Nonetheless, this is the period of their lives where the bicycle can offer a child some independence, and this time on the bicycle will give them the practice that will provide skills that last a lifetime. Neighborhood routes and off-road paths and trails offer fantastic opportunities for children to improve these skills with relatively little conflict points with high speed or high volume traffic.

Teenagers may be more apt to explore road racing, touring, or mountain biking to further hone their bicycling skills. High school or community teams or clubs that offer teens the opportunity to be involved and learn how to ride a bicycle in this way can be valuable. Additionally, focusing the creation of bicycle routes and multi-use paths near home and schools will make it possible for independent transportation for teens due to the availability of safe biking areas.

### **B. Adult Cyclist Education Programs**

Many bicycle accidents occur because of the bicyclist disobeying traffic laws. Riding on the wrong side of the road, at night without lights, or through red traffic lights are not only dangerous, they are illegal. In addition, a common complaint against bicyclists is that they habitually run red lights and stop signs. Bicyclists may not win over the respect of motorists until bicyclists learn to respect traffic laws. Many bicyclists and bicycle groups who follow traffic laws actually receive complements from motorists, while the majority of scorn against bicyclists is because they commonly break the law.

Indeed, much of the reasoning why a bicyclist breaks the law is because of conditions unknown to the motorist. Some cyclists may break the law where it is necessary to reasonably ride a bicycle where the streets and intersections are designed specifically for automobiles, but not designed for bicycle needs.

But unfortunately, bicyclists do break the law. Much of the time, they may not know that traffic laws apply to them, but it is also probable that many bicyclists decide that they wish not to follow the law. If cyclists were to dependably ride without breaking traffic laws, bicycle crash rates would most likely plummet and much of the dislike that many motorists have towards bicyclists would likely diminish. Seventy-five percent of the citizens surveyed for this plan admit to breaking standard roadway laws when on a bicycle.

The NCDOT laws for pedestrians and bicyclists can be found at [http://www.ncdot.org/transit/bicycle/laws/laws\\_bikelaws.html](http://www.ncdot.org/transit/bicycle/laws/laws_bikelaws.html) and the guide can be found at <http://www.ncdot.org/transit/bicycle/laws/resources/BikePedLawsGuidebook-Full.pdf>. It is



important that local law enforcement agencies as well as residents become familiar with the state bicycle laws.

Learning the Laws

The provision of community workshops that teach adults how to follow the laws of the roadway while on a bicycle is a potential education program. Despite any rationale for choosing to ignore traffic laws, it is essential that the bicycle community educate themselves on how they can follow the laws and efficiently travel by bicycle. Some common topics of an education course geared toward adults are:

1. *Lean for the Green:* Bicyclists will not typically be detected by loop detectors at signalized intersections unless they know to position their bicycle at an angle at a certain location within this loop. Cyclists can be educated on how to lean for the green instead of hastily running stop lights. In addition, many lights are detected by video monitors or change phases according to a timer. Learning how to differentiate these intersections will give the cyclist a sense of control at red lights.
2. *Stop Means Stop:* Too many stop signs can make a bicycle trip very tiring, but it is essential that a cyclist knows that is their responsibility to give proper right of way to other vehicles at stop signs. Motorists are likely to learn that bicycles share all of the rights and responsibilities of using a roadway if they notice bicyclists following the rules.
3. *Light up the Night:* Riding at night without a light or with dark clothing is dangerous. Lessons in choosing and using a front white light and a rear red light while riding would be useful. Additionally, bright-colored clothing is the difference between being seen and being invisible. The brighter the better.
4. *Ride like you're Invisible:* At all times, a cyclist on the streets should ride as if they are not seen by anyone. Because of all of the distractions on the roadways, the tendency for a motorist to ignore the presence of a bicycle, or the natural fact that a smaller object is more difficult to notice, it is prudent for a vehicle operator as frail as a bicyclist to be cautious for their own safety.
5. *Take the Lane:* Although a bicycle needs to be courteous and ride in a way that does not impede traffic flow, it is also important for them to ride with the same aggression as if they are any other vehicle. Some examples of riding aggressively but safely include:
  - o Riding on the right side of the road,
  - o Maintaining a decent pace while in traffic,
  - o Using turn signals, and
  - o Taking the lane and moving through traffic for safety purposes, preparing to make turns, or to avoid turning vehicles.



*Testing the sensitivity of a loop detector*





### Bicycle Maintenance Workshops

The Town of Mooresville should offer some basic bicycle maintenance workshop classes through a civic department such as the library or in partnership with the YMCA, bicycle store, or another business. Simple bicycle repairs such as changing a flat tire, removing wheels or other parts, adjusting breaks, and greasing or fixing a chain are crucial to the lifespan of a bicycle. A new bicycle may be used frequently until it has a punctured tube, then it can stay unused for years. A chain in need of grease may make riding a bicycle uncomfortable enough to quit, and a bicycle with poor brakes may be dangerous. A growing percentage of bicycles purchased are discount bikes bought at big box stores. These bicycles may have inexpensive components that may need constant repair while these stores do not offer the same services that traditional bicycle shops do.

Once multi-use paths or other family bicycle destinations are in existence in Mooresville, these locations would offer good opportunities for such programs to be offered or for private vendors to be encouraged to set up temporary stands.

### Bike Mentoring

For adults learning to take up cycling again, especially as a utilitarian cyclist, it is not always “like riding a bicycle.” Bicycle technology and options have changed considerably in the past few decades, traffic is more



complicated, social norms have been modified, and physical fitness may have diminished. Many new commuter cyclists may have questions about the type of bicycle to purchase how to pack clothes and gear, how to cope with weather, how to ride with traffic, or where to ride safely. These new cyclists may need to ride with more experienced commuters until they feel comfortable. They can share equipment ideas and riding strategies such as finding routes, choosing gear packs, or proper lighting. The greater Charlotte area already has such a group, known as *Bicycle Commuter Mentor Program* that can be found at [www.bikementor.org](http://www.bikementor.org). This group is quickly expanding and bicycle commuters involved from the municipalities around Charlotte are common, including Mooresville. The Town of Mooresville can work to promote this group for its potential bicycle commuters.

### Maps & Brochures

Once a small network of bicycle routes and paths are created, they should be advertised to the public with maps, brochures, or on-line documents. A person might be more likely to bicycle in Mooresville if they know that they could expect to find the paths, bike lanes, and bike routes that they saw printed on a map. A brochure-map combination that clearly and plainly states some of the basic bicycle laws would also be helpful. **Appendix I** shows The Town of Cary, North Carolina Bicycle Map and the Bicycle Facilities Map for the bicycle-friendly towns of Chapel Hill and Carrboro, North Carolina.





Wayfinding

Wayfinding signs are very important for any bicycle system. Limited systems require special guidance so that the cyclist should not have to make special efforts to find safe routes. Extensive bicycle route accommodations need the wayfinding to decipher the network. In any case, any level bicyclist will feel more comfortable on a bicycle trip if they have a good idea of where they are at various points on their trip. Unfamiliar trips will have a better chance of being attempted as well.

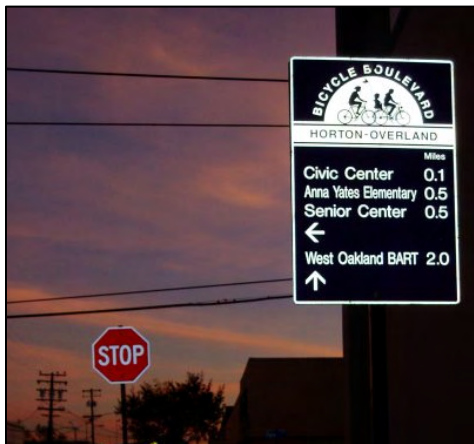


*Unlike most motorized vehicle trips, adding a small amount of distance to a bicycle trip can be a major problem. Maps help the cyclist determine the shortest route.*

- Signage should be minimal. Use existing signs, pavement, benches, or evaluate the needs for the sign at all.
- Signage should be aesthetically appealing.
- Signage should be maintained to be readable.
- The use of graphics such as maps, directional arrows, or illustrations are useful.



*Bicycle Boulevard signs navigate users on the Boulevard*



*Bicyclists can be guided toward popular destinations*



*Multi-use paths should be named and signed as part of the Town's transportation network*

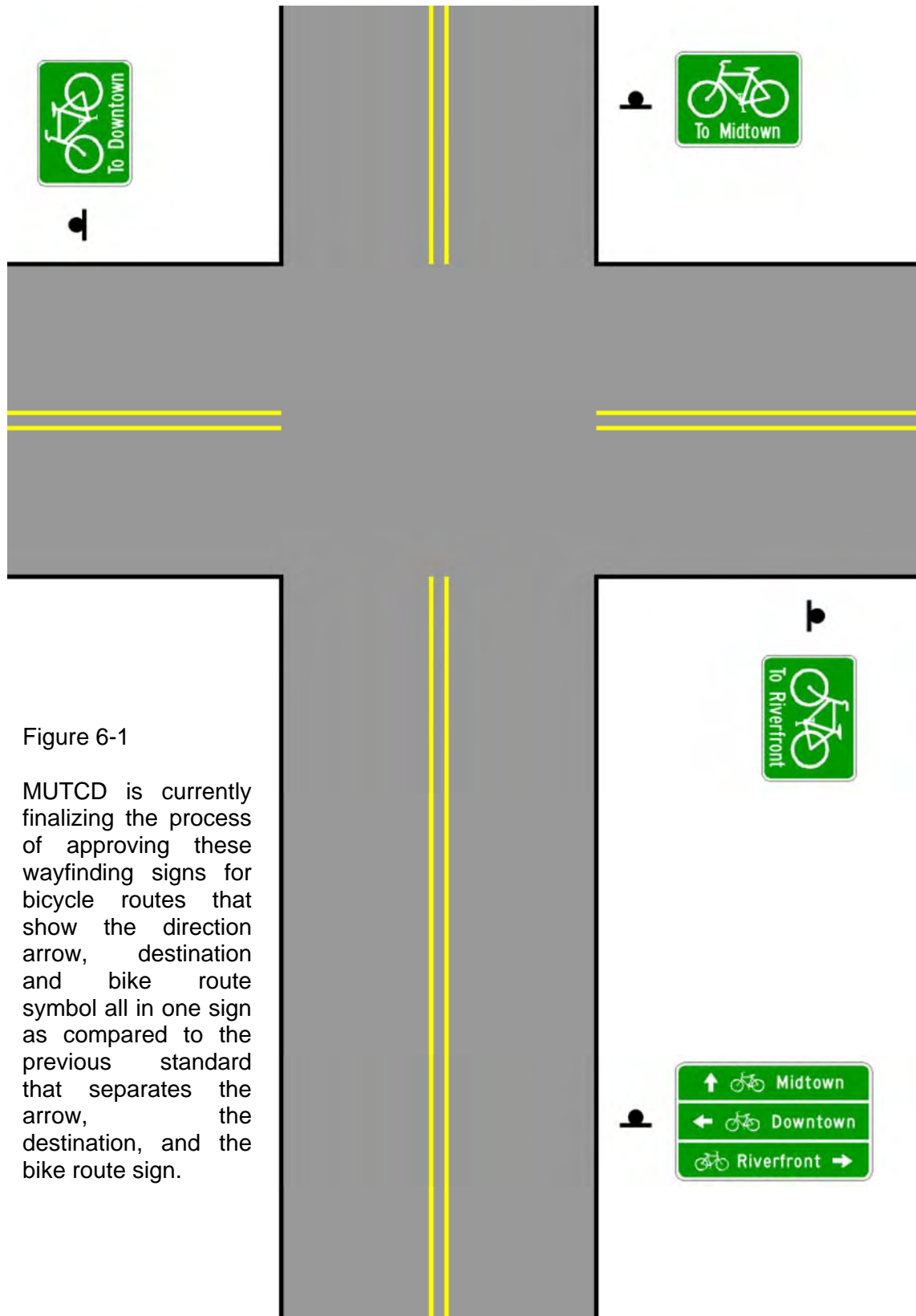


Figure 6-1

MUTCD is currently finalizing the process of approving these wayfinding signs for bicycle routes that show the direction arrow, destination and bike route symbol all in one sign as compared to the previous standard that separates the arrow, the destination, and the bike route sign.



Safety and Informational Signage

Safety and informational messages could be placed in locations where users could clearly read them, and quite possibly abide by their messages. Using riddles, rhymes, or stories to make the safety points increases the public’s interest. A local business or family could sponsor each structure and its corresponding safety sign.

The most affective safety and informational topics may include:

- Stopping at stop signs and stop lights;
- Riding on the right side of the street;
- Using a front and rear light at night;
- Signal turns by pointing or by using the standard hand signals;
- Carrying a tube patch kit and pump;
- The importance of hydration and/or nutrition; and
- The importance of locking bicycles and other crime reducing efforts.

Helmet use has been shown to protect both adult and child cyclists in collisions, preventing 60% of deaths and 85% of head injuries. This, along with the fact that 75% of North Carolina bicyclists currently use helmets when riding and that one out of every three bicycle deaths in North Carolina are children under the age of 16 make helmet use a common topic for these safety signs and programs. However, some concerns exist that mandatory or socially-bred helmet-use can negatively affect cycling by:

- Associating cycling with an exaggerated image of danger;
- Causing the cyclist to take more risks while cycling (some illegal) because of the increased sense of security;
- Decreasing the amount of cyclists because of the perceived dangers and the inconvenience or lack of comfort of acquiring or wearing a helmet.



*Although most safety signs seem to focus on wearing helmets, it might be more affective to consider greater attention given to common causes of collisions such as failure to yield at intersections or wrong-way travel.*

This bicycle plan does acknowledge the value and safety of wearing a helmet while cycling (especially for children), but does not discuss large scale education programs for helmet use based on previously noted concerns and current unknowns about the total effects of such programs on bicycling in the state. However, under North Carolina law, bicyclists and passengers on a bicycle that are under the age of sixteen are required to wear a helmet and are encouraged to do so. More information is available at:

[http://www.ncdot.org/transit/bicycle/safety/programs\\_initiatives/helmets\\_helmet.html](http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/helmets_helmet.html).



### **C. General Public Education**

#### Driver Education



Targeting the young generation with this plan is very important. Children aged 5-15 are the perfect age for bicycling in Mooresville because they are not yet old enough to drive, but are young enough to have the energy and ability to learn new skills and habits. Once these children turn sixteen, it should be expected that the majority of these youth are drawn to the automobile. The car is a status symbol, a mode of independence, and a sign that they are becoming an adult. The bicycle would not fare well in competition with the car for those experiencing their Sweet Sixteen, but many cyclists would be first to say that these young drivers are some of the most intimidating motorists on the road.

At the same time, young drivers are very impressionable and provide excellent opportunities to educate the driving population. Students in driver education classes can certainly be trained to drive initially by using a bicycle. A bicycle follows all the same rules of the road, and most students are physically able to ride a bike. Training to drive by using a bicycle offers other useful skills as well. Biking quickly for long periods, stop and go biking, riding the brake, quick acceleration, biking with low air pressure, and biking with a heavy load uses more energy than casual biking. Uneven pavement, slick or dark conditions, and congested traffic demands care while on a bicycle as well as in a car. The importance of learning good habits such as making eye contact and avoiding distractions such as radios, GPS units, MP3 players and cell phones are easier points to make while on a bike in the roadway. Learning these skills on a bike and appreciating how a motorized vehicle is similar can create safer drivers and possibly help curb some future emission and energy consumption concerns. This method of instruction may even help to educate these students both on proper use of a bicycle on a roadway and proper respect as a motorist for a cyclist. Almost 97% of respondents to the survey used for this plan stated that motorists in and around Mooresville have treated them with carelessness or aggression while on a bicycle. Sixty-seven percent of respondents to the survey used for this plan stated that concern for drivers care is one of the factors that most discourages them from bicycling in Mooresville.

#### North Carolina School Crossing Guard Training Program

As traffic continues to increase on North Carolina's streets and highways, concern has grown over the safety of our children as they bike or walk to and from school. At the same time, health agencies, alarmed at the increase in obesity and inactivity among children, are encouraging parents and communities to get their children walking and biking to school. In response, the Division of Bicycle and Pedestrian Transportation funded a study on pedestrian issues, including school zone safety, and decided to establish a consistent training program for law enforcement officers responsible for school crossing guards. According to the office of the North Carolina Attorney General, school crossing guards may be considered traffic control officers when proper training is provided as specified in GS 20-114.1.





Law enforcement agencies interested in participating in the School Crossing Guard Training Program should contact the Division of Bicycle and Pedestrian Transportation by phone at (919) 807-0777 or visit [http://www.ncdot.org/transit/bicycle/safety/programs\\_initiatives/crossing.html](http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/crossing.html)

Public Perception Marketing

Although an increase in bicycle facilities is far more popular than many transportation projects, it is highly recommended that a positive marketing campaign start as soon as possible. Multiple-use paths, bike lanes, and intersection improvements cost tax dollars, require right-of-way, and may upset some disenfranchised motorists. In addition, recent political events concerning the acquisition of right-of-way have created some public uneasiness with multi-use path and other projects that might require land easements.



*Greenway corridors are showing to be popular neighbors*

In reality, multi-use paths such as greenways have shown through studies such as one conducted by Mecklenburg County Park and Recreation to occasionally increase property re-sale values, have no increase or actually might decrease neighborhood crime, and result in more positive ecological effects than negative. Once greenways are successfully on the ground in communities, the residents know first hand of their benefits and welcome more. However, communities are sometimes wary as to how these paths might negatively affect them, and false information and negative perceptions may allow for a public relations issue before the walkways are in place.

Plus, designing a community where transportation choices exist has been shown to place communities at an economic advantage over communities that rely solely on the automobile. Tax dollars spent to improve or create bicycle facilities are tax dollars that place a return on the investment for the community.

The Town should first act to create a positive image for future greenways, traffic calming, intersection improvements, and other bicycle expenditures before any opposition occurs. Circulate the facts concerning these facilities and show the positive benefits.

**6.2. ENCOURAGEMENT & PROMOTION PROGRAMS**

Safe Routes to Schools



The Safe Routes to School Program was established in August 2005 as part of the most recent federal transportation re-authorization legislation, SAFETEA-LU. This law provides multi-year funding for the surface transportation programs that guide spending of federal gas tax revenue. Section 1404 of this legislation provides funding (for the first time) for State Departments of Transportation to





create and administer these programs which allow communities to compete for funding for local projects. Visit the Federal Highway Administration's web address for Safe Routes to School at <http://safety.fhwa.dot.gov/saferoutes/> and see Appendix O for funding opportunities related to it.

The steps below provide a framework for a Safe Routes to School (SRTS) program based on what has worked in other communities according to the website <http://www.saferoutesinfo.org>.

- Identify and contact the people who want to make walking and bicycling to school safe and appealing for children.
- Hold a kick-off meeting and set a vision: A goal of the first meeting is to create a vision and generate next steps for the group members.
- Gather information and identify issues: Collecting information can help to identify needed program elements and provide a means to measure the impact of the program later.
- Identify solutions: Solutions to identified issues will include a combination of education, encouragement, engineering and enforcement strategies. Safety is the first consideration.
- Make a plan: It does not need to be lengthy. Include encouragement, enforcement, education and engineering strategies. Create a time schedule for the plan.
- Get the plan and people moving: Hold a kick off event starting with a fun activity. Participate in International Walk and Bike to School Day or organize a bike train.
- Evaluate, adjust and keep moving: To sustain the program, consider building additional program champions and letting people know about your successes.

The North Carolina phone number for the Safe Routes to School program is as (919)807-0777 and the web address is

[http://www.ncdot.org/transit/bicycle/safety/programs\\_initiatives/Safe\\_Routes.html](http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/Safe_Routes.html)

### Walk to Work, Shop, School and Play Days

Designate a day, or preferably even a week or month where people walk to their destinations. This can coincide with *International Walk/Bike to School Week*, or with Bike to Work Week, or with another common "Hike, Bike, and Bus" week that some municipalities sponsor. Advertise these events, have some fun events along common bicycle routes, and offer prizes and recognition for shining participants. *International Walk and Bike to School Week* typically falls on the first week of October, and their web site with good information could be found at <http://www.walktoschool.org/>.



Bike to School events can be as simple as a few kids and parents meeting to walk or bike to school or very elaborate celebrations. Event logistics range from a central meeting location to a designated route where a group of bicyclists forming a chain or train that grows as it adds students on its way to school – similar to the Walking School Bus program (<http://www.walkingschoolbus.org/>). Successful events have the support and participation of the principal, police, and parents. Programs such as this give public agencies and representatives the opportunity to publicly support health, environment and safety initiatives.



**Walk (or Bike) a Child to School in North Carolina**

Thanks to the national initiative and support from the NC Governor’s Highway Safety Program, Walk a Child to School Programs have gained a foothold in North Carolina and are growing each year. To date more than 5,000 students in 12 communities in the state have participated.

Call NCDOT’s Division of Bicycle and Pedestrian Transportation to let them know about what the Town of Mooresville is doing to encourage children to walk (or bike) to school at (919) 807-0777 or email them with that information at [bikeped\\_transportation@dot.state.nc.us](mailto:bikeped_transportation@dot.state.nc.us).

**Town of Mooresville Bicycle Week**

Many towns have a particular week each year where its citizens are encouraged to use alternate forms of transportation such as bikes, transit, or by walking. This week reminds occasional bikers to dust their bike off in the spring, or starts children off with good biking habits to school in the fall. Bicycle weeks show the community that Mooresville supports bicycling as a form of transportation.



**Loaner Bike Programs**



*A “Blue Bike” loan program in Madison, Wisconsin*

Some cities have tried loaner bike programs where bicycles are left at transit stops, downtown, or other popular pedestrian areas for those who need to use them. A problem with this program is theft, but this can be mitigated by issuing any interested person a “Bicycle Loan Card” from the public library or Park and Recreation Department for a small fee or no fee. With this card, the user could check out the bicycle from transit stations, parks, or from the library or other public institution where a combination is given to a lock that can be used with the bicycle. The user must return the bicycle at the end of an appropriate time, or the combination could be given out to card

holders to use at any time. Cell phone technology also allows cell phone users to make reservations for these fleet bicycles. The reality of Mooresville’s growth patterns, consistently available parking, and present lack of bicycle routes and facilities places this program into the distant future for transportation purposes. The Town’s Park and Recreation Department may wish to consider a prototype program like this for use with their more popular future greenways on weekends and during the summer. Encouraging private bicycle rental enterprises at these locations and along multi-use paths will also benefit citizens, the Town of Mooresville, and small business owners.

**Compensate Bicycle Commuters**

Although it is well known that gasoline tax is a usage tax that helps pay for some roadway construction and maintenance, cyclists also pay for road infrastructure and public services related to roadways through sales, property, and income taxes, along with portions of retail purchases. Workplaces spend a certain percentage of their profits on transportation infrastructure to attract employees and customers. Some businesses and municipalities have



encouraged utilitarian bicycling with pay benefits, tax-write offs or discounts. A partnership may be created between Mooresville and local businesses that would identify regular bicycle commuters and compensate them through pay or tax benefits. As of the printing of this plan, the United States House of Representatives has acted in the past to amend section 132(f) of the IRS code to include "bicycles" as a transportation mode that commuters can claim for tax benefits, but this bill has not gone any further.

### **League of American Bicyclists Bicycle Friendly Community**

It should be a goal for Mooresville to join Carrboro, Cary, and Charlotte, North Carolina as designated Bicycle Friendly Communities. To achieve this designation, the following items would need to be addressed while implementing this plan:



- a. A policy to accommodate bicycles on all new/resurfaced roads
- b. A bicycle coordinator of some sort
- c. A bicycle committee of some sort
- d. Training for the engineers
- e. A bicycle parking ordinance
- f. Maintenance for bike facilities
- g. National Bike Month in May
- h. Bike to Work/School Day
- i. A bicycle facilities map
- j. Determine the number of people who bicycle in Mooresville for transportation

More information can be found on this program at: [www.bicyclefriendlycommunity.org](http://www.bicyclefriendlycommunity.org).

## 6.3. ENFORCEMENT PROGRAMS

### **Enforce the Laws**

Continued police enforcement of traffic laws is always necessary to protect bicyclists and pedestrians. Mooresville's Police Department should be particularly encouraged to ticket violators in residential, high density commercial, and other popular pedestrian and bicycling areas. Cyclists must also be encouraged to follow the law for their own safety, with violators also being educated and properly cited to correct behaviors.

Areas of focus for enforcement of the bicyclist:

- Driving at night without lights or required reflectors
- Riding the wrong way in a one-way traffic lane or on the wrong side of the road
- Running a stop sign or red light
- Failing to yield the right-of-way
- Failing to signal an abrupt turn



Areas of focus for enforcement at the motorist:

- Driving while impaired by drugs or alcohol
- Failing to yield the right-of-way
  - When turning left at intersections or at driveways
  - When turning right at intersections or at driveways
  - When entering roadway
- Speeding, particularly in neighborhoods and near schools
- Overtaking bicycles in areas where it cannot be done safely

## Sting Operations

Sometimes, cyclists are their own biggest enemy. This tactic makes an impact upon cyclists who fail to observe the law.

1. Identify locations based on crash data between bicycles and automobiles or known law breaking habits.
2. Observe to see the types of violations that are occurring and choose a location for the sting.
3. A police officer on a bicycle waits at a hidden driveway with easy view of an intersection. Motorists' behavior and bicyclists' behavior is noted by the officer, particularly red-light running by the cyclist and a motorist's failure to yield to bicyclists while turning.
4. The officer pursues and apprehends violators while other cyclists and motorists take notice.

## Bicycle Patrol Officers

The Mooresville Police Department should assign bicycle officers to be visible and personal presence, particularly in downtown neighborhoods and in the center of other Bicycle Districts. These officers will therefore get to know business owners, residents, and frequent visitors well, as they would be more reachable to the people of these communities. It is, however, very important that these officers follow the rules of the roadway as a positive example to other bicyclists (except when en-route to an emergency call).

Law enforcement officers are in a unique position to assist with and add credibility to community efforts to encourage bicycling and improve bicycle safety. However, most officers do not possess the bicycle safety knowledge or the community assessment skills necessary to do this job.

The National Highway Safety Administration offers classes for bicycle officers to learn the issues of bicycle safety.



*Greenville, NC has a bicycle patrol with 14 officers.*





Classes include:

*Community Bicycle Safety for Law Enforcement*  
*Law Officer's Good Practices Guide to Bicycle Safety and Enforcement*  
*Bicycle Safety Roll Call Video*

Contact:

National Highway Safety Administration (NHTSA)  
Safety Countermeasures Division (NTI-121)  
Bicycle Safety Program  
400 7th St. S.W.  
Washington, D.C. 20590  
Website: [www.nhtsa.dot.gov](http://www.nhtsa.dot.gov)

### 6.4. TRANSIT INTERFACE PROGRAMS

#### Bicycle Racks on Buses



*Each of Charlotte's CATS buses is equipped with bicycle racks*

Currently, the only fixed-route mass transit in Mooresville would be the Charlotte Area Transit System (CATS) express bus service (83X) from Mooresville to Charlotte. This route is limited in schedule, offering four morning trips from Mooresville to Charlotte on weekday mornings (Leaving Williamson Chapel Church in Mooresville from 6 AM – 7AM) and four afternoon trips from uptown Charlotte to Mooresville from 4 PM – 6 PM. Reverse commute transit was an option in 2006 but is no longer available.

Like all CATS buses, the 83 Express has a bike rack on each and every bus on this route. The bike rack holds two bikes and its use is included in the riders' fare at no extra cost. From February 2006 – January 2007, bike racks on the 83X were used 74 times and made up 0.12% of the CATS system bike rack usage for that same timeframe. Assuming these riders made a round trip, the average would be three bus trips per month back and forth from Mooresville to Charlotte that had a bicycle on the rack. Because the rider chose to take the bike with them, it might be assumed either that they had no place to lock their bicycle at the Mooresville stop or that their final destination in Charlotte was longer than they chose to walk from the uptown bus stops. Data on the number of bicycles that were parked at the park and ride are not available, but uptown commuters may possibly have chosen at some point to bicycle to the park-and-ride bus stop in Mooresville and leave a bicycle locked there.



*Mooresville may soon expect plans to begin a commuter rail service operated by CATS*





Mooresville's growth all but guarantees the need for a local bus service in the future. Each and every bus in any Mooresville future fleet should have bike racks, and primary transit stops and stations should have bicycle parking and connecting roadway accommodations for bicycles. Bus routes that connect the three Bicycle Districts of Downtown, Mount Mourne and Lake Norman would increase the bicyclists' reach around Mooresville.

**Bike Accommodation on Trains and at Transit Stations**

At printing time of this plan, the CATS South Corridor Light Rail does not allow bicycles to be on board the train during designated peak travel times. This rule may change, but the Town of Mooresville should support the allowance of bicycles in a designated area of the new CATS North Corridor Commuter Rail cars. Being able to bring a bicycle on a transit mode increases the reach of the transit to the user, and may increase ridership if proper accommodations are provided for the bicyclist at each end of their journey.

Transit stations are a very important part of a bicycle network. A great deal of development is expected in the Mount Mourne area near the proposed commuter rail station. Much of this development will be out of reach for practical walking to the station, but perfectly situated for an easy bicycle commute. Identifying opportunities and corridors for bicycle lanes and multi-use paths to connect the rail station to nearby developments could both increase rail ridership and decrease parking pressures.



*Long-term bike parking at a CATS transit station in Huntersville, NC (photo by Ken Tippette)*

Covered and secure overnight bicycle parking should also be available at transit stations. Uptown Charlotte is compact and walkable, and many commuters may not need their bicycle once in Charlotte. Bicycle riders to the Mount Mourne commuter rail station may even choose to leave their bicycle at the station because of policies, space limitations, or convenience. If there is not adequate and secure bicycle parking, potential bicycle commuters will choose to take their car instead. Adequate bicycle parking was defined on page 5-33. For a rail station, it is recommended that long term parking is provided. This parking should all be covered, with a mix of bicycle lockers for overnight use and open-air covered secure parking for most users. A "Bicycle Station" is ideal for a major transit station.

**6.5. SPOT IMPROVEMENT, MAINTENANCE, AND ROAD DEBRIS PROGRAMS**

**Pavement**

Just as potholes, uneven pavement, and visual obstructions irritate automobile drivers, these do the same to bicyclists. In fact, the survey completed for this plan found poorly maintained roadways and hazards to be the fifth highest deterrent to bicycling in Mooresville. Roadway margins should be free of cracks, splits, or crumbled pavement and storm



*An inventory of necessary repairs to the bicycle network should be completed*



grates should be relatively level with the asphalt and have grates perpendicular to the curb. Currently, no inventory exists of street pavement cracks, uneven manhole covers, potholes, or dangerous storm grates for Mooresville roads. It is recommended that the Town conduct such an inventory, also including notes on where sidewalks need maintenance or ADA upgrades. A means should also be established by which the Town can annually determine where new maintenance issues occur, and continually receive alerts from the public on roadway or sidewalk maintenance concerns. Once an initial list of necessary repairs and upgrades is



*Dangerous grates, cracks, or holes should be fixed, while some hazards can be marked so that bicyclists can avoid them.*

compiled, each particular maintenance project can be ranked according to the criteria set in Table 7.2 (page 7-20). These maintenance projects should be ranked separately from the projects outlined in Section 7, and be continuously updated as additional maintenance needs arise.

Additionally, small gaps in the bicycle network may occur when separate public or private projects do not completely connect. A serious effort should be made to connect these pieces of bicycle lanes, wide lanes, paved shoulders, multi-use paths, and even sidewalks. A policy should be created and enforced that ensures that these connections are always created in future projects (see Section 8).

Funding should be set aside for spot improvement maintenance that improve bicycle accommodations. An annual budget of \$100,000 should be set aside for small spot improvement projects. The Town should also apply for any available state or federal funding to correct any gaps in its existing sidewalk network and to retrofit ADA specific accommodations.

### **Roadway Debris and Litter**

Litter can negatively impact the quality of a bicycle ride, and may cause an injury or tire puncture. A flat tire can deter someone from riding a bicycle to run an errand or from commuting to work in the future. It can place a recreational cyclist's bicycle in the garage for months, or it could lead to an injury to the cyclist. Three programs would help control the numbers of flat tires considerably, and make Mooresville a cleaner place to live:

1. Encourage glass bottle deposit programs. Glass is certainly one of the most feared roadway debris to the cyclist. The biking community would be positively influenced if the state of North Carolina adopted a program where deposits are returned for glass bottles, and the Town would be behooved to encourage such a program.
2. Enforce litter laws.



3. Implement adopt-a-bike-lane or adopt-a-road programs. Bike lanes might need special attention once they are developed because they are not kept naturally swept by large and fast automobiles. Tree limbs, glass, nails, gravel, and other debris is commonly washed into bike lanes. The Town should be responsible for occasional sweeping, while community members can help patrol bike lanes for large objects like tree limbs that might pose a hazard to bikers in low-light conditions.
  
4. Initiate a tire cost sharing program. A tire equipped with Kevlar protection or other protection from punctures can cost twice as much as a standard rubber tire, but can save the owner that cost difference from punctured tubes within the first months, and save them invaluable time and efforts spent in repairing punctured tubes. Residents who describe their transportation as being financially dependent on a bicycle should be eligible for a cost sharing program with the Town where the cyclist purchases a Kevlar-lined tire but pays the cost of a discount tire while the Town pays the difference for a tire with adequate protection for road usage. Road debris is inevitable, cleaning is costly, and frequent punctured tubes are inconvenient. A better tire can place a bike on a road instead of in a garage. All bicycle owners should be educated on the benefits of a better tire for road conditions.



*A system should be in place to sweep bike lanes and other bicycle routes and paths*



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# Section 7

## Recommended Bicycle Projects







## 7.1. PROPOSED PROJECTS BY BICYCLE DISTRICT

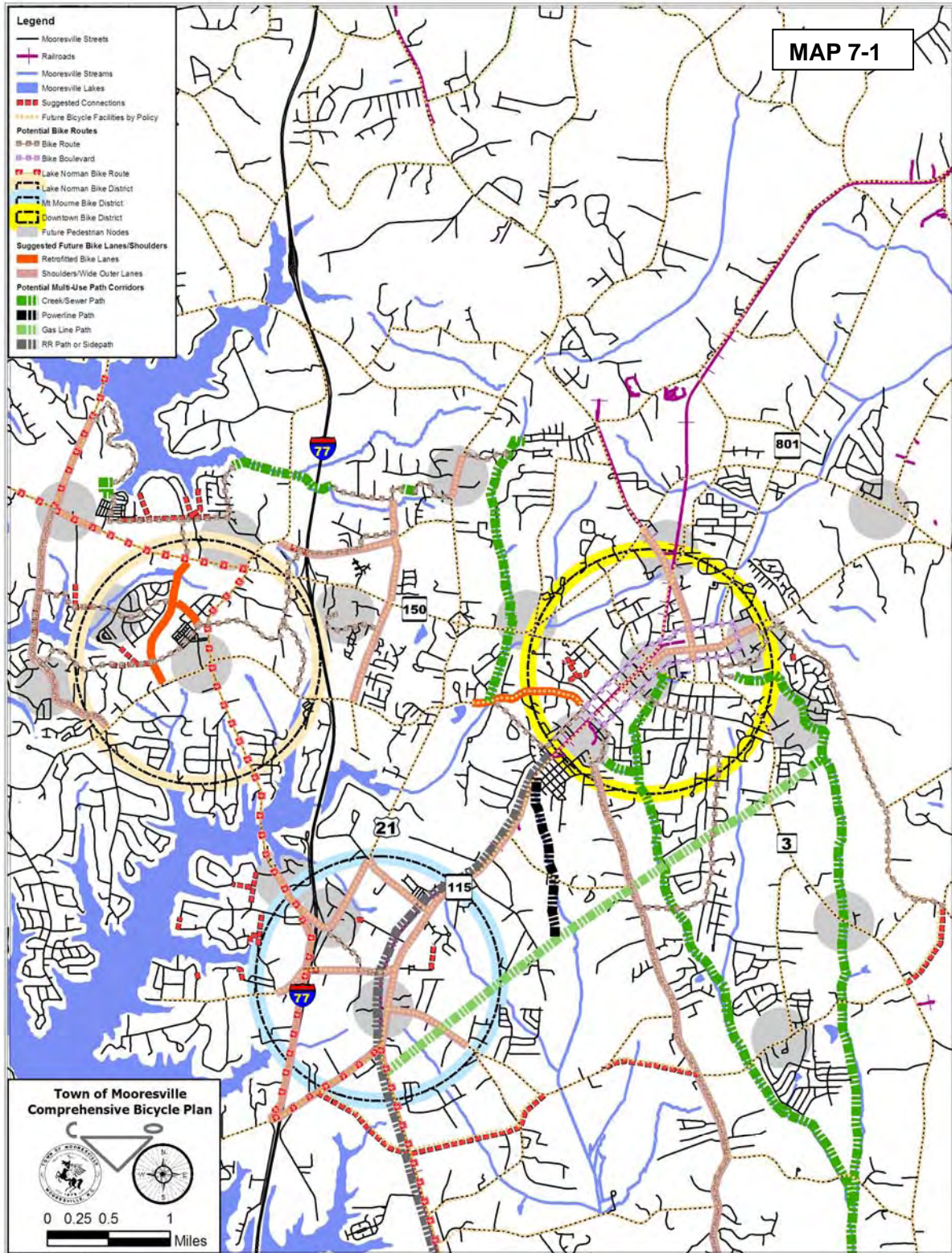
The preceding sections of this plan identify opportunities and specify guidelines and standards for the implementation of projects. Section 4 illustrates three “*Bicycle Districts*,” each representing an area small enough to realistically bike and which contains some or several of the proposed Pedestrian Oriented Development Zones from the *Mooresville Comprehensive Pedestrian Plan*. Section 5 summarizes the guidelines and standards that would be recommended to complete the projects outlined in this section. NCDOT adheres to the design guidelines provided in the American Association of State Highway and Transportation Officials’ Guide for the Planning, Design, and Operation of Pedestrian Facilities (AASHTO, 2004), the American Association of State Highway and Transportation Officials’ Guide for the Development of Bicycle Facilities (AASHTO, 1999) and the Manual on Uniform Traffic Control Devices (MUTCD).

The survey completed for this plan showed that over 90% of the respondents believed that Mooresville will benefit from better bicycling facilities, while an additional 7% thought that Mooresville would probably benefit from such facilities. Eighty-seven percent of respondents would bicycle more often with better bicycling conditions, and another 11% would probably bike more often. This section identifies specific bicycle projects in each of these districts (and in surrounding areas) that would significantly and efficiently improve Mooresville’s bicycling environment. **Map 7-1** provides an overall view of proposed projects, and more detailed maps are presented in conjunction with the discussion of projects related to each district and in **Appendix J** (refer to the legend in Map 7-1 for symbology for the maps of individual districts.)

This map also shows most arterials in the Town as including future bicycle facilities as a result of a “Complete Streets” policy. According to the [completestreets.org](http://completestreets.org) website, *Complete Streets* are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street. Roadways on this map are labeled as “Complete Streets” if no immediate plans are apparent for roadway improvements for motorized or non-motorized transportation. When, in the future, plans to refurbish these roadways begin, policy should require the inclusion of multimodal forms of transportation such as bicycles, pedestrians and transit in addition to motorized personal vehicles. Section 8, Recommended Policies and Ordinances, discusses this policy concept further.

As an additional note, at the printing of this plan, the NCDOT/Town of Mooresville Brawley School Road widening project design currently includes bicycle lanes. This is a very important bicycling link in Mooresville, connecting the west bike routes and trip generators with the eastern bike routes and generators. This project is not formally listed as a project for this plan because it is assumed to be a “done deal.” This plan does recommend that these bicycle lanes should remain a part of this future project and should never be removed from consideration.

The following suggestions are intended to serve as a guide toward the development of bicycle facilities in Mooresville. In the future, certain physical, political, social, economical, or other practical barriers may deviate these facilities from their mapped route. For these circumstances, alignment along alternative corridors is recommended to uphold the connective properties of these routes.



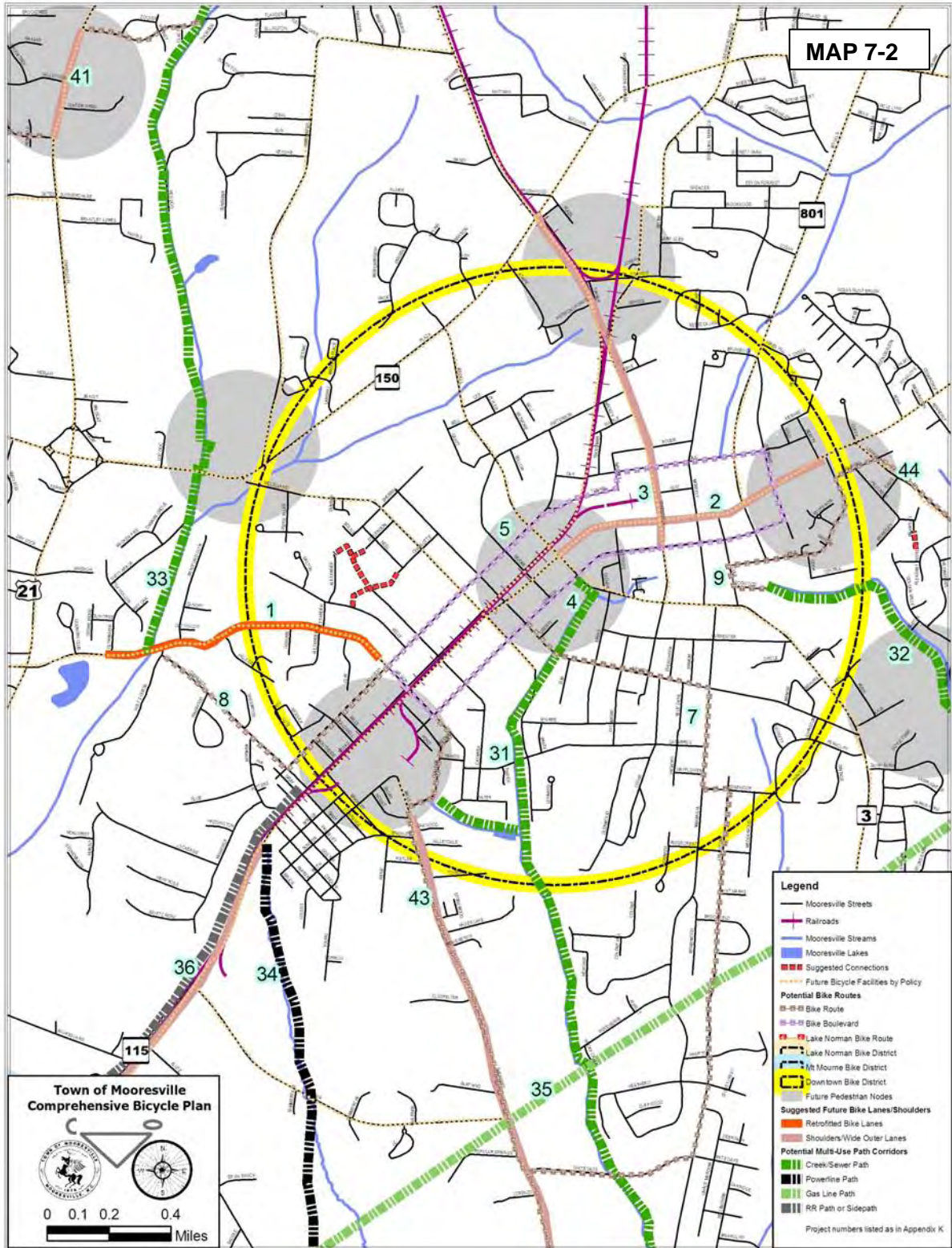


## I. Downtown (Map 7-2)

### Bicycle Lanes:

1. West Wilson should be striped to include a separated bicycle lane from Glynwater Drive near the golf course to Academy Street. The total paved width from curb to curb is 33 feet, with 16.5 feet available for each direction of travel. 10.5 foot wide motor vehicle lanes and 6 foot wide bicycle lanes (curb to stripe) can be marked along this 35 MPH roadway to offer both traffic calming and bicycle accommodations. Another option would be 11.5 foot wide motor vehicle lanes and 5 foot wide bicycle lanes. This option is not preferred however, as it encourages faster motorized traffic with more narrow bicycle facilities. The Mooresville Comprehensive Pedestrian Plan recommends sidewalks along the south side of West Wilson. Current prospects favor the placement of this sidewalk out of the existing right-of-way.
2. North Main Street begins a center turn lane near Iredell Avenue. At this point, the roadway width is 36 feet, plus 2 feet on each side for gutter pans. This could allow a lane conversion from 12 foot travel lanes and turn lane to two 10 foot motorized vehicle travel lanes, a 10 foot wide center turn lane (with pedestrian islands and barriers), and two 5 foot-wide bike lanes (2 foot of which is the gutter pan and 3 feet on asphalt). NCDOT and MUTCD typically prefer a minimum of 4 feet width from the edge of the gutter pan to the stripe for true bicycle lanes, but five feet is sometimes permitted in areas where there are no curbs. Simply striping these separated shoulders without bike lane stencils will still provide the traffic calming results and offer improved bicycle accommodations and similar projects have been done in Charlotte and other nearby localities. Since current right-of-way is limited between the existing curbs, either removing the center turn lanes (and restricting left turn movements) or widening the roadway would be necessary to include true bicycle lanes on this part of Main Street.
3. Statesville Road currently only has the space for bicycle lanes from Main Street to Center Avenue, where on-street parking is allowed. When a repaving opportunity presents itself, this road should be considered for the additional width and pavement for bicycle lanes or paved shoulders because of the needed north-south connectivity between NC 150 and the bicycle routes around downtown.
4. A small segment of Iredell Road could be striped as a bike lane from the proposed Church Street Bike Boulevard to the proposed Dye Creek Greenway terminus at Liberty Park. A sidepath built with the greenway would be an excellent alternative, and one that would possibly be a preferred treatment because of the short distance and the absence of driveways and intersections between this length of road. This sidepath would connect the Bike Boulevard to the greenway and negate the need for timid cyclists to attempt left turns into and out of the park onto Highway 3, but this access management would have to be perpetually maintained.









Bicycle Routes:

5. A beautiful stretch of residential roadway on Academy Street can be dedicated as a Bike Boulevard. This street parallels Main Street and runs from West Wilson to Tunnel Road, and is fringed with historic houses and shaded by large trees. The route can then turn onto Tunnel Road where cyclists can experience riding under Broad Street to the wide neighborhood streets Mackey and Oak, and then onto Stewart before intersecting with North Main Street. Oak and Stewart are wide streets with common on-street parking. This helps to slow traffic. Academy Street has fairly narrow roads, slow traffic speeds, and numerous four-way stop signs. Posting recognizable signs that designate the roadway as a Bike Boulevard and placing intermittent sharrows along the proper cycling path on the roadway (on the right side of the road on Academy, and closer to the center on roadways that have on-street parking such as Oak Street) will help to create a known cycling route where one already exists. In addition, each intersection should be studied to determine if Academy and Oak Streets can have priority crossing with the intersections. High volume intersections such as West Wilson Avenue, West McLelland Avenue and West Iredell Avenue should be evaluated to see if they can or should be modified into mini-roundabouts to both slow traffic and to keep bike and automobile traffic moving smoothly and safely. Traffic calming devices may be considered at one or more of these intersections to reduce non-local traffic. For example, a traffic diverter may be included with the roundabout on Academy and McLelland to restrict motorized traffic from entering south or north on Academy Street from McLelland Avenue. Traffic will still be permitted in this scenario to leave Academy Street onto McLelland, and bicycle traffic and emergency vehicles will still be able to enter Academy Street from any direction by using special barricades. This will help ensure that motorists on Academy Street are primarily local traffic. Another option would be to install traffic chokers in residential areas to slow and thus discourage non-local traffic. A feasibility study should be done for these treatments and public opinion from property owners along this stretch of roadway should be incorporated into the development of this Bicycle Boulevard.
6. The Bicycle Boulevard can be extended to form a closed circuit around downtown Mooresville. From North Main Street and Stewart Avenue, the route can continue south onto Church Street. To continue this route on Stewart, an intersection improvement is desired at Stewart and Main Street to safely move amateur bicyclists across this currently unsignalized intersection at a major roadway. A signal is best, but the crossing could be made sufficient on this road by installing a median safety island, crosswalks and visual warnings for the motorists. Church Street is very wide (width) and should include on-street parking accommodations or chicanes to keep traffic slow. This Boulevard will connect to the Bicycle Boulevard's source at West Wilson and Academy Street. Again, specific street signs and sharrows on the roadways encourage the public to use it as a bikeway, while the possible addition of roundabouts at high volume intersections such as Statesville Avenue, Iredell, Center, and Wilson should be studied. Intersections with smaller volume roadways should give priority crossing to Church Street. Non-local traffic can be discouraged by using traffic diverters or other traffic calming treatments. For example, North Church Street might be evaluated for a choker to slow and thus discourage non-local traffic near the residential portion of Church Street. A feasibility study should be done for this treatment, and public comments should be used to create this Bicycle Boulevard.



7. A standard bicycle route that extends the cyclists' reach from downtown would leave Church Street at East Center Avenue, then turn south onto Magnolia, Edgemoor, Fieldstone, and then White Oaks before connecting to Shearers. On-street parking, and possibly restriping Magnolia and Fieldstone to slow traffic or to better accommodate bicyclists would help comfort all levels of bicyclists. This neighborhood bicycle route can include many of the features of a Bicycle Boulevard such as traffic calming, traffic diverting, sharrows, and low traffic speeds. Future consideration can be given to take the steps necessary to graduate this route to a Bicycle Boulevard.
8. A standard bicycle route on Lowrance and South Academy can help to connect the bicycle facilities of downtown Mooresville. This route can extend from the corner of West Wilson, Lowrance, and Reeds Creek and connect to the corner of Academy and West Wilson.
9. A standard neighborhood bicycle route could connect the proposed greenway terminus on Rocky River Creek to the proposed regional bike route on Linwood. The route will use Dogwood Ave, Culp Street, Pine Street, and Briarhill and come within a block of the proposed Bicycle Boulevard on Church Street.

### Bicycle Parking:

10. A covered bicycle parking center should be constructed downtown, preferably at or near the Citizens Center. This covered bicycle rack should include a covered pavilion with 10 or more short term parking racks (for 20 bicycles or more) and 2 long term parking lockers (for four bicycles) outside of the covered pavilion. Water fountains, rest rooms, changing stalls with lockers, and showers are typically included in the larger bike station concept, but the nearby Citizen's Center makes it possible to create a useful sheltered bicycle parking facility without the extra costs. Projects such as these covered bicycle parking structures can be good community projects for non-profit groups.
11. Covered bicycle racks should be provided at each of the six public schools in the downtown area (Mooresville Elementary, Middle, and Intermediate Schools, East Mooresville Intermediate, South Mooresville Elementary, and Park View Elementary Schools). This parking area will include a covered pavilion over racks that will fit 20 bikes (this parking area should be placed in an area that can be expanded to fit more bicycles should demand increase for bicycle parking).
12. A covered bicycle rack should be provided at the new Mill Village mixed-use center. This parking area will include a covered pavilion over racks that will fit 20 bikes.



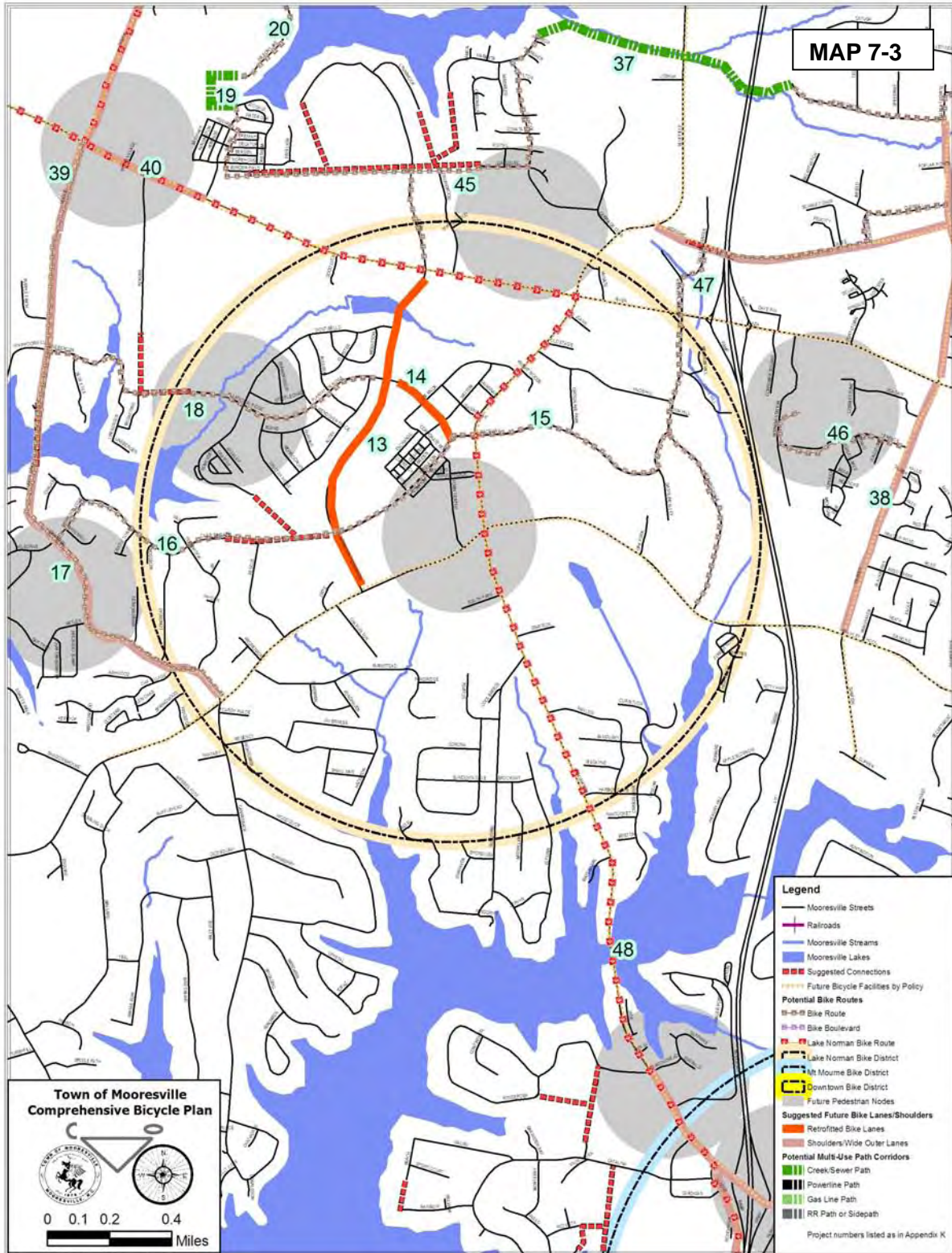
## II. Lake Norman (Map 7-3)

### Bicycle Lanes:

13. Morrison Plantation Pkwy currently has 48 feet of asphalt width for 4 lanes of vehicle traffic, median strips with turn pockets, and a 35 MPH speed limit from Brawley School Road to NC 150. Converting some of the roadway width to bicycle lanes would make this roadway more bicycle and pedestrian friendly. Some options for this roadway to bring to public meetings with residents include:
  - Two ten-foot wide motor vehicle lanes can be striped in each direction, with a four foot (plus 2 foot of the gutter pan) bicycle lane.
  - A single ten foot wide lane could be striped in each direction, along with a six foot bike lane. Additional 4' inner and outer curb-side buffer zones can be striped off to keep the bike lanes and automobile lanes to the desired width, and to possibly allow for better comfort for beginner bicyclists.
  - A designated on-street parking lane may be considered, with a door-buffer zone, a bicycle lane, and a motor vehicle lane in each direction. Another option can bring the entire curb into the roadway to create the needed space for only a bicycle lane and a motor-vehicle lane.
14. Plantation Ridge currently has a 36 foot wide travel area for two lanes of traffic (18 feet width per lane) from Morrison Plantation Parkway to Singleton Road and has occasional 8½ foot wide parking slots outside of that 36' roadway. This roadway should be restriped with two ten foot wide travel lanes, 6 foot wide bike lanes, and a 2 foot wide car door buffer zone.

### Bicycle Routes:

15. An alternate and popular route for bicyclists currently exists that connects Morrison Plantation with Brawley School Road near I-77. This route allows cyclists to bypass the multi-lane high traffic intersection of Williamson and Brawley School Roads. A signed bicycle route should begin at Singleton and Morrison Plantation Parkway and continue on Singleton onto Plantation Ridge at the roundabout, crossing Williamson onto Raceway Drive, then to Gasoline Alley, and right onto Rolling Hills Road before ending at Brawley School Road.
16. One of the potential bike routes that depend on new connectivity would start on Oak Tree Road and Morrison Cove and would continue onto Castle's Gate. It would be suggested to create connectivity between Castle's Gate and Singleton at Morrison Plantation Parkway to complete this route. This connectivity could be a standard road or a pedestrian and bicycle connection only.
17. Oak Tree Road may be connected to Doolie Road by a new bridge in the future. When and if this new bridge is created, the bridge and the roadways leading to it should be improved to provide the appropriate width for bicycle lanes or paved shoulders to compensate for the increase in vehicle speeds and volumes attracted to the new connection. Where it is not possible to accommodate bicycle facilities by adding new roadway width, appropriate traffic-calming measures should be constructed to keep traffic speeds desirable for a residential roadway.





18. A bike route can be signed on Linberger, then onto a possible connection that will allow a cyclist to get to Plantation Ridge. This connectivity can be a standard road or a pedestrian/bicycle only connection. In addition to a new road connection, an extended section of Linberger would need to be paved.
19. A short non-motorized multi-use trail connection can be made between the Lake Norman Elementary and Middle School campuses and the new residential developments on the corner of NC 150 and Perth Road. This project may be possible using both private and public property and funding from each.
20. Using the new multi-use path connection described in the previous project, a bike route can be established from Perth Road onto Lakeshore School Road, Wilson Lake Road, the new greenway to Gresham, to Water Oak, Racine, Border Field, and then onto a new road or path connection to Ervin.

**Bicycle Parking:**

21. A covered bicycle rack should be constructed in the center of this district, and might be a good opportunity to be a project that is created with the help of a private partner or sponsor. The YMCA is an excellent candidate, and a large proportion of the paper surveys for this plan were collected from this YMCA. This bicycle parking facility should include a covered pavilion with and minimum of 20 short term parking bicycle racks. Water fountains, rest rooms, changing stalls with lockers, and showers are typically included in larger bike stations, but the facilities in the nearby YMCA offer this benefit. The Town may be able to work out an agreement with the YMCA concerning the use of their facilities that will benefit the bicyclists of Morrison Plantation and the YMCA.
22. Covered bicycle racks should be provided at each of the five public schools in the Lake Norman area (Brawley Middle School, Lake Norman Elementary and High Schools, and Lake Shore Elementary and Middle Schools). This parking area should include a covered pavilion over racks that will fit 20 bikes (this parking area should be placed in an area that can be expanded to fit more bicycles should demand increase for bicycle parking).
23. Covered bicycle racks should be provided at the Target shopping center and at the Wal-Mart shopping center. These parking areas will include a covered pavilion over racks that will fit 20 bikes each. These shopping centers may find it in their best interest to agree to sponsor the cost of the bicycle parking if they can attract new customers or save money on standard parking lot costs.





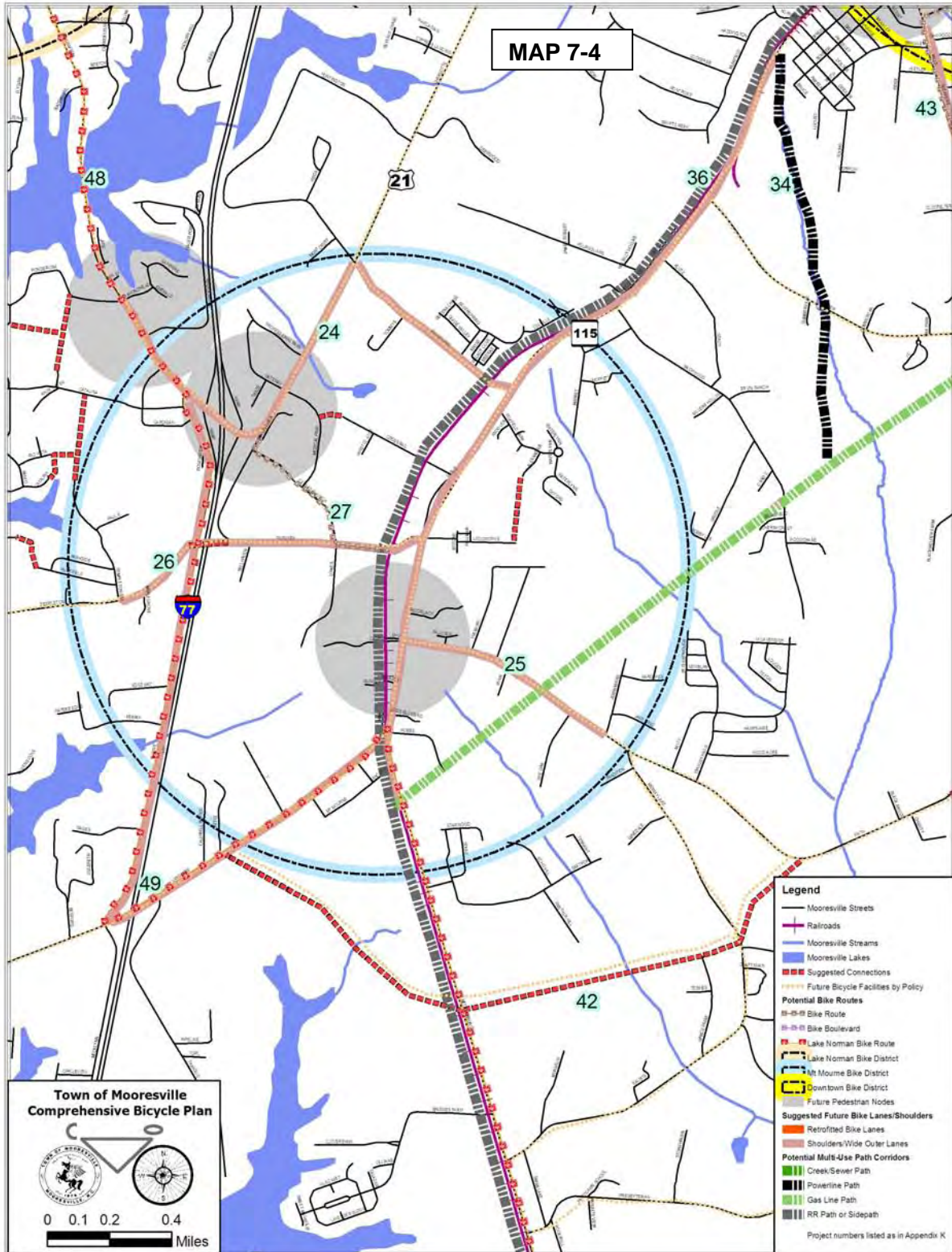
### III. Mount Mourne (Map 7-4)

#### Bicycle Lanes:

24. Crossing interstates is one of the most challenging obstacles for any skill-level cyclist because of the high speed, low angle interchange ramps that they must pass. Bicycle lanes or paved shoulders can help cyclists navigate these and need to be considered for any road widening project across I-77 on Williamson/21 from Diamondhead Drive to Waterlyn Road. This stretch of roadway is also within a short distance from most of Mount Mourne's attractions, and thus is more likely to be traveled by bicycle. If widening or repaving of this stretch of roadway does not include the widening of the bridge, it would be necessary to post 35 MPH and "Share the Road" signs, include bicycle lanes or paved shoulders up to the bridge, and then possibly add stenciled sharrows on road before bicycle lanes or paved shoulders appear again. It is important to have pavement markings and/or signage to direct and educate bicyclists and motorists where the interstate exit and entrance ramps merge with the roadway. Including bicycle lanes or paved shoulders with any repaving or widening project on Waterlyn to NC 115 would certainly help to close the loop around this bicycle district.
25. Faith Road should be retrofitted with 5-6 foot wide paved shoulders from Highway 115 to Jenny Marie Road or include these paved shoulders (or bike lanes) with any near-future repaving. At this point, there are no plans to repave this road.
26. If Fairview Road is ever extended to connect with Templeton Road by a new bridge across I-77, the current width of Fairview Road may allow for the simple additions of bicycle lanes or paved shoulders with some repaving and restriping work. The road today is 36 feet wide with no curb or gutter. Repaving the roadway from 115 to Templeton Bay Road, including 10 foot wide automobile lanes and 11 foot wide center turn lanes will provide adequate space for bicycle lanes or paved shoulders by only adding minimal asphalt width. This will serve this Bicycle District very well by developing a practical East-West connector. At this point, there are no official plans for this new bridge.

#### Bicycle Routes:

27. A bicycle route from Highway 21, beginning on Fairview, then turning onto Centre Church and connecting again with Fairview will be a low traffic alternative for cyclists to reach the Hospital area from the shopping centers on Highway 21. At one point on Centre Church Road there is a barricade that makes the road impractical to cross by bicycle. This plan recommends removing a piece of this barricade and constructing a pedestrian and bicycle connection to the remainder of Centre Church.





### Bicycle Parking:

28. A bike station should be constructed in this district, and this may be a good opportunity to seek the help of a private partner or sponsor, or with another agency that has an interest. Lowes or CATS are excellent candidates. This bike parking station should include a covered pavilion with short term parking (racks) for a minimum of 20 and long term parking (lockers) for around 10 bicycles. A water fountain, rest room, changing stall with lockers, and showers should also be included in this bike station. Providing this bike station at the commuter rail terminus will most likely attract more bicyclists and require additional bicycle parking.
29. Covered bicycle racks should be provided at each of the two public schools in the Mount Mourne area (Mount Mourne Elementary and Middle Schools). This parking area will include a covered pavilion over racks that will fit 20 bikes (this parking area should be placed in an area that can be expanded to fit more bicycles if demand for bicycle parking grows).
30. A covered bicycle rack should be provided at the Lake Norman Medical Center. This parking area will include a covered pavilion over racks that will fit 20 bikes.

## 7.2. PROPOSED STUDY AREA-WIDE PROJECTS

### Multi-Use Paths:

31. The looping combination of Dye Creek and Rocky River Creek greenways that were described in the Comprehensive Pedestrian Plan in detail should be considered as a top priority in the implementation of the Bicycle Plan as well. The Dye Creek Greenway should begin at Liberty Park on Iredell Avenue (with obvious connections to downtown) and extend south on Dye Creek to its merge with Rocky River Creek. Although Rocky River Creek is the currently planned route for the future Catawba Regional Trail, Dye Creek may achieve the same connectivity goal with a more popular route out to the county border.
32. The Trust for Public Land has tentative plans to route the multi-county Catawba Regional Trail on Rocky River. If this becomes a reality, it will extend from the county line north past Dye Creek to its ending point near Dogwood Ave. The Town of Mooresville can work with the Trust to acquire land and to construct the greenway.
33. The Reeds Creek Greenway that was described in the Comprehensive Pedestrian Plan in detail should be highly considered as part of the Bicycle Plan's implementation as well. This multi-use path would connect the north Mooresville neighborhoods to downtown from Markham Drive to West Wilson Avenue. In addition, an unnamed stream with an accompanying power line branches from Reeds Creek eastward was mentioned in the Pedestrian Plan as a potential greenway that would run parallel to NC 150. Each greenway described in the Greenway Plan or the Pedestrian Plan should be considered as a bicycle project as well.
34. The Comprehensive Pedestrian Plan recommended acquiring easements along the power lines in Mooresville. A line of particular interest stretches south from NC 115 near downtown to the new developments along the gas line. Acquiring a 50 foot public access easement on this utility would be very beneficial for the eventual construction of a 10 foot wide paved bicycle path. Although sewer easements and creek paths offer



good slow-speed bicycle paths and walking trails, power lines, railroads, and gas lines offer fantastic cycling corridors for recreation and utilitarian cyclists who require faster routes. The long distances, direct and straight routes, and the absence of the slower-strolling pedestrians make these multi-use corridors practical for many types of recreational and commuter bicyclists who wish to reach faster speeds. Power line right-of-ways can occasionally offer some grading challenges, however.

35. The gas line corridor from Highway 115 (or possibly as far west as the large church on Langtree) to the proposed Rocky Rover Greenway would be an excellent multi-use path corridor if access is granted. If a paved path is not possible, a 10 foot wide finely crushed gravel path would also be practical for most cyclists.
36. Highway 115 is a direct route for cyclist and motorists from Mooresville to Davidson, and is an important cycling corridor. Narrow lane width with high speed and high volume traffic make this roadway challenging for bicycles and motorists to share the road without conflicts that might be dangerous. The railroad along 115 offers a rail-with-trail possibility, especially since this rail corridor has a slight possibility for some rehabilitation with a future commuter rail line into Charlotte. The roadway itself is a decent route for a 10 foot wide paved sidepath since there are few driveways or intersections in between 115 and the railroad. This sidepath can be located adjacent to the roadway itself or in between the road and the rail. It is important to take special care to ensure that cyclists on this sidepath would be visible to motorists. Suggestions include routing the path immediately adjacent to either the roadway or the rail at all intersections, to include appropriate mid-block crossings at least 300 feet from either the rail or 115, or place stop signs for the path users at each intersection that cannot be placed within these specifications. See Section 5 on sidepaths for more information. Six foot wide paved shoulders should also be included on each side of Highway 115 extending to the Mecklenburg County line when the road is repaved. This will provide safe options for cyclists who are more comfortable bicycling on the roadway and provide safety benefits to automobiles as well. Many bicyclists will use the roadway instead of the shared use path because they have found the roadway to be more convenient, better maintained, or safer. Bicyclists using the roadway may be harassed by some motorists who feel that in all cases bicyclists should be on the adjacent path.
37. A multi-use path would be very beneficial along Byers Creek from Maranta Road to Byers Creek Road. This would give a much needed east-west connection for cyclists and pedestrians. This path would span from the Winslow Bay neighborhood, through any existing underpass under I-77, and to racing attractions on Byers Creek Road. An additional multi-use path connection would be desirable on Byers Creek from Eastbend Court to Bentley Place. This would open up possibilities for this corridor to be a major bike route in Mooresville. A suitable alternative to this east-west connector parallel to NC 150 would be to connect Oats/Gates Road to Midnight Place and Regency Center Drive over the interstate, with suitable bicycle and pedestrian accommodations.

#### Bicycle Lanes:

38. When resurfacing/and or widening Talbert and Talbert Point Roads occurs, bicycle lanes or paved shoulders should be included from Byers Creek Road to Brawley School Road.
39. When resurfacing/and or widening Doolie Road occurs, bicycle lanes or paved shoulders should be included from the High School (or further south) to Highway 150. When



resurfacing/and or widening Perth Road occurs, bicycle lanes or paved shoulders should be included from Lakeshore School/Wilson Lake to Highway 150.

40. When resurfacing/and or widening NC 150 occurs, bicycle lanes or paved shoulders should be included from the Doolie/Perth Roads to Water Oak (or further east).
41. When resurfacing/and or widening US 21 occurs, bicycle lanes or paved shoulders should be included from Brantley Place to Flanders (at minimum).
42. When resurfacing/and or widening/and or new alignment of the proposed East-West Connector (from Comprehensive Transportation Plan) from Langtree Road to 152 occurs, bicycle lanes or paved shoulders should be included.

### Bicycle Routes:

43. A bike route could be signed and mapped on Shearers Road (and parts of Freeman, College and Mills) from East Wilson to the Mecklenburg County Line. This road is an aesthetically pleasing, low volume roadway that is very popular with cyclists. At the same time, this road exists in a location within the Town limits that is very desirable for an increase in growth. Everything should be done to keep the character of this corridor, while still allowing for appropriate growth. Ensuring low traffic speeds and volumes on this corridor with traffic calming techniques is recommended. Currently, little residential and no commercial development, along with an indirect connection to downtown Mooresville and Mecklenburg Counties municipalities minimizes the traffic. Restricting growth on Shearers Road to a local, walkable, and bikeable development at a center core with low speed connectors, roundabout intersections, and immediate low volume/rural land uses elsewhere on Shearers Road can mitigate many foreseeable problems. Currently, the road's volumes are at the upper threshold for a Bicycle Route at 3200 ADT. Any new traffic expected will increase this ADT, and thus remove much of the roadway's attractiveness to bicyclists. When regular repaving maintenance is due, repaving the roadway with extra width for paved shoulders would be highly recommended.
44. A signed and mapped bicycle route on Linwood Road from Briarhill to the future East West Connector will present another option for regional bicyclists. Again, growth on this corridor should be confined to local, walkable, and bikeable development at a center core with low speed connectors, roundabout intersections, while preserving much of the remaining corridor to the greatest extent possible. Significant increases in traffic speeds over 45 miles per hour or 3,000 ADT would require paved shoulders on this route.
45. A signed bicycle route from NC 150 along Ervin would be made possible with a future, but yet unplanned, roadway connection to Walmsley Place. The route could continue onto Glencoe Lane and Marantha Road, connecting Morrison Plantation with the proposed Byers Creek Greenway.
  - o An additional signed bike route from the end of the Byers Creek greenway along Byers Creek Road, Talbert Pointe, and Eastbend Court will further this bikeway to the bicycle lanes or paved shoulders recommended on Talbert Road.
  - o Extending this route further across a short multi-use path extension on Byers Creek will help a cyclist reach the neighborhoods here.
  - o A final extension of this bike route from the suggested bicycle lanes or paved shoulders on Highway 21 onto Flanders Place to the proposed Reeds Creek Greenway will complete this east-west route and allow the cyclist to take Reeds Creek Greenway into downtown Mooresville.





46. Marking Terrance Road as a Bike Route to Wal-Mart (as shown in the Comprehensive Pedestrian Plan as a sidewalk and pedestrian route) will allow a back entrance route to shopping centers without using NC 150.
47. A future route could fork north on Rolling Hills Road from the bicycle route outlined for Project #15, across NC 150 onto Regency Center/Gallery Center, and then across I-77 on a new bridge that connects Midnight Lane to Gates/Oats Road. This new route can lead to Talbert Point Road. This new bridge over I-77 is a proposal in the Town of Mooresville Comprehensive Transportation Plan.
48. The Lake Norman Bike Route is planned to use 115, Langtree, Alcove, Williamson, 150, and Perth roadways in Mooresville. These roadways all currently offer challenges for the cyclist now, and significant cooperation is needed between the Council of Governments, NCDOT, and the Town of Mooresville to make this route possible for a wide range of recreational cyclists. By policy requirements defined in Section 8, all future road improvements along this roadway must consider bicyclists. Treatments of wide outside lanes, paved shoulders or bike lanes, safe intersections, and safe motor vehicle speeds.
  - o This plan offers a wide range of bike route options on lower speed and lower volume roadways that the Town of Mooresville may wish to pursue to advertise as possible alternatives to this route. There are existing and potential bike facilities on Shearers Road, Highway 115, Brawley School Road, roadways within and connecting to the Morrison Plantation development, and a Town proposal to connect Oak Tree Road and Doolie Road with a bridge. Any of these alternatives can create a safer, more enjoyable route that seemingly serves Mooresville better economically than the proposed Lake Norman Bike Route. As roadways become redesigned and repaved with bicycle accommodations, the route that the Lake Norman Bike Route follows should be reevaluated to include roadways that have lower volumes, safer speeds and that are more enjoyable.
49. Langtree and Alcove Roads should have paved shoulders or bike lanes installed with any repaving. The proposed bridge over I-77 on Langtree Road will be wide enough to accommodate bike lanes and these roads are a part of the Lake Norman Bike Route.

**Bike Parking:**

50. The Town of Mooresville should purchase a minimum of 24 suitable bicycle racks for distribution around the Town. Businesses and the Town of Mooresville can cooperate by sharing the purchase and installation costs of these racks. Locations for these racks can be prioritized according to where other bicycle projects mentioned in this plan might be located and thus might make a bicycle trip more likely. Some suggested locations include; popular shopping areas on bike routes, each of Mooresville's parks, the Winnie Hooper Center, the War Memorial, and all public service facilities such as the post offices, libraries, and other government facilities.
51. A portable/temporary multi-bicycle rack would be useful for the Town to have for special events such as "Cruise-In," "Lake Norman Days," and downtown parades.



## Mooresville Comprehensive Bicycle Plan

Table 7.1 summarizes each of the recommended projects:

Table 7.1: Summary of Projects

Project #	Bicycle District	Project Type	Roadway / Location
1	Downtown	Bike Lane Striping	West Wilson
2	Downtown	Future Shoulders/Bike Lanes	Main Street
3	Downtown	Future Shoulders/Bike Lanes	Statesville Road
4	Downtown	Upland Multi-Use Path	Iredell Avenue
5	Downtown	Bike Boulevard	Academy/Tunnel/Mackey/Oak/Stewart
6	Downtown	Bike Boulevard	Stewart/Church/Wilson
7	Downtown	Bike Route	Center/Magnolia/Edgemoor/ Fieldstone/Whiteoaks
8	Downtown	Bike Route	Lowrance/Academy
9	Downtown	Bike Route	Dogwood/Culp/Pine/Briarhill
10	Downtown	Covered Bicycle Parking	Citizen Center
11	Downtown	Covered Bicycle Parking	Mooresville Elementary, Middle, and Intermediate Schools, East Mooresville Intermediate, South Mooresville Elementary, and Park View Elementary Schools
12	Downtown	Covered Bicycle Parking	Mill Village
13	Lake Norman	Bike Lane Striping	Morrison Plantation Pkwy
14	Lake Norman	Bike Lane Striping	Plantation Ridge
15	Lake Norman	Bike Route	Singleton/Plantation Ridge/Raceway/Gasoline Alley/Rolling Hills
16	Lake Norman	Bike Route	Morrison Cove/Castle's Gate/ <i>Future Road</i>
17	Lake Norman	Future Shoulders/Bike Lanes	Oak Tree/Happy Oaks/ <i>Future Bridge/Doolie</i>
18	Lake Norman	Bike Route	Linberger/ <i>Future Road</i> /Plantation Ridge
19	Lake Norman	Lowland Multi-Use Path	Wilson Lake/Schools
20	Lake Norman	Bike Route	Lakeshore School/Wilson Lake Rd/ <i>Future Greenway</i> /Gresham/Water Oak/Racine/Border Field/ <i>Future Road</i>
21	Lake Norman	Covered Bicycle Parking	YMCA



22	Lake Norman	Covered Bicycle Parking	Brawley Middle School, Lake Norman Elementary and High Schools, and Lake Shore Elementary and Middle Schools
23	Lake Norman	Covered Bicycle Parking	Target and Wal-Mart Shopping Centers
24	Mount Mourne	Future Shoulders/Bike Lanes	Williamson/21/Waterlyn
25	Mount Mourne	Future Shoulders/Bike Lanes	Faith Road
26	Mount Mourne	Future Shoulders/Bike Lanes	Templeton/ <i>Future Bridge</i> /Fairview
27	Mount Mourne	Bike Route/Upland Multi-Use Path	Fairview/Centre Church/Fairview
28	Mount Mourne	Bike Station	<i>Future Commuter Rail Station</i>
29	Mount Mourne	Covered Bicycle Parking	Mount Mourne Elementary and Middle Schools
30	Mount Mourne	Covered Bicycle Parking	Lake Norman Medical Center
31	Study Area	Lowland Multi-Use Path	Dye Creek
32	Study Area	Lowland Multi-Use Path	Rocky River Creek
33	Study Area	Lowland Multi-Use Path	Reeds Creek
34	Study Area	Upland Multi-Use Path	Power line
35	Study Area	Upland Multi-Use Path	Gas Line
36	Study Area	Upland Multi-Use Path/Paved Shoulders	Between Railroad and 115
37	Study Area	Lowland Multi-Use Path	Byers Creek
38	Study Area	Future Shoulders/Bike Lanes	Talbert Point/Talbert
39	Study Area	Future Shoulders/Bike Lanes	Doolie/Perth
40	Study Area	Future Shoulders/Bike Lanes	NC 150
41	Study Area	Future Shoulders/Bike Lanes	US 21



42	Study Area	Future Shoulders/Bike Lanes	<i>Future East-West Connector from Langtree to 152</i>
43	Study Area	Bike Route/Paved Shoulders	Shearers, Freeman, College, Mills
44	Study Area	Bike Route	Linwood
45	Study Area	Bike Route	Ervin to Flanders
46	Study Area	Bike Route	Terrance Road
47	Study Area	Bike Route	Rolling Hills, Regency/Gallery Cr., Midnight Ln./New Bridge, Gates/Oats
48	Study Area	Lake Norman Bike Re-Route	115/Fairview/Centre Church Rd/Williamson/Plantation Ridge Drive/Doolie
49	Study Area	Future Shoulders/Bike Lanes	Langtree and Alcove
50	Study Area	Individual Bike Racks	As needed
51	Study Area	Portable Bike Rack	For Special Events

### 7.3. PRIORITIZATION OF PROJECTS

A project prioritization methodology is an important tool through which the Town can determine where to focus its efforts on the development of pedestrian facilities. A methodology was developed to objectively compare the attributes of proposed projects. This methodology is used to prioritize projects as part of this plan, and in the future, the Town can use the same methodology to reassess its priorities and consider new projects.

#### Prioritization Methodology

To compare the merits of each project, a scoring system is used to assign “points” to each proposed project. Points are assigned according to ten specific criteria, as described below. Projects are assigned points in each category based on how well the project meets each criterion. A higher number of points indicate a “better” project.

The total number of points across all criteria indicates each project’s final score. The maximum score for a project is 100 points, based on a scale of 0-10 points for each of the ten criteria. All criteria are weighted equally.

Suggested criteria are based on three major elements: connectivity, safety, and ease of implementation. Specific criteria are defined for each of these three areas:

#### Connectivity

1. Provides access to major destinations such as shopping/business, schools/community centers, homes, public/social services, or recreation/entertainment (10 points maximum)
2. Provides obvious access to children and low-income residents, with special emphasis on younger and low-income children (10 points maximum)
3. Closes gaps or connects existing routes (10 points maximum)



4. Improves existing bike corridors (10 points maximum)

Safety

5. Improves safety for children and low-income residents, with special emphasis on younger and low-income children (10 points maximum)
6. Improves an existing known safety issue (10 points maximum)
7. Calms motorized traffic or provides alternate bike routes (10 points maximum)

Ease of Implementation

8. The project is already in consideration and a likely project to be completed by the Town, another agency or a development (10 points maximum)
9. Project is supported by officials or by the public (10 points maximum)
10. The project can be implemented at a reasonable cost without extensive right-of-way acquisition or intensive design features (10 points maximum)

After the scores of all the projects have been tallied, some projects may have identical scores. In this case, the Town of Mooresville can determine which project should be ranked ahead of the other based on its knowledge of what project will best fit the needs and cost considerations of Mooresville. Based on the objectives of this plan, the project that best serves the children of Mooresville would usually be the top priority.

Application of Methodology

Each project was judged by the consultant and the Town based on the criteria described above. Summary information is presented in the Implementation Plan in Section 9, and raw scores assigned to each project are detailed in **Appendix K**. In the cases where different project alternatives are suggested, the project cost shown in this table is computed based on the project as it is illustrated on the project map. Although this methodology is intended to objectively compare the qualities of individual projects, there is some inherent subjectivity in assigning the number of points in each category. The methodology used in scoring for each of the categories is described below in **Table 7-2**.





# Mooresville Comprehensive Bicycle Plan

**Table 7-2**  
**Ranking Criteria for Projects**  
**100 points Total**

**Bold** conditions are individually tallied  
*Italicized* condition is recorded as the total score

<b>Provides Access to Major Destinations (10 pts.)</b>	<b>Shopping / Business (2)</b>	<b>Schools / Community Centers (2)</b>	<b>Homes (2)</b>	<b>Public / Social Services (2)</b>	<b>Recreation / Entertainment (2)</b>
<b>Provides Obvious Access to Children or Low Income (10 pts.)</b>	<b>Elementary School Aged Children (3)</b>	<b>Middle School Aged Children (2)</b>	<b>High School Aged Children (1)</b>	<b>Low-Income Children (2)</b>	<b>Low Income Adults (2)</b>
<b>Closes Gaps or Connects Routes (10 pts.)</b>	<i>Definitely (10)</i>	<i>Significantly (8)</i>	<i>Modestly (6)</i>	<i>Unknown (4)</i>	<i>No (0)</i>
<b>Improves Existing Bike Corridors (10 pts.)</b>	<i>Yes, Popular Routes (10)</i>	<i>Existing (8)</i>	<i>Potential (6)</i>	<i>Unknown (4)</i>	<i>No (0)</i>
<b>Improves Safety for Children or Low Income (10 pts.)</b>	<b>Elementary School Aged Children (3)</b>	<b>Middle School Aged Children (2)</b>	<b>High School Aged Children (1)</b>	<b>Low-Income Children (2)</b>	<b>Low Income Adults (2)</b>
<b>Improves an Existing Known Safety Issue (10 pts.)</b>	<i>Definitely (10)</i>	<i>Significantly (8)</i>	<i>Modestly (6)</i>	<i>Unknown (4)</i>	<i>No (0)</i>
<b>Calms Motorized Traffic or Provides Alternate Bike Routes (10 pts.)</b>	<i>Definitely (10)</i>	<i>Significantly (8)</i>	<i>Modestly (6)</i>	<i>Unknown (4)</i>	<i>No (0)</i>
<b>Project Already in Consideration (10 pts.)</b>	<i>Yes (10)</i>	<i>Most Likely (8)</i>	<i>Potentially (6)</i>	<i>Unknown (4)</i>	<i>No (0)</i>
<b>Potential or Existing Political or Public Support for Project (10 pts.)</b>	<i>Support from both Public &amp; Staff/Officials (10)</i>	<i>Support from Public or Staff/Officials (8)</i>	<i>Assumed Modest Support (6)</i>	<i>Unknown (4)</i>	<i>No (0)</i>
<b>Cost (10 pts.)</b>	<i>Desirable (10)</i>	<i>Standard (8)</i>	<i>Modest (6)</i>	<i>Acceptable (4)</i>	<i>Excessive (0)</i>

## Grouping of Projects

To help identify the most beneficial projects as determined through this prioritization methodology, all projects receiving a score of 65 or higher (out of 100 possible points) are identified as “high priority” projects. All projects presented in this plan have merit and should be pursued; however, the identification of a subset of “high priority” projects will enable Town officials to focus their efforts on the early implementation of a few infrastructure projects that will make significant improvements to the bicycle transportation system.

Projects that received a score ranging from 55-64 were considered to be “mid-range” projects. Projects that realistically have little chance of implementation in the near future are categorized as “long-term” projects and have thus scored less than 55 out of 100 possible points. However, these projects always have the outside possibility of being built with the help of policies that require projects identified in this plan to be constructed as part of adjoining developments or roadways. Mid-range projects have the best possibility of graduating to high priority level in near future re-rankings when the existing conditions change.



### Reconsideration of Priorities

The projects included in this plan have been prioritized based on current conditions. However, conditions affecting these proposed projects are constantly changing – as time passes, opportunities may appear that allow for easy implementation of lower ranked projects, new projects may be proposed, currently proposed projects may no longer be feasible, and completion of some projects may impact the viability of other projects. For these reasons, it is suggested that the Town of Mooresville, through a proposed bicycle / pedestrian advisory committee, update the prioritized project list every two years based on changing conditions, re-ranking projects as high priority, mid-term or long term projects. Projects may be added to or deleted from the overall list, and the prioritization of specific projects may change based on new developments, a change in public support, construction of connecting facilities or new destinations, or other factors potentially affecting project implementation. In short, the identification of high priority projects should change every few years to reflect Mooresville’s changing needs and conditions. Funding opportunities for these projects are listed in **Appendix L**.



## 7.4. PROPOSED HIGH PRIORITY PROJECTS

**Table 7-3** illustrates summary information for the high priority projects, based on the ranking that each project received. This table represents a compilation of the individual project information contained in Appendix K and uses cost estimates described in Appendix H.

**Table 7-3: Infrastructure Project Summary Information**

Rank	Description of Project	Roadway / Location	Approximate Cost
1	Multi-Use Path with New Shoulders on Roadway	Along Highway 115	\$4,950,550
2	Retrofitting of Bike Lanes	West Wilson Avenue	\$14,172
3	Retrofitting of Bike Lanes	Plantation Ridge Drive	\$7,388
4	Multi-Use Path	Along Dye Creek	\$4,221,760
5	Retrofitting of Bike Lanes	Morrison Plantation Parkway	\$36,067
6	Neighborhood Bike Route	Through Southern Neighborhoods	\$5,658
7	Bike Route with New Paved Shoulders	Shearers Road Corridor	\$2,463,313
8	Bike Boulevard	Academy Street Corridor	\$40,169
9	Bike Boulevard	Church Street Corridor	\$48,535
10	Multi-Use Path Neighborhood Connection to School	Lake Norman Elementary/Middle	\$188,760

Total \$11,976,372

Rank	Parking Project	Location	Approximate Cost
P1	Individual U-Shaped Bicycle Racks	Spread as Needed	\$2,880
P2	Sheltered Rack for Multiple Bicycles	At each Public School	\$332,800
P3	Sheltered Rack for Multiple Bicycles	Downtown - Citizen's Center	\$27,600

Total \$363,280

*Complete project costs are only estimated because more detailed study is needed to determine the ultimate design of the facility; the design would determine costs.*



**Project Priority Number 1: Multi-use path along Highway 115 and repaving road with shoulders**

Approximate cost: \$4,950,550







**Project Priority Number 2: Bicycle lanes on West Wilson Street**

Approximate cost: \$14,172







**Project Priority Number 3: Bicycle lanes on Plantation Ridge Drive**

Approximate cost: \$7,388







**Project Priority Number 4: Multi-use path along Dye Creek**

Approximate cost: \$4,221,760

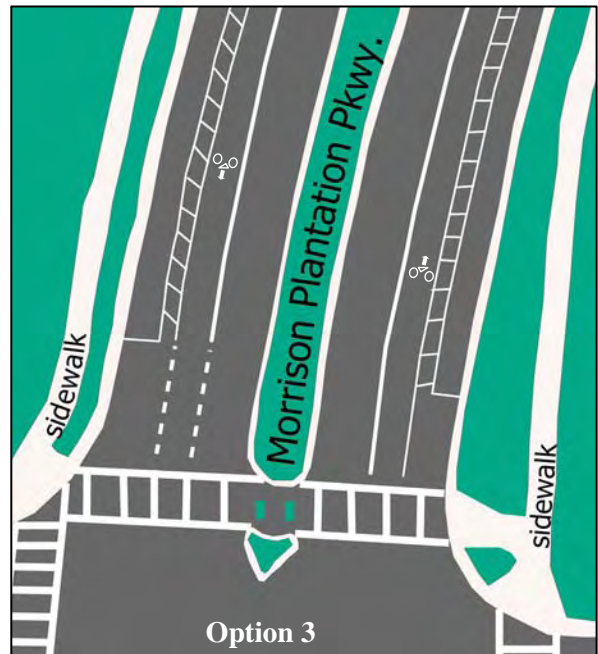
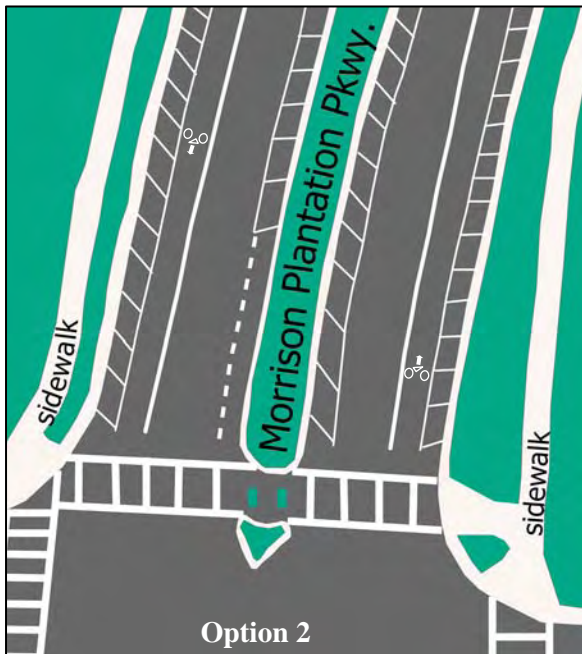
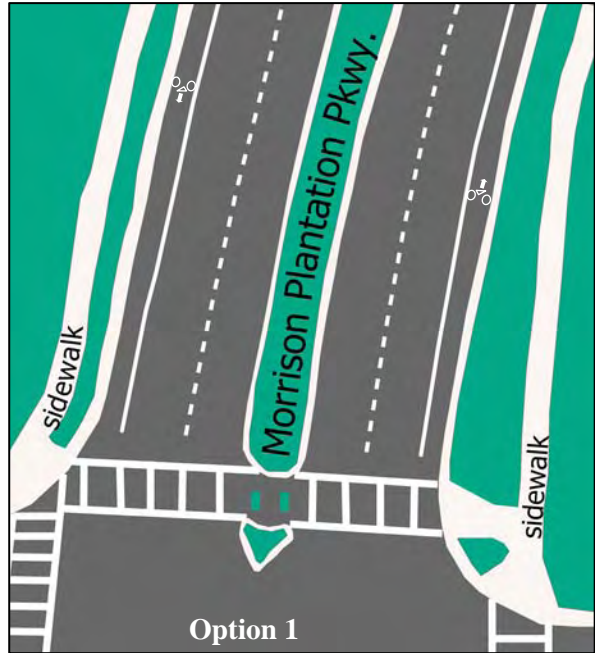
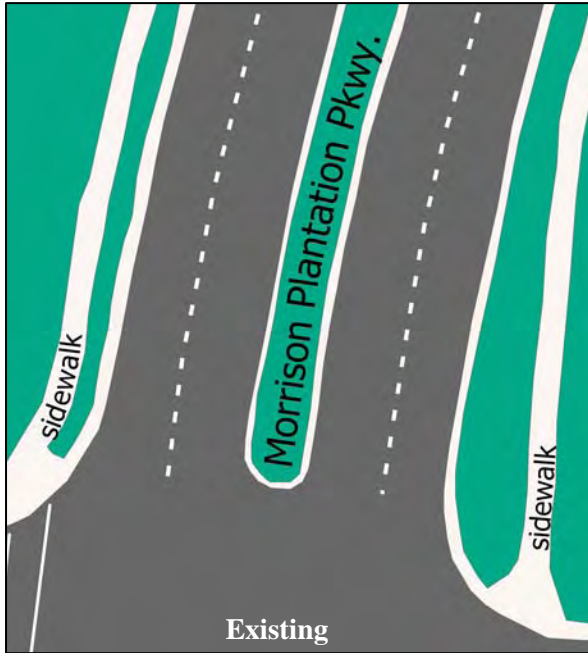






**Project Priority Number 5: Bicycle lanes on Morrison Plantation Parkway**

Approximate cost: \$36,067 (cost is retrofitting lanes instead of repaving)





**Project Priority Number 6: Bicycle route through southern neighborhoods**

Approximate cost: \$5,658







**Project Priority Number 7: Bike route on Shearers Road with road repaving for shoulders**  
Approximate cost: \$2,463,313







**Project Priority Number 8: Bicycle Boulevard – Academy Street**

Approximate cost: \$40,169







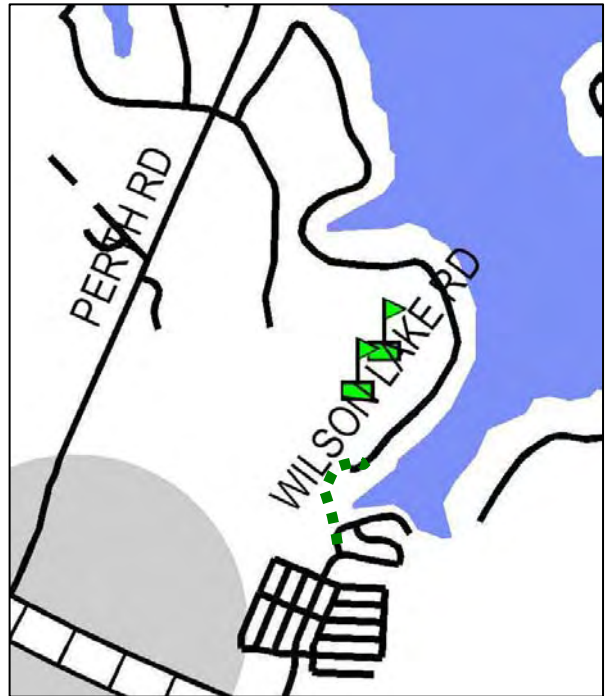
**Project Priority Number 9: Bicycle Boulevard – Church Street corridor**  
Approximate cost: \$48,535





**Project Priority Number 10: Multi-Use Path Neighborhood Connection to Lake Norman Middle and Elementary Schools**

Approximate cost: \$188,760



Section 8  
Recommended Policies and  
Ordinances







## 8.1. POLICY RECOMMENDATIONS

Land use policies and regulations of the last half of the 20<sup>th</sup> Century have discouraged bicycle and pedestrian-friendly roadways and development and have encouraged automobile use. The recommendations provided in this section are intended to create more transportation options to Mooresville's residents and create a more complete street system.

### ***Emphasis on Complete Street Design***

By policy, Mooresville streets should all be designed to accommodate automobiles, transit, bicycles, and pedestrians. This concept is known as "Complete Streets" because each street completely accommodates all types of transportation users. The provision of transit, bicycle and pedestrian facilities shall be embraced by policy as a primary element in accommodating travel demand and relieving congestion on all new roadways in Mooresville and before any street widening projects are undertaken.

### ***Locations of Public Facilities***

By policy, locations of public facilities should take into consideration non-motorized access.

- A policy statement should be made that the preferred method of transportation of children to Mooresville's schools is non-motorized (walking, bicycling, skating, etc.) For the development of new schools, finding a school location inside of a developed or future residential development is preferred. If this is not feasible, design the school so that its main entrance faces away from thoroughfares or collectors and toward future or existing residential areas. Schools must encourage children to get themselves to school without the use of cars or buses. New developments that add to the need for new school construction should provide acceptable off-road access from the residences to the schools.
- The locations of post offices, health departments, Social Security offices, parks, libraries, police stations, abuse care centers, courts, DMV offices and other civic facilities should be in a location where non-motorized access is top priority. Simply placing these facilities near a sidewalk or a bike lane is not adequate, but placing these facilities within a short walk or bike to neighboring residents is ideal. Many of the users of these facilities are not able to or cannot afford to drive. In cases such as Social Security offices where there is typically one branch office, a central location is best. The Town should have a policy to work with the county, the state, and the federal governments to make this possible.
- Plans for roadway construction must not compromise projects and concepts brought forth in the Comprehensive Bicycle Plan. A new roadway should never sever a planned multi-use path corridor and a road widening project must always leave room for bicycle lanes and sidewalks. A copy of NCDOT's policy that provides protection for local municipalities' greenway plans regarding new state road construction is found in **Appendix L** and can be found at:

[http://www.ncdot.org/transit/bicycle/laws/laws\\_greenway\\_admin.html](http://www.ncdot.org/transit/bicycle/laws/laws_greenway_admin.html)



## 8.2. GENERAL POLICY RECOMMENDATIONS

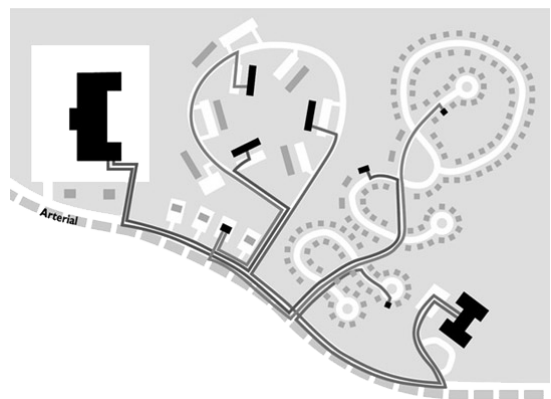
### Use of the Bicycle Districts as a Planning Tool

The concept of the “Bicycle District” is emphasized throughout this plan. As stated earlier, these districts are not intended to designate the only places where bicycle infrastructure projects can occur (many projects are recommended outside of these districts as well); rather, these districts are intended to identify areas in which a strong emphasis should be placed on strengthening the existing Pedestrian Oriented Development Zones to include bicycle transportation that connect the regions of Mooresville together.

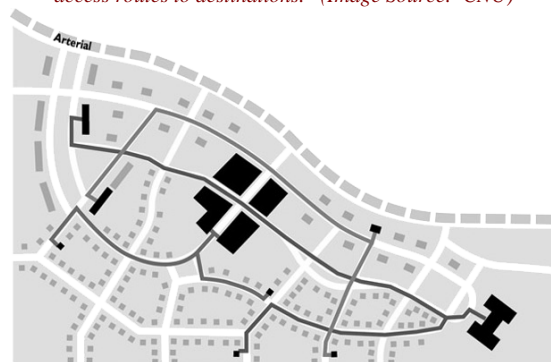
### Requirements for Infrastructure Associated with New Developments and New or Improved Roads

Requirements for new bicycle infrastructure should be consistent throughout the Town’s planning jurisdiction, not just in the designated Bicycle Districts. These requirements should be strengthened for all areas of the planning area. It is important to consider that only 3.2% of the citizens surveyed for this plan would *not* support development policies that would encourage bicycling. Suggested guidelines are as follows (these requirements should apply to all new development):

- New commercial development shall be oriented to the street and include reasonable connections from the development to the external bicycle network in the public right-of-way.
- New residential development of two dwelling units per acre or greater shall have a grid-like or interconnected curvilinear street pattern designed for travel speeds of no more than 25 miles per hour with block lengths preferably no more than 660 feet in distance. These block separations may be streets or 10-12 foot wide paths for pedestrian and bicycle users.
- Cul-de-sacs shall not be permitted unless geographic or other natural barriers exist that make connections unrealistic. A developer may create a cul-de-sac or a *close* if an acceptable bicycle and pedestrian connection is created with a 10-12 foot wide paved path that is built to standards set forth in this plan for multi-use paths.
- New developments shall connect to neighboring developments. Commercial areas shall create a motor-vehicular, bicycle and/or pedestrian connection to adjacent residential



*The development style above has a complete lack of connectivity and forces all trips onto the arterial road versus the development style below, which allows multiple access routes to destinations. (Image Source: CNU)*





communities and provide a future connection option for future developments. New residential communities shall connect to existing residential and commercial developments, as well as provide connection possibilities to future adjacent developments. Exemptions may apply if there is a substantial natural or geographical barrier, or if there is an environmental concern with such a connection. New developments should be required to provide connections across natural barriers if they are listed as projects in this plan.

- All new developments and road projects shall include bicycle accommodations in street design and construction related to the project according to Table 5-1.
- New and refurbished developments should include long term or short term bicycle parking by policy. (See Page 5-33 for bicycle parking guidelines and Appendix G for examples of bicycle parking ordinances)
- Any new development where there is a bicycle project mapped from the Comprehensive Bicycle Plan shall include that project to a functioning level according to guidelines. In most cases, exact alignment of the projects is not definite.
- New developments should include public green/open space with public rest rooms, public water fountains, and public seating areas. These features add vital necessities and aesthetics to Mooresville that will make bicycle trips enjoyable and practical. Multi-use paths that serve to connect key destinations may be developed as part of the open space requirement.
- When an existing multi-use path or bicycle lane is closed for construction or maintenance reasons, an adequate detour route should be established that does not cause undue inconvenience to the cyclist.
- All new and rehabilitative local, state, and federal road and bridge project planning and construction projects must consider and include any reasonable non-motorized accommodation for both pedestrians and bicycles. In most cases, this should include bicycle lanes, but could include wide outside lanes, paved shoulders or multi-use paths. Sidewalks should not be considered as bicycle projects. According to NCDOT policy, 5'-6' sidewalks shall be included on new bridges where a pedestrian need is identified, and a determination on providing sidewalks on one or both sides of new bridges will be made during the planning process according to the NCDOT Pedestrian Policy Guidelines. Bicycle lanes may be considered with local support, and are highly recommended on these new bridges. NCDOT shall fund all or part of the cost of projects when they are mapped and recommended as part of a transportation plan. **Appendix L** includes NCDOT's Pedestrian Policy Guidelines and Bicycle Policy Guidelines. The Pedestrian Policy can be found at [http://www.ncdot.org/transit/bicycle/laws/ped\\_guide.pdf](http://www.ncdot.org/transit/bicycle/laws/ped_guide.pdf), while the NCDOT Bicycle Policy can be found at [http://www.ncdot.org/transit/bicycle/laws/laws\\_bikepolicy2.html](http://www.ncdot.org/transit/bicycle/laws/laws_bikepolicy2.html).
- All multi-use paths must be reasonably ADA accessible. See Section 5.5 for more information.



## 8.3. SPECIFIC LOCAL ORDINANCE CRITIQUE AND RECOMMENDATIONS

### A. Zoning Ordinance

Mooresville's zoning ordinance was critiqued in the Comprehensive Pedestrian Plan, and many of the land-use policies that influence pedestrians also have the same influence on bicyclists. The Zoning Ordinance is also being revised at the same time as this Bicycle Plan is being written, and is expected to address many of these issues. There are two primary common issues the zoning ordinances that most directly impact the non-motorized transportation. First is the ability to mix residential uses with neighborhood-serving commercial uses. The second major issue is that the Area, Yard, and Height Requirements need to allow for development at the human level rather than at the automobile level. Mooresville's current zoning ordinance does this well and the revised ordinance is expected to improve on any deficiencies.

#### **1. Mixed-Uses**

In order to promote active living, more people need to live within walking or comfortable biking distance of shopping, employment, recreation, and/or civic destinations. The normal order of density progression is to concentrate people and activities closer together at the core and in mixed-use nodes to provide efficient service and encourage healthy, vibrant, human-scaled environments. The most efficient way for the Town to provide for residents – including but not limited to youth under the driving age, those of limited means, and the elderly and those of limited physical capacities (people in all of the categories above typically make up 30% or more of a local population) – to access goods and services is to allow for housing, especially multi-family (apartments and condos) housing and townhouses, to be developed in conjunction with or adjacent to businesses that provide for residents' needs: grocery stores and other convenience services. Mooresville's zoning ordinance consistently allows the mix of residential and commercial uses.

#### **2. Human-Scale Development Standards**

##### Use Density-based Requirements versus Lot Size:

A more flexible tool than lot size or acreage requirements is the application of base density requirements for new development. These can aid in neighborhood design by allowing (but not necessarily requiring) a variety of lot sizes within close proximity while regulating the actual number of units that impact surrounding infrastructure. Such a requirement also helps to protect natural features and open space by allowing flexibility in developing sites that are not flat. Detached single family homes can actually be developed to a density of 12-16 units per acre before a fire-rated wall, such as those used in town homes, is required. Mooresville's zoning ordinance does not require a certain minimum lot size for most single family residential developments, but does have some lot size requirements for most other developments.



Reduce Setback Requirements:

Building setbacks, especially front setbacks, are appropriately related to the type of street, the use of the building, and the surrounding development context. For example, buildings on large, busy thoroughfares could rightfully be set back. However, buildings on pedestrian and bicycle friendly streets, especially neighborhood, mixed-use and neighborhood business streets can easily and appropriately be built close to the street to promote bicycle appeal and safety.

More importantly, this approach to setbacks preserves natural features within the prescribed building envelope, eliminates the opportunity for staggered facades, and organizes the garage on the site in close proximity to the front facade. In truth, the front yard is the least used portion of a typical single family house lot. Deep setbacks also tend to be less attractive for bicyclists and pedestrians since they remove the feeling of enclosure and proximity to human activity that people desire for interest and feeling of security.

Front and rear setbacks from zero to 10 or 15 feet can increase the private, usable space of the rear yard as well as the building envelope. This improves the human dimensions of the street by bringing front doors closer to the sidewalk, where people bicycling by can interact somewhat with people in the semi-public spaces of front porches and front yards.

Currently, Mooresville's General Business zoning district has a front building setback of 15 feet from the right of way, and most other uses, including the Office, Neighborhood Business, and Highway Corridor Districts have front setbacks of 30 feet from the right of way, with a standard setback for the principal highways of Mooresville being 80 feet. The mixed Use District has 50 foot front setbacks for non-residential buildings and 20 foot setbacks for residential buildings.

The setback requirements in the CBD allow for the continuation of human-scaled development that was the early pattern of the downtown's development. However, nowhere else in the Town could such development be replicated under the current development standards.

Automobile Parking Lots

Article 9 of the Zoning Ordinance describes off-street parking requirements. In his book *The High Cost of Free Parking*, renowned Economist Donald Shoup shows that minimum parking requirements are the source of many urban ills, including impeding the use of active modes of transport – walking and biking. He compares the requirement for and provision of “free” parking at almost every location in America to a rental apartment where the utilities are required to be included in the rent thus giving the tenants no incentive to curtail their use of electricity or water. In fact, the tenants have an incentive to use as much of these commodities as possible since they will incur no additional cost to do so. The same is true for motor vehicle parking. Since almost everywhere that we take our car will have a free place for us to keep it at our destination, we have little incentive to consider other options for getting there.





Shoup recommends that municipalities let developers decide how many parking spaces they require. To further reduce the impact of automobile parking on bicycle transportation, the Town should consider including the following measures in its development regulations:

### Establish Parking Maximums

Consider parking maximum thresholds. This will limit the overbuilding of parking lots. Parking maximums can encourage additional development since more land can be used for building instead of parking and existing buildings with little existing parking can be reused.

### Encourage Shared Parking

Shared parking for uses that have different operating hours (such as night clubs and offices) makes efficient use of space, reduces the size of parking lots, and increases the amount of land on a parcel that may be devoted to buildings versus parking. In certain districts, such as the CBD, Shoup suggests offering developers an in-lieu fee option to contribute to public parking instead of building their own parking on-site.

### Encourage On-Street Parking

On-street parking should be encouraged to be included with any off-street parking. On-street parking is one of the most efficient ways to provide and share parking. It also benefits bicyclists by slowing the speed of cars on the roadway.

### Require Bicycle Parking

Just as the provision of motor vehicle parking has been shown to induce driving, the provision of safe and convenient parking for bicycles can have the same effect on bicycling. Bicycle parking can be provided at a fraction of the cost of automobile parking and in a fraction of the space – 10 to 12 bicycles can be parked in the area of one car parking space at a cost of tens of dollars per bicycle space versus hundreds or thousands of dollars per motor vehicle space. The Town should consider requiring bicycle parking for multifamily and all non-residential development. Different standards of bicycle parking are needed for short term visitors and customers and for longer term users like employees, residents and students. Typically, 1 bicycle space per 20 motor vehicle spaces is sufficient to provide for visitor parking demand. See Appendix G for examples.

## **B. Subdivision Ordinance**

There are some development standards in Article IV of the Town's current Subdivision Ordinance that should be modified to allow for more human-scaled development:

1. Section 403 needs to better ensure that a road's name will be contiguous with future and current extensions.

This states that street extensions which are obviously in alignment with existing streets shall be given the same name. Mooresville has numerous examples of roadway names that change as they are extended. Unreliable street name



continuity and constant name changes make navigation more difficult for non-motorized vehicles that cannot afford to spend extra effort backtracking or circling long blocks. An effort should be done for a new street made up of two connected roads to take one common name.

2. Section 404.1 (b) should be revised to reduce minimum and maximum block lengths.

The current maximum allowed block length of 1500 feet is too long for convenient non-motorized transportation, and the current minimum block length of 400 feet is the maximum for many pedestrian and novice bicycle trips. Ideally sized blocks are 200-400 feet wide. The block length should be based on a variety of factors, including the density of the development and the zoning district and the development context of the development (urban versus rural) up to a maximum of 800 to 1000 feet.

Consider requiring blocks longer than 800 feet to provide a non-motorized connection through the block. Consider requiring 20 - 30 foot easements and 10 foot wide multi-use paths through these blocks.

**Strengths of Article IV of the Subdivision Ordinance:**

There are a number of development standards in Article IV of the Town's current Subdivision Ordinance that should be mentioned here because of their potential to provide positive effects on bicycling:

**Section 405. Road Standards**

*405.4 Access to Adjacent Properties*

*Aside from a subdivision's point(s) of entry from an existing public street(s), each subdivision shall, whenever technically feasible, have at least one street extended to the exterior boundary of the subdivision (as determined by the Technical Review Committee) and a temporary turn-around provided at such point.*

*405.6 Points of Ingress and Egress*

*The subdivider shall provide no less than two (2) points of ingress and egress per public road street frontage except:*

- 1. When the exterior frontage on a particular public road is less than one-thousand (1,000) feet.*
- 2. There are unique physical characteristics of the property which would render a second entrance impractical.*



3. Where the NCDOT or the Town Engineer would not allow such second entrance.

405.7 *General Street Requirements (Inside and Outside Town Limits)*

*(d) Continuation of Adjoining Streets: The proposed street layout shall be coordinated with the street system of the surrounding area. Where possible, existing streets shall be extended to provide access to adjacent subdivisions and to provide for additional points of ingress and egress*

*(e) Large Tracts or Parcels: Where land is subdivided into larger parcels than ordinary building lots, such parcels shall be arranged so as to allow for the opening of future streets and logical further resubdivision.*

*(g) Wheelchair Ramps: In accordance with Chapter 136, Article 2A, Section 136-44.14, all street curbs in North Carolina being constructed or reconstructed for maintenance procedures, traffic operations, repairs, correction of utilities, or altered for any reason after September 1, 1973, shall provide wheelchair ramps for the physically handicapped at all intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.*

405.8 *Cul-de-sacs*

*Cul-de-sacs shall be limited except when necessitated by topography, property shape, property accessibility, and/or land use relationships. Cul-de-sacs shall not be used to avoid extension to an existing street. All cul-de-sacs shall be built in accordance with the most recently adopted version of the Town's Land Development Guidelines Manual.*

This limitation of cul-de-sacs is good; however, it could specifically state that any approved cul-de-sac length is to be no more than 250 feet. Necessary cul-de-sacs that must be longer in length must also include an acceptable bicycle and pedestrian connection.

405.9 *RESERVED*

405.10 *Sidewalks/Planting Strips*

*Wherever possible, sidewalks shall provide a continuous pedestrian network. Sidewalks shall comply with the Americans with Disabilities Act. Sidewalks shall be constructed along both sides of all residential streets except alleys and lanes. Cul-de-sacs and closes shall be reviewed on a site by site basis for this requirement.*

*On all streets where sidewalks are provided, there shall be a planting strip placed between the inner edge of the sidewalk and the outer edge of the curb. Said planting strip shall be a minimum of six (6) feet in depth*



*and shall be built in accordance with the most recently adopted version of the Town's Land Development Guidelines Manual. Sidewalks be a minimum of 5' (five) feet in width.*

*The Subdivision Administrator or Technical Review Committee, in approving plats, shall have the ability to waive or modify the requirements of this Section in particular situations where strict application would serve no meaningful purpose.*

### **C. General Codes and Ordinances**

A municipality's codes and ordinances can help or hinder proper bicycle use and education. A complete list of codes and ordinances in Mooresville that are related to bicycling are listed in **Appendix M**. There is no reason to modify most of these with the following exceptions:

- *Sec. 23-1. (Code 1975, §§ 7.1--7.7, 7.8(b), (c), 7.9--7.14) Definitions. Vehicle means every device in, upon or by which any person or property is or may be transported or drawn upon a highway, except devices moved by human power or used exclusively upon stationary rails or tracks.*
  - This code needs to include a bicycle as a vehicle, as according to North Carolina State Law [§20-4.01 (49)].
- *Sec. 23-213. (Code 1975, § 7.152(a)). Use of right-hand side of roadway. Every person operating a bicycle upon a roadway shall ride as near to the right-hand side of the roadway as practicable, exercising due care when passing a standing vehicle or one proceeding in the same direction.*
  - This code needs to make exceptions for bicycles that are preparing to make a left turn, for passing another vehicle, for safety reasons such as road debris or traffic situations, for instances where the bicycle is, or is intended to, keep a speed that is comparable to motor vehicles (such as in Central Business Districts or roundabouts), while traveling on one-way streets, or other exception listed under North Carolina law [§20-146].
- *Sec. 23-215. (Code 1975, § 7.152(c)). Use of bicycle paths. Whenever a usable path for bicycles has been provided adjacent to a roadway, bicycle riders shall use such path and shall not use the roadway.*
  - This code needs to be deleted. Currently, there are no bicycle paths in existence in the Town of Mooresville, but there are sidepaths recommended in this plan, but recommended with caution. Any off-road pathway is intended to be a multi-use path, shared by bicyclists and pedestrians. There are many times and circumstances where experienced cyclists should take the roadway instead of a parallel path where the sidepath is not the safest travel option for higher speed bicyclists. A code shall never force a bicyclist to use a facility that they might feel is not the safest alternative. In addition, this code as written may be wrongly interpreted to say that any parallel path may serve as an appropriate bike path. This might mean a sidewalk or a future multi-use path that may not bring the cyclist to the same destination that the roadway would. Recent state laws have been adopted outside of North Carolina that makes local laws of this type illegal for safety reasons. North Carolina State Law does not require that bicyclists use paths adjacent to roadways.



## Mooresville Comprehensive Bicycle Plan

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- *Sec. 23-216. (Code 1975, § 7.157(b)). Authority to prohibit riding on designated roadways. The chief of police is authorized to erect signs on any roadway prohibiting the riding of bicycles thereon by any person, and when such signs are in place no person shall disobey the signs.*
  - This code contradicts the North Carolina Department of Transportation's Guide to Bicycle and Pedestrian Laws statement that, "Under North Carolina law, bicycles are considered vehicles and should be treated just like any other vehicle." [§ 20-4.01 (49)], [§20-171.1], and [§20-171.8]
- *Sec. 23-220. (Code 1975, § 7.155) Carrying articles. No person operating a bicycle shall carry any package, bundle or article which prevents the rider from keeping at least one (1) hand upon the handlebars.*
  - This code should be modified and applied to all operators of all vehicle types, and be expanded to prevent all distractions that require the use of both hands.
- *Sec. 23-223. Lamps and brakes. (b) (Code 1975, § 7.158). Every bicycle shall be equipped with a brake which will enable the operator to make the braked wheel skid on dry, level, clean pavement.*
  - This code may not require any modification, but the Town of Mooresville should be aware that there is a type of bicycle known as a "fixie" that has no standard brake, but where braking is done by the means by which the skilled operator can lift and move the tires. Other municipalities have been struggling with the question as to whether or not this braking skill should be considered a braking system.
- **ARTICLE VI. BICYCLES AND OTHER TOY VEHICLES**
  - The bicycle is referred to as a TOY VEHICLE numerous times in the Code of Ordinances. This needs to be immediately corrected. The reference of the bicycle as a toy removes any authority that this plan has to legitimize the bicycle as a transportation mode. A bicycle should be considered a vehicle for all ages.
- *Sec. 23-193. (Code 1975, § 7.157(a) Prohibited uses on public streets and sidewalks during events. No person shall ride a bicycle, scooter, skateboard or other similar vehicle upon a sidewalk within the central or general business district.*
  - While this code is warranted, the Town of Mooresville needs to immediately take the steps necessary to make the downtown central & general business district roadways attractive to all skill levels of bicyclists, since a law prohibits them from using the sidewalk. This requires the immediate addition of signs, sharrows, bike lanes, education, and speed enforcement.
- *Sec. 23-195. (Code 1975, § 7.44). Use of coasters, roller skates and similar devices on roadway. No person upon roller skates or riding in or by means of any coaster, toy vehicle or similar device shall go upon any roadway except while crossing a street on a crosswalk, and when so crossing such person shall be granted all of the rights and shall be subject to all of the duties applicable to pedestrians. This section shall not apply upon any street while set aside as a play street as authorized by ordinance.*
  - Removing the bicycle as being classified as a toy vehicle will make this code acceptable.





## 8.4. OTHER POLICY RECOMMENDATIONS AND SUGGESTIONS

### Speed Limit on Residential Streets

The speed limit should be reduced to 20 mph on all residential and mixed-use commercial streets. Five times as many people die when hit by a car going 30 miles per hour versus a car going 20 miles per hour. Speed limits in school zones during arrival and dismissal times should be no more than 15 mph. If possible, avoid placing main entrances to schools along North Carolina state roads as a 15 mph speed limit may not be permitted.

Streets are designed for a specific speed, and simply changing the speed limit does not alter driving habits unless there is significant enforcement. As new streets are rebuilt, or existing streets are improved, the opportunity exists to create an environment where the driver would rather drive at a speed that is safer near pedestrian activity areas. Consider creating a policy that includes incorporating low speed design into residential and high density commercial street design. As Mooresville develops the proposed Pedestrian Oriented Development Zones from the Comprehensive Pedestrian Plan, streets should change to accommodate both pedestrians and bicyclists. Narrow lane widths, curvy alignments, alternating on-street parking, landscaping, short building setbacks, bicycle lanes, sidewalks, and other added features could eventually naturally decrease the comfortable driving speed. Lower posted speed limits on roads with higher design speeds, some traffic calming measures, and increased law enforcement would be necessary to deter speeding, particularly where bicyclists must share roadway lanes with automobiles.

### Acquisition of Easements for Bicycle Projects

As the Town seeks to create non-motorized connections in areas that are already developed, the availability of right-of-way inevitably will be an obstacle. The Town should take steps to formalize a policy regarding the construction of multi-use paths or connections outside of the public right-of-way. Ideally, the Town should identify opportunities to reach agreements with property owners to provide a multi-use path easement as necessary for new projects without acquiring property. Easements for public access should be a standard addition for any new or re-contracted utility easements. For example, standard 10 foot wide utility rights of way should be modified to a minimum width of 30 foot utility and public access shared right of way. Some multi-use paths need up to 100 feet of right of way width to accommodate substandard soil conditions. In addition, an effort should be made to ensure that conservation easements purchased by developers should not restrict environmentally mindful construction of a multi-use path or public access for such a path.

There are several means by which the Town of Mooresville can acquire the financial and land resources needed to develop bicycle networks. These include *Reservations*, *Dedications*, *Payment-in-Lieu*, *Impact Fees*, and the *Transfer of Development Rights*. These methods are defined below. It is important to note that if Federal Highway funds are sought or used, the land owner must be offered fair market value for any land acquired.



### *Reservation:*

Residential developments impacting a public facility (school, park, multi-use path, or roadway) are required to set aside land for a certain period of time so public agencies can purchase a specified area.

### *Dedication:*

These are usually found in zoning or subdivision ordinances, whereby a piece of land from a development is given fee-simple to the public for a particular use, such as a park or multi-use path, or roadway with bike facilities. Dedication requirements are almost always attached to residential development, but can be extended to commercial development as well. Local governments can require a dedication based on the need to provide more public recreation facilities due to the needs of the new residents coming with the development. If a planned residential or commercial development is located on a planned bicycle project, an easement must be dedicated for the future multi-use path. The regulation should also clearly state the standards for size, topography, and accessibility. This information helps with consistency and legality of the dedication process. If the new development is not on a planned route, the developer shall make a payment-in-lieu of a dedication.

### *Payment-in-Lieu:*

These payments are tied to dedication regulations. The developer pays a fee that represents the value of the site or the improvement that would have been dedicated or provided. Donations are required when affected by a planned park or multi-use path route, but those developments not affected still bear similar expenses. Payment-in-lieu fees are typically earmarked by its purpose, geographic area, and have a specific time limit. These fees can be used to pay the development costs of nearby multi-use paths.

### *Impact Fees:*

This is a one time fee imposed on new development. The intent of an impact fee is to shift the cost of providing public facilities (roads, sewers, parks, etc.) needed to serve new growth from the general tax base to the new development generating the demand for the new facilities. Tied to numbers of people (dwelling units, bedrooms) rather than land use, impact fees require state-granted enabling legislation to enact.

### *Transfer of Development Rights:*

This is an arrangement that allows landowners to sell/transfer potential density of development of their property (sending area) to another location better suited to accommodate additional development (receiving area). Sending areas are typically those areas preferred to be protected and conserved such as open space, forests, watersheds, wetlands, and historic landmarks. Receiving areas are places that have capacity to accommodate new development, such as pedestrian and transit oriented development, infill, etc.

### *Incentives:*

There are a range of incentives that can be used to acquire and protect open spaces, like Density Bonuses, tax incentives, Conservation Subdivision Ordinances, Cluster Development, etc.

An example ordinance that uses some of these tactics is found in Appendix I of the 2006 Pedestrian Plan, and an example of an easement agreement is in **Appendix N** of this plan.

# Section 9 Implementation





## 9.1. IMPLEMENTATION OF PROPOSED INFRASTRUCTURE PROJECTS

The implementation of new and expanded bicycle infrastructure projects is an important component of Mooresville's Bicycle Plan. The best implementation strategy would enforce the idea of considering bicycle accommodation with standard maintenance and resurfacing of existing roads. Existing roads when repaved or redesigned should include appropriate bicycle accommodations according to Table 5-1 on page 5-11. Additionally, as intersections are modified to add or improve signalization, consideration should be given to bicycle detection and safety. Incorporating bicycle projects into municipal projects should not end with roadways. Sewer lines or parking lots may need occasional major maintenance. Properly grading a sewer route after replacing pipes or installing bike racks in a newly resurfaced parking lot would save higher project costs later if these improvements are retrofitted.

In addition, any future arterial and connector roads in Mooresville should include bicycle lanes in the roadway design and construction. Future residential secondary roads and streets within Pedestrian Oriented Development Zones should be designed for low speed connecting traffic. It is necessary that the Town of Mooresville does not miss any future opportunity to design safe and convenient transportation for all modes.

However, a considerable portion of Mooresville's bicycle network will have to be built as separate projects. Projects that are identified, if completed, would create a basic network of cycling routes across Mooresville. Completing the short segments of bicycle lanes that are mapped in this plan, or constructing the few multi-use paths that are illustrated would be the minimal network needed to provide bicycle access. Completing the network so that bicycling is an option for all of Mooresville's citizens would depend on policy.

It is important to realize that roadway bicycle projects can benefit motorists and pedestrians as well, and should be considered as general transportation projects.

### Implementation of High Priority Projects

To help narrow the immediate focus for the Town in the implementation of bicycle projects, a subset of "high priority projects" was defined based on the scores received by each project as part of the prioritization process described in Section 7. The ten projects receiving a score of at least 65 out of 100 points were designated as high priority projects. Focusing initially on this more limited list of infrastructure projects will enable the Town to implement the projects that will have the most benefit to cyclists in the area, while building support for additional development of the bicycle network. The other projects listed could still be implemented with or before these high priority projects if the resources become available and the need or opportunity is apparent.

### Bicycle Parking

Bicycle parking is a necessary ingredient to the overall transportation system. As providing roadways for automobiles would be incomplete without someplace for them to be parked once they reach the destination, the same goes for bicycles. Bicycle parking projects ranged in complexity from purchasing single racks for broad installation to bike stations complete with lockers and showers. Individual inverted "U" style bicycle racks can immediately be purchased and installed at select locations around the Town. This is a high priority project, and the Town can work with businesses who wish to receive a rack by purchasing the rack and allowing the





business to install it according to guidelines set in Section 5. Another high priority project, covered bicycle parking decks, should immediately be installed at each public school in the study area. Covered parking decks at shopping centers, the medical center, and the more complex bike stations recommended are midrange projects that should be considered once basic bicycle networks are beginning to take root. Creating and adopting a Bicycle Parking Ordinance is a top priority for getting bicycle parking installed with new development.

Listings sorted by ranking and geographic area of proposed high priority, mid-range, and long-range projects are included in Appendix K. Table 9.1 Summarizes the High Priority Projects.

Table 9.1: High Priority Projects

Rank	Description of Project	Roadway / Location
1	Multi-Use Path with New Shoulders on Roadway	Along Highway 115
2	Bike Lane Striping with Sidewalks	West Wilson Avenue
3	Bike Lane Striping	Plantation Ridge Drive
4	Multi-Use Path	Along Dye Creek
5	Retrofitting of Bike Lanes	Morrison Plantation Parkway
6	Neighborhood Bike Route	Through Southern Neighborhoods
7	Bike Route with New Paved Shoulders	Shearers Road Corridor
8	Bike Boulevard	Academy Street Corridor
9	Bike Boulevard	Church Street Corridor
10	Multi-Use Path Neighborhood Connection to School	Lake Norman Elementary/Middle

Rank	Parking Project	Location
P1	Individual U-Shaped Bicycle Racks	Spread as Needed
P2	Sheltered Rack for Multiple Bicycles	At each Public School
P3	Sheltered Rack for Multiple Bicycles	Downtown - Citizen's Center

Funding Opportunities

A combination of funding sources will be needed to construct the infrastructure projects summarized in Section 7. The Town of Mooresville should seek all viable funding opportunities for project implementation, including federal and state monies where available (i.e. inclusion on the state TIP). Special funding programs for specific types of projects (e.g. Safe Routes to School) should also be pursued. Private foundations should be thoroughly researched to identify possible funding options.

Although many funding sources potentially can provide revenues for project implementation, it is likely that local government funding will be a primary component (for matching federal / state funds and for implementation where other revenue streams are not available). Therefore, it is recommended that the Town establish a set aside amount in the annual Public Works budget for bicycle infrastructure project implementation. Other departments should consider setting aside funding for bicycle-related projects as well including the Park and Recreation Department for off-road dirt trails among others. An annual set aside would ensure that progress is made every year on constructing the specified projects, and would illustrate a commitment from the Town to improve the bicycle network. It is important to consider that only 3.4% of the citizens surveyed for this plan would not support public funding to support bicycle facilities. Voter approved bonds may therefore be a feasible option for local funding. Appendix O shows more detail on potential funding sources.



### **Bicycle Accommodation Funding Techniques**

A feasible funding option may be to give all commuters a choice as to how their tax dollars are appropriated. Give property owners an option to designate part of their taxes specifically to bicycle facilities, or vehicle tax renewals may ask the payer to include an additional donation to improve Mooresville's bicycle accommodations.

### **Project Completion**

A gradual and phased approach is the most realistic possibility for the completion of most of the recommended projects. As new segments of roadway are widened or repaved, bicycle facilities can be added, or as new developments arrive, new bicycle connections can be created. The segments will not be completely connected immediately, but eventually come together to form an intercity network.

Some high priority or other projects may be done in phases. For example, a 6 mile greenway section along Dye Creek may require two separate phases of work. Completing the initial three miles of pathway will serve a large part of the community very well while funding and land becomes available for the final three miles. Additionally, the multi-use pathway alongside Highway 115 would be complemented by paved shoulders alongside Highway 115. If either the pathway or the paved shoulders could be built before the other, this would be acceptable.

The Bicycle Boulevard is a great example of a project that may be best completed in phases. The route should first have each of its immediate hazards mitigated such as dangerous grates or unsafe intersections. Signs can then be installed on this route as the Town begins the process of further calming non-local traffic flows and installing the way finding necessary to be a Bicycle Boulevard. As with any neighborhood bicycle project, public involvement is necessary. As the residents agree to the type of traffic calming they prefer, plans are made to complete the Bicycle Boulevard. Once the traffic calming measures are complete, through stop signs on the route can be replaced with other intersection treatments and pavement markers and signs can be installed.

## **9.2. ADOPTION OF POLICY AND ORDINANCE REVISIONS**

The recommended policy and ordinance revisions discussed in Section 8 should be fully considered as the Town of Mooresville updates its existing zoning ordinances. The Town is simultaneously rewriting its Land Use Plan, and should include bicycle-oriented provisions in this plan. Incorporating the policy recommendations described in Section 8 in the Town's updated planning and zoning tool kit will play a major role in defining the future cycling environment of Mooresville.

## **9.3. PRIORITIZATION AND IMPLEMENTATION OF PROGRAMS**

A variety of possible ancillary programs are described in Section 6. Some of these programs should be implemented as high priority programs in the near-term, while others could not be efficiently implemented without a more developed bicycle facility network. Specific comments for each of the types of programs discussed in Section 6 are offered below.



### Education Programs

Education programs should be pursued in the near-term, working especially with the Mooresville school system to identify opportunities for new programs within the schools. Safety programs for adults and children are beneficial regardless of the extent of the bicycle infrastructure network. Adult education through community workshops, bicycle maintenance education, mentoring, driver's education, and public perception marketing are considered high priority and can all be initiated immediately. Some education programs, such as wayfinding signage and bike facility maps/brochures will not practically be complete until more projects are on the ground.

### Encouragement and Promotion Programs

Various encouragement and promotion programs are described in Section 6. These programs should be phased in over time. It is important that encouragement and promotion activities are on-going, rather than one-time efforts. Planning for these programs can begin immediately, but the implementation may not take effect until after a significant distance of bicycle routes connect the Town as these programs are partly to promote and show off Mooresville's bicycling opportunities.

### Enforcement Programs

The Town should strongly consider immediate implementation of traffic law enforcement programs. This is a high priority.

### Transit Interface and Transportation Options

Many of the policies and projects recommended in this plan are intended to create a strong framework for a viable multimodal transit system that includes any potential future Town-circulating mass transit. Transportation options help to create more choices for bicycles and a stronger bicycle system, while land use development that encourages strong bicycle networks also create stronger mass transit systems.

### Spot Improvement, Maintenance and Debris Programs

Pavement cracks, storm grates, and debris can deter bicycling, cause injury or puncture tires. A Spot Improvement Program to identify and mitigate these hazards should be implemented as soon as possible, and should be considered as a high priority program. Many municipalities set aside a set level of funding for a Spot Improvement Program every year. It is suggested that Mooresville adopt a similar approach, including a set amount of funding in the Public Works budget every year for street cleaning and roadway improvements. Once an initial list of necessary repairs and upgrades is compiled, each particular maintenance project can be ranked according to the criteria set in Section 7.2 (page 7-20). These maintenance projects should be ranked separately from the projects outlined in Section 7, and be continuously updated as additional maintenance needs arise. An annual budget of \$100,000 for spot improvements would provide a starting point for enabling minor improvements around the Town. Additional programs can be created later to supplement the initial improvements to combat roadside debris accumulation such as glass recycling encouragement, the enforcement of litter laws, Adopt-A-Road programs, or bicycle tire replacement programs.



#### 9.4. ORGANIZATION OF A BICYCLE COMMITTEE

A committee should be created by a joint effort between Mooresville's planning staff and the Town Council that will oversee the implementation of this plan. The committee should be made up of stakeholders that will have the interest, knowledge, and ability to ensure that the proper steps are taken to find funding, change or create public policy, re-rank projects as necessary, and encourage the community to embrace bicycle travel. This committee may be combined with a pedestrian and greenway committee if necessary. Mooresville's Planning Department, Utilities Department, Police Department, Parks and Recreation Department and Iredell County Schools should all make an effort to become familiar with and make decisions based off of this plan. Citizens groups, organizations, and businesses are also encouraged to get involved with the implementation of this plan.

Until such a committee is formed, and if such a committee never forms, Mooresville's Planning Department is primarily responsible for carrying out the recommendations of this plan.



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# Appendices





Initial Public Meeting:

Tuesday, May 1, 2007  
Charles Mack Citizen Center  
215 N. Main Street  
6 PM to 8 PM.

Presentation and group question and answer period occurred from approximately 6:25 to 7:00.

The meeting was advertised on surveys located at drop boxes displayed at the library, Town Hall, the Citizen's Center, the War Memorial, the Chamber of Commerce, the YMCA, Target, Dick's Sporting Goods, and Cool Breeze Cyclery. The online link to the survey and the meeting time and location was advertised on the Town's website, on Mooresville's March utility bills, in the Charlotte Observer Neighbors section, The Lake Norman Times, and the Mooresville Tribune. Flyers were also printed and distributed.

Citizens Attended:

1. Katie Cook Mooresville, 28115
2. Denise Lizauslas Mooresville, 28115
3. Gerard Schreuders Mooresville, 28117
4. Don Bartell Mooresville, 28117
5. Tom Nolan Mooresville, 28117
6. Barb Riter Mooresville 28115
7. Adam Beesam Cornelius, 28031
8. Kathryn Their MSU, 28115
9. Mike Heiner Mooresville, 28117
10. Roy Cottrell Mooresville, 28115
11. Margo Fesperman Mooresville, 28115
12. John Pritchard Newton/Comm Mbr, 28658
13. Mark Sullivan Mooresville, 28115
14. Carla Fassbender Mooresville, 28115
15. Frank Rader Mooresville, 28115
16. Paul Reeves Mooresville, 28115

Oral Comments Received:

- *Rails to Trails would be nice here.*
- *I do all my errands by bike – I live on White Oaks Road*
- *I always have to lock to posts, there are no bike racks.*
- *Some benches on bike paths would be nice to rest on.*
- *Cars are too fast now-a-days.*
- *US 21 and 115 need bike lanes*
- *150 is very bad! Shoulders would help.*
- *Mooresville's roads are bad in general.*
- *Perth Road is getting bad, it was once nice for biking.*
- *Church Street around Cemetery...*
- *Widening in conjunction with repaving & routine maintenance.*
- *Improve roadways w/policies.*



## Mooresville Comprehensive Bicycle Plan

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- *Concentrate in areas where people move in who are used to biking (Yankees moving into Morrison Plantation)*
- *Traffic is getting worse, drivers are inattentive.*
- *New theme park(?) on Rocky River*
- *Build off of Magnolia Shoulders*
- *Roadway markings need to be repainted for cars and cyclists.*

### Written Comments Received:

- *I live right in town – I would like to ride by bike to the grocery store, the bank, post office, and uptown. I have done this once or twice. Reasons for not: 1) No place to lock bike. 2) Traffic very heavy, 3) No road “alert” for car drivers to be aware of people on bikes. I really hope this comes full circle, the need is here and I hope we make it come true. - K Cook*
- *Sidewalks are dangerous for pedestrians & bicyclists when they serve as the only “safe” “bike route.” It would be great to see more bicycle routes in town.*
- *It is really important that Town of Mooresville officials earmark some funding for sidewalks, bikeways, and greenways. This is a key to recruiting new business to this area.*
- *Winston Salem has marked bike routes on the roads (metal signs). The routes are numbered and there are signs sporadically on the route to let riders know they are on the right roads. The bike shops teamed with the city/town to establish the routes.*

Participants had the opportunity to review maps of current conditions in Mooresville and to make comments. The posted flyer for the forum is shown on the next page. A similar flyer was posted for the final public forum.



## Town of Mooresville – Bicycle Study Underway!



**Important Public  
Workshop Upcoming!**

### Public Input is Needed:

The Town of Mooresville is in the initial stages of developing a Comprehensive Bicycle Plan.

This plan will provide a framework for creating a safer and more usable bicycle network in Mooresville, and is intended to give Mooresville's citizens more transportation options and to create a more livable town.

This plan will build upon projects and policies recommended in the Comprehensive Pedestrian and Land Use Plans such as new multiple-use paths, better street connectivity, and community-based development polices.



A workshop will be held to enable residents to voice their opinions on needed bicycle improvements for adults and children.

A follow-up workshop will be held later in the year to present the draft plan for resident feedback.

Input from each of these workshops will be incorporated into the final plan.

### Potential Elements to be Included in the Plan:

- Off-road paths / greenways
- Traffic calming
- New policies and standards
- Connectivity
- Utilitarian and recreational cycling
- Benefits of cycling
- Programs to encourage safe, practical, and enjoyable cycling
- Enrichment of child bicycling options

### Plan to Attend the Public Workshop

A public workshop to receive input for the Comprehensive Bicycle Plan will be held on **Tuesday, May 1, 2007** at the Charles Mack Citizen Center, 215 N. Main Street in Mooresville anytime from 6 PM to 8 PM.

In addition, please consider taking a few minutes to complete a survey online concerning this plan:

<http://www.ci.mooresville.nc.us/planning>

For more information please contact:

Mr. Chris Bauer, Transportation Planner, Town of Mooresville, at (704) 663-2891 or [cbauer@ci.mooresville.nc.us](mailto:cbauer@ci.mooresville.nc.us)





## Mooresville Comprehensive Bicycle Plan

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Final Public Meeting:

Tuesday, February 7, 2008  
Charles Mack Citizen Center  
215 N. Main Street  
6 PM to 8 PM.

Presentation and group question and answer period occurred from approximately 6:20 to 7:20.

The meeting was advertised on flyers displayed throughout the Town. The Charlotte Observer Neighbors section, The Lake Norman Times, and the Mooresville Tribune also received advertisement information for the meeting.

Citizens Attended:

Don Bartell	Angie & Craig Maus	Frank Rader
Frank Schaffer	Dan Brewer	Tony Tagliaferri
Katie Cook	Angela Eay	Dennis & Denise Watson
Karen & George Grayson	Bill Cashion	Mitch Abraham
Steve Doolittle	Cathy Kaczmon	Kristina Thoennes
Michael Kadlecik	Stephen Lambert	Scott Knutsen
Brian Knight	Mary Kisting	
Frank Schaffer	Tom Nolan	

The Draft Plan was presented by a Powerpoint slideshow, while display boards highlighted maps and illustrations of the priority projects of the Plan. Residents had the opportunity to complete comments cards, mark on the display boards, or to orally voice any concerns or comments.

There were several oral and written comments from residents who reside at the Harris Village Private Community. Their concern is that a greenway shown on the map will be built on property that belongs to them without their approval. They were told that any final plans for facility construction would be put forward to the communities around the proposed projects, and purchases or easements of property for the pathway shown through their community were unlikely without consent from their homeowner's association and all landowners involved. This pathway would likely only come to fruition if or when the homeowner's association decides in the future to accept any proposal from the Town to plan and construct such a pathway on their property.

Other written comments received:

*Be sure that the Town Board authorizes formation of a Bicycle/Pedestrian Advisory Committee!*

*Excellent Plan – Go – Go!!*



*West Wilson Corridor could be modified after Catawba Ave. in Cornelius. With Sidewalks, bike stripes and brick crosswalks and even shallow speed bumps. Lower the speed limit to 25 MPH. It is the main entrance into Mooresville, it could be beautiful!!*

*I don't see parents (allowing heir children to bike or walk to school). The children in our community can't even go to the bus stop alone, 3 doors away. The parents drive them to the bus stop. It is not just this way in Mooresville alone. I worked in a school in New Jersey and it was the same way there.*

*I love the plan, can't get started soon enough. I especially look forward to the greenways!*

*Bike accommodations should be stressed in the plan on Langtree Road and Alcove Road as part of the condition by the Town of Mooresville's requests to include bike lanes with the "Langtree of the Lake" development. Accommodations should be made for residents in this area to be able to access the new Langtree of the Lake development by foot or bicycle. (Paraphrased)*

*The Lowes Headquarters needs to be a big factor in the Mount Mourné area for bicycle commuting options. (Paraphrased)*

*The Lake Norman Bike Route should consider feeder routes to nearby Langtree of the Lake, Davidson College, All Seasons Marina, and others. Decrease the speed limit on Langtree Road and create a class 1 bike/ped path on Langtree Road. (Paraphrased)*

Select examples of boards presented at these meetings follow this page:



## On-Street Bicycle Facilities

### *Signed Bike Routes*



**Recommended on:**

- Low speed, low volume roads
- Scenic and direct routes

**Best for:** Cyclists of all skill and comfort levels

### *Wide Outside Lanes*



**Recommended on:**

- Low to medium volume local collector roads
- Wide roadways with curb and gutter, but too narrow for bike lanes

**Best for:** Cyclists of higher skill and comfort levels

### *Bike Lanes*



**Recommended on:**

- Urban roads with curb and gutter
- Medium to high volume collector and arterial urban roads

**Best for:** Cyclists of intermediate skill and comfort levels

### *Paved Shoulders*



**Recommended on:**

- Rural roadways
- Secondary roadways without curb and gutter and with limited driveways and intersections

**Best for:** Cyclists of varying skill levels, usually for recreation



## Other Bicycle Considerations

**Multi-Use Paths**

**Proper Signage**

**Transit with Bike Accommodations**

**Connectivity**

**Roadway Features**

**Bike Parking**

**Education**

**Safety Features**

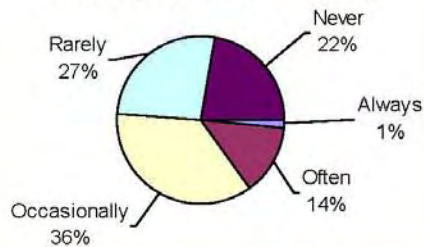
**Other Bicycle Considerations**



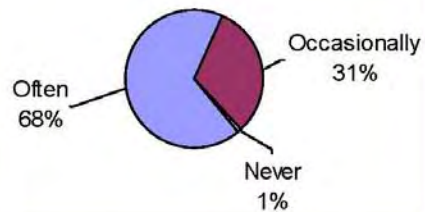


## Selected Public Survey Results

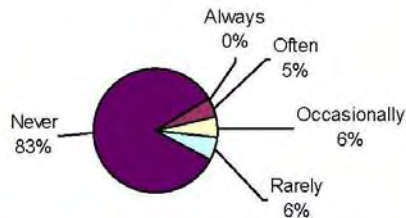
I choose to bicycle for **TRANSPORTATION** (not recreation) around my community



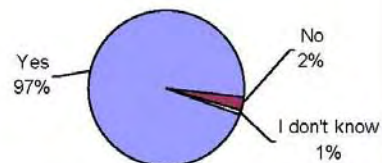
I bike for pleasure or recreation



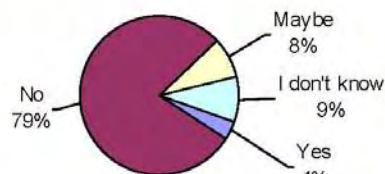
My child rides a bicycle to or from school...



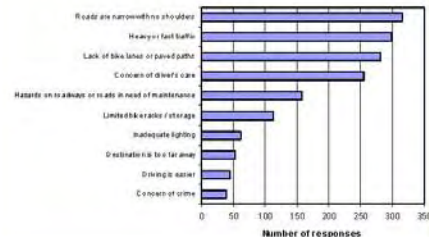
Would you like for your child to be able to bike more often?



I believe that Mooresville has adequate bicycle accommodations



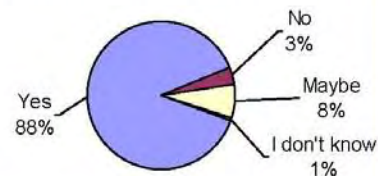
The following obstacles have MOST discouraged me from biking in Mooresville...



Would you bicycle more if many of the obstacles you cited were corrected?



Would you support public funding for bicycle facilities such as bike lanes and greenway paths?







Do you currently live within the Town limits of Mooresville, North Carolina?			Response Percent	Response Count
YES			54.0%	218
NO			46.0%	186
			<b>answered question</b>	<b>404</b>
			<b>skipped question</b>	<b>3</b>

I ride a bicycle on occasion. (at any locale)			Response Percent	Response Count
YES			91.9%	374
NO			8.1%	33
			<b>answered question</b>	<b>407</b>
			<b>skipped question</b>	<b>0</b>

I _____ choose to bicycle for TRANSPORTATION (not recreation) around my community. (check one)			Response Percent	Response Count
ALWAYS			1.3%	5
OFTEN			13.7%	51
OCCASIONALLY			36.0%	134
RARELY			26.6%	99
NEVER			22.3%	83
			<b>answered question</b>	<b>372</b>
			<b>skipped question</b>	<b>35</b>



# Mooresville Comprehensive Bicycle Plan

I bike for TRANSPORTATION (check one)			Response Percent	Response Count
BY CHOICE			96.7%	265
OUT OF NECESSITY			3.3%	9
			<b>answered question</b>	<b>274</b>
			<b>skipped question</b>	<b>133</b>

I have used a bicycle to get to work in/from Mooresville.			Response Percent	Response Count
YES			20.0%	55
NO			80.0%	220
			<b>answered question</b>	<b>275</b>
			<b>skipped question</b>	<b>132</b>

I _____ bike for pleasure or recreation. (check one)			Response Percent	Response Count
OFTEN			68.0%	251
OCCASIONALLY			31.2%	115
NEVER			0.8%	3
			<b>answered question</b>	<b>369</b>
			<b>skipped question</b>	<b>38</b>



**When you bike at ANY locale, check the box under the best description as to whether you highly enjoy, enjoy, use, or do not use that type of bike facility.**

	Highly Enjoy	Enjoy	Use	Do Not Use	Rating Average	Response Count
NEIGHBORHOOD ROADS	33.2% (114)	<b>37.6% (129)</b>	25.1% (86)	4.1% (14)	2.00	343
LOW SPEED URBAN ROADS SUCH AS DOWNTOWNS	16.8% (57)	28.0% (95)	<b>29.5% (100)</b>	25.7% (87)	2.64	339
MOST MAIN URBAN OR SUBURBAN ROADWAYS SUCH AS WILLIAMSON AND BRAWLEY SCHOOL ROADS	7.4% (25)	8.9% (30)	23.5% (79)	<b>60.1% (202)</b>	3.36	336
ROADWAYS WITH DESIGNATED AND MARKED BIKE LANES	<b>49.4% (164)</b>	25.3% (84)	14.8% (49)	10.5% (35)	1.86	332
OFF ROAD MULTIPLE-USE PAVED PATHS SUCH AS RAIL TRAILS AND GREENWAYS (NOT SIDEWALKS)	<b>45.7% (153)</b>	24.2% (81)	14.9% (50)	15.2% (51)	2.00	335
PAVED WALKING PATHS ALONG ROADS (SIDEWALKS)	15.9% (53)	18.6% (62)	22.5% (75)	<b>42.9% (143)</b>	2.92	333
RURAL ROADS WITH PAVED SHOULDERS	<b>42.4% (142)</b>	21.2% (71)	19.4% (65)	17.0% (57)	2.11	335
MOST OTHER RURAL ROADS	<b>30.1% (99)</b>	20.4% (67)	27.1% (89)	22.5% (74)	2.42	329
OFF-ROAD, NON-PAVED TRAILS SUCH AS MOUNTAIN BIKE TRAILS	<b>37.2% (124)</b>	20.7% (69)	13.8% (46)	28.2% (94)	2.33	333
<i>answered question</i>						<b>350</b>
<i>skipped question</i>						<b>57</b>


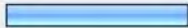


**Do you break any standard vehicle rules of the roadway when on a bike? (Bicycles are required by law to follow the same rules that motor vehicles follow while on the roadways) (check one)**

	Response Percent	Response Count
ALWAYS <input type="checkbox"/>	2.4%	8
OFTEN <input type="checkbox"/>	3.3%	11
OCCASIONALLY <input type="checkbox"/>	20.2%	68
RARELY <input type="checkbox"/>	<b>49.0%</b>	165
NEVER <input type="checkbox"/>	25.2%	85
<i>answered question</i>		<b>337</b>
<i>skipped question</i>		<b>70</b>




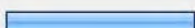



## Mooresville Comprehensive Bicycle Plan

**When biking in or around Mooresville, do motor vehicle drivers ever treat you with carelessness or aggression? (check one if this applies to you)**

	Response Percent	Response Count
ALWAYS 	6.3%	21
OFTEN 	30.8%	102
<b>OCCASIONALLY</b> 	<b>42.0%</b>	139
RARELY 	17.5%	58
NEVER 	3.3%	11
<i>answered question</i>		<b>331</b>
<i>skipped question</i>		<b>76</b>

**How often do you ride your bicycle WITHIN the Mooresville (south Iredell) area? (check one)**

	Response Percent	Response Count
EVERY DAY 	1.5%	5
SEVERAL TIMES A WEEK 	24.9%	86
<b>SEVERAL TIMES A MONTH</b> 	<b>38.4%</b>	133
INFREQUENTLY 	31.8%	110
NEVER 	3.5%	12
<i>answered question</i>		<b>346</b>
<i>skipped question</i>		<b>61</b>

**Please list by rank the three (3) most common roads that you may bike on (if any) within the Mooresville (south Iredell) area.**

	Response Percent	Response Count
1. 	100.0%	235
2. 	88.5%	208
3. 	72.8%	171
<i>answered question</i>		<b>235</b>
<i>skipped question</i>		<b>172</b>





How often do you ride your bicycle OUTSIDE of the Mooresville (south Iredell) area. (check one)		
	Response Percent	Response Count
EVERY DAY <input type="checkbox"/>	3.3%	11
<b>SEVERAL TIMES A WEEK</b> <input checked="" type="checkbox"/>	<b>33.0%</b>	<b>111</b>
SEVERAL TIMES A MONTH <input type="checkbox"/>	27.4%	92
INFREQUENTLY <input type="checkbox"/>	28.6%	96
NEVER <input type="checkbox"/>	7.7%	26
	<b>answered question</b>	<b>336</b>
	<b>skipped question</b>	<b>71</b>

The following obstacle(s) have MOST discouraged me from biking in Mooresville: (check those that MOST apply)		
	Response Percent	Response Count
Lack of biking areas separated from traffic like bike lanes or paved trails <input type="checkbox"/>	74.0%	281
<b>Roadways are too narrow or have no shoulders</b> <input checked="" type="checkbox"/>	<b>82.9%</b>	<b>315</b>
Roadways are poorly maintained or have hazards <input type="checkbox"/>	41.6%	158
Heavy or fast traffic on the roads and in the intersections <input type="checkbox"/>	78.7%	299
Travel areas are not well lit <input type="checkbox"/>	16.3%	62
Destination is too far away to bike <input type="checkbox"/>	14.0%	53
Concern of drivers' care (inattention, cell phone use, sobriety, etc) <input type="checkbox"/>	67.1%	255
It seems easier to drive <input type="checkbox"/>	11.8%	45
Weather (too hot, cold, rainy, icy, etc.) <input type="checkbox"/>	6.3%	24
I have too much stuff to carry <input type="checkbox"/>	4.7%	18
There is no way to shower or to keep a clean appearance where I would bike <input type="checkbox"/>	6.8%	26
There are limited places to lock/store a bike <input type="checkbox"/>	29.7%	113





# Mooresville Comprehensive Bicycle Plan

Concern of crime		10.0%	38
Health or physical condition does not permit biking		0.8%	3
Bicycle is usually broken, has deflated tires, or needs some maintenance		0.5%	2
I dislike biking		1.3%	5
I do not own a bike		1.8%	7
I do not know how to ride a bike		0.8%	3
Nothing discourages me from biking to where I need to go		5.5%	21
Other (please specify and let us know if you have never visited Mooresville)		9.2%	35
<b>answered question</b>			<b>380</b>
<b>skipped question</b>			<b>27</b>

Would you bicycle more if many of the obstacles you checked above were corrected? (check one or leave blank if it does not apply to you)			
		Response Percent	Response Count
YES		87.1%	331
NO		2.1%	8
MAYBE		10.8%	41
<b>answered question</b>			<b>380</b>
<b>skipped question</b>			<b>27</b>



I believe that Mooresville has adequate bicycle accommodations. (check one)		
	Response Percent	Response Count
YES <input type="checkbox"/>	3.7%	14
NO <input checked="" type="checkbox"/>	78.4%	298
MAYBE <input type="checkbox"/>	8.4%	32
I DON'T KNOW <input type="checkbox"/>	9.5%	36
<b>answered question</b>		<b>380</b>
<b>skipped question</b>		<b>27</b>

I believe that Mooresville will benefit from having better bicycle accommodations. (check one)		
	Response Percent	Response Count
YES <input checked="" type="checkbox"/>	90.3%	344
NO <input type="checkbox"/>	2.9%	11
MAYBE <input type="checkbox"/>	6.3%	24
I DON'T KNOW <input type="checkbox"/>	0.5%	2
<b>answered question</b>		<b>381</b>
<b>skipped question</b>		<b>26</b>

Would you support development policies that encourage bicycling such as mandatory bicycle racks at new developments or better connectivity of new roads? (check one)		
	Response Percent	Response Count
YES <input checked="" type="checkbox"/>	85.3%	324
NO <input type="checkbox"/>	3.2%	12
MAYBE <input type="checkbox"/>	9.7%	37
I DON'T KNOW <input type="checkbox"/>	1.8%	7
<b>answered question</b>		<b>380</b>
<b>skipped question</b>		<b>27</b>



# Mooresville Comprehensive Bicycle Plan

Would you support public funding for bicycle facilities such as bike lanes and greenway paths? (check one)			
		Response Percent	Response Count
YES		88.4%	335
NO		3.4%	13
MAYBE		7.7%	29
I DON'T KNOW		0.5%	2
<i>answered question</i>			<b>379</b>
<i>skipped question</i>			<b>28</b>

What is your sex?			
		Response Percent	Response Count
MALE		63.6%	241
FEMALE		36.4%	138
<i>answered question</i>			<b>379</b>
<i>skipped question</i>			<b>28</b>

What is your age?			
		Response Percent	Response Count
16-25		4.2%	16
26-35		21.3%	81
36-45		41.8%	159
46-55		21.1%	80
56-65		7.6%	29
OVER 65		4.0%	15
<i>answered question</i>			<b>380</b>
<i>skipped question</i>			<b>27</b>



Do you have any children from the ages of 5-15 years old in Mooresville?		
		Response Percent
		Response Count
YES		22.6%
NO		77.4%
		<b>answered question</b>
		<b>381</b>
		<b>skipped question</b>
		<b>26</b>

What is your child's age? (Please answer for any one child, additional surveys can be completed for additional children if their biking habits differ)		
		Response Percent
		Response Count
5		11.8%
6		4.7%
7		10.6%
8		7.1%
9		15.3%
10		8.2%
11		10.6%
12		16.5%
13		3.5%
14		3.5%
15		8.2%
		<b>answered question</b>
		<b>85</b>
		<b>skipped question</b>
		<b>322</b>



## Mooresville Comprehensive Bicycle Plan




My child _____ rides a bicycle to or from school. (check one)				
			Response Percent	Response Count
ALWAYS			0.0%	0
OFTEN	<input type="checkbox"/>		4.6%	4
OCCASIONALLY	<input type="checkbox"/>		5.8%	5
RARELY	<input type="checkbox"/>		5.8%	5
NEVER	<input checked="" type="checkbox"/>		83.9%	73
<b>answered question</b>				<b>87</b>
<b>skipped question</b>				<b>320</b>

Please describe how each of the following reasons why parents may not be comfortable with their children biking to school pertains to YOUR concerns.						
	I STRONGLY AGREE	I AGREE	I SOMEWHAT AGREE	I DISAGREE	Rating Average	Response Count
I have traffic related concerns or believe there are a lack of bike paths	93.4% (71)	5.3% (4)	0.0% (0)	1.3% (1)	1.09	76
I have crime related concerns	24.3% (17)	22.9% (16)	25.7% (18)	27.1% (19)	2.56	70
Distance would be too far for my child	24.3% (17)	12.9% (9)	18.6% (13)	44.3% (31)	2.83	70
Bad weather or heavy loads make biking impractical	29.6% (21)	15.5% (11)	26.8% (19)	28.2% (20)	2.54	71
My child does not own a bike or it is usually in disrepair	1.5% (1)	1.5% (1)	0.0% (0)	97.0% (64)	3.92	66
<b>answered question</b>						<b>76</b>
<b>skipped question</b>						<b>331</b>





**Would you be comfortable with your child biking to school more often if traffic speeds were lower in your community? (check one)**

	Response Percent	Response Count
YES 	42.9%	33
NO 	41.6%	32
I DON'T KNOW 	15.6%	12
<i>answered question</i>		<b>77</b>
<i>skipped question</i>		<b>330</b>

**Would you be comfortable with your child biking to school more often if paved pathways were available? (check one)**

	Response Percent	Response Count
YES 	74.0%	57
NO 	18.2%	14
I DON'T KNOW 	7.8%	6
<i>answered question</i>		<b>77</b>
<i>skipped question</i>		<b>330</b>

**Would you be comfortable with your child biking to school more often if the school was closer to or in your community? (check one)**

	Response Percent	Response Count
YES 	71.4%	55
NO 	7.8%	6
I DON'T KNOW 	20.8%	16
<i>answered question</i>		<b>77</b>
<i>skipped question</i>		<b>330</b>



# Mooresville Comprehensive Bicycle Plan

My child _____ rides a bicycle elsewhere around our community. (check one)				
			Response Percent	Response Count
OFTEN			36.1%	31
OCCASIONALLY			38.4%	33
RARELY			20.9%	18
NEVER			4.7%	4
<i>answered question</i>				<b>86</b>
<i>skipped question</i>				<b>321</b>

Please describe how each of the following reasons why parents may not be comfortable with their children biking in their community pertains to YOUR concerns by checking the appropriate box.						
	I STRONGLY AGREE	I AGREE	I SOMEWHAT AGREE	I DISAGREE	Rating Average	Response Count
I have traffic related concerns or believe there are a lack of bike paths	81.8% (18)	13.6% (3)	0.0% (0)	4.5% (1)	1.27	22
I have crime related concerns	9.5% (2)	19.0% (4)	23.8% (5)	47.6% (10)	3.10	21
Where they would want to bike would be too far for my child	5.0% (1)	15.0% (3)	35.0% (7)	45.0% (9)	3.20	20
My child does not own a bike or it is usually in disrepair	5.3% (1)	5.3% (1)	0.0% (0)	89.5% (17)	3.74	19
<i>answered question</i>						<b>22</b>
<i>skipped question</i>						<b>385</b>

Would you be comfortable with your child biking more often if traffic speeds were lower in your community? (check one)				
			Response Percent	Response Count
YES			36.4%	8
NO			27.3%	6
I DON'T KNOW			36.4%	8
<i>answered question</i>				<b>22</b>
<i>skipped question</i>				<b>385</b>



Would you be comfortable with your child biking more often if paved pathways were nearby? (check one)		
	Response Percent	Response Count
YES	86.4%	19
NO	9.1%	2
I DON'T KNOW	4.6%	1
<i>answered question</i>		<b>22</b>
<i>skipped question</i>		<b>385</b>

Would you like for your child to be able to bike more often? (check one)		
	Response Percent	Response Count
YES	96.5%	83
NO	2.3%	2
I DON'T KNOW	1.2%	1
<i>answered question</i>		<b>86</b>
<i>skipped question</i>		<b>321</b>

If you have any comments, suggestions, or concerns, please write them here. Also, please let us know if you do not live in the Mooresville/Charlotte, North Carolina region or if you have never visited this region.	
	Response Count
	126
<i>answered question</i>	<b>126</b>
<i>skipped question</i>	<b>281</b>



1. Stop spending on pet projects
2. NC roads in general are very bad for bicyclists. There are no shoulders on the roads. The roads are not even big enough for general automobile traffic.
3. Really- please help.
4. Would be nice to incorporate a bike lane in new Brawley School Rd repaving and widening plan and extend it to Williamson Rd.
5. I currently drive to Sherrill's Ford to ride because of the level of congestion. Would love to bike from YMCA to Lowes Corp.
6. Please do something.
7. Please make developers build people-friendly projects, no car-friendly projects. People first please! Bicyclers, strollers, walkers need a safe place to go outside. We need more green areas and less paved parking lots.
8. I back the bike plan
9. Reduce the speed limit in adjacent streets of Main Street
10. I've just recently moved here and was very disappointed to find no bike trails and very dangerous roads with litter or no shoulder.
11. Bike lanes would be a huge improvement.
12. I don't believe Mooresville will ever implement any accommodations for bicyclists because Mooresville can't even improve the existing roads to accommodate vehicle traffic in the past 15 years!
13. I want to see more Share the road signs in and around Mooresville: We need to make the public aware.
14. If you get a chance, please take a look at the bike plan in Greensboro. That is the one thing I miss most about living there. I could ride every day from very close to UNCG to Guilford Battleground and back without ever getting on a road. Safetywise, I never had to worry about anything other than running over joggers/walkers. As a cyclist, I was never in danger. Thanks so much for looking into this; it is much needed.
15. As a motorist I have grave concerns about the lack of bike lanes. I live near an area that large



numbers of cyclist use on a regular basis for recreation. Just recently, on my way to work, I passed hundreds of cyclists. Every weekend I see dozens of them on the roads near my house. I try very hard to be respectful but it can frequently add 10 to 15 minutes to my short drive to work. I am in great fear of other motorists who pass the bikers over the double yellow lines. The roads have very few safe areas where a car can pass a bicycle and visibility in these areas is limited. It can be miles before a safe place to pass. I was following a bike last week and a motorist came up behind me and after beeping and weaving crossed the double yellow line and passed both me and the bike. Seconds later a car came in the opposite direction. This is an extremely dangerous situation. I urge you to add more bike lanes especially in the Shearer's, Rocky River, and Johnson's Dairy Areas of Mooresville, Thank you from a non-biker.

16. Thanks for initiating this. I believe with more sidewalks and this great weather here, it would enable people to visit the town center by bike, which would help the stores on main st. Growing up in Rockville Maryland, there were sidewalks everywhere and I rode to school and even right into D.C. With gas prices soaring I think it would be a great help. Thanks again and good luck!  
Sincerely, Mark Jordan resident Curtis Pond
17. Please keep Shearers road open for cyclists. The food Lion project is a BAD idea. Folks that move there have accepted the fact they live in the country.
18. Last rode that is safe to ride from Davidson to Mooresville is Shearers Rd, do not let Food Lion build there. Also there is no good logical way to get there to shop, the demographics do not support a store. Highway 3 or 115 would be better choices and would have better traffic flows.
19. Better painted road lanes for cars and bicycles!
20. It would be great to see improved bicycle routes in Mooresville! I do not bike as much as I would like because roadways aren't safe and sidewalks are for walking, no bicycling.
21. I live off the 801 not far from town. If I could bicycle to the store to pick up groceries I would go buy a bike tomorrow. Right now there is no safe way to do that. Bike lanes would be a huge improvement to the Mooresville area.
22. Clarification: Biking concerns about my child are also age related. If my child was older (12+) AND there was a safe route to school, then I would support him riding his bike to/from school.
23. Please keep Shearers Road rural and without commercial development.
24. The Shearers road corridor is a haven for road cyclists in the Mooresville/Charlotte community. Maintaining and improving that area will only draw more people into the Mooresville area. The corridor is the backbone to various charity rides, as well as, standard routes used by cycle clubs in





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the area.

25. I am concerned and dismayed by the proposed Food Lion at the intersection of Shearers and Rocky River. I believe this will make those roads more congested and more dangerous for the 100's of cyclists that use these "country roads" to enjoy the sport of cycling.
26. I am the president of the Trarheel Trailblazers Mtn. Bike Club. We have constructed several trails in the I-77 corridor (N. Meck Park, Fisher Farm Park, Lake Norman State Park and are currently building a handicapped accessible trail at Jetton Park). Mooresville has no formal mtn. bike trails and is missing out on the economic and health benefits offered by off-road cycling...Contact me at 704.458.5087 to discuss...
27. Residence: Charlotte Visit Mooresville/Davidson at a minimum of ten times a year (both organized cycling events & small group training rides).
28. I live off Poplar Tent Rd near Concord NC and ride my bike quite frequently down Odell School Rd to Davidson - Concord Rd and then to Shearers Rd into Mooresville and back via Patterson Farm and Johnson Dairy Rd. The route is beautiful and such a pleasure to ride -- I am renewed each time I ride that route, it is just that pretty and scenic. I wish everyone could appreciate the beauty of the area at a slower speed and I hope part of your planning process centralizes new business to Hwy 3 corridor (where it is most prevalent already) to allow the scenic rural roads to continue to be utilized and appreciated for generations to come. It is a treasure that is fast dwindling (as you know from looking at the growth / urban spread of the Brawley School Rd. area) so I encourage you to preserve some form of peacefulness now because you can never get it back once disturbed. Thank you!!! Cynthia Lipski 8531 High Ridge Lane Concord NC 28027
29. It has been proven that property values actually increase when bike or walking paths are present for the use of the public. It encourages exercise and generally raises awareness for the rest of the general population. Hope you far thinking. Ed
30. I think the proposed Food Liion development at the intersection of Rocky River and Shearers Road would be disastrous to biking in our community. This is the main biek thoroughfare between Davidson/Corneleus/Huntersville and Mooresville/South Iredell. All of the other roads as currently marked have too much, high speed traffic.
31. Limit development in rural areas. Provide more roads with bike lanes and or paved shoulders.
32. All towns need to develop a strategy for adequate cycling and walking. Gas prices will soon dictate alternative modes of transportation and cities and towns need to be ready. I live in Mt. Holly but work in Mooresville several times a week. I have ridden in several cycling events and



with friends in Mooresville and you have to pick roads carefully as you venture in and out of town. I cannot cycle from home to work in Mooresville because I have to carry equipment, but even if I did, I would have to cycle up Hwy 16 through Denver and then onto Hwy 150 and down Brawley School Rd or up Perth Rd. I don't think I would last a year doing that before some crazy driver would hit me or someone would make a mistake and create havoc with my soul. It sure wouldn't be any fun riding that route all the time. I sometimes go to Lake Norman State Park to mountain bike so carry a bike with me at times. Highway 150 is a disaster for alternative transportation and, of course, many of the roads to the Lake such as Brawley School Road and Williamson Road. Both those roads need extra shoulder to accommodate cyclist. I am amazed that the citizens who live along Brawley School Road haven't done more to establish something. You can't even walk along those roads safely even for a short distance. That is a crime. Of course, there are a lot of people who are in the upper income brackets and high gas prices don't seem to deter them from driving every where and any time. However, most citizens are feeling the gas pinch and it isn't going to get much better. Summing it all up we need to help our citizens get healthier and off their butts. Good alternatives such as greenways, neighborhood connectors, rails to trails, wide shoulders and off road trails in parks and woodland area would be great. Imagine if you could ride from your neighborhood all the way out to Lake Norman without having to look over your shoulder all the time. Sounds great doesn't it. Bob Weeks 123 Henderson St. Mount Holly NC 28120 704-822-8011 Tarheel Trailblazer and Gaston County Cyclist member Note: Mt. Holly is now into several years of planning for their greenway along the Catawba River. They have recently hired Chuck Flink to handle the design and help with the implementation of the system.

33. I use to live and work in Davidson. I biked to work at IR during Nov,Dec,Jan,&Feb 06. I moved back to Colorado in Sep 06. Mooresville had lots of busy roads therefore I did not ride in Mooresville much. I did ride Grey rd to Shearers to Rocky River to NC 3 south past DEI to Johnson Dairy rd to Shearers back to Davidson. Ron Guerrero 303-472-1862

34. I live in the Mooresville area right outside of the town limits. Some of the roads are scary to ride on since there are not shoulders on them to be able to get out of the way of the cars traveling on the roads.

35. Mooresville is a prime location for the area cyclists. Many of whom have chosen to live in the Huntersville, Davidson, Cornelius, Mooresville area due to the advantages that area offers cyclists. I think great care needs to be taken to ensure the needs of cycling are met as the town grows and develops. In addition, the growth of the cycling community can be a huge benefit to the future of Mooresville and Iredell County. Both in an economic and environmental manner. I live in the Huntersville area but am in Mooresville 4-5 times per week. I cycle in Mooresville a



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minimum of 3 times per week. Often more. If greater care were given to incorporate cycling as a primary alternative means of transportation, then I would certainly use the bike to get around, more often, outside of recreational riding.

36. One of my biggest concerns is the possibility of a new Food Lion on Shearers Rd. at Rocky River Road. Shearers Rd. is considered one of the primary roads for cycling in the area because the traffic is not as heavy as on other roads -- like Highway 3. Having a large retail venue on this road would be detrimental. It seems that havng the Food Lion on Hwy. 3 would make more sense, not only for their customers, but also for the cycling community. Thank you for your concern and for conducting the survey!
37. As the area continues to grow, bike friendly development will ease congestion while promoting a healthy lifestyle. Please preserve the Shearers - Rocky River Road area for bicycle friendliness. Commercial development outside of current areas is a detriment.
38. we must encourage non-motorized vehicle use whenever and wherever we can.
39. It would be nice to have a path from Langtree Marina to ALcove for Safe exercise along langtree. Make sure exit 32 is bike friendly.
40. Davidson COLlege has a great trail for riding -would love to see that in Mooresville.
41. We are in despeate need of bike routes that are safe for the family.
42. There are no good safe bike paths from Perth Road are ato shopping/eating areas near Williamson, Brawley, Morrison Plantation, etc. This is a huge deterrent from my biking. I would strongly support such a path or greenway!
43. Roads not fit for biking.
44. There are many times when I would like to bike to errands but because we have no bike lanes in an out of Mooresville I use my gas guzzler (my car).
45. WE NEED HELP!
46. I ride in the state park of the Huntersville Business park off I-77 ex 23 due to bad traffic and poor roads in Mooresville.
47. car drivers need to be educated with what Share the Raod means! Wider roads/bike lanes are needed
48. Please put a bike lane down main street from downtown out to the middle school and ball park for safety -thanks!



49. All roadways in Mooresville should have marked bike lanes.
50. Coordinate the planning/construction/improvements of roads with bicycle lanes/paths
51. New Jersey has better bike lanes than Mooresville
52. Mooresville desperately needs a greenway. It's very dangerous to ride bikes anywhere.
53. Hoping a bike lane is added to Brawley School Road as it is widened. I'd love to be able to bike back and forth to work.
54. YMCA should get a teen cycling team
55. Bike paths along heavily trafficked roads (such as Hwy. 150) would encourage me most to increase my biking for transportation. Park trails are nicest for pleasure biking.
56. Roads are terrible. No room for bikes. I live on Williamson Road & Brawley. I used to bike with my girls in Wilkesboro every weekend. We would drive downtown, eat, shop, etc. 20+ miles round trip.
57. Impossible to ride on Brawley because of traffic and narrow roads!
58. Concentrate on roads first (1) widen and (2) properly time lights. Then add sidewalk/bicycle path.
59. I am pleased that consideration is being given to upgrading cycling environment in the Mooresville area.
60. We need a large park with paved bike path. Please!
61. As a driver, bicycles are unnecessary obstacles. Bikers on busy roads are rude and insensitive to drivers. It's a wonder more aren't killed. They cause road blockage a lot and should be banned in many areas!!
62. I ride all the roads around Mooresville - often. The narrow roads coupled with no bike lanes and increased traffic have dramatically increased the risk of injury or fatality.
63. Connectivity of neighborhoods w/ downtown. i.e. I-77/150 and Brawley School Rd to downtown.
64. thanks
65. I live in Mooresville and I believe much more should be done to make the roads safer for bikers.
66. We live in Winslow Bay where we can ride inside the neighborhood and to the Target plaza. That's all. We can't even think about riding north on Bluefield, south on Williamson, or anywhere near 150. Keep in mind the bike paths do not need to parallel roads. We have this new Best Buy



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plaza going up right next door and can't walk to it because there is no way to safely cross 150. We need a walking/riding bridge across 150.

67. I ride a bike frequently for exercise and for competition, I know realistically bike roads can't be put everywhere. But my number one request would be at least one linking the west and east side of I-77. If you consider the three connecting roads in the city limits (Hwy 150, Brawley School Rd, and Williamson Rd) there really is no way to safely bike from one side of town to the other. That would be my number one bike trail/road/shoulder request. Thank you for putting out this survey.
68. EMIS is across Rt 150...even with a light and a dedicated separated paved bike path off from the Hwy I would be hesitant to allow. With a bridge or tunnel over/under 150 and a paved path protected by a fill guardrail from the Hwy would I consider an escorted riding to school. Cherry Grove is bad enough with the lack of proper sidewalks already.
69. I am an amateur cyclist. I ride road and off-road. I usually ride a 30 mile loop in and around the Mooresville area. For the most part the roads are fine. Some surfaces could be reworked to make the ride smoother. I always avoid Plaza Drive and Brawley School Road because of the heavy traffic. If you want a greater response to this survey you might want to contact the owner of Cool Breeze Cyclery 704-663-8812. Good Luck...
70. The plan should prioritize neighborhood connectivity to trails, paths, bike lanes that lead to schools, other neighborhoods and shops. Mooresville should also work closely with the other Lake Norman towns to encourage connectivity to those other areas.
71. Would like to see greenways and mountain bike trails like Lake Norman near Troutman.
72. There are some roads that need repair or cleaning on the right side of the roadway where cyclists travel. I travel on bicycle through your town to other events and to visit those that live in your area regularly.
73. I wonder whether the railroad track that runs alongside Highway 115 to Statesville could not be converted into a trail. It would be great if there was a good parking area at either end too. We used to live in Cary, NC and were very impressed with the greenway/trail system there. I have included a link to their website to give you some idea --  
<http://townofcary.org/depts/prdept/greenway/gwyhome.htm>
74. I would suggest including Mt. Bike trails into any parks in the Mooresville area. This sport attracts good caliber people, safe, and is great exercise. See success at Fisher Farm and Lake Norman State Park.





75. Having a biking/pedestrian friendly community is something we shouldn't have to ask another's opinion on.... To me, to be able to walk or bike safely to get food, recreation, to get to work, to get exercise, is just plain common sense. We shouldn't have to ask someone's "opinion", as it is so obvious to its' benefits.
76. Why not create a survey seeking direct and constructive input on the issues related to the school system.
77. I think mooresvile and Iredell needs more off road mtn bike trail systems, besides duke power state park theres not any, unless you go in to mecklenburg co, theres several parks and a few walk ways, Its a good way for communitys to stay active and familys enjoy biking together..
78. Developing more "destinations"such as the Itusi trail at Lake Norman State Park will serve as afoundation and help to grow the bicycling culture in and around the Mooresville area. I get up to ride at Lake Norman State Park as often as possible. On most occasions, I take Exit 36 from I77. I usually eat food, buy gas, and do some shopping in Mooresville before heading back to Charlotte. Those are dollars on mine that may have never been spent in Mooresville if it wasn't for the trails at Lake Norman State Park. More mountain bike trails in Mooresville means more people will make the trip up more often. You also have a HUGE grassroots volunteer pool to assist with trail planning and building in clubs such as the Tarheel Trailblazers and Dirt Divas - and shops such as Cool Breeze Cyclery and First Flight Bikes (Statesville). One final note...I currently drive to Mooresville to ride - in the future if the commuter rail is built coming from Charlotte, I would take the train up to Mooresville to ride...if I am still able to ride a bike by then!
79. I enjoy riding just about anywhere, but the roads in Mooresville leave me feeling more concerned about being accidentally hit by a car, than actually enjoying the ride. Biking lanes marked on HWY 115 from Downtown Mooresville to Davidson would be a huge win. Thanks for putting this initiative together. You have my support. Chad
80. I have been a Mooresville resident since October 2006. Some of my survay answers may seem incongruous because, though a strong proponent of bike paths, and a biking enthusiast, I do not bike much here. It is because I don't feel that there are safe places to bike in the area. Greenways and designated bike paths (that could be used by walkers and runners also)are the way to go. Changes in zoning ordinances that require residential and commercial developers to include greenways and bike paths in their plans would be a sure way to get the ball rolling. Sidewalks seem to be appearing in many developments. They should be required of all developers, and the city of Mooresville should begin planning to install sidewalks on all existing city streets. The while lines that 'separate' walkers from vehicles on city streets do not provide a safe situation for walkers. Though walking to school would be considerably healthier and promote a sense of



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independence and responsibility, MANY parents drive their children to school every day because it is not safe for them to walk.

81. Please consider adding paved bike paths to town parks and other publicly owned land. Require all developers of new housing developments to build bike paths that would be maintained in the future by the Town. These paths can also be used by walkers and runners.
82. Traffic is so ridiculous in Mooresville that it is unsafe to drive a car, much less send yourself or someone out on a bicycle. While you are planning for bike routes, spend some time and money and fix the traffic lights around town.
83. Would love to see the Greenways built like Mecklenburg County! It is a great resource and healthy living for all.
84. Priority for Bike Lanes: Brawley Rte 115 to Davidson Route 3 South
85. I live in Mooresville and would love to be able to bike, by myself and with my family. However I do not feel that my children are safe on the bitty bike lanes. I live in the Magnolia/Fieldstone area and even with adequate speed limits the roads curve enough (and people take the curves in the bike path) that I will not allow my children to ride their bikes to school. I also will not let them walk alone. Bikepaths/sidewalks separated from the road by more than a magic white line of paint would make the entire area more pedestrian and bike accessible (or maybe even pedestrian and bike friendly!)
86. The plan to add bikeways and paved trails is one of the best ideas I have heard in a long time we need safe places for us and our children to ride. This will help encourage more outdoor activity which now is so limited do to the lack of the above mentioned Thank you Mooresville planning committee!!!! :)
87. We don't need money wasted on bike routes. The town needs to get homeowners to tidy up and make the town more pleasing to the eye. Too much junk in yards, dead cars, indoor furniture outside etc.
88. I desperately want to ride my bike -- to the Mt. Mourne P.O., or to the Library and bank. It is just too dangerous going on 115. I am almost sorry that I bought a home where I cannot ride my bike! I have done it, but it is difficult to lift my bike up on the rack and drive to Davidson, and then do the same thing to get home. Right now, the only safe place (not that safe--construction ongoing) is that new Waterlynn community. I would love to see a part like one on Jetton with the bike paths!
89. The roads are poor enough to drive on let alone bike on. They are a JOKE how busy and narrow they are. I am disappointed in the short sightedness of the County and City with the lack of a



growth plan. The roads need work - need widening - need turn lanes - it is a joke around this city and getting worse as new subdivisions open.

90. I'm a Mooresville resident for about 43 years now, (born here). I rode my bike on Magnolia, Heritage, Center, Carpenter, and more as a teenager with no worries. This town is not safe for bike riders anymore. This does NOT mean we should fully accommodate everything so that it will become a perfect bike community!!! Until there are appropriate safe travel conditions for bikes, they should not be on streets with a speed limit over 25. Drivers these days will not do their part. And drivers shouldn't have to maneuver dangerously on roads like hwy 115 to avoid hurting the cyclist or anyone else!!!!!!!
91. We live off of Brawley School Road and feel trapped by the lack of facilities. Lake Norman Elementary doesn't not even have a bike rack or sidewalks to the school. Once we get to Brawley School Road, it isn't safe to ride there (not even really safe to drive with the current traffic situation). I would love to be able to go to the grocery store, post office, parks, video store.....via bike but don't currently feel that we can get there safely.
92. I have been riding around Mooresville and have found the number of riders is greatly increasing, but the amount of traffic is also greatly increasing. I no longer feel safe riding the streets that were not previously heavily traveled. I now have to schedule my riding on off traffic days like Sunday morning at 7:00 am. Bike lanes like they have in Davidson and Cornelius encourage safe riding. It would be nice if Mooresville had similar bike lanes. Future developments requiring road improvements should also have a wider shoulder for bike lanes.
93. I have made a point of observing bicycles in town (not children) and they do not observe the traffic laws. It appears that their concerns are a one way street. They only want vehicles to share the road but they are certainly not willing to do the same. Sharing the road and observing the traffic laws should apply to the bicycles as well.
94. I would LOVE to see more bicycle friendly areas throughout the town, as well as more paths to connect major shopping areas to the various residential areas of the town.
95. My name is Staton Carter, I live and work in Salisbury, NC. I felt the need to fill out this survey since Salisbury and Rowan County are going through the same processes with cycling in the community. I have recently been named to a steering committee that will provide guidance towards the use of grant money set aside for bike safe roads and programs. Thank you for the survey, I look forward to seeing the progression. Staton S. Carter
96. Today I bicycle for sport but would use my bike around town for transportation if the roads were wider. Around town there is too much traffic and not safe for bike riders. I typically drive to an



outside location and then ride there.

97. As a 10-year resident of Iredell County near the Mooresville City Limits, I do not believe that the key issue at this time is bike paths and increasing bike ridership. The infrastructure for the majority of adults and children in the area - both those that ride bikes and those that don't - is in sad condition or sorely lacking. More focus should be placed on dealing with the more fundamental problems of inadequate roads, too few school rooms to handle current and future registrations, provision of adequate emergency services, inadequate water and sewer availability and managing the reckless growth rate in the area. Limited funds should be spent on the projects that serve the majority, not ones from which few will benefit.
98. The bikers in this town think they are above the law. They run stop signs, stop lights, ride 5 & 6 wide. They also do not give an consideration to the traffic, as I am sure they will say motorists do not give them the right of way. I believe they should bike on roads that are not heavily traveled. I have seen people pass them in the curve on Linwood Road, while they are riding 5 deep, and either almost hit a biker or hit a car head on.
99. Area is very unfriendly to bicycle traffic. It is cars or nothing. We need to make it safer for all to enjoy and save fuel
100. I moved to Mooresville from Los Angeles CA about two years ago. In metropolitan LA, I rode approximately 7,000 miles per year, both recreationally and to commute/shop. I never had even a close call with a car (I have above average skills and am always pretty careful). I wouldn't, for one minute, consider commuting or shopping by bicycle around Mooresville because of the absolutely unsafe conditions - mostly because the roads are too narrow for the SUV's and construction vehicles, let alone a car and a bike. I really feel sorry for the little kids around here who will probably never know the pure joy of riding a bike.
101. I hope you do a better job of "planning" this than you did of the monstrosity of hotel development (and thereby ruining quiet neighborhoods) near Langtree.
102. Would like to see Main Street made one way. Narrow roads with a white line drawn along the edge don't qualify as bike lanes! Visited friend in Ohio last summer and was astounded by the great bike/ walking paths all through their small town. Rode our bikes to dinner ! Same Michigan- bike trails everywhere and Michigan's broke !!
103. Everything in Mooresville is close enough together to make riding a bike to pick up a grocery item or visit a friend very feasible if there was: greater community acceptance of bikers, less reckless driving, better roads and designated motorless pathways. The current situation is very unfriendly to bikers, including the above mentioned items as well as the greater issue of slow state



response to upgrading roads and improving traffic flow.

104. Please advise if Mooresville has a bicycle advisory committee and if so if community residents not living within the city limits may apply for membership. Tom Nolan 181 Castaway Trail Mooresville, NC 28117 Phone 704-896-8526
105. I've bicycled on a greenway in Boulder CO, that was more than 5 miles long. It was great, just bicyclers and runners. A nice path winding through businesses and nature with no vehicular traffic. something like this would be great for Mooresville and would create another draw to the town.
106. CHRIS I WOULD LIKE TO SEE MORE BIKE LANES TO SOME OF THE OUT SUBDIVIONS LIKE LYNNWOOD FARMS/ HARRIS VILLAGE/CURTIS POND, AND I WOULD LIKE TO SEE GREENWAY BIKE WALK PATHS IN FUTURE SUBDIVIONS AND THE DOWNTOWN AREA. THANKS FOR YOU HELP.
107. A vote for connectivity between Catalina Dr, Rio Vista and Templeton Bay
108. I live in Charlotte and very seldomly go to Mooresville to bike. I went there once on #83 bus (with my bike)to work for the day, but that bus is now discontinued from Charlotte to Mooresville in the morning and from Mooresville to Charlotte in the afternoon. Only those who live in Mooresville and work in Charlotte can bus/bike combo now. I biked there once for the Y to Y Challenge - VERY nice rural and urban roads there on a Saturday morning.
109. Nice survey. Thank you for your concern about the needs of cyclists in the Mooresville area!
110. Thanks for considering improvements for those of us who enjoy cycling.
111. When I moved to the area and took my drivers test to obtain a North Carolina Drivers Licence,there were questions on the test pertaining to drivers when they approached Bicycles and Pedestrians. It says that the driver must slow down until it is safe to pass. This rule is not observed on Mooresville Roads. In fact,when I was riding my bike a few weeks back,a Mooresville Police car speed-ed by me and almost pushed me off the road. I figured he must be in a hurry to catch someone breaking the law,only to find that they were in a hurry to beat the lunch rush at Bojangles. When my wife and I were attending a event last summer in downtown Mooresville,we asked an overweight officer if there were any bike racks where we could lock our bikes. He laughed and told us the schools and library were the only places he knew. We had asked because it states that bikes are not allowed on the sidewalks of Downtown Mooresville. Maybe if he rode a bike or walked a beat ,he might lose some of that weight
112. Checking out your survey. I am on the Ped/Bike committee here in Oxford MS. We are





## Mooresville Comprehensive Bicycle Plan

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considering a similar survey. I would be interested in hearing how many responses you get and how you are using it to guide your plans. Thanks Mike Mossing, mmossing@gmail.com

113. I would love for this to be a biking community. It is a real shame that our youth do not get to enjoy biking as a means of transportation but with traffic and child prepators...I will only let my shild bike with us or on our street.

114. I totally support any intiatives that require bike lanes be added in new developments and when roads are scheduled to be repaved. Too many of the town roads can barely maintain the width of a car let alone the trucks that use them. Subsequently it makes these same roads unsafe for cycling. Thanks!

115. You chose the Monkey! Isn't it great?

116. I don't live in Mooresville; I live in northeast Charlotte, but I am interested in moving toward the Mooresville area, and if Mooresville had a bicycle friendly road system I would definitely be more interested in moving there. In the 1970's I lived in Davis, California, known as "bicycle town USA". There were probably as many bicycles as people there. It was great being able to do all my movements around town on a bike! I recommend you investigate Davis' bicycle planning. Go to <http://www.city.davis.ca.us/topic/bicycles.cfm> and click on "Davis Bike Plan with images" and their other links, and confer with the Davis town planners to get their recommendations and advice. Thanks!

117. good for you in thinking ahead of the curve and with the trends.

118. I would like to make Mooresville a bicycle friendly community and if my two children were able to ride around Mooresville without having to head towards Jetton Park or other greenways in Mecklenburg.

119. I'm glad to Mooresville taking the steps to plan for this issue. I live just outside Mooresville in the county and would love for the county to step up and make Iredell a bike friendly county and really a destination for healthy lifestyle oriented citizens. I look at tampa with its 30 miles of bike trails and dream of that type of safe connectivity in our area perhap a trail around the lake. What a drawl for potential tourism...

120. If you look around Mooresville, any road with a 45MPH limit is inadequate for any bike rider. There are no shoulders and drivers get very frustrated waiting behind the biker to pull over and let traffic pass. It's amazing tha set there aren't more fatalities on these types of roads. But yet you see them every weekend on 150, hwy 3, etc during the busiest time of day.

121. Don't worry about the bicyclists!!!! The roads around Mooresville are terrible and can not hold



capacity. Spend the taxpayers money on something that will benefit everyone, just not a subset of people. Roads, Roads, Roads!!!!!!!!!!

122. Many people cycle at the far end of Brawley School Rd (from The Point and beyond) but it is far too dangerous to cycle the rest. I believe that if there were a bike lane at least from Williamson Rd to The Point many cyclists would use it and it might cut down on some auto traffic (I know several people say they would cycle to the grocery for occasional items and their children would ride bikes to school if there were an adequate bike lane on both sides of Brawley School Rd.). It would also help people access the many side roads down here which offer scenic lakeview cycling.
123. The posted speed limit in my neighborhood is 25 mph. Vehicles frequently go 45-50. There is no enforcement.
124. If bikers are going to ride in such large groups that it virtually shuts down roads such as Shearers Rd., they should have to get a permit and arrange police escorts. They should not be allowed to impede traffic.
125. The question about spending public funds should be more pointed. It should say "Would you pay more taxes to. . . ." The single most effective thing we can do for bikes is to install many small bike racks everywhere we can or can require. Even when not used, they remind me I could be biking and it is a pretty day. . . . At the Public Hearing have some Bike Retailers show bikes set up to carry school books, computer bags, portfolio's, etc. Map the back roads from me to school. For example I would not go to South School biking on Timber Road, but I would through Mill Village.
126. Mountain bike trails are great! Lake Norman State Park is an awesome trail and Mooresville could benefit from having additional trails on the eastern side of the city towards Rowan County where it is more rural.



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Meeting: Steering Committee Meeting #1  
January 17, 2007  
4:00 PM – 5:30 PM  
Charles Mack Citizen Center

Attendees:

Mitch Abraham, Town of Mooresville Board of Commissioners  
Don Bartell, Iredell County TAB, M-SI Chamber of Commerce  
Christian Bauer, Town of Mooresville Planning  
Bill Clark, URS Corporation – North Carolina  
Katie Cook, citizen  
Margo Fesperman, citizen  
John Finan, Town of Mooresville Public Works  
Joseph Guerrero, citizen  
Bjorn Hansen, Centralina COG  
Wanda McKenzie, Town of Mooresville Parks and Recreation  
John Pritchard, citizen  
Frank Rader, Town of Mooresville Board of Commissioners  
Brett Wallace, URS Corporation – North Carolina  
Steve Warren, Iredell County Planning Dept.  
Barry Whitesides, Iredell County Planning Dept.  
Steve Young, Mooresville Graded School District

Chris Bauer began the meeting with a welcome and introductions. He thanked the committee for their time, and passed around a tally sheet for each participant to use to vote on their preferred meeting day of the week (*The preferred day was eventually tallied to be Thursday*). Chris briefly described the purpose and process of the bicycle plan, gave a history of the recent Comprehensive Pedestrian Plan, and introduced NCDOT's role and contribution to the effort.

At this point John Vine-Hodge, the representative from NCDOT's Bicycle and Pedestrian Division, introduced himself and gave an outline of the grant, the program, and what he expects this committee and this plan to accomplish. Brett Wallace presented an overview of the program including the scope, what the general layout of the plan would look like and the timeline.

Bill Clark followed with a power point presentation that highlighted the fundamentals of a good bicycle network, potential on and off road bicycle facilities, and land use examples. The steering committee was then asked to brainstorm on concerns, issues, or suggestions that they might have for the bicycle network in Mooresville. Comments included:

- Shearers road is an excellent cycling road and should be preserved as a rural route.
- A good long distance shared-use trail connecting Mooresville with Mount Mourne and Davidson would be a good idea. Possibly on NC 115 or the commuter rail line. Riding on 115 currently is intimidating.
- Communication between neighboring towns like Davidson and Troutman is suggested to make sure that plans tie in together.
- There may be an old rail line between Mooresville and Troutman that may serve as a future rail trail?
- Right-of-Way might be difficult to determine on many roads.



## Mooresville Comprehensive Bicycle Plan

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- Very narrow paved shoulders are not in the best interest of bikers because automobiles believe that this is where they need to stay. Dangerous.
- There are some wild dog issues on many of Iredell's roadways.
- Brawley School Road – determine the exact bike improvements that are suggested on this roadway. Chris believes that bike lanes are included in design.
- Mill Village would be big trip generator for downtown.
- Schools need to be a priority, even if those projects are more involved to implement.
- Consider how to show these projects to citizens, staff, and policy members in a way that will give them the understanding and appreciation that is needed to make the decisions that they need to make.

Determining the goals of the project is the next crucial step that should be determined in this process. Committee members suggested:

- Facilities should be pleasurable to ride on.
- There must be the perception and reality of safety.
- Shared roadways, trails, bike lanes, etc must be clearly marked.
- Bike parking is a necessity to mention.
- Showers might also be worth mentioning.
- Policy requirements from developers, employers, etc.
- Connectivity.
- Discuss options – transit, bike, walk, car, etc.
- Health, environment
- School, kids, elderly, special groups are all important.
- Different facilities for different types of riders.
- Integrate Mooresville's plan with other plans in region – and connect long distance facilities.
- Modify ped plan goals to suit cycling.
- Use goals from Cary or other biking towns in North Carolina.
- Highlight showcase projects.

These goals will be summarized succinctly for review and adoption at the next meeting. As the time expired for this meeting, members who needed to leave were asked to look at the draft survey that was handed out and to give comments to Chris as soon as possible. Our upcoming plan is to have a survey distributed to the public in a month or two that can give us valuable feedback and also advertise this project and its first public meeting. (Some participants turned in surveys with their feedback and suggestions before leaving).

The next meeting will be in the spring, possibly in late April. At this time, and weather permitting, we are expecting to spend a short part of the meeting on bicycles on the streets of downtown Mooresville. Bicycles can be provided for those who are not able to have one here on that day. The meeting was adjourned at 5:35 PM.





Meeting: Steering Committee Meeting #2  
May 31, 2007  
3:30 PM – 5:00 PM  
Charles Mack Citizen Center

Attendees:  
Don Bartell, Iredell County TAB, M-SI Chamber of Commerce  
Christian Bauer, Town of Mooresville Planning  
Bill Clark, URS Corporation – North Carolina  
Katie Cook, citizen  
Margo Fesperman, citizen  
Michael Harper, Town of Mooresville Zoning  
Wanda McKenzie, Town of Mooresville Parks and Recreation  
John Pritchard, citizen  
John Vine-Hodge, NCDOT  
Brett Wallace, URS Corporation – North Carolina  
Steve Warren, Iredell County Planning Dept.  
Barry Whitesides, Iredell County Planning Dept.  
Steve Young, Mooresville Graded School District

Chris Bauer began the meeting with a welcome and introductions. He thanked the committee for their time, and passed around a role sheet. Bill began with a quick recap of the bicycle facilities tour offered just prior to the meeting. The tour circled downtown using Main Street and Church Street and highlights included discussion about:

- “No bicycles permitted” signs in parking lots and on sidewalks need to be clearer as to their intentions. If no bicycles are allowed on sidewalks, are streets perceivably safe for most users?
- Are traffic light detectors capable of easily detecting the presence of a bicycle?
- How can bicyclists downtown ride safely to avoid car doors from on-street parking?
- How are bicycles affected by one way roads or by not allowing turns?
- Roadways such as Church Street and Academy Street offer low speed/low volume alternative routes.
- Some hazards in the roadways are easily corrected such as pavement cracks or “tire eater” drainage grates.
- Where are all the bicycle racks?

Brett then discussed the survey results. The survey was available from March 30 until May 29, and responses were generated from on-line surveys as well as with surveys collected from various locations around town. In total, 407 surveys were collected, and select results include the following:

- While 99% of respondents said that they bike for pleasure or recreation, almost half of the respondents stated that they rarely or never bike for transportation.
- With 79% of the respondents stating that they believe that Mooresville does *not* have adequate bicycle facilities, 87% said that they would bike more often if bicycling obstacles that they stated earlier in the survey were corrected.



## Mooresville Comprehensive Bicycle Plan

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- Only 3% of the respondents believed that Mooresville would *not* benefit from having better bicycling accommodations, and only 3% likewise would *not* support development policies or public funding for bicycle facilities.
- 89% of parents say that their children rarely or never bicycle to school, 74% of those parents said that they would be more comfortable with their children biking to school if paved pathways were available, and 97% of all parent responders stated that they want their children to bike more often.

Shearers Road, Highway 115, and Brawley School Roads were listed as being the most popular corridors for bicyclists. This shows how much recreational cycling influences these results.

Bike lanes, paved multi-use paths, and rural roads with paved shoulders were stated as being their favorite type of bicycling facilities, while narrow roadways with no shoulders, heavy traffic, and a lack of separate biking areas are their top three obstacles from bicycling in Mooresville.

At this time, Bill followed by reviewing the draft copies of Sections 1 – 4 of the plan. These sections were distributed to the committee members at the meeting. Copies for those that were not in attendance can be retrieved by contacting Chris Bauer. Comments about any aspect of this draft are encouraged and highly appreciated until the next meeting and can be directed to Bill at [william\\_clark@urscorp.com](mailto:william_clark@urscorp.com). The final sections of the plan will be distributed at the next meeting in the late summer. A summary of the review *with Comments received in italics*:

### Section 1: Introduction

- This section gives much of the background information that is crucial to a bicycle plan.
  - *Bullet, instead of number, the goals so that it does not make it seem that there is a particular hierarchy.*
  - *Chris suggested having the Town Board assign the numbers to the benchmark goals – others agreed and commented that this plan needs to make sure that the benchmarks goals are attainable but far-reaching. As further project sections get finalized, a more accurate idea of these goals can be projected, and then submitted to the Town Council for review.*
  - *The committee questioned NCDOT's level of responsiveness concerning bicycle facilities compared to other states. John Vine-Hodge said that NCDOT is improving, with \$400,000 given yearly for planning projects and by having its departments working together on road design projects.*

### Section 2: Existing Conditions

- This section describes the social and physical conditions that are currently in Mooresville that pertain to bicycling. Concerning the highlighted text, this is where changes need to be made prior to the final draft. Any help with this is appreciated.
  - *There are bike racks at the Library – some education is required to convince users to lock their bikes at this rack to prevent theft.*

### Section 3: Existing Plans, Programs, and Policies

- Town staff can particularly assist with any gaps in this section, as it highlights much of the existing policies and plans that pertain to bicycling.



Section 4: General Bicycle System Plan

- This section is based off of designing a bicycle culture around economic centers, and part of this process is by first comparing the similarities between the top 10 small cities for bicycle commuting.
  - *The committee was concerned that most of these cities were not in the southeast, and had too much influence from a major university to compare realistically with Mooresville. The idea was presented to instead try to compare Mooresville with Carolina cities such as Greenville, South Carolina and Greensboro, North Carolina that may have already achieved some of the things that Mooresville wants to do.*

The listing of the potential projects is also nearly complete, and a map was emailed to each of the committee members and posted in the room for their review. Each committee member is encouraged to look at this map in detail and provide comments. Some comments concerning potential projects included: *Questions and comments are italicized*, while answers to these questions follow with a hollow bullet.

- *Lowe's development will change all of the Mt. Mourne area, including Langtree and the proposed commuter rail station and their involvement is crucial to the future.*
  - Although road policy and Lowe's involvement will certainly shape this area the most, some multi-use paths and bike lanes are suggested on the map. Committee members should provide any specific suggestions they may have to ensure that this area develops properly. NCDOT and Iredell County have approved a bridge over I-77 at Langtree Road that would be wide enough to accommodate bicycle lanes, but would only be striped once Langtree is repaved to provide for them.
- *Will this plan work with north Mecklenburg towns?*
  - No communication has been made with these towns yet, although Davidson is now beginning their own bicycle plan. Numerous potential bicycle routes will connect south Iredell to Davidson, including a suggested path along the commuter rail line, a paved shoulder along Highway 115 (The Lake Norman Bike Route), Shearers Road, and the possibility of linking the Rocky River Greenway south with the Catawba Land Conservancy's idea for a regional bike trail.
- *The west side of I-77 needs bicycle connectivity and accommodations, especially greenways.*
  - There are several suggested greenways and road connections (particularly associated with new development) that will be carried over from the Pedestrian Plan, along with polices that will make it necessary to include bicycle lanes on new and improved road projects.
- *Will mountain bike trails be included as part of this plan?*
  - As a transportation plan, this bicycle plan will concentrate on specific connections that are viable transportation routes, although it will certainly enforce the idea that encouraging recreational bicycle-use is a good gateway towards using bicycles for utilitarian purposes. In addition, some projects in this plan may possibly serve the mountain biking community to some extent, and the Plan will recommend that Mooresville's Park and Recreation Department consider an off-pavement bicycle component in their park system, preferably at a park on a bicycle route.



## Mooresville Comprehensive Bicycle Plan

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Brett finished the meeting by describing the next steps. The nuts and bolts to the plan will be incorporated in the form of guidelines and specs, programs will be defined, the projects will be prioritized, and policies will be drafted. The results from the public input will be incorporated into the planning process, and a final public forum will take place (possibly this fall) once this steering committee reviews the entire draft concept by later this summer.

The next steering committee meeting will take place in August or September. At that time, the planning team hopes to have all of the steering committee's suggested edits complete for the first four sections, and will have a draft of the final sections for each member. The steering committee is encouraged to contact the planning team at any time with questions, comments, or ideas throughout the entire process. The meeting was adjourned at 4:50 PM.



Meeting: Steering Committee Meeting #3  
September 13, 2007  
3:30 PM – 5:00 PM  
Charles Mack Citizen Center

Attendees:

Don Bartell, Iredell County TAB, M-SI Chamber of Commerce  
Christian Bauer, Town of Mooresville Planning  
Helen Chaney, NCDOT Division of Bicycle and Pedestrian Planning  
Bill Clark, URS Corporation – North Carolina  
Katie Cook, citizen  
Margo Fesperman, citizen  
John Finan, Town of Mooresville Streets Superintendent  
Frank Rader, Town of Mooresville Board of Commissioners  
Mark Sullivan, citizen  
John Vine-Hodge, NCDOT Division of Bicycle and Pedestrian Planning

Chris Bauer began the meeting with a welcome and introductions. He thanked the committee for their time, and passed around a role sheet. Bill began with a quick recap of where we are in the process of this plan after distributing a draft copy of a depiction of what the Plan Summary would look like. The Summary highlighted each section of the Plan succinctly, describing Mooresville’s current bicycling environment, the goals of the Plan, the needs of the community, public input summary, an overview of the Plan’s concept, illustrations of the types of projects, proposed programs, recommended policies, and a description of the implementation process. With the exception of the suggestion to use another name rather than “*Bicycle Parking Deck*” for the sheltered bike parking projects, there were no immediate comments on the Draft Summary.

Bill then distributed a copy of the Project Table showing a summary of each of the 48 initially proposed projects. These projects were identified and proposed based off of comments and suggestions by this steering committee and by attendees of the public forum and participants in the survey. Projects were also identified based off of field visits. He asked each member of the committee to review this table and comment on the proposed projects by October 1<sup>st</sup>.

Bill continued by describing the process by which each of the projects was ranked. The ranking process was generally accepted by the committee, with a concern that giving two points instead of zero for undesirable conditions was awkward. After an explanation of why this is ranked in this manner, it was still agreed that the cause for this concern should be corrected.





## Mooresville Comprehensive Bicycle Plan

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At this point, Bill reviewed the projects that are ranked as *High Priority* projects at this time. Questions, comments, and brief answers on each are as follows:

1. Multi-use path and paved shoulders along NC 115:
  - ◇ *Are there right-of-way concerns?* There might be, particularly with the railroad.
  - ◇ *Will cycling safety be addressed in the Plan?* Yes.
  - ◇ *Why should the path be on one side of the road rather than the other?* It does not have to be, but the higher number of intersection conflicts makes the west side safer.
  - ◇ *Can the parts of the project be separated or done in phases?* Yes.
2. Wilson Avenue bike lanes:
  - ◇ *Since the Pedestrian Plan has sidewalks as one of its recommended options for this road, they should be an option in this plan.* Further meetings will take place to insure that the right project is done. An option discussed that is potentially viable includes a five foot wide sidewalk on one side of the road with 14' wide vehicle lanes in the roadway instead of marked bicycle lanes. An option that could also be considered would be 10 foot wide motor vehicle lanes, 4.5 foot wide unmarked bicycle lanes, and a four foot wide sidewalk. This configuration would be safest with a reduction in speed limit from 35 to 30 or 25 miles per hour and could offer the highest degree of traffic calming.
  - ◇ *There was some concern over motor vehicle lanes that are 10 foot wide.* 10 foot wide lanes are very common both regionally and nationally. They are considered safest for roadways with posted 35 MPH speed limits or less, but are common on roadways with faster speeds including Mooresville's Doolie Road, Oak Tree Road, Talbert Road, McClelland Ave, Shearers Road, parts of Langtree Road and others.
3. Bicycle lanes on Plantation Ridge in Morrison Plantation
  - ◇ *This Road is not yet owned by the Town of Mooresville.*
  - ◇ *What will stop a preoccupied motorist from crossing the white line and hitting the biker from behind?* Statistics show that being hit from behind while in an urban bicycle lane is very unlikely.
4. Greenway along Dye Creek
  - ◇ *A portion of this project has some designated money in the budget.*
5. Bike lanes on Morrison Plantation Parkway (This project has 3 options, one with 4 motor vehicle lanes with bike lanes, and the other two with only two motor vehicle lanes, bike lanes, and extras such as on-street parking.)
  - ◇ *This Road is not yet owned by the Town of Mooresville.*
  - ◇ *The option to keep four motor vehicle travel lanes seems to be the most palatable.* Yes, it will certainly be far easier politically to never reduce the number of travel lanes in an existing street. However, these road diets are becoming common and have been shown to move as many cars, if not more, while being safer for both motorists and non-motorists. It is recommended to keep all the options on the table.
6. Standard bicycle route through the Fieldstone road neighborhood.
7. Bicycle boulevard on Academy Street
8. Bicycle route on Shearers Road with new paved shoulders
9. Bicycle boulevard on Church Street
10. Bicycle lanes on NC 150
  - ◇ *Because of projects planned in the future, this project might not be feasible.*



It was suggested for a few of these projects to be identified as pilot projects for implementation as soon as possible that will give the public a taste of bicycling in Mooresville. Some discussion followed as to where these projects should be while many agreed that short-term projects in and around downtown might be the most visible and beneficial.

The steering committee was asked to review these projects and to email or call Bill with any comments for the development of the Final Draft Plan by October 1<sup>st</sup>. Edits will then be made to create a draft plan that should be presented to the public this fall.

In addition, anyone with photos that depict bicycling in Mooresville is encouraged to email those to Bill as well for inclusion in the Final Plan.

The next and final steering committee meeting will take place immediately prior to the Final Draft Plan's adoption by the Town Council, possibly before the end of the calendar year.

The meeting adjourned at 5:00 PM.



## Mooresville Comprehensive Bicycle Plan

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Meeting:           Steering Committee Meeting #4  
                      March 27, 2007  
                      4:00 PM – 5:00 PM  
                      Charles Mack Citizen Center

Attendees:

Don Bartell, Iredell County TAB, M-SI Chamber of Commerce  
Christian Bauer, Town of Mooresville Planning  
Tim Brown, Town of Mooresville Planning  
Bill Clark, URS Corporation – North Carolina  
Katie Cook, citizen

Chris Bauer began the meeting by thanking the committee for their time and effort in this planning process. He also explained how the adoption process would be for the plan, which includes final comments by this steering committee and NCDOT, review by the Planning Board and review and adoption by the Town Board.

The meeting was brief, with only two members of the steering committee present. Both were pleased with the Final Draft Plan and our time was spent discussing the layout of the plan and conceptual issues with greenways, public relations, and implementation. An important part of this plan is its recommendation of policies that are conducive to bicycling and its ability to adapt and evolve with changing conditions in Mooresville. To be fully affective, it is most highly recommended that a Pedestrian and Bicycle Committee be created that will oversee the implementation of ideas set forth in these plans.

The committee was asked to have any final comments emailed to either Bill or Chris by Monday morning, April 7. The Final Draft Plan is currently under final review by NCDOT and will be presented to the Planning Board immediately upon NCDOT's approval, possibly in late April or early May. The Town Board meeting for adoption would be in late May or early June.

Thank you everyone! The meeting adjourned at 5:00 PM.



Published on September 14, 2006, Page 1N, Charlotte Observer  
PROJECT WILL AID CYCLISTS, WALKERS

Source: KATHRYN THIER, KTHIER@CHARLOTTEOBSERVER.COM

When widening work starts on Brawley School Road in two years, it'll create extra room for more than just cars. Mooresville plans to share the cost with the state of adding sidewalks between Talbert and Chuckwood roads, even though about 60 percent of that stretch is outside the town's jurisdiction. The state also will pay the entire cost of adding bicycle lanes. "Eventually (all of) Brawley School Road will be part of Mooresville, and we'll..."

Published on August 20, 2006, Page 1N, Charlotte Observer  
BRAWLEY RESIDENTS: WE'RE FED UP AND TIRED OF TALKING

Source: KATHRYN THIER, KTHIER@CHARLOTTEOBSERVER.COM

Some residents of the Brawley School Road peninsula are done complaining about traffic and overdevelopment. They're ready to act. They say their whining about delays in state plans to widen the road doesn't endear south Iredell residents to county commissioners. So they plan to show officials why uncontrolled growth in south Iredell is bad for the whole county. "The northern part of the county is screaming they don't want their taxes raised to..."

Published on June 11, 2006, Page 1N, Charlotte Observer  
BRAWLEY SCHOOL OFFICER PREFERS PEDAL POWER

Source: KATHRYN THIER, KTHIER@CHARLOTTEOBSERVER.COM

Just because you're stuck in traffic on Brawley School Road doesn't mean you're safe from an officer's ticket book. Iredell County sheriff's deputy Sgt. Todd Carver patrols by one of the most low-tech transportation methods available: the bicycle. "In the afternoon, it's just easy pickins' for me because (drivers) have nowhere to go," said Carver, 34. Carver and other members of...

Published on June 8, 2006, Page 1N, Charlotte Observer  
GOT A BIKE? TOWN PLANS NEW TRAILS

Source: KATHRYN THIER, KTHIER@CHARLOTTEOBSERVER.COM

Snap on those bike helmets. Mooresville just received a state grant to help make the town more bicycle-friendly. The \$45,500 grant plus a \$19,500 local match will pay for the town's transportation planner and a consultant to map where future bike lanes, routes and paths should go. The grant won't pay for bike lanes, but having a plan will help the town set requirements for new development. The ideas in the plan will be built as the town can afford them or as...

Published on June 1, 2006, Page 2N, Charlotte Observer  
BIKE RIDE BRINGS IN \$14,000

Source: JOE MARUSAK, Staff Writer

Mooresville Dr. Susan Dean, whom I wrote about March 12, raised at least \$14,000 for the Susan G. Komen Breast Cancer Foundation on her first cross-country bicycle trek. Dean, a plastic and reconstructive surgeon, said she rode the entire 2,900 miles without needing to put her bike up for part of the journey in a support van that accompanied her and the other 30 or so riders. "I rode every mile," Dean said. Her trip started April 24 in Irvine, Calif., and ended May...



Published on March 12, 2006, Page 1N, Charlotte Observer  
SHE'LL BE MOOOVING ALONG ON CROSS-COUNTRY TREK

Source: JOE MARUSAK, Staff Writer

Dr. Susan Dean is riding from California to Georgia this spring on a bike painted like a cow. Dean figures the trip will cost her \$50,000, including travel expenses and keeping her office open and her employees paid. But her journey is for a great cause: She is raising money for the Susan G. Komen Breast Cancer Foundation, which has invested \$630 million in breast cancer research, education, screening and treatment programs in its 25 years. Dean is a plastic and reconstructive surgeon...

Published on September 29, 2005, Page 1N, Charlotte Observer  
OAK TREE TO TEENS: NO BIKES ALLOWED

Source: JOE MARUSAK, Staff Writer

Two teenagers who figured out a gas-saving shortcut to Lake Norman High have hit a roadblock. Turns out bicycles are verboten in the Villages at Oak Tree older-adult community off Oak Tree Road. The guys have used streets in the private community as part of their route from their homes off Stuttz Road to McCrary Creek-Morrison Cove. They use a johnboat to cross the water to get to school. My column last week about their adventures stirred folks at the Villages at Oak Tree, including...

Published on November 28, 2004, Page 2J, Charlotte Observer  
COMMISSIONERS BACK BIKE LANES FOR INTERCHANGE

Source: KATHRYN WELLIN, STAFF WRITER

Iredell County commissioners say they support bike lane markings for the future interchange of Interstate 77 and Langtree Road in Mount Mourne, after the state Department of Transportation dropped the markings from the design. Commissioners voted unanimously last week to send a resolution to N.C. DOT, asking that the markings be reincluded. Still, commissioners' Chairman Steve Johnson asked, "Who in their right mind would ride a bicycle there?" ...

Published on October 16, 2002, Page 19M, Charlotte Observer  
POLICE GET MONEY FOR BIKE PATROL

Source: ERICA BESHEARS, STAFF WRITER

Blue-light bicycles are coming to town. Mooresville police plan to start a bike patrol to promote more face-to-face contact with neighborhood residents and better patrolling by police at special events, Capt. Kendell Hillard said. The Police Department is buying two bikes and special bike outfits for six officers, with money from this year's local law enforcement block grant. The Mooresville Town Board recently approved spending the \$19,117 on the bike patrol, as well as on...





Posted on Mon, Mar. 12, 2007

## **Mooresville seeks input on bicycling**

KATHRYN THIER

kthier@charlotteobserver.com

Give your 2 cents on how Mooresville can create a better bicycling environment by responding to a survey.

The town is developing a comprehensive bicycle plan and needs input from residents. The plan will suggest ways the town can become more bicycle-friendly and map areas for bike lanes and trails.

The survey is available on the town's Web site. Details: [www.ci.mooresville.nc.us](http://www.ci.mooresville.nc.us) and click on "Planning" and then "Mooresville Bicycle Plan Survey" in the scroll.

Hard copies are available by calling town Transportation Planner Chris Bauer at 704-663-2891.

Responses will be collected until May 1, the date of a public forum on the bicycle plan.

The forum is at 6 p.m. May 1 at the Charles Mack Citizen Center, 215 N. Main St. The town will provide services and aids for disabled people who wish to participate in the forum. Contact Chris Bauer in advance to make arrangements.

### **MOORESVILLE: Have your say on bicycles**

The Charlotte Observer, March, 2007 by KATHRYN THEIR

Mooresville residents can give their two cents on how the town can create a better bicycling environment by responding to a survey. The town is developing a comprehensive bicycle plan and needs input from residents or those who bike around Mooresville. Mooresville Transportation Planner Chris Bauer said he hopes people who don't bicycle will also respond.

"It's easy to get responses from folks who ride and cycle all the time," he said. "We're looking for their input, but we're also trying to see what are the barriers out there that stop (others) from riding more often." The survey is available on the town's Web site or by request to the Planning Department. Responses will be collected until May 1, the date of a public forum on the bicycle plan.

### **Notice of a Citizens' Survey for the Comprehensive Bicycle Plan**

The Town of Mooresville needs your help! We are developing a Comprehensive Bicycle Plan to help create a better bicycling environment and citizen input is extremely valuable. Please go to The Town of Mooresville's web site at <http://www.ci.mooresville.nc.us/>, click on 'Planning,' and then the link on the scroll that says 'Mooresville Bicycle Plan Survey,' to complete a short survey. For more information, or to get a paper survey, please contact Chris Bauer, Town of Mooresville Transportation Planner at 704-663-2891.

A public forum open to everybody will be held to discuss this plan at the Charles Mack Citizen Center on **Tuesday, May 1st at 6:00 PM**. Survey responses will be collected until that time. Thanks!

The Town will provide auxiliary aids and services for disabled persons who wish to participate in the meetings to comply with the American Disabilities Act. To receive special services, please contact Mr. Bauer to provide adequate notice prior to the date of the workshop so that arrangements can be made.



### **Notice of the Final Public Forum for the Comprehensive Bicycle Plan**

February 2008, Charlotte Observer Neighbors Section

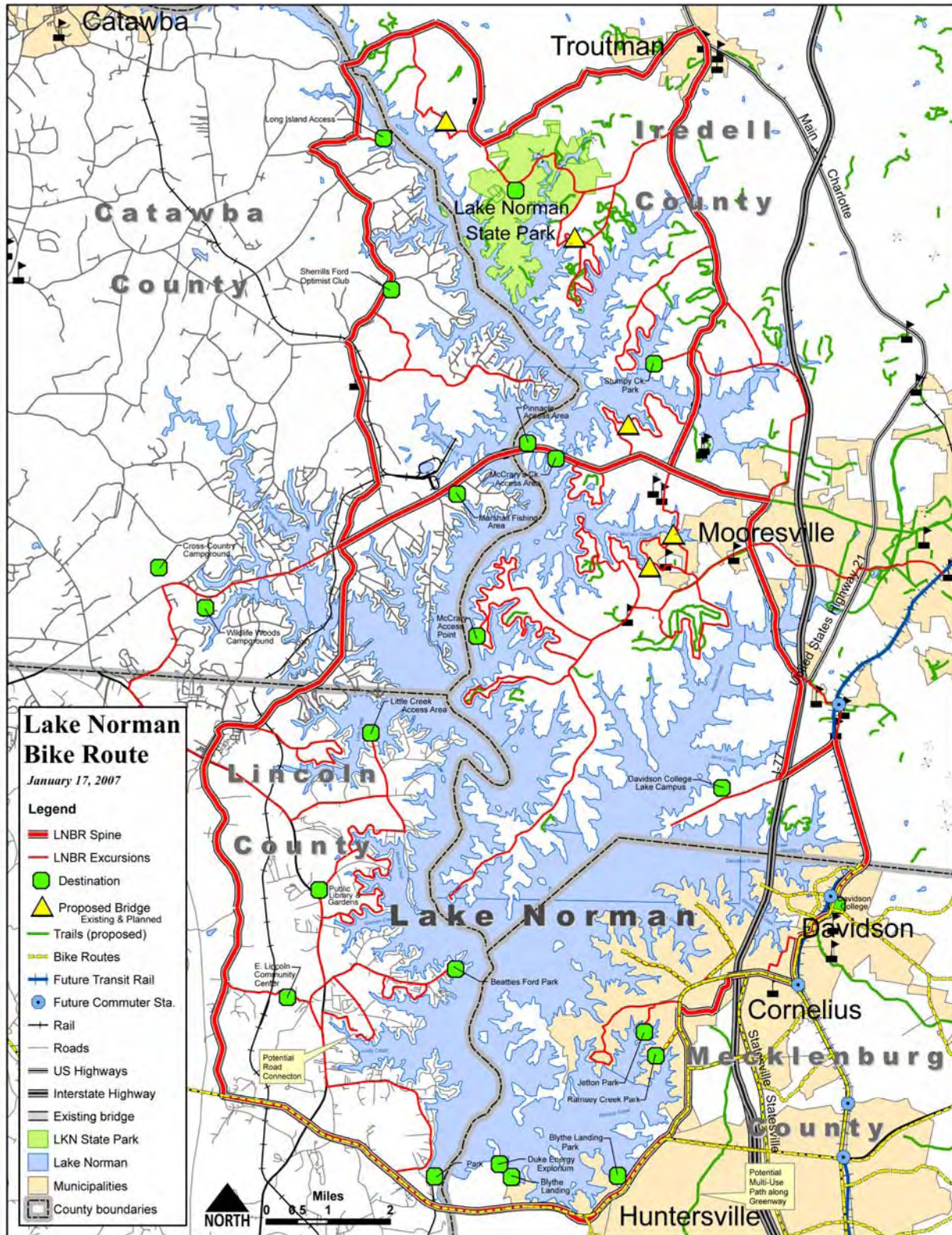
The Town of Mooresville needs your help! We are developing a Comprehensive Bicycle Plan to help create a better bicycling environment and citizen input is extremely valuable. A workshop will be held to enable residents to give feedback on the draft plan that was developed based on citizen comments from a previous public forum and from the results to a survey conducted last spring. The workshop is open to everybody and will be at the Charles Mack Citizen Center on Thursday, February 7, 2008. Drop in anytime between 6:00 PM and 8:00 PM to give us your comments. A brief presentation will begin the workshop, followed by an opportunity for the public to review highlights of the plan and to ask questions and give suggestions. This forum will be the final formal opportunity for residents to review the draft plan and to present new ideas to be incorporated into the final plan.

The Town will provide auxiliary aids and services for disabled persons who wish to participate in the meetings to comply with the American Disabilities Act. To receive special services, please contact Mr. Bauer at (704) 663-2891 to provide adequate notice prior to the date of the workshop so that arrangements can be made.

### **GREENWAY PLANS SCALED BACK**

The Charlotte Observer, February 24, 2008 by KATHRYN THEIR

Mooresville commissioners appeared to scale back the town's fledgling greenway program at their annual planning retreat last week. Meeting Thursday at the Graylyn International Conference Center, commissioners stepped away from their stated goal of providing five miles of greenways, walking trails and bike paths by 2010. "It's going to cost us millions and millions, and it benefits a few," said Commissioner Frank Rader.



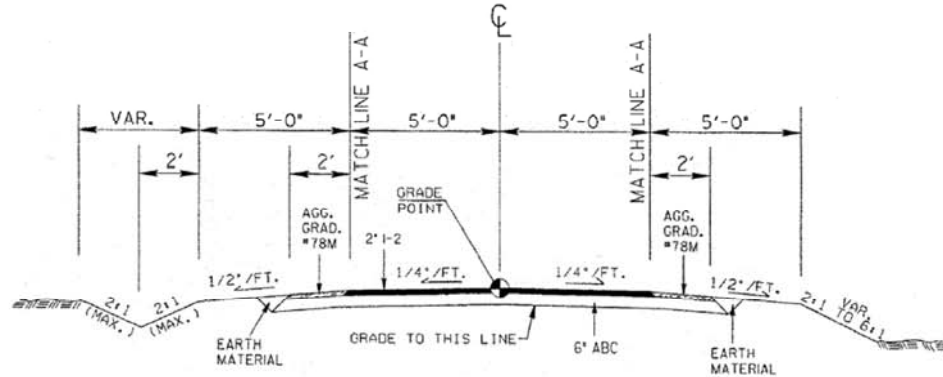


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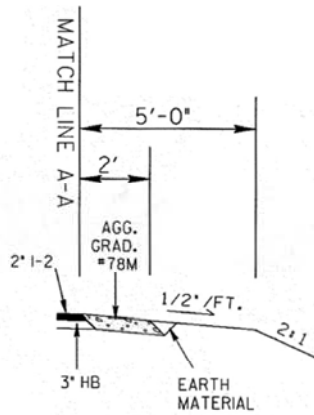


**RECOMMENDED TYPICAL SECTION OF 10-FT ASPHALT PATHWAY  
With 2-Ft Crushed Stone Shoulder**



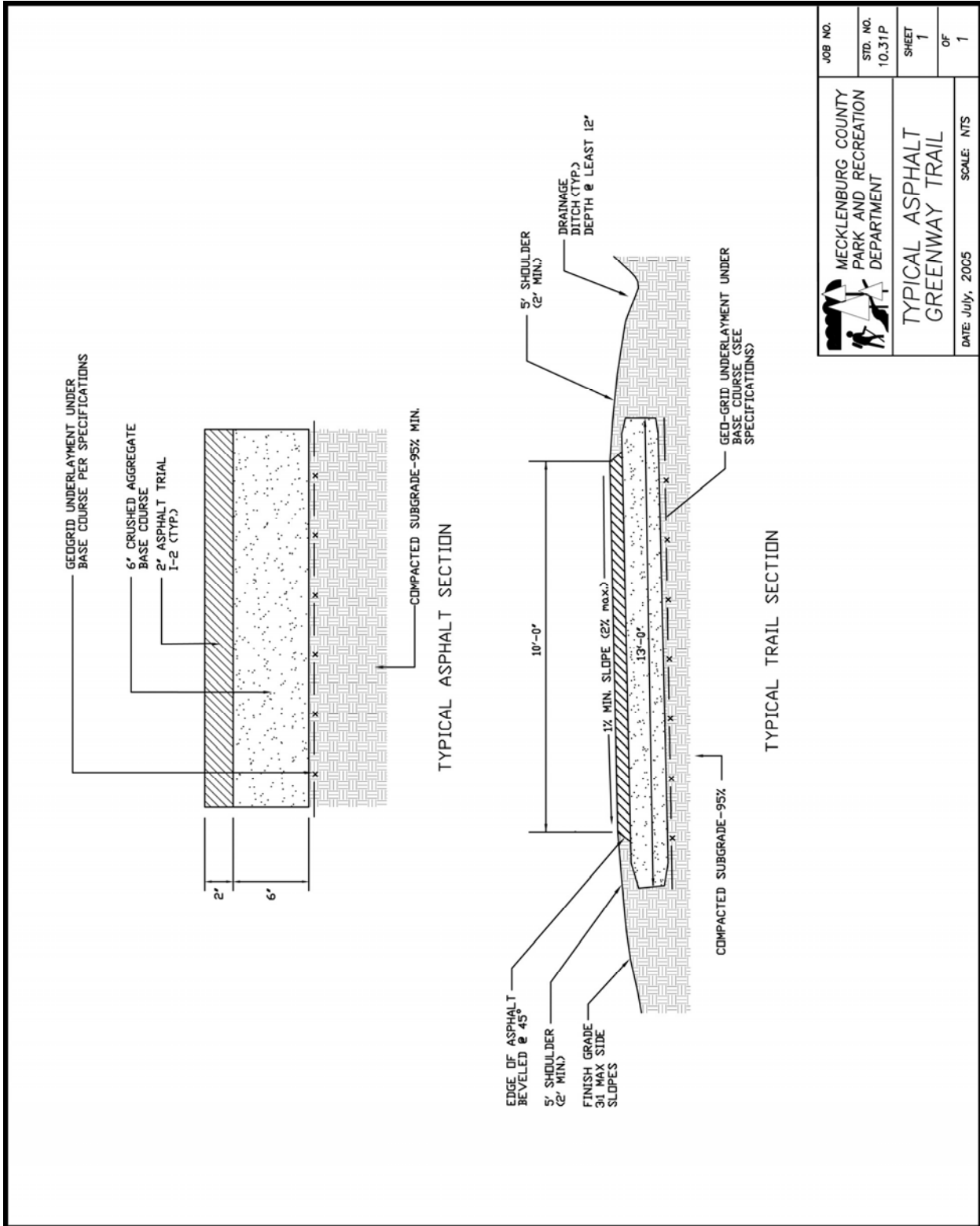
**RECOMMENDED PAVEMENT DESIGN**

NOTE : PROJECTS WITH POOR SOILS  
MAY SUBSTITUTE 6" OF ABC  
WITH 3" OF HB.



NCDOT – Bicycle Facilities Guide: Types of Bicycle Accommodations



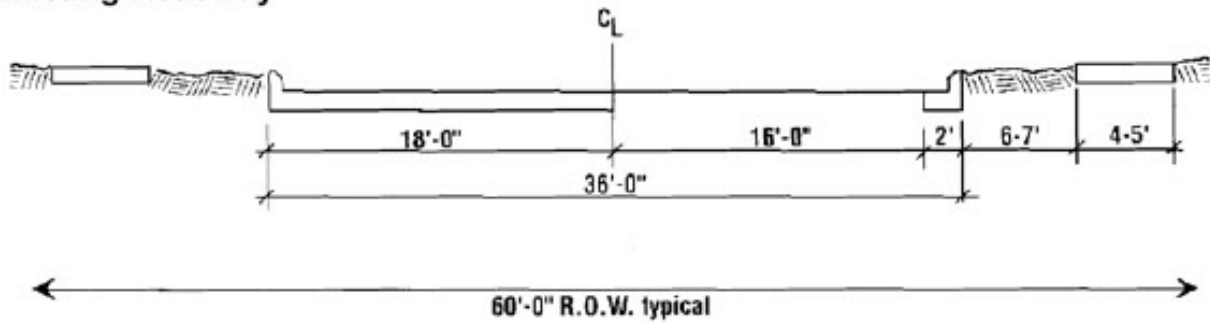


JOB NO.	MECKLENBURG COUNTY PARK AND RECREATION DEPARTMENT
STD. NO.	10.31P
SHEET	1
OF	1
DATE: July, 2005	SCALE: NTS
<b>TYPICAL ASPHALT GREENWAY TRAIL</b>	

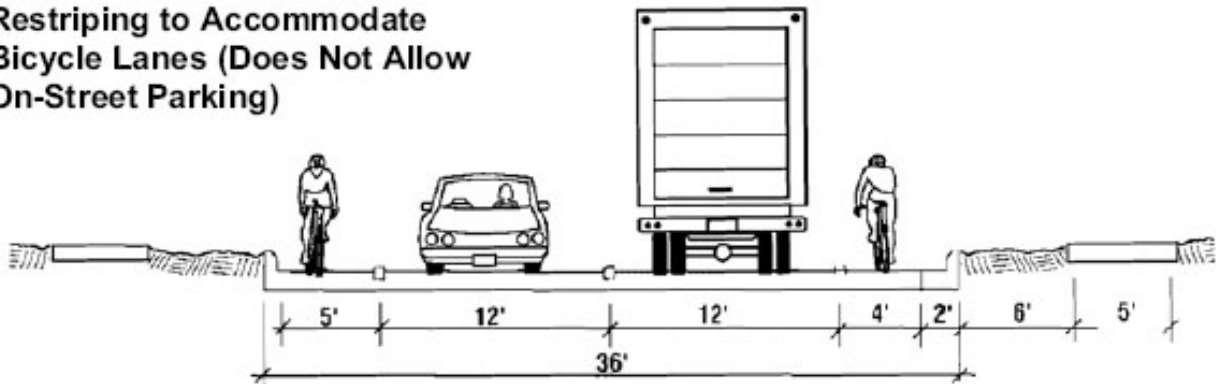


## Bicycle Lane Retrofitting Alternatives:

### Existing Roadway

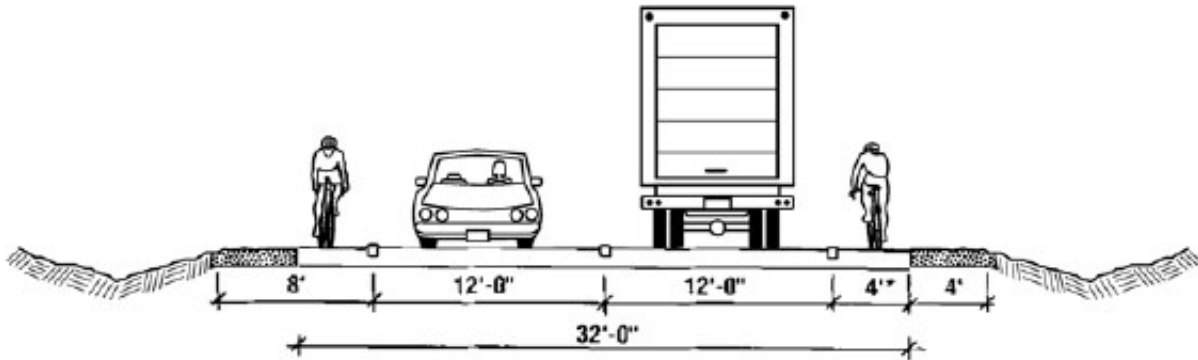


### Restriping to Accommodate Bicycle Lanes (Does Not Allow On-Street Parking)



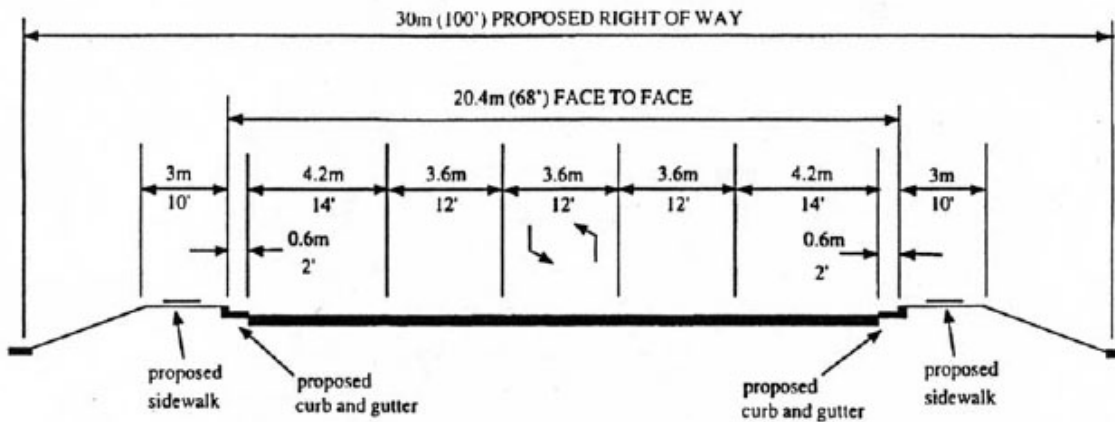


### Roadway Retrofitted with 4-Ft Paved Shoulders



\* If speeds are higher than 40 mph, shoulder widths greater than 4' are recommended.

### 5-LANE TYPICAL SECTION With Wide Outside Lanes





**CITY OF CHARLOTTE, NC BICYCLE PARKING ORDINANCE**

Section 12.202A. Bicycle parking standards.

(1) Short-term bicycle parking shall meet the following standards:

(a) Covered spaces. If twenty (20) or more short-term bicycle spaces are required, then at least fifty (50) percent of the required short-term bicycle spaces shall be covered. Coverage may be provided under roof overhangs or awnings, in bicycle lockers or within or under other structures.

(b) Location. Short-term bicycle parking should be located along a major building approach line and clearly visible from the approach. The rack area should be no more than a 30-second walk (one hundred twenty (120) feet) from the entrance it serves and should preferably be within fifty (50) feet. A rack area should be as close or closer than the nearest nonhandicap car parking space. A rack area should be clearly visible from the entrance it serves. A rack area should be provided near each actively used entrance. In general, multiple buildings should not be served with a combined, distant rack area. It is preferred to place smaller rack areas in locations that are more convenient.

(c) The requirements of subsection 12.202A(3) shall be met.

(d) Lighting. Lighting in the bicycle parking area shall meet the IESNA recommended maintained minimum horizontal and vertical illumination values and the recommended maximum to minimum uniformity ratios.

(e) Design. Bicycle parking areas shall meet the design specifications in the Charlotte-Mecklenburg Land Development Standards Manual Chapter. Other designs and manufacturers may be deemed acceptable by the plans review staff.

(2) Long-term bicycle parking shall meet the following standards:

(a) Covered spaces. All spaces shall be fully covered from inclement weather.

(b) Location. Long-term bicycle parking shall be located no more than five hundred (500) feet from a primary entrance of the use they are intended to serve. Long-term bicycle parking may consist of indoor parking, racks in covered loading dock areas, racks in garage structures, bicycle lockers or other means which provide coverage to the bicycle. Such parking may be restricted to use only by employees, tenants, residents or others at the discretion of the property owner or management.

(c) Lighting. Lighting in the bicycle room, compound or locker area shall meet the IESNA recommended maintained minimum horizontal and vertical illumination values and the recommended maximum to minimum uniformity ratios.

(d) Design. Bicycle parking areas shall meet the design specifications in the Charlotte-Mecklenburg Land Development Standards Manual. Other designs and manufacturers may be deemed acceptable by the plans review staff.

(e) The standards of subsection 12.202A(3) shall be met.

(3) General standards for all bicycle parking areas:

(a) Secured. Bike lockers and racks shall be securely anchored to the ground and on a hard surface.



## Mooresville Comprehensive Bicycle Plan

(b) Maneuvering areas. Each required bicycle parking space shall be accessible without moving another bicycle. An aisle at least five (5) feet wide is required between the building wall and the bicycle parking rack to allow room for bicycle maneuvering, unless specified otherwise in the Charlotte-Mecklenburg Land Development Standards Manual. Bicycle parking spaces should provide a clearance of at least four (4) feet on adjacent sidewalks. Bicycle lockers should be situated so there are no obstructions within five (5) feet of the entry door(s) of the locker.

(c) Signs. If required bicycle parking is not clearly visible from the entrance to the building, parking structure, transit station, or lot, a sign shall be posted at the primary entrances indicating the location of the parking.

(d) Use. Required bicycle parking spaces shall be available for residents, visitors, customers and/or employees of the use.

(Ord. No. 2916, § 1(2), 3-21-2005)

TABLE 12.202: MINIMUM REQUIRED OFF-STREET PARKING SPACES, BY USE\* \* All square footage is gross square footage.

TABLE INSET:

Permitted Uses	Required Number of Auto Parking Spaces	Long-term Bicycle	Short-term Bicycle
Residential Uses:			
Bed and breakfasts (B&B's)	1 additional space per guest room	n/a	n/a
Boarding houses	1 additional space per boarding room	n/a	n/a
Dormitories	1 space per 2 residents	1 space per 2 residents	1 space per 8 units; min. 4
Dwellings, detached	2 spaces per unit	n/a	n/a
Dwellings, duplex	2 spaces per unit	n/a	n/a
Dwellings, triplex	1.5 spaces per unit	none	none
Dwellings, quadraplex	1.5 spaces per unit	none	none
Dwellings, attached	1.5 spaces per unit	n/a	n/a
Dwellings, multi-family	1.5 spaces per unit	none	2, or 1 space per 20 units
Dwellings, multi-family	.25 spaces per unit	n/a	n/a





elderly or disabled			
Dwellings, accessory elderly or disabled	1 spaces per unit	n/a	n/a
Dwellings, low income	1 space per unit	n/a	n/a
Dwellings, mixed use	1 space per unit	none	2, or 1 space per 20 units
Manufactured housing	2 spaces per unit	n/a	n/a
Institutional Uses:			
Adult care centers	1 space per employee, plus 1 space per 6 adults	2, or 1 per 20 employees	2
Child care centers	1 space per employee, plus 1 space per 10 children	2, or 1 per 20 employees	2
Civic, social service or fraternal facilities	1 space per 250 square feet	2, or 1 per 10,000 square feet	5% of auto parking
Cultural facilities	1 space per 4 seats	2, or 1 per 10,000 square feet	2, or 1 space per 20 seats
Elementary, middle or junior high schools	1 space per classroom	none	1 space per classroom
Fire stations	1 space per 300 sq. ft., excluding apparatus room	2 per station	None
Government buildings	1 space per 300 square feet	2, or 1 per 10,000 square feet	5% of auto parking
Group homes	2 spaces per unit	2, or 1 per 10,000 square feet	none
Health institutions	1.2 spaces per bed	2, or 1 per 10,000 square	5% of auto parking



## Mooresville Comprehensive Bicycle Plan

		feet	
High schools	1 space per classroom, plus 1 space per 5 students	none	1 space per classroom
Jails	1 space per 2 employees	2, or 1 per 10,000 square feet	5% of auto parking
Nursing homes, retirement homes, etc. Dependent living facility Independent living facility	1 space per 3 beds 1.5 spaces per unit	2, or 1 per 10,000 square feet	5% of auto parking
Religious institutions	1 space per 4 seats	none	2% of auto parking
Stadiums, arenas or coliseums	1 space per 3 seats	none	2% of seats or per CMPC review
Universities, colleges or junior colleges	1 space per 2 students	2 spaces per office building, except for dormitories, above	10% of auto parking
Rail or bus stations, transit centers without parking lots		A minimum of 8 or per CDOT review	A minimum of 8 or per CDOT review
Park and ride lots with parking lots (rail or bus)		4% of auto spaces for lots < 400 auto spaces or a minimum of 8 3% of auto spaces of lots of 400--800 auto spaces 2% of auto spaces of lots >	A minimum of 6 or per CDOT review



		800 auto spaces or per CDOT review.	
Other institutional uses	1 space per 250 square feet	2, or 1 per 10,000 square feet	5% of auto parking
Office and Business Uses:			
Bus terminals and train stations	1 space per 4 seats in the terminal	5% of auto parking or a minimum of 8 or per CDOT review	A minimum of 6 or per CDOT review
Clinics	1 space per 200 square feet	2, or 1 per 70,000 square feet or per CMPC review*	5% of auto parking
Financial institutions	1 space per 200 square feet	2, or 1 per 10,000 square feet	5% of auto parking
Funeral homes	1 space per 150 square feet in parlors and assembly areas		
Showrooms	1 space per 1000 sq ft	2, or 1 per 20,000 square feet	5% of auto parking
Hotels/motels (a) Per room for rent (b) Per meeting room capacity (c) Restaurant/entertainment facility	1 space per room or suite, plus 1 space per 4 seats, plus 1 space per 250 square feet	1 space per 20 rentable rooms	None
Indoor recreation - Swimming pool - Tennis or racquet court	1 space per 75 square feet of water 3 spaces per court	2, or 1 per 10,000 square feet, or per	5% of auto parking



## Mooresville Comprehensive Bicycle Plan

- Other indoor recreation	1 space per 200 square feet	CMPC review	
Laboratories	1 space per 400 square feet	2, or 1 per 10,000 square feet, or per CMPC review*	5% of auto parking
Marinas	1 space per boat slip	1 per 20 berths	5% of auto parking
Offices	1 space per 300 square feet	2, or 1 per 10,000 square feet	2, or 1 per 40,000 square feet
Medical offices	1 space per 200 square feet	2, or 1 per 10,000 square feet	5% of auto parking
Neighborhood food and beverage service	1 space per 175 square feet	2, or 1 per 10,000 square feet	5% of auto parking
Nightclubs, lounges and bars	1 space per 75 square feet	none	5% of auto parking
Outdoor recreation (See specific district for location) - Driving range - Golf course (9 and 18 holes) - Par 3 golf course - Riding academy - Swimming pool - Swimming pool (as part of planned dev.) - Tennis or racquet court - Tennis courts (as part of planned dev.)	1.2 spaces per tee 90 spaces per 9 holes 40 spaces per 9 holes 1 space per horse stall 1 space per 75 square feet of water 1 space per 100 square feet of water 3 spaces per court 2 spaces per court	2, or 1 per 10,000 square feet (for employees)	None for golf course (9 and 18 holes) and Par 3 golf course. 5% of auto parking for all other uses.
Post offices	1 space per 400 square feet	2, or 1 per 10,000 square	5% of auto parking



		feet	
Restaurants	1 space per 75 square feet	2, or 1 per 10,000 square feet	5% of auto parking
Retail establishments - Motion picture theatres - Other retail establishments - All other establishments	1 space per 3 seats 1 space per 250 square feet 1 space per 250 square feet	2, or 1 per 12,000 square feet	5% of auto parking
Shopping centers, greater than 50,000 square feet	1 space per 250 square feet	2, or 1 per 12,000 square feet	5% of auto parking
Wholesale establishments	.25 space per 1,000 square for the wholesaling portion; plus 1 space per 400 square feet for any accessory office	2, or 1 per 40,000 square feet	5% of auto parking
Other business uses	1 space per 250 square feet	2, or 1 per 10,000 square feet	5% of auto parking
Industrial uses:			
Airports	1 space per 4 seats in the terminal	Per CMPC review*	Per CMPC review
Manufacturers and warehouses	25 space per 1,000 square feet for the manufacturing or warehousing portion plus 1 space per 400 square feet for any accessory office	2, or 1 per 40,000 square feet	1% of auto parking
Other industrial uses	1 space per 400 sq feet	2, or 1 per 40,000 square feet	1% of auto parking





Planning commission staff in conjunction with CDOT may waive or reduce bicycle parking depending on the surrounding land uses of a particular development, and the accessibility of a site by bicycle. One example of a location where less bicycle parking would be required is at a freeway interchange with no connection to the surrounding neighborhoods.

(Ord. No. 3455, § 1, 11-16-1992; Ord. No. 3523, § 1(45), 3-15-1993; Ord. No. 305, § 1.4(A), 6-19-1995; Ord. No. 383, § 15, 9-18-1995; Ord. No. 389, § 4(A), 10-16-1995; Ord. No. 529, § 1(6), 4-15-1996; Ord. No. 1452, § 1(3), 2-21-2000; Ord. No. 1996, § 1, 1-22-2002; Ord. No. 2239, § 1(4.A), 2-17-2003; Ord. No. 2242, § 1(3), 2-17-2003; Ord. No. 2287, § 1, 4-21-2003; Ord. No. 2880, § 1(B), 2-21-2005; Ord. No. 2916, § 1(2), 3-21-2005; Ord. No. 3177, § 1, 1-17-2006)

Section 12.209. Allowable reductions and restrictions of parking.

When at least one hundred (100) motor vehicular parking spaces are required in table 12.202 to serve institutional, office and industrial uses on a parcel, a reduction in required parking is permitted provided a minimum of five (5) class II (short-term) bicycle parking spaces are provided. The remaining number of parking spaces may be reduced by one (1) for each additional class II (short-term) bicycle parking space provided. The remaining number of parking spaces may also be reduced by two (2) percent for the addition of two (2) showers and four (4) lockers for every two hundred fifty (250) employees. The number of motor vehicular parking spaces shall be reduced by no more than twenty-five (25) percent.

(Ord. No. 2916, § 1(3), 3-21-2005)

(5) Long-term bicycle parking is not required if the entire development has a gross floor area of two thousand five hundred (2,500) square feet or less.

(6) Commercial surface parking lots located within the I-277 freeway are exempt from providing bicycle parking.

(Ord. No. 1038, § 2(1)(a), 5-18-1998; Ord. No. 1470, § 1(2), 3-20-2000; Ord. No. 2412, § 3(2)A., 10-20-2003; Ord. No. 2881, § 2(2), 2-21-2005; Ord. No. 2916, § 1(2), 3-21-2005)

Editor's note: Ord. No. 2916, § 1(2), changed the title of § 12.202 from "Required number of off-street parking spaces" to "Required number of off-street parking and bicycle spaces."



## CITY OF DAVIDSON, NC BICYCLE PARKING ORDINANCE

### Section 10: Parking

#### **Motor Vehicle Parking Exceptions**

A. Parking requirements for motor vehicles do not apply to the Village Center Planning Area, defined as the blocks bounded by, and any pedestrian courts within, Main Street, Jackson Street, and Griffith Street. Bicycle parking is still required.

B. In the Village Center Planning Area, existing buildings which were legally constructed without the provision of on-site motor vehicle parking and infill housing on existing lots of record may meet requirements with on-street motor vehicle parking and will be construed as conforming as to parking. Such buildings are eligible for change of use permits for building up fits and expansion. Bicycle parking will not be required unless the existing site is redeveloped.

C. Residential buildings may meet or contribute to meeting motor vehicle parking requirements with on-street parking if individual driveways are minimized and the fronting street is specifically designed to meet the parking needs of the residential buildings. Existing residential buildings will not have to add bicycle parking unless the site is redeveloped.

D. Where motor vehicular access is provided between adjoining non-residential sites and the operating hours of adjoining uses do not overlap, the uses may share up to 50% of required parking spaces. Shared use of motor vehicle parking shall be guaranteed by a contract or other legally binding document. Bicycle parking may be provided in a common area for adjacent properties as long as the parking facility is no further than 50 feet from any main entrance.

#### **10.2.2 Bicycle Parking**

All non-residential and multi-family residential buildings shall include an area for parking bicycles. Bicycle parking standards are based on the number of vehicular parking spaces and the expected time needed to park the bicycle. All bicycle parking requirements (short and long-term) should be demonstrated on site plans or final plats for the development. See Table 10.2.2 for numbers of spaces per type of use.

#### **Short Term Bicycle Parking**

A short term bicycle parking space is defined as a rack to which the frame and at least one wheel can be secured using varying types of bike locks (U-lock, wire cable, etc). This type of parking is appropriate for short-term parking such as shopping areas, libraries, other places where the typical parking duration is less than two hours.

#### **Long Term Bicycle Parking**

A long term bicycle parking space is defined as protecting the entire bicycle and its components from inclement weather. It is to be located where it will serve the needs of cyclists who need to leave their bicycles unattended for extended periods of time, such as employees, tenants or residents. Examples of long term parking may include indoor parking, racks in covered loading dock areas, racks in garage structures, bicycle lockers or other means which provide coverage to bicycles. Such parking may be restricted to use only by employees, tenants, residents or others at the discretion of the property owner or management.

Examples of long term bicycle parking include bike lockers, covered and fenced bicycle racks, or interior rooms with secure access where bicycles may be stored. It is recommended that buildings designed for 50 or more



employees build a shower/locker room for those employees who may commute from long distances. See <http://www.bikeparking.com> for examples of secure bike lockers and other long-term bicycle storage devices.

### Required Racks

Where bicycle racks are used, “Inverted U” type racks or other racks that support the bicycle at two points on the bicycle frame are required. Developers and site designers may choose to be creative in the design of bike racks as long as they meet functional requirements.



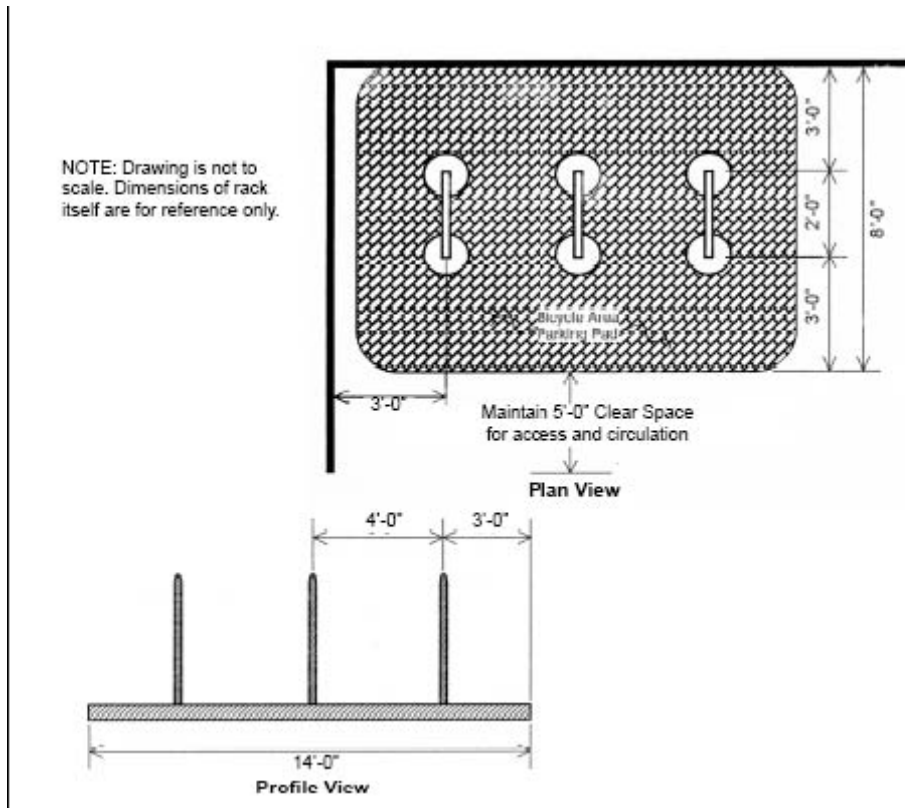
*“Inverted U” bicycle rack*

### Rack Siting and Dimensions of Bicycle Parking

- a. Racks shall be secured to the ground on a hard surface such as concrete, asphalt or unit pavers.
- b. Each bicycle parking space shall provide six feet by two feet (6' x 2') in area per bicycle plus the area needed for access.
- c. Bicycle parking shall be located no closer than three (3) feet from any wall to provide adequate space for access and maneuvering.
- d. At least four (4) feet between parallel racks shall be provided for access.
- e. Bicycle racks installed on sidewalks should provide for a clear, unobstructed width of at least five (5) feet for pedestrians and should be installed at least three (3) feet from the face of curb.
- f. Bicycle racks must be placed a minimum of four (4) feet from existing street furniture (i.e. mailboxes, light poles, benches) and be no closer than twelve (12) feet from the edge of fire hydrants.
- g. Short term parking racks should be placed along a major building approach line and clearly visible from the approach and no more than 50 feet from building entrances or no further than the closest motor vehicle parking space, whichever is less. Rack placement should allow for visual monitoring by people within the building and/or people entering the building
- h. In multi-family residential developments, bike racks may be provided in a communal area, as long as it is accessible to all tenants/residents and in a safe, open public space. Staff will work with the developer to select an appropriate location for collective bicycle parking in a multi-family development.
- i. If required bicycle parking is not visible from the street or main building entrance, a sign must be posted at the main entrance indicating the location of the parking.



- j. Facilities with multiple entrances shall locate a portion of the required bicycle parking at each entrance.



**Covered Spaces**

- a. If 10 or more bicycle spaces are required, at least 50 percent of the bicycle spaces must be covered by an awning or placement under an arcade or other means. The cover for bicycle parking shall be a minimum of seven (7) feet above finished grade. This protects bicycles and provides shelter from inclement weather for cyclists while securing the bicycle and loading purchases.
- b. When motor vehicle parking is provided in a covered space (such as under a building or in a parking deck), all short term bicycle parking may be located in the structure or other areas protected from weather. If short term bicycle parking is provided in a parking deck, the bike racks must be located on ground level at the nearest point to the building entrance.
- c. Motorcycles, mopeds, and other one-person occupancy motorized vehicles may park under covered bicycle parking shelters. Motorized vehicles shall not obstruct or limit access to bicycle parking under covered shelters.



**Bicycle Parking Requirements**

The minimum number of bicycle parking spaces per any multi family or non-residential use, when required, is two (2) or one rack. A single “inverted U” bicycle parking rack will count as two (2) bicycle parking spaces. The maximum required short-term bicycle spaces shall be 20 or 10 racks for any single development.

**Table 10.2.2**

<b>Use Type</b>	<b>Auto Parking Min</b>	<b>Auto Parking Max</b>	<b>Short Term Bicycle Parking Spaces</b>	<b>Long Term Bicycle Parking Spaces</b>
Single Family Residential	1 space per Dwelling Unit	2 space per Dwelling Unit	None	None
Attached Residential or Multi-Family	1 space per Dwelling Unit	2 space per Dwelling Unit	10% <sup>1</sup> of max auto parking	5% <sup>1 2</sup> of max auto parking
Commercial (excl retail)	2 spaces per 1000 square feet of commercial use	3.5 spaces per 1000 square feet	10% of max auto parking	5% of max auto parking
Retail	2 spaces per 1000 square feet of commercial use	5 spaces per 1000 square feet for retail uses	10% of max auto parking	5% of max auto parking
Warehouse & Industrial	.25 spaces per 1000 square feet	2 spaces per 1000 square feet	5% of max auto parking	2% of max auto parking
Civic/Institutional	N/A	N/A	As required by Planning Director	

<sup>1</sup> Bicycle parking is only required for multi-family dwellings of more than 4 units/building.

<sup>2</sup> If the number of required long-term bicycle parking spaces for residential uses is less than 1 for a development, then it is not required.





## SAMPLE COST ESTIMATES

Below are approximate unit costs for the types of bicycle projects proposed in this plan, based on some example project costs that have been recently implemented, along with costs of other bicycle projects. Project cost estimations in Appendix K are based off of these figures, and do not necessarily include extra costs involved in the project such as advanced grading issues, land acquisition, land clearing, etc. All cost estimates are from projects constructed or budgeted between or during 2006 and 2007 unless stated otherwise.

### Multi-Use Paths

- Floodplain paths, such as creek or sewer paths may require more site preparation than pathways on higher ground. Floodplain costs usually involve drainage issues (i.e., need for culverts and bridges, or geotextiles), permitting issues, and boardwalk. Mecklenburg County Park and Recreation's greenways are typically constructed on creek corridors or sewer easements, and whose greenways therefore provide good cost examples for many of Mooresville's recommended multi-use paths.
- Rail Trails and sidepaths that have the advantage of being on a relatively cleared alignment with some existing grading and base work already complete can be constructed more economically.

### Typical Costs Associated with Floodplain Shared - Use Paths on Waterways or Sewer Lines

- \$120 per linear asphalt foot (installation including grading, clearing, construction, and a subbase with 18" on either side of asphalt for shoulder stabilization) 633,600 per mile + 10% administration and design = approximately \$700,000 per mile = \$132 per linear foot
- 10' Concrete walkway: \$300,000 - \$500,000 per mile (with design and administration – add 10%)
- 10' wide prefabricated "Steadfast" type Pedestrian Bridge: \$1,200 per linear foot with design, engineering, installation and administration costs. An 8' wide clearance can reduce this cost.
- 10' paved asphalt path (with two-foot margins and associated improvements): \$100 - \$125 per foot (\$528,000 - \$660,000 per mile.) Add 10% for design and administration.
- Boardwalk: Historically \$200 / linear foot (\$1,056,000 / mile), lately has increased to \$225 - \$250 per linear foot. Unit prices on bids can see boardwalks come in anywhere from \$150 - 350/LF. Boardwalk is 8' clear.
- Converted Culverts and Underpasses: \$60,000 - \$100,000. Varies according to width, lighting needs, if stream restoration is involved, and other circumstances.
- Mecklenburg County Park and Recreation's designers typically estimate \$120 per linear foot for construction of path (clearing, grading, subbase -- 14' wide, asphalt trail 10' wide).
- Mecklenburg County Park and Recreation routinely estimates \$1,000,000/mile for the design and construction of greenway paths in Mecklenburg County (10' wide asphalt trail). This cost takes into account various factors including need for culverts, drainage and flood studies.
- Mecklenburg County Parks and Recreation recently spent \$615,000 for 1.6 miles of a new portion of Mallard Creek Greenway. Other recent construction costs: 1.9 miles (Four Mile Creek Greenway) Design: \$241,102 Construction: \$1,663,255. Irwin Creek Greenway (1.0 miles) Design: \$107,000, Construction: \$428,088. These costs do not



include any funds for contingency (typically around 5% for construction and 10-15% for FFE -- i.e., signage, benches, trashcans, bike racks, water fountains, etc.)

- Mecklenburg County Park and Recreation recently paid \$128,000 for an 80' span on Briar Creek (included concrete approaches) and \$142,000 for an 80' span on Little Sugar Creek (approaches and railing included in costs) both bridges are 10' clear. Cost includes design, engineering and installation.
- Mecklenburg County Park and Recreation recently paid \$60,000 for a simple bridge underpass conversion for a greenway under Remount Road along Irwin Creek, \$150,000 for an underpass conversion on Toby Creek with a major stream restoration project included in the cost, and \$170,000 for NCDOT to design and install a Con-Span under a pre-existing bridge to build a greenway path.

### Other Costs More Typical with Upland Multi-Use Paths on Rail Beds, Road Corridors, Gas, or Electric Lines. (Upland and Lowland Multi-Use Path Projects May Share a Number of these Common Construction Costs Depending on Site-Specific Factors)

- Construction is less expensive in upland areas, especially where grading is already complete or where a sub-base is not needed.
- Rail Trail construction can be estimated at \$510,000 per mile, based on other North Carolina Rail Trail projects plus an additional 10% for design and administration. This plan uses \$106 per linear foot to calculate all costs estimations for paths built on roadway and other upland corridors.
- The American Tobacco Trail (a rail trail in the Raleigh-Durham area) cost \$330,000 per mile for construction costs in 2002. The City of Durham notes that they have seen a 10 – 11% increase in construction costs in later years, with a more moderate climb earlier. This cost included hauling away ballast and ties (not rails), filling in areas of bad soil, upfitting 12" and 18" drain pipes to 24" and 36" to meet new code requirements, grading, and paving.
- 10' Crushed Rock walkway: \$80,000 - \$120,000 per mile (with design and administration – add 10%). These greenways have high maintenance costs.
- Mecklenburg County Park and Recreation's most recent construction cost for a stand alone asphalt parking lot (34 spaces) at Four Mile Creek/Johnston Rd was \$173,000.
- Parking lot: \$18 per square yard. (Parking lots for greenways can typically be shared with shopping areas, parks, or other public destinations and more typically are not needed at all because they are neighborhood access points.)

### Intersections

- Crosswalk/Countdown signal: \$5,000 per intersection (this includes installation and an additional installed post). This cost can be up to \$15,000 per intersection if a retrofit is done with APS devices.
- Neighborhood Crosswalk: \$1,000
- Midblock Crosswalk: \$5,000
- Pedestrian Island: \$5,000 - \$10,000
- Curb extensions: \$5,000 - \$25,000
- Mini-roundabout: \$4,000

### Bicycle Lane Marking

- Bicycle lane striping (thermoplastic):
  - Simply striping a wide roadway: \$15,000/mile with design and administration for both sides of the road.



- \$1.20 per linear foot of 6” wide thermoplastic for line striping (installed)
- \$350.00 for each set of performed thermoplastic bike symbols with arrows (installed)
- Grinding out existing travel lanes and restriping:
- \$1 per foot for grinding existing lane stripes per stripe plus vehicle and bicycle lane marking costs

**Mill and Resurface Roadways**

To repave an existing roadway (Prices are per mile, source is Florida DOT because their policies provide for bicycle accommodations):

Mill and Resurface, 2 Lane Rural Road with 5' Paved Shoulders	<b><u>\$469,756.98</u></b>
Mill and Resurface, 3 Lane Rural Road with 5' paved shoulders, Center Turn Lane	<b><u>\$653,688.54</u></b>
Mill & Resurface 2 Lane Urban Road	<b><u>\$454,275.13</u></b>
Mill & Resurface 3 Lane Urban Road with Center Turn Lane	<b><u>\$622,349.75</u></b>
Mill & Resurface 4 Lane Undivided Urban Road	<b><u>\$908,262.41</u></b>
Mill & Resurface 5 Lane Urban Road with Center Turn Lane	<b><u>\$1,089,384.12</u></b>
Mill & Resurface, Divided, 4 Lane Urban Roadway	<b><u>\$914,169.10</u></b>

**New Roadway Construction**

To repave an existing roadway (Prices are per mile, source is Florida DOT because their policies provide for bicycle accommodations):

New Construction, Undivided, 2 Lane Rural Road with 5' Shoulders	<b><u>\$2,654,542.74</u></b>
New Construction, Undivided, 3 Lane Rural Road with 5' Shoulders, Center Turn Lane	<b><u>\$3,167,118.23</u></b>
New Construction, Undivided, 3 Lane Urban Arterial with Center Turn Lane & 4' Bike Lanes	<b><u>\$6,143,701.01</u></b>
New Construction, Divided, 6 Lane Urban Road with 5' Sidewalk, 4' Bike Lanes	<b><u>\$9,160,842.04</u></b>

**Bicycle Racks, Signage, Lighting, and Landscaping**

- Bicycle Parking Racks
  - The City of Charlotte pays \$120.00 (installed in-house) for a standard “U” shaped bicycle rack from Geo Specs on Davidson Street in Charlotte.
  - Bicycle Lockers: installed are \$1,000.00 according to [www.bicyclinginfo.org](http://www.bicyclinginfo.org)
    - A Bicyclinginfo.org survey of local bicycle program managers in 2000 revealed the following range of costs that agencies charge people to rent bicycle lockers.
      - University of California, Davis: \$20 per quarter (10-12 weeks), \$20 key deposit, \$10 per quarter for those commuting 10 miles or more (one way).



## Mooresville Comprehensive Bicycle Plan

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- Portland, Oregon: \$10/month, \$25/3 months, \$45/6 months, \$25 key deposit. Rate structure assumed to cover locker costs over 10-year period.
- Albuquerque, NM: Free lockers for downtown employees.
- Madison: \$75/1 year.
- Cincinnati: Has 10 lockers in downtown. \$40/6 months. Recent increase in key deposit to cover lock replacements.
- Maryland Mass Transit Admin: \$25/3 months, \$70/ year, \$25 refundable key deposit.
- Washington DC Metro: \$45/6 months, \$70/year, \$10 key deposit
- Tucson: 54 lockers(108 spaces) in downtown, 54 lockers (108 spaces) at select transit stops, \$2/month, \$7.50 refundable key deposit.
- The City of Portland, Oregon very recently (2006) paid \$24,400 (with design and construction) for several covered bicycle parking decks known as bike oases. They fit 20 bicycles, and the price does not include the price for the 10 individual “U” racks that fit inside or the cost of and sidewalk, curb and gutter, or drainage work.
- Several California cities, along with Seattle have installed central “Bike Stations”, complete with short and long term covered bicycle storage, restrooms, showers, and lockers. These cost from a few hundred thousands dollars to a couple million dollars. Any similar central bicycle parking facility in the Town of Mooresville will likely be far less intricate and expensive than these Bike Stations located in larger, more bicycle friendly cities. For the purpose of this study, a very hypothetical cost of \$500,000 is estimated, but can be very different based on size and partnerships involved in such a facility.
- Lighting: Varies widely depending on type of light and location. Lighting an underpass could be \$2,000 - \$5,000 for 3 to 4 lights. Mecklenburg County Park and Recreation recently paid approximately \$11,000 for the wiring and installation of 2 underpasses (8-12 lights under each).
- Landscaping: Contractor installed foliage costs around \$400 - \$500 per tree and \$25 - \$50 per shrub.
- Marking a route with signs:
  - \$2,000 per mile with design and administration
    - Signs: \$250 – \$350 each
      - A standard bike route is assumed to be \$0.38 per linear foot, if no traffic calming or lane width expansion is expected
      - A downtown Bicycle Boulevard is assumed to cost \$5.04 per linear foot to include:
        - Signage at \$0.38 per linear foot
        - An intersection every 1/5 of a mile to include:
          - 5 thermoplastic sharrow symbols per mile on each side of the road after each intersection at \$0.66 per linear foot
          - 5 mini-roundabouts per mile at \$4,000 each and one with a traffic diverter (+\$1,000) for \$4 per linear foot



The table below summarizes the costs for the project types specifically named in Appendix K. These costs are only general costs. Actual project costs will vary from project to project depending on multiple factors.

Project Type	Costs Per Linear Foot
Bike Route	\$0.38
Total Bike Boulevard Costs	\$5.04
Lane Striping (Per Stripe)	\$1.20
Lane Stripe Grinding (Per Stripe)	\$1.00
Multi-Use Path (Lowland)	\$132.00
Multi-Use Path (Upland)	\$106.00
Repaving with Shoulders/Bike Lanes	\$89.00
Repaving with Shoulders/Bike Lanes (with center turn lane)	\$122.00

Project Type	Costs Per Item
Individual Bike Racks	\$120.00
Covered Bicycle Parking	\$25,600
Bike Station	\$500,000
Neighborhood Crossing	\$1,000
Mid-Block Crosswalk	\$5,000
Underpass or Culvert	\$100,000
Pedestrian Bridge	\$120,000
Bike Lane Symbols	\$350.00





## Mooresville Comprehensive Bicycle Plan

Some general cost estimates (not necessarily used to determine project costs for this plan) and other notes are included below from the United States Department of Transportation for traffic calming facilities: (USDOT-FHWA, 2002, <http://www.fhwa.dot.gov/environment/tcalm/index.htm>)

Measure	Reduces Traffic	Noise	Loss of Parking	Restrict Access	Emergency Entrance	Maintenance	Cost
<b>Traffic Education Campaign</b>	Maybe	No change	None	None	None	No	Varies
<b>Speed Display</b>	Yes	No change	None	None	None	No	\$250/day
<b>Neighborhood Sign</b>	Maybe	No change	None	None	None	No	\$200/sign
<b>High Visibility Crosswalks</b>	Maybe	No change	None	None	None	Yes	\$1K-\$5K
<b>Police Enforcement</b>	Yes	No change	None	None	None	No	\$75/hour
<b>Narrowing Lanes</b>	Yes	No change	None	None	None	Yes	\$1K-\$3K
<b>Speed Limit Signing</b>	Maybe	No change	None	None	None	No	\$200/sign
<b>Stop Signs</b>	Maybe	Increase	None	None	None	No	\$200/sign
<b>Signing Restrictions</b>	No	No change	None	Yes	None	No	\$200/sign
<b>Bike Lane</b>	Maybe	No change	Maybe	No	None	Yes	\$25K-\$75K/mile
<b>Sidewalk</b>	No	No change	Maybe	No	None	Yes	\$20-\$30/foot
<b>Median Island</b>	Maybe	Decrease	Maybe	Yes	Yes	No	\$10K-\$75K
<b>Gateway</b>	Yes	Decrease	Maybe	Yes	None	No	\$10K-\$20K



Measure	Reduces Traffic	Noise	Loss of Parking	Restrict Access	Emergency Entrance	Maintenance	Cost
<b>Curb Extension</b>	Maybe	No change	Yes	None	Some	Yes	\$10K-\$20K
<b>Choker</b>	Yes	No change	Yes	None	Some	No	\$15K
<b>Speed Hump</b>	Yes	Increase	Maybe	None	Yes	Yes	\$5K
<b>Raised Crosswalk</b>	Yes	Increase	Yes	None	Some	Yes	\$5-\$10K
<b>Raised Intersection</b>	Yes	Increase	Yes	None	Yes	Yes	\$25K-\$50K
<b>Traffic Circle</b>	Yes	No change	Maybe	None	Some	Maybe	\$15-\$25K
<b>Intersection Channelizing</b>	Yes	No change	Yes	None	None	Maybe	\$15-\$20K
<b>Chicane</b>	Yes	Maybe	Yes	None	Yes	Maybe	\$20K-\$40K
<b>Entrance Barrier</b>	Maybe	No change	Maybe	Yes	Maybe	No	\$15-\$20K
<b>One-way Streets</b>	No	No change	None	Yes	Yes	No	\$5K



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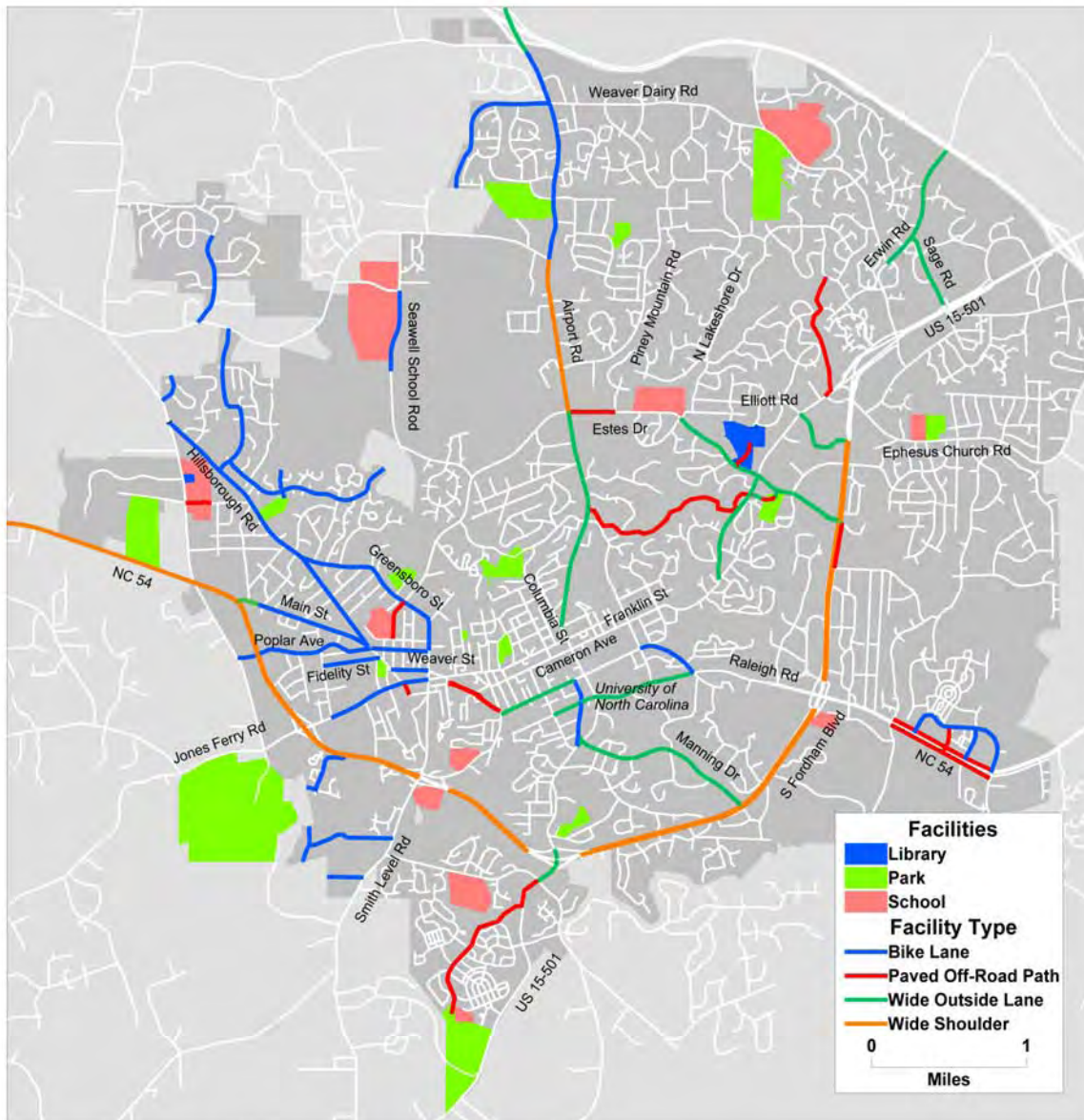






# Chapel Hill and Carrboro Bicycle Facilities

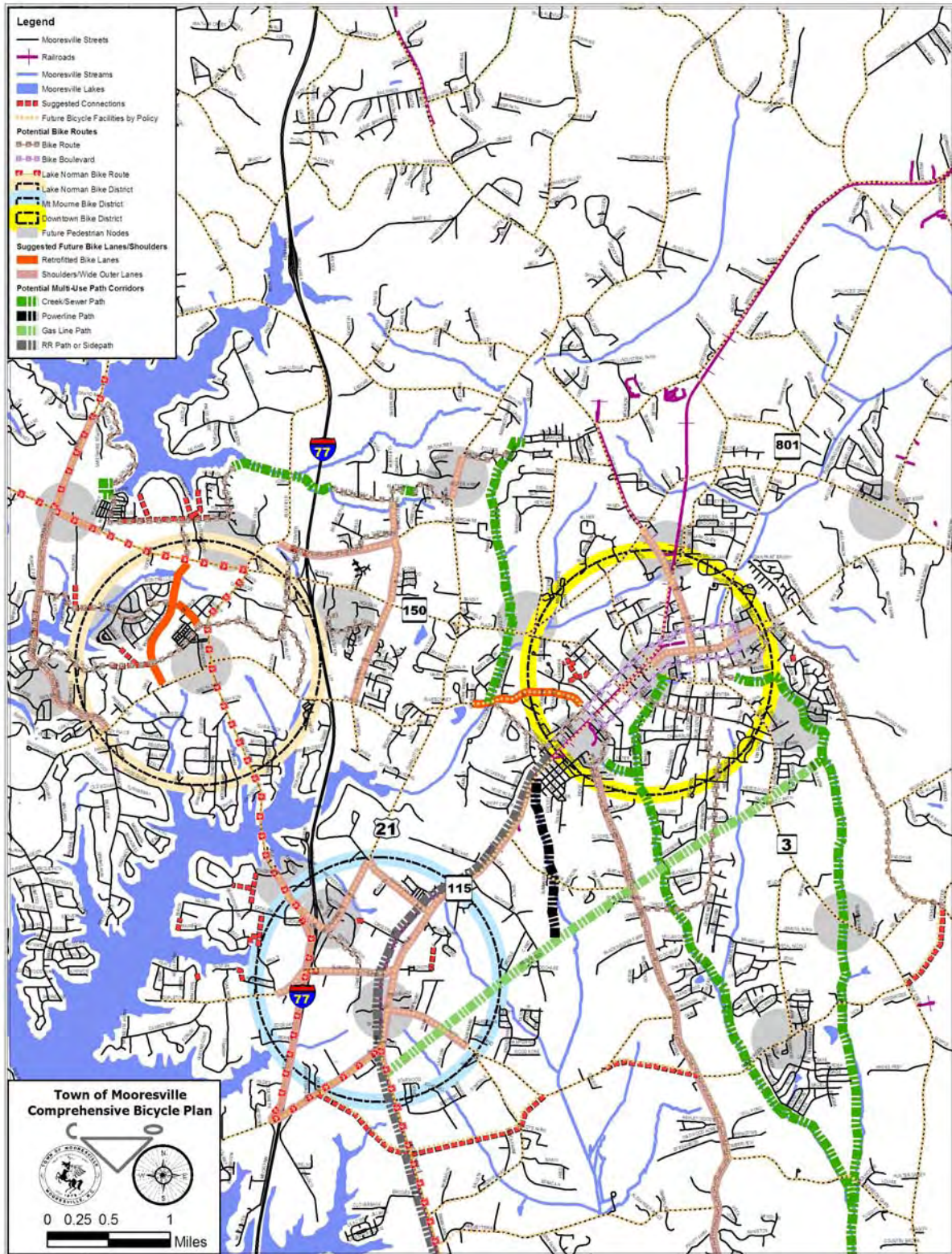
Note: Most road in Chapel Hill and Carrboro are suitable for bicycle travel  
Facilities on this map are explicitly designated for bicycle use.



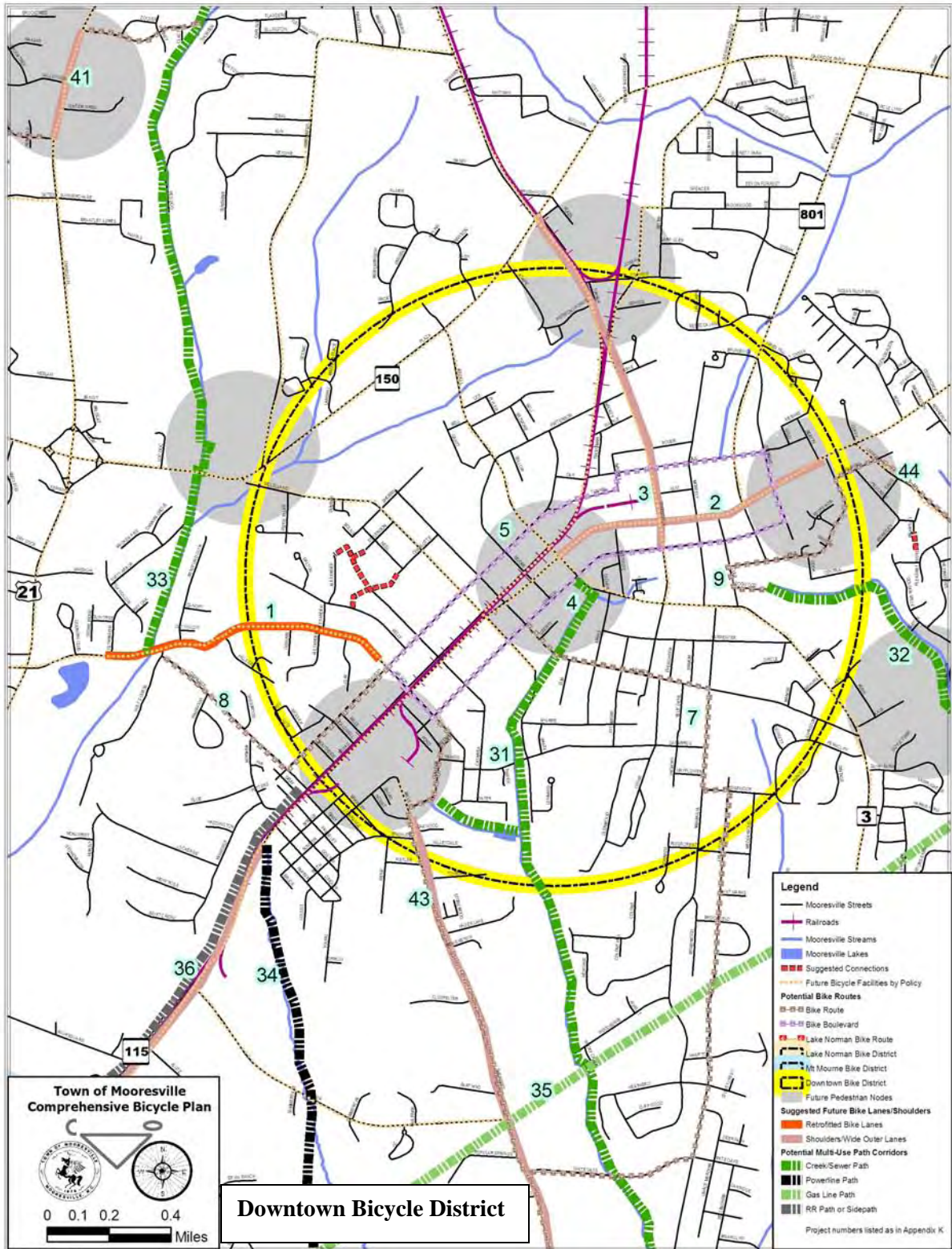
Bike Lane - Striped and signed, curb  
 Wide Shoulder - Striped, no signs, varying width, no curb  
 Wide Outside Lane - Extra width in outer lane, no stripe  
 Paved Off-Road Path - Mixed-use trail, no motor vehicles

Prepared by: Chapel Hill Planning Department  
 Data Source: Chapel Hill Planning Department, September 2003

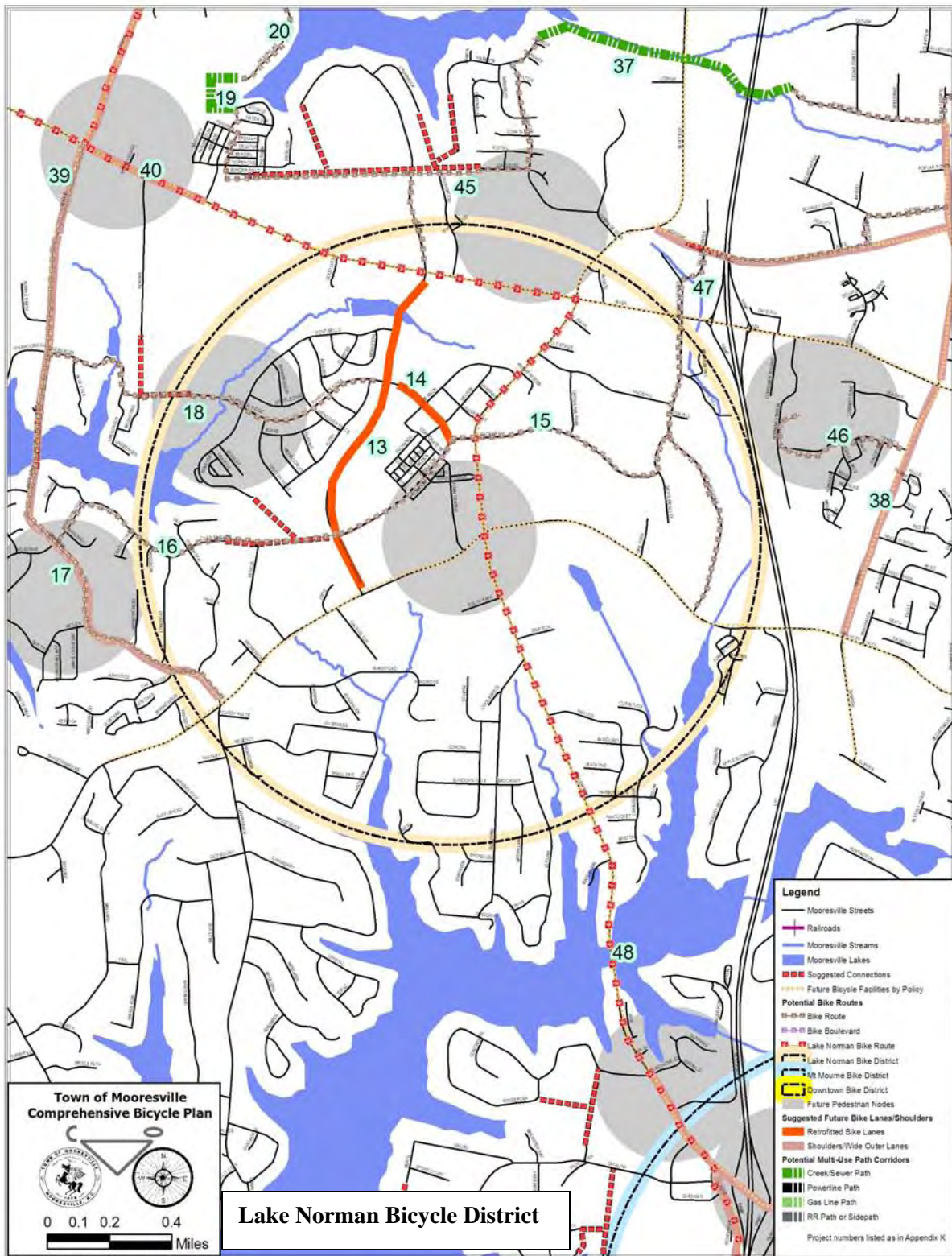




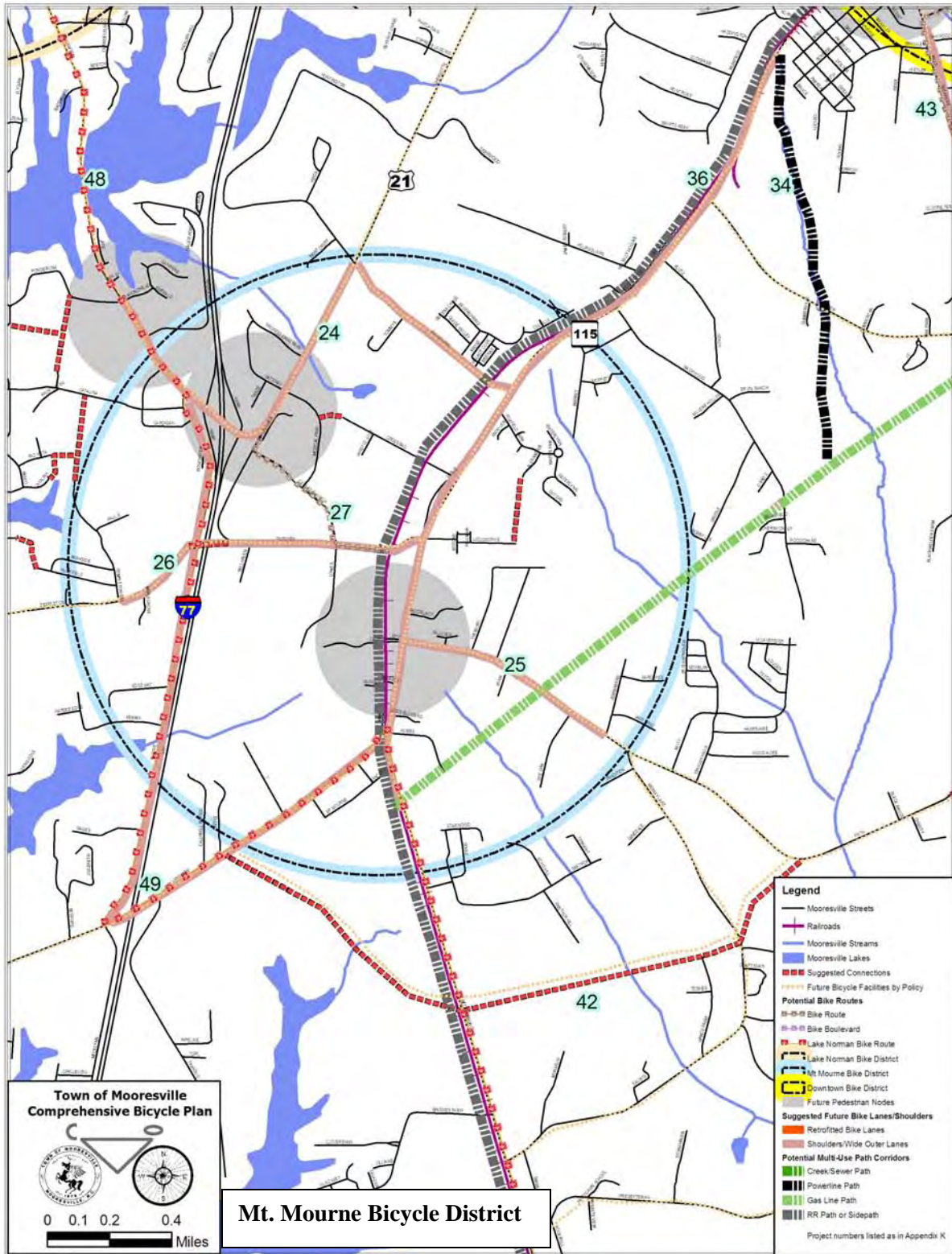














Proposed Infrastructure Projects

Project #	Bicycle District	Project Type	Roadway / Location	From	To	Distance / #	Unit Cost	Estimated Project Cost	Estimated TOTAL Project Cost	Project Evaluation (Total of 100 Points)											Total Points	Ranking	Priority Level	
										Connectivity				Safety			Ability to Implement							
										Provides Access to Major Destinations (10 pts.)	Provides Obvious Access to Children or Low Income (10 pts.)	Closes Gaps or Connects Routes (10 pts.)	Improves Existing Bike Corridors (10 pts.)	Improves Safety for Children or Low Income (10 pts.)	Improves an Existing Known Safety Issue (10 pts.)	Calms Motorized Traffic or Provides Alternate Bike Routes (10 pts.)	Project Already in Consideration (10 pts.)	Potential or Existing Political or Public Support for Project (10 pts.)	Cost (10 pts.)					
1	Downtown	Bike Lane Striping	West Wilson	Glynwater Drive	Academy	4,990	\$2.84	\$14,172	\$14,172	8	7	8	10	7	6	10	10	8	10	84	2	HIGH		
2	Downtown	Future Shoulders/Bike Lanes	Main Street	Iredell Road	Beatty/Pine	4,960	\$4.84	\$24,006	\$24,006	6	7	4	6	7	4	8	0	4	4	50		long-range		
3	Downtown	Future Shoulders/Bike Lanes	Statesville Road	Church	Plaza	6,250	\$89.00	\$556,250	\$556,250	7	7	0	4	7	6	6	0	4	4	45		long-range		
4	Downtown	Upland Multi-Use Path	Iredell Avenue	Church	Liberty Park	250	\$106.00	\$26,500	\$26,500	10	5	8	6	5	4	4	4	6	8	60		mid-range		
5	Downtown	Bike Boulevard	Academy/Tunnel/Mackey/Oak/Stewart	West Wilson	East Main	7,970	\$5.04	\$40,169	\$40,169	10	8	6	8	8	4	10	0	4	8	66	8	HIGH		
6	Downtown	Bike Boulevard	Stewart/Church/Wilson	East Main	Academy	9,630	\$5.04	\$48,535	\$48,535	10	8	6	8	8	4	10	0	4	8	66	9	HIGH		
7	Downtown	Bike Route	Center/Magnolia/Edgemoor/Fieldstone/Whiteoaks	Church	Shearers	14,890	\$0.38	\$5,658	\$5,658	10	6	6	8	6	6	6	6	6	10	70	6	HIGH		
8	Downtown	Bike Route	Lowrance/Academy	W. Wilson/Reeds Creek	West Wilson	5,300	\$0.38	\$2,014	\$2,014	6	7	6	8	7	4	6	0	6	10	60		mid-range		
9	Downtown	Bike Route	Dogwood/Culp/Pine/Briarhill	Rocky River Creek	Linwood	4,710	\$0.38	\$1,790	\$1,790	6	4	0	0	4	4	6	0	6	10	40		long-range		
10	Downtown	Covered Bicycle Parking	Citizen Center			1	\$27,600.00	\$27,600	\$27,600													Parking #3	HIGH	
11	Downtown	Covered Bicycle Parking	Mooreville Elementary, Middle, and Intermediate Schools, East Mooreville Intermediate, South Mooreville Elementary, and Park View Elementary Schools			6	\$25,600.00	\$153,600	\$153,600														Parking #2	HIGH
12	Downtown	Covered Bicycle Parking	Mill Village			1	\$25,600.00	\$25,600	\$25,600															long-range
13	Lake Norman	Bike Lane Striping	Morrison Plantation Pkwy	Brawley School	150	5,780	\$6.24	\$36,067	\$36,067	9	6	8	10	6	10	10	0	4	10	73	5	HIGH		
14	Lake Norman	Bike Lane Striping	Plantation Ridge	Morrison Plantation	Singleton	1,410	\$5.24	\$7,388	\$7,388	9	6	10	10	6	8	10	0	10	10	79	3	HIGH		
15	Lake Norman	Bike Route	Singleton/Plantation Ridge/Raceway/Gasoline Alley/Rolling Hills	Morrison Plantation Pkwy	Brawley School Road	10,370	\$0.38	\$3,941	\$3,941	10	6	6	8	6	4	6	0	6	10	62		mid-range		
16	Lake Norman	Bike Route	Morrison Cove/Castle's Gate/Future Road	Oak Tree Road	Morrison Plantation Pkwy	5,570	\$0.38	\$2,117	\$2,117	6	6	6	6	6	4	6	0	4	8	52		long-range		
17	Lake Norman	Future Shoulders/Bike Lanes	Oak Tree/Happy Oaks/Future Bridge/Doolie	Brawley School Road	150	11,450	\$89.00	\$1,019,050	\$1,019,050	8	6	10	6	6	0	0	6	4	4	50		long-range		
18	Lake Norman	Bike Route	Linberger/Future Road/Plantation Ridge	Doolie	Morrison Plantation Pkwy	6,370	\$0.38	\$2,421	\$2,421	6	6	6	6	6	6	10	0	6	8	60		mid-range		
19	Lake Norman	Lowland Multi-Use Path	Wilson Lake/Schools	Gresham	Private&Public Land	1,430	\$132.00	\$188,760	\$188,760	6	5	10	0	6	10	10	6	4	8	65	10	HIGH		
20	Lake Norman	Bike Route	Lakeshore School/Wilson Lake Rd/Future Greenway/Gresham/Water Oak/Racine/Border Field/Future Road	Perth Rd	Ervin	10,500	\$0.38	\$3,990	\$3,990	4	5	6	0	5	4	4	0	6	8	42		long-range		
21	Lake Norman	Covered Bicycle Parking	YMCA			1	\$25,600.00	\$25,600	\$25,600															long-range
22	Lake Norman	Covered Bicycle Parking	Brawley Middle School, Lake Norman Elementary and High Schools, and Lake Shore Elementary and Middle Schools			5	\$25,600.00	\$128,000	\$128,000														Parking #2	HIGH
23	Lake Norman	Covered Bicycle Parking	Target and Wal-Mart Shopping Centers			2	\$25,600.00	\$51,200	\$51,200															long-range
24	Mount Mourne	Future Shoulders/Bike Lanes	Williamson/21/Waterlyn	Diamondhead	115	10,160	\$122.00	\$1,239,520	\$1,239,520	6	1	8	8	1	8	6	6	4	6	54		long-range		
25	Mount Mourne	Future Shoulders/Bike Lanes	Faith Road	115	Jenny Marie	3,860	\$89.00	\$343,540	\$343,540	6	2	4	6	2	4	6	0	4	8	42		long-range		
26	Mount Mourne	Future Shoulders/Bike Lanes	Templeton/Future Bridge/Fairview	Templeton Bay Road	115	5,650	\$122.00	\$689,300	\$689,300	6	5	8	0	5	4	6	6	6	6	52		long-range		
27	Mount Mourne	Bike Route	Fairview/Centre Church/Fairview	21	Centre Church	3,350	\$0.38	\$1,273	\$14,473	6	0	6	4	0	0	6	6	6	8	42		long-range		
28	Mount Mourne	Upland Multi-Use Path	Connects Centre Church Road			100	\$132.00	\$13,200																long-range
29	Mount Mourne	Bike Station	Future Commuter Rail Station			1	\$500,000.00	\$500,000	\$500,000															long-range
30	Mount Mourne	Covered Bicycle Parking	Mount Mourne Elementary and Middle Schools			2	\$25,600.00	\$51,200	\$51,200														Parking #2	HIGH
30	Mount Mourne	Covered Bicycle Parking	Lake Norman Medical Center			1	\$25,600.00	\$25,600	\$25,600															long-range





Proposed Infrastructure Projects

Project #	Bicycle District	Project Type	Roadway / Location	From	To	Distance / #	Unit Cost	Estimated Project Cost	Estimated TOTAL Project Cost	Project Evaluation (Total of 100 Points)											Total Points	Ranking	Priority Level
										Connectivity				Safety			Ability to Implement						
										Provides Access to Major Destinations (10 pts.)	Provides Obvious Access to Children or Low Income (10 pts.)	Closes Gaps or Connects Routes (10 pts.)	Improves Existing Bike Corridors (10 pts.)	Improves Safety for Children or Low Income (10 pts.)	Improves an Existing Known Safety Issue (10 pts.)	Calms Motorized Traffic or Provides Alternate Bike Routes (10 pts.)	Project Already in Consideration (10 pts.)	Potential or Existing Political or Public Support for Project (10 pts.)	Cost (10 pts.)				
31	Study Area	Lowland Multi-Use Path Pedestrian Bridge Neighborhood Crossing Mid-Block Crosswalk Underpass or Culvert	Dye Creek	Iredell	Rocky River Creek	28,430 3 4 1 1	\$132.00 \$120,000.00 \$1,000.00 \$5,000.00 \$100,000.00	\$3,752,760 \$360,000 \$4,000 \$5,000 \$100,000	\$4,221,760	10	10	6	4	10	6	10	8	8	6	78	4	HIGH	
32	Study Area	Lowland Multi-Use Path Pedestrian Bridge Neighborhood Crossing Mid-Block Crosswalk Underpass or Culvert	Rocky River Creek	Dye Creek	Dogwood	26,470 1 1 1 1	\$132.00 \$120,000.00 \$1,000.00 \$5,000.00 \$100,000.00	\$3,494,040 \$120,000 \$1,000 \$5,000 \$100,000	\$3,720,040	10	6	6	4	6	4	10	6	6	6	64		mid-range	
33	Study Area	Lowland Multi-Use Path Pedestrian Bridge Neighborhood Crossing Mid-Block Crosswalk Underpass or Culvert	Reeds Creek	Markham	W. Wilson	12,410 1 1 1 1	\$132.00 \$120,000.00 \$1,000.00 \$5,000.00 \$100,000.00	\$1,638,120 \$120,000 \$1,000 \$5,000 \$100,000	\$1,864,120	6	5	6	0	6	4	10	6	6	6	55		mid-range	
34	Study Area	Upland Multi-Use Path Pedestrian Bridge Neighborhood Crossing Mid-Block Crosswalk	Powerline	21	Gas Line	7,030 1 1 1	\$106.00 \$120,000.00 \$1,000.00 \$5,000.00	\$745,180 \$120,000 \$1,000 \$5,000	\$871,180	4	7	4	0	7	4	8	0	4	8	46		long-range	
35	Study Area	Upland Multi-Use Path Pedestrian Bridge Neighborhood Crossing Mid-Block Crosswalk	Gas Line	Rocky River Greenway	115	22,810 1 1 1	\$106.00 \$120,000.00 \$1,000.00 \$5,000.00	\$2,417,860 \$120,000 \$1,000 \$5,000	\$2,543,860	8	6	8	0	6	4	10	6	4	8	60		mid-range	
36	Study Area	Upland Multi-Use Path Mid-Block Crosswalk Crosswalk Repaving with Paved Shoulders	Between Railroad and 115 NC Highway 115	County Line	Lowrance	25,290 3 4 25,290	\$106.00 \$5,000.00 \$1,000.00 \$89.00	\$2,680,740 \$15,000 \$4,000 \$2,250,810	\$4,950,550	10	10	6	10	10	8	10	6	8	8	86	1	HIGH	
37	Study Area	Lowland Multi-Use Path Lowland Multi-Use Path Pedestrian Bridge Neighborhood Crossing Mid-Block Crosswalk Underpass or Culvert	Byers Creek Byers Creek	Maranta Eastbend	Byers Creek Rd Brantley Place	4,660 650 1 1 1 1	\$132.00 \$132.00 \$120,000.00 \$1,000.00 \$5,000.00 \$100,000.00	\$615,120 \$85,800 \$120,000 \$1,000 \$5,000 \$100,000	\$926,920	6	4	8	0	4	8	10	6	4	0	50		long-range	
38	Study Area	Future Shoulders/Bike Lanes	Talbert Point/Talbert	Byers Creek Rd.	Brawley School	8,950	\$89.00	\$796,550	\$796,550	8	1	8	4	1	4	6	0	4	8	44		long-range	
39	Study Area	Future Shoulders/Bike Lanes Future Shoulders/Bike Lanes	Doolie Perth	High School 150	150 Wilson Lake	1,580 4,190	\$89.00 \$89.00	\$140,620 \$372,910	\$513,530	6	6	8	8	6	4	6	0	4	8	56		mid-range	
40	Study Area	Future Shoulders/Bike Lanes	NC 150	Doolie/Perth	Water Oak	2,250	\$122.00	\$274,500	\$274,500	6	1	6	8	1	10	8	0	4	8	52		long-range	
41	Study Area	Future Shoulders/Bike Lanes	US 21	Brantley Place	Flanders	1,940	\$89.00	\$172,660	\$172,660	2	3	6	6	3	4	6	0	4	8	42		long-range	
42	Study Area	Future Shoulders/Bike Lanes	Future East-West Connector from Langtree to 152	115	Williford					8	6	8	0	6	4	6	8	6	10	62		mid-range	
43	Study Area	Bike Route Repaving with Paved Shoulders	Shearers, Freeman, College, Mills	East Wilson	Mecklenburg County	27,560 27,560	\$0.38 \$89.00	\$10,473 \$2,452,840	\$2,463,313	4	6	7	10	6	6	8	6	6	8	67	7	HIGH	
44	Study Area	Bike Route	Linwood	Briarhill	New East/West Connector	15,230	\$0.38	\$5,787	\$5,787	4	1	0	6	1	4	4	0	4	8	32		long-range	
45	Study Area	Bike Route Bike Route Bike Route Bike Route	Ervin/Recommended Road/Walmsley/Glencoe/Marantha Byers Creek Rd/Talbert Pointe/Eastbend Brantley Place Flanders	150 Byers Creek 21 Byers Creek 21	Byers Creek Byers Creek 21 Reeds Creek	6,100 3,508 1,997 2,097	\$0.38 \$0.38 \$0.38 \$0.38	\$2,318 \$1,333 \$759 \$797	\$2,318 \$2,889	6	3	4	0	3	4	8	0	4	8	40		long-range	
46	Study Area	Bike Route	Terrance Road	Talbert	Shopping Center	3,000	\$0.38	\$1,140	\$1,140	8	4	6	6	4	6	6	6	6	8	60		mid-range	
47	Study Area	Bike Route	Rolling Hills, Regency/Gallery Cr., Midnight Ln./New Bridge, Gates/Oats	Gasoline Alley	Talbert	8,000																long-range	
48	Study Area	Lake Norman Bike Re-Route	115/Fairview/Centre Church Rd/Williamson/Plantation Ridge Drive/Doolie					\$0	\$0													long-range	
49	Study Area	Future Shoulders/Bike Lanes	Langtree and Alcove	NC 115	US 21	15,000	\$89.00	\$1,335,000	\$1,335,000	6	2	8	6	2	4	6	8	8	8	58		mid-range	
50	Study Area	Individual Bike Racks	As needed			24	\$120.00	\$2,880	\$2,880													Parking #1 HIGH	
51	Study Area	Portable Bike Rack	For Special Events																			mid-range	



## NCDOT Greenway Administrative Process

In 1994 the NCDOT adopted administrative guidelines to consider greenways and greenway crossings during the highway planning process. This policy was incorporated so that critical corridors which have been adopted by localities for future greenways will not be severed by highway construction. Following are the text for the Greenway Policy and Guidelines for implementing it.

### Administrative Action to Include Local Adopted Greenways Plans in the NCDOT Highway Planning Process

#### **January, 1994**

In concurrence with the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and the Board of Transportation's Bicycle Policy of 1978 (updated in 1991) and Pedestrian Policy of 1993, the North Carolina Department of Transportation recognizes the importance of incorporating local greenways plans into its planning process for the development and improvement of highways throughout North Carolina.

#### **NCDOT Responsibilities:**

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

Where possible, within the policies of the Department, within the guidelines set forth in provisions for greenway crossings, or other greenway elements, will be made as a part of the highway project or undertaken as an allowable local expenditure.

#### **Local Responsibilities:**

Localities must show the same commitment to building their adopted greenway plans as they are requesting when they ask the state to commit to providing for a certain segment of that plan. It is the responsibility of each locality to notify the Department of greenway planning activity and adopted greenway plans and to update the Department with all adopted additions and changes in existing plans.

It is also the responsibility of each locality to consider the adopted transportation plan in their greenways planning and include its adopted greenways planning activities within their local transportation planning process. Localities should place in priority their greenways construction activities and justify the transportation nature of each greenway segment. When there are several planned greenway crossings of a proposed highway improvement, the locality must provide justification of each and place the list of crossings in priority order. Where crossings are planned, transportation rights of way should be designated or acquired separately to avoid jeopardizing the future transportation improvements.

### Guidelines for NCDOT to Comply With Administrative Decision to Incorporate Local Greenways into Highway Planning Process



Thoroughfare plans will address the existence of greenways planning activity, which has been submitted by local areas. Documentation of mutually agreed upon interface points between the thoroughfare plan and a greenway plan will be kept, and this information will become a part of project files.

Project Planning Reports will address the existence of locally adopted greenways segment plans, which may affect the corridor being planned for a highway improvement. It is, however, the responsibility of the locality to notify the Department of the adopted greenways plans (or changes to its previous plans) through its current local transportation plan, as well as its implementation programs.

Where local greenways plans have not been formally adopted or certain portions of the greenways plans have not been adopted, the Department may note this greenway planning activity but is not required to incorporate this information into its planning reports.

Where the locality has included adopted greenways plans as a part of its local transportation plan and a segment (or segments) of these greenways fall within the corridor of new highway construction or a highway improvement project, the feasibility study and/or project planning report for this highway improvement will consider the effects of the proposed highway improvement upon the greenway in the same manner as it considers other planning characteristics of the project corridor, such as archeological features or land use.

Where the locality has justified the transportation versus the leisure use importance of a greenway segment and there is no greenway alternative of equal importance nearby, the project planning report will suggest inclusion of the greenway crossing, or appropriate greenway element, as an incidental part of the highway expenditure.

Where the locality has not justified the transportation importance of a greenway segment, the greenway crossing, or appropriate greenway element, may be included as a part of the highway improvement plan if the local government covers the cost.

A locality may add any appropriate/acceptable greenway crossing or greenway element at their own expense to any highway improvement project as long as it meets the design standards of the NCDOT.

The NCDOT will consider funding for greenway crossings, and other appropriate greenway elements only if the localities guarantee the construction of and/or connection with other greenway segments. This guarantee should be in the form of inclusion in the local capital improvements program or NCDOT/municipal agreement.

If the state pays for the construction of a greenway incidental to a highway improvement and the locality either removes the connecting greenway segments from its adopted greenways plans or decides not to construct its agreed upon greenway segment, the locality will reimburse the state for the cost of the greenway incidental feature. These details will be handled through a municipal agreement. Locality must accept maintenance responsibilities for state-built greenways, or portions thereof.

Details will be handled through a municipal agreement. 06/01/05



**DEPARTMENT OF TRANSPORTATION  
PEDESTRIAN POLICY GUIDELINES  
EFFECTIVE OCTOBER 1, 2000**

These guidelines provide an updated procedure for implementing the Pedestrian Policy adopted by the Board of Transportation August 1993 and the Board of Transportation Resolution September 8, 2000. The resolution reaffirms the Department's commitment to improving conditions for bicycling and walking, and recognizes non-motorized modes of transportation as critical elements of the local, regional, and national transportation system. The resolution encourages North Carolina cities and towns to make bicycling and pedestrian improvements an integral part of their transportation planning and programming.

**REQUIREMENTS FOR DOT FUNDING:**

**REPLACEMENT OF EXISTING SIDEWALKS:**

The Department will pay 100% of the cost to replace an existing sidewalk that is removed to facilitate the widening of a road.

**TIP INCIDENTAL PROJECTS:**

DEFINED: Incidental pedestrian projects are defined as TIP projects where pedestrian facilities are included as part of the roadway project.

**REQUIREMENTS:**

1. The municipality and/or county notifies the Department in writing of its desire for the Department to incorporate pedestrian facilities into project planning and design. Notification states the party's commitment to participate in the cost of the facility as well as being responsible for all maintenance and liability. Responsibilities are defined by agreement. Execution is required prior to contract let. The municipality is responsible for evaluating the need for the facility (ie: generators, safety, continuity, integration, existing or projected traffic) and public involvement.
2. Written notification must be received by the Project Final Field Inspection (FFI) date. Notification should be sent to the Deputy Highway Administrator - Preconstruction with a copy to the Project Engineer and the Agreements Section of the Program Development Branch. Requests received after the project FFI date will be incorporated into the TIP project, if feasible, and only if the requesting party commits by agreement to pay 100% of the cost of the facility.
3. The Department will review the feasibility of including the facility in our project and will try to accommodate all requests where the Department has acquired appropriate right of way on curb and gutter sections and the facility can be installed in the current project berm width. The standard project section is a 10-ft berm (3.0-meter) that accommodates a 5-ft sidewalk. In accordance with AASHTO standards, the Department will construct 5-ft sidewalks with wheelchair ramps. Betterment cost (ie: decorative pavers) will be a Municipal responsibility.



## Mooresville Comprehensive Bicycle Plan

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4. If the facility is not contained within the project berm width, the Municipality is responsible for providing the right of way and/or construction easements as well as utility relocations, at no cost to the Department. This provision is applicable to all pedestrian facilities including multi-use trails and greenways.

5. A cost sharing approach is used to demonstrate the Department's and the municipality's/county's commitment to pedestrian transportation (sidewalks, multi-use trails and greenways). The matching share is a sliding scale based on population as follows:

MUNICIPAL POPULATION	DOT PARTICIPATION	LOCAL PARTICIPATION
> 100,000	50%	50%
50,000 to 100,000	60%	40%
10,000 to 50,000	70%	30%
< 10,000	80%	20%

Note: The cost of bridges will not be included in the shared cost of the pedestrian installation if the Department is funding the installation under provision 6 - pedestrian facilities on bridges.

6. For bridges on streets with curb and gutter approaches, the Department will fund and construct sidewalks on both sides of the bridge facility if the bridge is less than 200 feet in length. If the bridge is greater than 200 feet in length, the Department will fund and construct a sidewalk on one side of the bridge structure. The bridge will also be studied to determine the costs and benefits of constructing sidewalks on both sides of the structure. If in the judgment of the Department sidewalks are justified, funding will be provided for installation. The above provision is also applicable to dual bridge structures. For dual bridges greater than 200 ft in length, a sidewalk will be constructed on the outside of one bridge structure. The bridges will also be studied to determine if sidewalks on the outside of both structures are justified.

7. FUNDING CAPS are no longer applicable.

8. This policy does not commit the Department to the installation of facilities in the Department's TIP projects where the pedestrian facility causes an unpractical design modification, is not in accordance with AASHTO standards, creates an unsafe situation, or in the judgment of the Department is not practical to program.

### INDEPENDENT PROJECTS

DEFINED: The DOT has a separate category of funds for all independent pedestrian facility projects in North Carolina where installation is unrelated to a TIP roadway project. An independent pedestrian facility project will be administered in accordance with Enhancement Program Guidelines.





### **NCDOT Bicycle Policy**

Pursuant to the Bicycle and Bikeways Act of 1974, the Board of Transportation finds that bicycling is a bonafide highway purpose subject to the same rights and responsibilities and eligible for the same considerations as other highway purposes, as elaborated below.

1. The Board of Transportation endorses the concept that bicycle transportation is an integral part of the comprehensive transportation system in North Carolina.
2. The Board of Transportation endorses the concept of providing bicycle transportation facilities within the rights-of-way of highways deemed appropriated by the Board.
3. The Board of Transportation will adopt Design Guidelines for Bicycle Facilities. These guidelines will include criteria for selecting cost-effective and safety-effective bicycle facility types and a procedure for prioritizing bicycle facility improvements.
4. Bicycle compatibility shall be a goal for state highways, except on fully controlled access highways where bicycles are prohibited, in order to provide reasonably safe bicycle use.
5. All bicycle transportation facilities approved by the Board of Transportation shall conform with the adopted "Design Guidelines for Bicycle Facilities" on state-funded projects, and also with guidelines published by the American Association of State Highway and Transportation Officials (AASHTO) on federal aid projects.

### **Planning and Design**

It is the policy of the Board of Transportation that bicycle facility planning be included in the state thoroughfare and project planning process.

1. The intent to include planning for bicycle facilities within new highway construction and improvement projects is to be noted in the Transportation Improvement Program.
2. During the thoroughfare planning process, bicycle usage shall be presumed to exist along certain corridors (e.g., between residential developments, schools, businesses and recreational areas). Within the project planning process, each project shall have a documented finding with regard to existing or future bicycling needs. In order to use available funds efficiently, each finding shall include measures of cost-effectiveness and safety-effectiveness of any proposed bicycle facility.
3. If bicycle usage is shown likely to be significant, and it is not prohibited, and there are positive cost-effective and safety-effective findings; then, plans for and designs of highway construction projects along new corridors, and for improvement projects along existing highways, shall include provisions for bicycle facilities (e.g., bike routes, bike lanes, bike paths, paved shoulders, wide outside lanes, bike trails) and secondary bicycle facilities (traffic control, parking, information devices, etc.).



4. Federally funded new bridges, grade separated interchanges, tunnels, and viaducts, and their improvements, shall be designed to provide safe access to bicycles, pursuant to the policies of the Federal Highway Administration.
5. Barriers to existing bicycling shall be avoided in the planning and design of highway projects.
6. Although separate bicycle facilities (e.g., bike paths, bike trails) are useful under some conditions and can have great value for exclusively recreational purposes, incorporation of on road bicycle facilities (e.g., bicycle lanes, paved shoulders) in highway projects are preferred for safety reasons over separate bicycle facilities parallel to major roadways. Secondary complementary bicycle facilities (e.g., traffic control, parking, information devices, etc.) should be designed to be within highway rights-of-way.
7. Technical assistance shall be provided in the planning and design of alternative transportation uses, including bicycling, for abandoned railroad rights-of way. This assistance would be pursuant to the National Trails act Amendment of 1983, and the resultant national Rails to Trails program, as will the Railway Revitalization Act of 1975.
8. Wherever appropriate, bicycle facilities shall be integrated into the study, planning, design, and implementation of state funded transportation projects involving air, rail, and marine transportation, and public parking facilities.
9. The development of new and improved bicycle control and information signs is encouraged for the increased safety of all highway users.
10. The development of bicycle demonstration projects which foster innovations in planning, design, construction, and maintenance is encouraged.
11. Paved shoulders shall be encouraged as appropriate along highways for the safety of all highway users, and should be designed to accommodate bicycle traffic.
12. Environmental Documents/Planning Studies for transportation projects shall evaluate the potential use of the facility by bicyclists and determine whether special bicycle facility design is appropriate.
13. Local input and advice shall be sought, to the degree practicable, during the planning stage and in advance of the final design of roadway improvements to ensure appropriate consideration of bicycling needs, if significant.
14. On highways where bicycle facilities exist, (bike paths, bike lanes, bike routes, paved shoulders, wide curb lanes, etc.), new highway improvements shall be planned and implemented to maintain the level of existing safety for bicyclists.
15. Any new or improved highway project designed and constructed within a public-use transportation corridor with private funding shall include the same bicycle facility considerations as if the project had been funded with public funds. In private transportation projects (including parking facilities), where state funding or Department



approval is not involved, the same guidelines and standards for providing bicycle facilities should be encouraged.

### Construction

It is the policy of the Board of Transportation that all state and federally funded highway projects incorporating bicycle facility improvements shall be constructed in accordance with approved state and federal guidelines and standards.

1. Bicycle facilities shall be constructed, and bicycle compatibility shall be provided for, in accordance with adopted Design Guidelines for Bicycle Facilities and with guidelines of the American Association of State Highway and Transportation Officials.
2. Rumble strips (raised traffic bars), asphalt concrete dikes, reflectors, and other such surface alterations, where installed, shall be placed in a manner as not to present hazards to bicyclists where bicycle use exists or is likely to exist. Rumble strips shall not be extended across shoulder or other areas intended for bicycle travel.
3. During restriping operations, motor vehicle traffic lanes may be narrowed to allow for wider curb lanes.

### Maintenance

It is the policy of the Board of Transportation that the state highway system, including state-funded bicycle facilities, shall be maintained in a manner conducive to bicycle safety.

1. State and federally funded and built bicycle facilities within the state right-of-way are to be maintained to the same degree as the state highway system.
2. In the maintenance, repair, and resurfacing of highways, bridges, and other transportation facilities, and in the installation of utilities or other structures, nothing shall be done to diminish existing bicycle compatibility.
3. Rough road surfaces which are acceptable to motor vehicle traffic may be unsuitable for bicycle traffic, and special consideration may be necessary for highways with significant bicycle usage.
4. For any state-funded bicycle project not constructed on state right-of-way, a maintenance agreement stating that maintenance shall be the total responsibility of the local government sponsor shall be negotiated between the Department and the local government sponsor.
5. Pot-holes, edge erosion, debris, etc., are special problems for bicyclists, and their elimination should be a part of each Division's maintenance program. On identified



bicycle facilities, the bike lanes and paths should be routinely swept and cleared of grass intrusion, undertaken within the discretion and capabilities of Division forces.

### Operations

It is the policy of the Board of Transportation that operations and activities on the state highway system and bicycle facilities shall be conducted in a manner conducive to bicycle safety.

1. A bicyclist has the right to travel at a speed less than that of the normal motor vehicle traffic. In exercising this right, the bicyclist shall also be responsible to drive his/her vehicle safely, with due consideration to the rights of the other motor vehicle operators and bicyclists and in compliance with the motor vehicle laws of North Carolina.
2. On a case by case basis, the paved shoulders of those portions of the state's fully controlled access highways may be studied and considered as an exception for usage by bicyclists where adjacent highways do not exist or are more dangerous for bicycling. Pursuant to federal highway policy, usage by bicyclists must receive prior approval by the Board of Transportation for each specific segment for which such usage is deemed appropriate, and those segments shall be appropriately signed for that usage.
3. State, county, and local law enforcement agencies are encouraged to provide specific training for law enforcement personnel with regard to bicycling.
4. The use of approved safety helmets by all bicyclists is encouraged.

### Education

It is the policy of the Board of Transportation that education of both motorists and bicyclists, regarding the rights and responsibilities of bicycle riders, shall be an integral part of the Department's 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, and in conjunction with safety efforts through the Governor's Highway Safety Program. The Division of Motor Vehicles is also urged to include bicycle safety and user information in its motor vehicle safety publications.

### Parking

It is the policy of the Board of Transportation that secure and adequate bicycle parking facilities shall be provided wherever practicable and warranted in the design and construction of all state-funded buildings, parks, and recreational facilities.



BICYCLE REFERENCES IN THE TOWN OF MOORESVILLE CODE OF ORDINANCES

DIVISION 2. BICYCLES

Sec. 23-211. Applicability of traffic laws to persons riding bicycles.

Every person riding a bicycle upon a roadway shall be granted all of the rights and shall be subject to all of the duties applicable to the driver of a vehicle by the laws of this state declaring rules of the road applicable to vehicles or by this chapter applicable to the driver of a vehicle, except as to special regulations in this article and except as to those provisions of law and ordinances which by their nature can have no application.

(Code 1975, § 7.149)

Sec. 23-212. Obedience to traffic-control devices.

(a) Any person operating a bicycle shall obey the instructions of official traffic-control signals, signs and other control devices applicable to vehicles, unless otherwise directed by a police officer.

(b) Whenever authorized signs are erected indicating that no right or left or U-turn is permitted, no person operating a bicycle shall disobey the direction of any such sign, except where such person dismounts from the bicycle to make any such turn, in which event such person shall then obey the regulations applicable to pedestrians.

(Code 1975, § 7.150)

Sec. 23-213. Use of right-hand side of roadway.

Every person operating a bicycle upon a roadway shall ride as near to the right-hand side of the roadway as practicable, exercising due care when passing a standing vehicle or one proceeding in the same direction.

(Code 1975, § 7.152(a))

Sec. 23-214. Riding abreast.

Persons riding bicycles upon a roadway shall not ride more than two (2) abreast except on paths or parts of roadways set aside for the exclusive use of bicycles.

(Code 1975, § 7.152(b))

Sec. 23-215. Use of bicycle paths.

Whenever a usable path for bicycles has been provided adjacent to a roadway, bicycle riders shall use such path and shall not use the roadway.

(Code 1975, § 7.152(c))

Sec. 23-216. Authority to prohibit riding on designated roadways.

The chief of police is authorized to erect signs on any roadway prohibiting the riding of bicycles thereon by any person, and when such signs are in place no person shall disobey the signs.(Code 1975, § 7.157(b))





Sec. 23-217. Manner of riding; carrying passengers.

- (a) A person propelling a bicycle shall not ride other than astride a permanent and regular seat attached thereto.
- (b) No bicycle shall be used to carry more persons at one time than the number for which it is designed and equipped.

(Code 1975, § 7.151)

Sec. 23-218. Speed.

No person shall operate a bicycle at a speed greater than is reasonable and prudent under the conditions then existing.

(Code 1975, § 7.153)

Sec. 23-219. Emerging from alley or driveway.

The operator of a bicycle emerging from an alley, driveway or building shall, upon approaching a sidewalk or the sidewalk area extending across any alleyway, yield the right-of-way to all pedestrians approaching on the sidewalk or sidewalk area, and upon entering the roadway shall yield the right-of-way to all vehicles approaching on the roadway.

(Code 1975, § 7.154)

Sec. 23-220. Carrying articles.

No person operating a bicycle shall carry any package, bundle or article which prevents the rider from keeping at least one (1) hand upon the handlebars.

(Code 1975, § 7.155)

Sec. 23-221. Parking generally.

No person shall park a bicycle upon a street other than upon the roadway against the curb or upon the sidewalk in a rack to support the bicycle or against a building or at the curb, in such a manner as to afford the least obstruction to pedestrian traffic.

(Code 1975, § 7.156)

Sec. 23-222. Parking in front of theatres.

Any person who parks or leaves a bicycle in the spaces in front of the theatres in the town which have been marked off and in which the parking of motor vehicles is forbidden shall be guilty of a misdemeanor.

(Code 1975, § 7.147)



Sec. 23-223. Lamps and brakes.

(a) It shall be unlawful for any person to operate a bicycle on any public street within the town during the time from one-half hour after sundown until one-half hour before sunrise unless such bicycle is equipped with a front light visible for three hundred (300) feet and a rear light or reflector visible for two hundred (200) feet.

(b) Every bicycle shall be equipped with a brake which will enable the operator to make the braked wheel skid on dry, level, clean pavement.

(Code 1975, § 7.158)

## ARTICLE VI. BICYCLES AND OTHER TOY VEHICLES

### DIVISION 1. GENERALLY

Sec. 23-191. Responsibility of parents.

The parent of any child and the guardian of any ward shall not authorize or knowingly permit any such child or ward to violate any of the provisions of this article.

(Code 1975, § 7.148(a))

Sec. 23-192. Applicability of article.

The regulations of this article applicable to bicycles shall apply whenever a bicycle is operated upon any street or upon any public path set aside for the exclusive use of bicycles, subject to those exceptions stated in this article.

(Code 1975, § 7.148(b))

Sec. 23-193. Prohibited uses on public streets and sidewalks during events.

(a) No person shall ride a bicycle, scooter, skateboard or other similar vehicle upon a sidewalk within the central or general business district.

(b) It shall be prohibited for any person to have on the public streets and sidewalks during any parade, festival or any other approved event any bicycles, roller skates, skateboards, roller devices, mopeds, and other transportation devices, whether motor-powered or self-propelled. Animals of all types, not restricted to dogs, cats, snakes, rodents, etc., are also prohibited. These restrictions do not apply to dogs associated with law enforcement operations or visually impaired persons, handicapped persons using motorized or nonmotorized wheelchairs, and baby strollers used to transport small children. This subsection does not pertain to any of the aforementioned when such is a registered or sanctioned part or function of the event sponsors.

(c) A violation of any provision of this section shall subject the offender to a civil penalty of fifty dollars (\$50.00).

(Code 1975, § 7.157(a), (c), (d); Ord. No. 88-2, 2-1-88; Ord. No. 96-34, §§ 1, 2, 11-4-96)



Sec. 23-194. Clinging to vehicles.

No person riding upon any bicycle, coaster, roller skates, sled or toy vehicle shall attach such bicycle, coaster or other device or himself to any vehicle upon a roadway.

(Code 1975, § 7.124)

Sec. 23-195. Use of coasters, roller skates and similar devices on roadway.

No person upon roller skates or riding in or by means of any coaster, toy vehicle or similar device shall go upon any roadway except while crossing a street on a crosswalk, and when so crossing such person shall be granted all of the rights and shall be subject to all of the duties applicable to pedestrians. This section shall not apply upon any street while set aside as a play street as authorized by ordinance.

(Code 1975, § 7.44)

Sec. 23-196. Penalty.

Any violations of this article subjects the offender to a civil penalty of fifty dollars (\$50.00) as provided in section 1-14.

(Ord. No. 2000-2, § 2, 8-10-2000)

Secs. 23-197--23-210. Reserved.

### DIVISION 6. RULES OF CONDUCT (Cemetery)

Sec. 8-144. Bicycles and motorcycles.

No bicycles or motorcycles shall be admitted to the cemeteries except such as may be in attendance at funerals or on business.

(Code 1975, § 9.42(k))

Sec. 23-1. Definitions concerning vehicles.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Bicycle means every device propelled by human power upon which any person may ride having two (2) tandem wheels either of which is over twenty (20) inches in diameter. Motor vehicle means every vehicle which is self-propelled, but not operated upon rails. Pedestrian means any person afoot. Traffic means pedestrians, ridden or herded animals, vehicles and other conveyances, either singly or together, while using any street for purposes of travel. Vehicle means every device in, upon or by which any person or property is or may be transported or drawn upon a highway, except devices moved by human power or used exclusively upon stationary rails or tracks.

(Code 1975, §§ 7.1--7.7, 7.8(b), (c), 7.9--7.14)



**THE FOLLOWING IS AN EXAMPLE EASEMENT AGREEMENT USED BY MECKLENBURG COUNTY AND CHANGED TO BE IREDELL COUNTY**

STATE OF NORTH CAROLINA

COUNTY OF IREDELL

**THIS EASEMENT AGREEMENT** is made and entered into as of the \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_, by and among \_\_\_\_\_, “Grantor(s)”; and **THE TOWN OF MOORESVILLE, a political subdivision of the State of North Carolina**, “Grantee”;

**WITNESSETH:**

**WHEREAS**, Grantors are the owners of certain property located in Iredell County, North Carolina, which property is more particularly described on Exhibit A attached hereto (the “**Easement Area**”); and

**WHEREAS**, The Town of Mooresville is developing a Town-wide plan for greenway, recreational, park and land preservation purposes along the various creeks, floodplains, and other areas in the Town, including the property which is described on Exhibit A; and

**WHEREAS**, Grantors desire to grant to Grantee a perpetual easement over said property for the uses set forth herein;

**NOW, THEREFORE**, for and in consideration of the premises and the sum of One Dollar (\$1.00) to it in hand paid, the receipt of which is hereby acknowledged, Grantors hereby give and grant unto Grantee a perpetual right and easement over the property described on Exhibit A attached hereto for public active or passive green space, greenway, park, recreational, watershed or land preservation purposes, including the right to maintain and make improvements to the bank and bed of \_\_\_\_\_ Creek. Grantee shall have the right to grant easements or rights-of-way across the Easement Area for underground utilities, roadways incident to the use of the Easement Area, or other public purposes consistent with the primary purposes set forth above. Grantee shall have the sole right to promulgate rules and regulations for the reasonable use of the property by the public, provided the property is used for the purposes stated herein. If reasonable access to the greenway property is otherwise unavailable, Grantors further grant unto the Grantee reasonable access from time to time to the Easement Area over any remaining



contiguous property owned by Grantors for the purpose of developing and maintaining the property (but not for public access) for the purposes set forth herein; provided, Grantee shall (a) to the extent possible, utilize existing roads for such purposes, (b) repair any damage resulting from such access, and (c) upon request of Grantors execute a supplemental instrument delineating an appropriate access route to provide the agreed access.

GRANTORS AND GRANTEE, for themselves and their heirs, successors and assigns, further agree as follows:

1. Grantee shall be responsible, at its expense, for maintaining the Easement Area in accordance with the purposes set forth herein, including construction and maintenance of a trail, removal of trash, waste and litter, and efforts to control vandalism and other crimes within the Easement Area. Grantors shall have the right, but not the obligation, to enter the Easement Area to plant flowers, remove litter, and beautify same in the event Grantee fails to perform such functions in a reasonable manner, subject to approval by Grantee, which approval will not be unreasonably withheld.

2. Grantors, for themselves and their successors and assigns, reserve the right to grant easements or rights-of-way for underground utilities within the Easement Area for the benefit of the Grantors' adjacent land, at such locations and in such manner as may be approved by Grantee in the exercise of its reasonable discretion, provided such easements do not interfere with the use of the Easement area as set forth herein and provided Grantors repair any damage to the Easement Area resulting from the implantation of such utilities.

3. To the full extent permitted by law, Grantee shall defend, indemnify and hold harmless Grantors, and their successors and assigns, from and against all claims, demands, loss and damage by third parties arising out of or relating to use of the property by the public, provided such claims do not result from the acts, negligence or willful misconduct of Grantors or their heirs, successors or assigns.

4. Grantors retain fee simple ownership of the title to the Easement Area, subject to the rights granted to Grantee herein, for the specific purpose of allowing the land burdened by the Easement Area to be included in the calculation of zoning density for building improvements permitted on Grantors' land abutting the Easement Area, as such density may be allowed under current or future zoning ordinances.





5. Grantors make no representations or warranties whatsoever, whether express or implied, with respect to the condition of or title to the property that is the subject of this Agreement, which property Grantee agrees to accept, AS IS, in its present legal and physical condition.

**TO HAVE AND TO HOLD** the aforesaid rights, privileges, and easement unto the Grantee, its successors and assigns, for so long as said property is utilized by Grantee, its successors and assigns, for the purposes set forth herein, and no longer.

**IN WITNESS WHEREOF**, the parties have executed this Easement Agreement the day and year first above written.

\_\_\_\_\_  
(Name of Grantor)

\_\_\_\_\_  
(Name of Grantor)

**STATE OF NORTH CAROLINA  
TOWN OF MOORESVILLE**

I, \_\_\_\_\_, a Notary Public for THE TOWN OF MOORESVILLE, North Carolina, certify that \_\_\_\_\_ **and (Spouse)**, \_\_\_\_\_ personally appeared before me this day and acknowledged the execution of the foregoing instrument.

Witness my hand and official stamp or seal this \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_.

*[Stamp/Seal]*

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_



# Mooresville Comprehensive Bicycle Plan

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**IN WITNESS WHEREOF**, the parties have executed this Easement Agreement the day and year first above written.

## TOWN OF MOORESVILLE

By: \_\_\_\_\_  
\_\_\_\_\_, Chairman  
MOORESVILLE TOWN COUNCIL

## STATE OF NORTH CAROLINA TOWN OF MOORESVILLE

This \_\_\_\_ day of \_\_\_\_\_, 200\_\_, personally came before me \_\_\_\_\_, who, being first duly sworn, says that (s)he is the Chairman of the Mooresville Town Council, and that said writing was signed by him on behalf of the Town of Mooresville by its authority duly given. And the said \_\_\_\_\_ acknowledged the said writing to be the act and deed of the Town of Mooresville.

*[Stamp/Seal]*

Notary Public  
My Commission Expires:

## EXHIBIT A

Lying and being in Iredell County, North Carolina, and being more particularly described as follows:



## FUNDING OPPORTUNITIES

A variety of funding sources are available for implementing the projects and programs recommended as part of this plan. Many sources have eligibility restrictions that limit their use to specific types of projects, but other sources can be used for a variety of projects. Brief descriptions of potential funding sources, along with the types of projects that are applicable, are provided below. Funding opportunities are categorized as follows:

- Federal Government Sources;
- State Government Sources;
- Local Government Sources;
- Private Sector Sources;
- Local Fundraising; and
- Foundations.

### Federal Government Sources

Although most federal / state governmental funding sources are competitive in nature, these sources represent an important opportunity for funding large-scale projects. For more information on these funding programs as enabled under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), please refer to the SAFETEA-LU website at <http://www.fhwa.dot.gov/safetealu>.

- Federal Aid Construction Funds – Several categories of federal aid construction funds — National Highway System (NHS) and Surface Transportation Program (STP) — or Congestion Mitigation and Air Quality (CMAQ) funds provide for the construction of bicycle and pedestrian transportation facilities. The primary source of funding for bicycle and pedestrian projects is STP Enhancement Funding (source: NCDOT Division of Bicycle and Pedestrian Transportation). These Federal funds typically require a 20% local match.

*Appropriate Projects:* Bike lane and paved shoulder construction, multi-use path construction

- Recreational Trails Program – The Recreational Trails Program provides funds to States to develop and maintain trails, including trails for non-motorized uses as well as motorized uses. These Federal funds typically require a 20% local match.

*Appropriate Projects:* Multi-use path / greenway development (easement acquisition, construction, and maintenance); trail safety and environmental protection programs

- Safe Routes to School Program (SRTS) – This program is intended to enable and encourage children, including those with disabilities, to bicycle and walk to school; to make bicycling and walking to school safe and more appealing; and to facilitate the planning, development and implementation of projects that will improve safety, and reduce traffic, fuel consumption, and air pollution in the vicinity of schools.



## Mooresville Comprehensive Bicycle Plan

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Funds are to be administered by State departments of transportation to provide financial assistance to State, local, and regional agencies, including non-profit organizations, that demonstrate the ability to meet the requirements of the program. North Carolina received an apportionment of approximately \$2.4 million in FY 2006, and this figure is projected to increase over the course of the current Federal authorization bill until FY 2009 to up to \$15 over a five year period.

*Appropriate Projects:* Eligible activities include the planning, design, and construction of projects that will substantially improve the ability of students to bicycle and walk to school. These include sidewalk improvements, traffic calming and speed reduction improvements, bicycle and pedestrian crossing improvements, on-street bicycle facilities, off-street bicycle and pedestrian facilities, secure bike parking, and traffic diversion improvements in the vicinity of schools (within approximately 2 miles). Such projects may be carried out on any public road or any bicycle or pedestrian pathway or trail in the vicinity of schools.

Each state must set aside from its Safe Routes to School apportionment not less than 10 percent and not more than 30 percent of the funds for non-infrastructure-related activities to encourage walking and bicycling to school. These include public awareness campaigns and outreach to press and community leaders, traffic education and enforcement in the vicinity of schools, student sessions on bicycle and pedestrian safety, health, and environment, and training, volunteers, and managers of safe routes to school programs (source: <http://www.fhwa.dot.gov/safetealu/factsheets/saferoutes.htm>).

Innovative funding approaches in Wisconsin for Safe Routes to School include:

- City of La Crosse, Wisconsin planning department used \$60,000 in Community Development Block Grant (CDGB) funds for their city-wide SRTS plan, which included a SRTS National Course.
- Some other communities in Wisconsin are using small grants (\$1,000) from the state public health chronic disease work groups on diabetes, physical activity and nutrition, etc. toward funding local initiatives like offering the SRTS National Course. The source of this money is often the CDC.

The North Carolina Safe Routes to Schools Program will include a grant reimbursement program to fund infrastructure and non-infrastructure projects, a program to award consultant services to develop Action Plans, spot improvement project funds administered by the NCDOT Highway Divisions and facilitator support for presenting community-based SRTS workshops. The North Carolina contact for the Safe Routes to School program is as follows:

Safe Routes to Schools  
NC Dept of Transportation, Division of Bicycle and Pedestrian Transportation  
1552 Mail Service Center  
Raleigh, NC 27699-1552  
Phone: 919-807-0777  
<http://www.ncdot.org/transit/bicycle/saferoutes/SafeRoutes.html>



### State Government Sources

- State Construction Funds – State roadway construction funds (not including the Highway Trust Fund for Urban Loops and Interchanges) may be used for the construction of bicycle accommodations that are a part of roadway improvement projects (source: NCDOT Division of Bicycle and Pedestrian Transportation).

*Appropriate Projects:* Bicycle lane, paved shoulder, intersection, or sidepath construction.

- Governor’s Highway Safety Program (GHSP) – GHSP funding is provided through an annual program, upon approval of specific project requests, to undertake a variety of bicycle and pedestrian safety initiatives. Amounts of GHSP funds vary from year to year, according to the specific amounts requested (source: NCDOT Division of Bicycle and Pedestrian Transportation). <http://www.ncdot.org/programs/ghsp>

*Appropriate Projects:* Bike lane and multi-use path construction; safety programs

- NCDOT Transportation Improvement Program (TIP) – Six million dollars are annually set aside for the construction of bicycle improvements that are independent of scheduled highway projects in communities throughout the state. For independent bicycle and multi-use path projects to be added to the TIP, they will follow essentially the same TIP process as do highway projects. Independent projects may involve the construction of multi-use trail, the striping of bicycle lanes, and the construction of paved shoulders among other facilities. See the DBPT web site for more information on the TIP process -

[http://www.ncdot.org/transit/bicycle/funding/funding\\_TIP.html](http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html)

Incidental projects are those funded through a scheduled highway project. Bicycle and pedestrian accommodations such as bike lanes, widened paved shoulders, sidewalks, and bicycle-safe bridge design are frequently included as incidental features of highway projects. NCDOT commonly provides full funding to incidental bicycle facilities. See the DBPT web site for NCDOT’s Bicycle Policy Guidelines –

[http://www.ncdot.org/transit/bicycle/laws/laws\\_bikepolicy2.html](http://www.ncdot.org/transit/bicycle/laws/laws_bikepolicy2.html)

- The NCDOT Transportation Unit administers a portion of the enhancement funding set-aside through the Call for Projects process. In North Carolina the Enhancement Program is a federally funded cost reimbursement program with a focus upon improving the transportation experience in and through local North Carolina communities either culturally, aesthetically, or environmentally. The program seeks to encourage diverse modes of travel, increase benefits to communities and to encourage citizen involvement. This is accomplished through qualifying activities including bicycle and pedestrian facilities, bicycle and pedestrian safety, etc. Funds are allocated based on an equity formula approved by the Board of Transportation. The formula is applied at the county level and aggregated to the regional level. Available fund amount varies. In previous Calls, the funds available ranged from \$10 million to \$22 million. The Call process takes place on even numbered years or as specified by the Secretary of Transportation. The Next Call is anticipated to take place in





## Mooresville Comprehensive Bicycle Plan

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2008, barring financial constraints related to federal recessions. Web site: [www.ncdot.org/financial/fiscal/Enhancement/](http://www.ncdot.org/financial/fiscal/Enhancement/)

- Powell Bill Program - Annually, State street-aid (Powell Bill) allocations are made to incorporated municipalities which establish their eligibility and qualify as provided by statute. This program is a state grant to municipalities for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Funding for this program is collected from fuel taxes. Amount of funds are based on population and mileage of town-maintained streets. For more information, visit [www.ncdot.org/financial/fiscal/ExtAuditBranch/Powell\\_Bill/powellbill.html](http://www.ncdot.org/financial/fiscal/ExtAuditBranch/Powell_Bill/powellbill.html).

For more information on how to receive these state funds, contact the regional NCDOT office.

Contact info:

North Carolina Department of Transportation  
Division 12  
1710 East Marion Street  
Shelby, NC 28152  
(704) 480-9020

<http://www.ncdot.org/doh/operations/division12/>

### Local Government Sources

Local governments participate in funding pedestrian projects through dedicated funding sources as well as annual set-asides of departmental budgets. In the future, Mooresville should strive to identify a set amount of funding every year for bicycle infrastructure improvements. This amount can be included as a line item in the Town's budget to be applied toward projects identified in this plan. Additionally, communities are generally supportive of local bond options for bicycle and pedestrian improvements and for recreational paths. Bonds could be Mooresville's most crucial local funding source. Taxes levied on utilities, gas, vehicle registrations, or retail goods can also apply toward bicycle infrastructure. Powell Bill funds and impact fees may also be used.

Metropolitan Planning Organizations (MPOs) in North Carolina which are located in air quality nonattainment or maintenance areas have the authority to program Congestion Mitigation Air Quality (CMAQ) funds. CMAQ funding is intended for projects that reduce transportation related emissions. Some NC MPOs have chosen to use the CMAQ funding for bicycle and pedestrian projects. Local governments in air quality nonattainment or maintenance area should contact their MPO for information on CMAQ funding opportunities for bicycle and pedestrian facilities.

### Private Sector Sources

Perhaps the most important funding source for improvements to Mooresville's bicycle infrastructure is private sector sources. Ensuring that bicycle facilities are implemented in



conjunction with future developments is important so that the Town does not have to go back and retrofit facilities later using government funding.

In addition, local companies may be interested in financially supporting bicycle projects and programs. Major local employers may support projects as part of their community giving programs or employee health programs. Recognition for contributions could be prominently displayed on signage along the sidewalk or path that was supported by private funds. Paris, France, recently began a massive commuter bike rental program that is completely funded by a mix of private sponsorship and the usage fees for the bicycles.

### Local Fundraising

Local matching monies could be raised for projects by seeking private donations for specific projects. Several examples of these efforts are given below (information taken from the Pedestrian and Bicycle Information Center at <http://www.walkinginfo.org>).

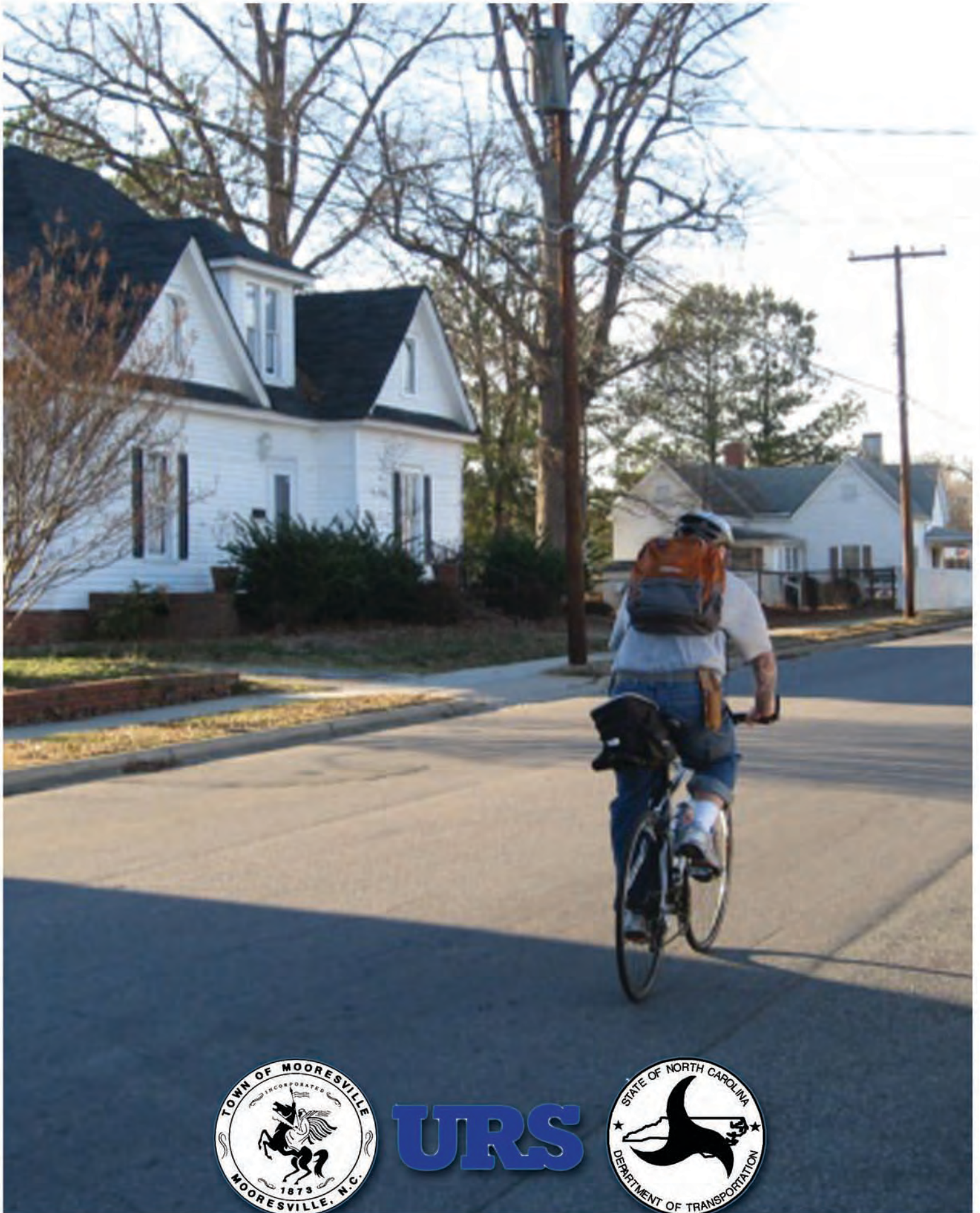
- *In Ashtabula, Ohio the local trail organization raised one-third of the money they needed to buy the land for the trail, by forming a "300 Club." Three hundred acres were needed for the trail and they set a goal of finding 300 folks who would finance one acre each. The land price was \$400 an acre and they found just over 100 people to buy an honorary acre, raising over \$40,000.*
- *In Jackson County, Oregon a "Yard Sale" was held. The Bear Creek Greenway Foundation sold symbolic "yards" of the trail and placed donor's names on permanent markers that are located at each trailhead. At \$40 a yard, they raised enough in private cash donations to help match their \$690,000 Transportation Enhancements program award for the 18-mile Bear Creek trail linking Medford, Talent, Phoenix and Ashland.*
- *Selling bricks for local sidewalk projects, especially those in historic areas or on downtown Main Streets is increasingly common. Donor names are engraved in each brick, and a tremendous amount of publicity and community support is purchased along with basic construction materials. Portland, Oregon's downtown Pioneer Square is a good example of such a project. This can be adjusted to fund bike lanes. \$3 - \$5 per foot should fund most bike lane striping projects. Donators' names can be included on adjacent sidewalks.*
- *In Colorado Springs, the Rock Island Rail-Trail is being partly funded by the Rustic Hills Improvement Association, a group of local home-owners living adjacent to the trail. Also, ten miles of the trail was cleared of railroad ties by a local Boy Scout troop.*
- *A pivotal 40-acre section of the Ice Age Trail between the cities of Madison and Verona, Wisconsin, was acquired with the help of the Madison Area Youth Soccer Association. The soccer association agreed to a fifty year lease of 30 acres of the parcel for a soccer complex, providing a substantial part of the \$600,000 acquisition price.*



### Foundations

A number of charitable foundations have provided funds for bicycle projects, including infrastructure projects as well as safety programs. One of the largest of these foundations is the Robert Wood Johnson Foundation, which has a strong focus on projects that have a positive benefit on public health, such as bicycling. The Foundation Center ([www.fdncenter.org](http://www.fdncenter.org)) is an online resource that catalogs numerous foundations.





**URS**

