2015

# Comprehensive

# Bicycle

## Plan

# Village of Pinehurst

NORTH CAROLINA

1895
VILLAGE OF
PINEHURST

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

Division of
Bicycle &
Pedestrian
Transportation
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

McGill
ASSOCIATES
ENGINEERING·PLANNING·FINANCE

# VILLAGE OF PINEHURST

# COMPREHENSIVE BICYCLE PLAN
# JUNE 2015

McGill ASSOCIATES
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Kostelec PLANNING
Assess
Plan
Implement
Evolve

# TABLE OF CONTENTS

## SECTION FIVE: SAFETY AND ENFORCEMENT



## SECTION SIX: HEALTH IMPACTS OF BICYCLING AND WALKING



## SECTION SEVEN: BICYCLE ROUTES AND RECOMMENDATIONS



## SECTION EIGHT: IMPLEMENTATION AND EVALUATION



## APPENDICES

# EXECUTIVE SUMMARY

The Village of Pinehurst, North Carolina, is committed to providing its citizens with a safe community in which to live, work and play, including the future improvement and/or construction of bicycle-friendly transportation corridors. To plan for these efforts, McGill Associates, in conjunction with Kostelec Planning and a Village-appointed Steering Committee, has prepared this Comprehensive Bicycle Plan on behalf of the Village.

A portion of the funding for the plan was derived from a grant provided by the North Carolina Department of Transportation (NCDOT), Division of Bicycle and Pedestrian Transportation (DBPT). Production of this Plan was performed concurrently with a Village-funded Comprehensive Pedestrian Plan. The Steering Committee guided both efforts and helped to establish the vision for developing both bicycle and pedestrian facilities within Pinehurst.

Pinehurst is the largest municipality in Moore County and is regionally recognized as an outstanding residential community and, internationally, as a major golf resort. The North Carolina State Data Center estimates that the population in the Village increased from 9,706 residents in 2000 to 15,525 residents in 2013, a growth of nearly 60%. While the retired population continues to be the largest demographic, more families with children are relocating to the area.

Tourism also plays a major role in the local economy, with more than forty golf courses in the Moore County area. The Village of Pinehurst and Pinehurst Resort have also had the distinct pleasure of being given National Landmark status for their historical and significant role in United States golf history.

Because of year-round tourism and rapid population growth, Village leaders have recognized the need for a Comprehensive Bicycle Plan that addresses both the current and future needs of their residents and visitors. As part of this Plan, peer communities that relate to Pinehurst in terms of having a “residential resort” setting with numerous golf courses were also evaluated with respect to their bicycling systems, with key findings and notable accomplishments included (See Sections 1.5 to 1.10).

The established goals of this Plan are to:

- Increase the options for bicycling as an alternate form of transportation within the Village of Pinehurst
- Create a bicycle friendly community that is an important part of the urban structure
- Promote bicycling as a healthy exercise
- Create a bicycle environment that is friendly to all users - including seniors, disabled persons and children

- Improve connections between disparate parts of the Village
- Promote bicycle safety

In order to understand and evaluate the existing conditions, identify user needs and provide recommendations for appropriate improvements, the following process was used:

1. *Conduct an inventory of the existing bicycling system*
2. *Assess the needs of the cyclist*
3. *Formulate objectives and recommendations*
4. *Plan for the implementation of improvements using an action-oriented method*
5. *Examine and potentially revise current policies/programs*

To better understand the opinions, concerns, and desires of the community, three different methods were used during the preparation of this Plan to solicit input from the community and the public as follows:

***Steering Committee Meetings***

A total of five Steering Committee Meetings were held to provide direction and insight to McGill Associates and Kostelec Planning. The names of Steering Committee members can be found in the Acknowledgments section at the beginning of this document.

***Community Workshops/Events***

Bicycle and Pedestrian Public Input was sought during advertised, formal public workshops at Village Hall, at special community events (Live After 5 and PES Fall Festival), and during a community bike ride.

***Pedestrian/Bicycle Survey***

A survey/questionnaire was developed for this Plan, which was made available to residents via Community Meetings, by pick-up at Village Hall, and via the internet from a link on the Village's main web page. The survey was also advertised in the Village newsletter, on social media sites and in the local newspaper. A copy of the survey is provided in Appendix A and the results are summarized in Section Two.

Most residents that participated in these events noted an interest in bicycling within Pinehurst, but safety concerns are preventing many of them from regularly riding a bike. Other common themes obtained during the public input phase include:

- More connectivity is needed between residential areas and destination points, such as Downtown Pinehurst and neighboring communities to safely access these destinations

- Praise to the Village for the existing greenway system, trails at the Arboretum and trails at Rassie Wicker Park; however, numerous comments were obtained regarding difficulties of cycling on the current system due to the unpaved surface material (gravel screenings)

- A dissatisfaction with having to drive somewhere to safely ride a bicycle

The current bicycling system in Pinehurst does not contain dedicated facilities or special route markings for cyclists. Therefore, those wishing to bike on area roads have to share the road with motorists and other vehicles. In addition, the unpaved greenways, while not conducive to many types of bicyclist travel, are used by some cyclists as they are oftentimes the only connecting facility or they are where bicyclists feel most comfortable riding.

The historic Village areas offer the best on-street bicycling conditions within Pinehurst due to low volume, low speed and shaded streets. One who wishes to comfortably bike for recreation or to reach destinations within this area finds a very pleasant place to ride. Unfortunately, the lack of connectivity prevents most residents from accessing the downtown area from other parts of the Village.

On busier roads and highways, there is limited shoulder width to accommodate bicyclists and there are no continuous routes with shoulders wide enough (4-feet or 5-feet) for bicycling. The “enclosed” feel of some streets due to tree canopy and narrow travel lane widths make some routes more suitable than others, as motorists tend to drive slower on streets with an enclosed feeling due to close proximity of trees and motorists in other travel lanes.

To create a bicycle-friendly transportation system in Pinehurst, existing corridors must be strengthened by filling in gaps, repairing existing facilities and providing safe and efficient paths across busy vehicular corridors. Additional corridors need to be provided to connect major portions of the Village (east to west and north to south) and to serve as neighborhood connectors. New connectors need to be provided to reach important destinations, especially near public schools, parks and popular commercial areas.

Corridors were identified during the planning process as those routes that are popular among local cyclists, and recommendations for shared lane markings, bike lanes, side paths, etc. are provided in Section Seven of this report. The recommendations include

short term and long term recommendations, individual project maps, estimated costs, etc. The prioritized corridor recommendations are summarized in Table ES-1.

**Table ES-1: Pinehurst Projects Priority Ranking**

| Project Ranking | *PINEHURST PROJECTS PRIORITY RANKING* | Total Points | Safety | Level of Service Improvement | Links to Greenways | Proximity to Parks | Proximity to Schools | Proximity to Village Ctr & Other | Ease of Implementation | Likely Health Impact | Partnership Potential |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Maximum Points** | **100** | **20** | **15** | **10** | **10** | **10** | **10** | **10** | **10** | **5** |
| | **Project Name** | | | | | | | | | | |
| 1 | NC 211 from Traffic Circle to Pinewild ** | **88** | 20 | 15 | 10 | 10 | 5 | 3 | 10 | 10 | 5 |
| 2 | US Highway 15/501 from Forest Drive to Voit Gilmore Lane | **76** | 20 | 15 | 5 | 5 | 10 | 3 | 3 | 10 | 5 |
| 3 | US 15/501 from Forest Drive to Juniper Lake Road * | **75** | 20 | 15 | 10 | 5 | 0 | 3 | 7 | 10 | 5 |
| 4 | NC Highway 2 from NC 5 to Station Avenue | **65** | 10 | 10 | 7 | 3 | 10 | 10 | 3 | 7 | 5 |
| 5 | NC Highway 5 from Holly Pines to NC 211 | **62** | 15 | 10 | 7 | 5 | 0 | 10 | 5 | 7 | 3 |
| 6 | Morganton Road from NC 5 to US 15/501 | **57** | 20 | 15 | 3 | 0 | 7 | 3 | 3 | 5 | 1 |
| 7 | Page Road from NC 2 to US 15/501 | **53** | 10 | 5 | 10 | 3 | 5 | 5 | 7 | 5 | 3 |
| 8 | Airport Road from NC 2 to Gaeta Drive | **49** | 15 | 10 | 10 | 0 | 0 | 3 | 3 | 5 | 3 |
| 9 | Linden Road from Pine Vista Drive to NC 5 (greenway or bike lanes) * | **34** | 15 | 5 | 5 | 0 | 0 | 5 | 0 | 3 | 1 |
| 10 | Murdocksville Road from NC 211 to Juniper Lake Road | **32** | 5 | 15 | 0 | 3 | 0 | 0 | 5 | 3 | 1 |
| 10 | Chicken Plant Rd from Linden Rd to West Pinehurst Community Park * | **32** | 5 | 10 | 10 | 0 | 0 | 0 | 3 | 3 | 1 |

**** Denotes a greenway project***
***** Denotes a sidepath project***

The list above is simply provided to help Pinehurst and its partners determine what improvements to pursue immediately for funding. The purpose of this ranking is not to implement these projects in a specific order. For instance, in the event that NCDOT is resurfacing a street where there is a lower-ranking project, Pinehurst should take advantage of the opportunity to explore the implementation of a project from the Plan.

Section Eight of this Plan provides a list of action steps to help guide the development of the proposed bicycling network in Pinehurst. These steps are listed below, and will be crucial in moving forward with the overall recommendations of the Village's Comprehensive Bicycle Plan.

1. *Adopt the Plan*
2. *Identify Resurfacing Projects for Potential Shoulder Widening*
3. *Continue to Emphasize Complete the Streets*
4. *Develop Supportive Education and Enforcement Programs*
5. *Establish an Annual Budget for Plan Implementation*
6. *Measure Performance*
7. *Complete the Bicycle Friendly Community Application*

In addition to recommendations within specific corridors, this Plan also provides information and guidance on design standards for bicycle facilities (See Section Three), recommendations on Bicycling Education and Encouragement (See Section Four), information and guidance on Safety and Enforcement (See Section Five), and a summary of the Health Impacts of Bicycling (See Section Six). The health assessment discusses the health related outcomes, both positive and negative, of increasing investment and promotion in active transportation facilities.

# SECTION ONE: INTRODUCTION AND DISCUSSION OF PEER COMMUNITIES

## 1.1 VISION STATEMENT

The Village of Pinehurst, North Carolina, is committed to providing its citizens with a safe community in which to live, work and play. Part of this commitment includes the future improvement and/or construction of bicycle-friendly transportation corridors throughout the Village. Consequently, the Village of Pinehurst hired McGill Associates (McGill) to develop a Comprehensive Bicycle Plan and assist with these efforts.

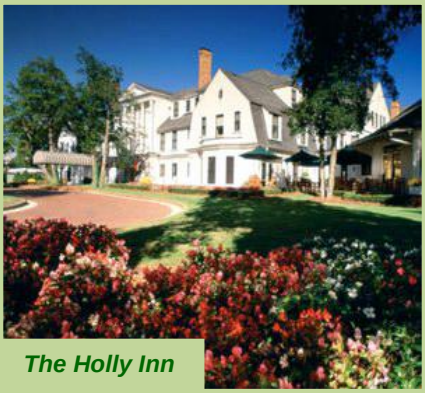
In preparing this plan, McGill teamed with Kostelec Planning, LLC from Asheville, North Carolina and also worked closely with a Bicycle Plan Steering Committee comprised of members appointed by the Village. A portion of the funding for the plan was derived from a grant provided by the North Carolina Department of Transportation (NCDOT) Division of Bicycle and Pedestrian Transportation (DBPT).

On June 3rd 2014, McGill held a "kick-off" meeting with members of the Bicycle Plan Steering Committee to define their vision for the proposed Pinehurst bicycle network. After a brief introduction, the Steering Committee participated in an exercise designed to elicit their perceptions of the needs and desires for a bicycle system in the Village. Throughout the development of this plan, the Steering Committee provided valuable input and guidance to McGill, Kostelec Planning and the planning team.

In addition, the production of this Comprehensive Bicycle Plan was performed concurrently with a Village-funded Comprehensive Pedestrian Plan. The project Steering Committee guided both efforts and established the vision for developing both bicycle and pedestrian facilities within Pinehurst.

## 1.2 HISTORY

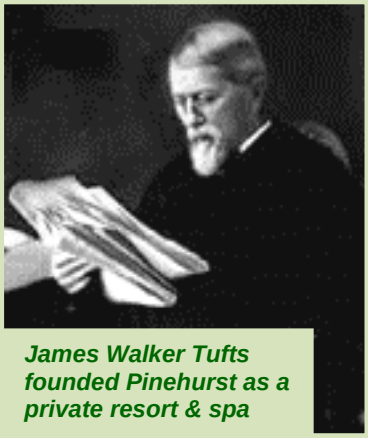
### The History of the Village of Pinehurst


*The Holly Inn*

The Village of Pinehurst is situated in what is often referred to as the Sandhills of North Carolina. The Sandhills consist of a strip of ancient beach dunes in the interior of North and South Carolina (evidenced by a former coastline when the ocean level was higher, or the land was lower) and divides the "piedmont" and the "coastal plain". Approximately sixty miles southwest of Raleigh, the state capitol, Pinehurst is also approximately seventy-five miles east of the Charlotte metro area. The Village spans approximately 14.9

square miles, having 14.3 square miles of land and 0.6 square miles of water. Major thoroughfares to Pinehurst include NC Highway 5, NC Highway 2, NC Highway 211 and US Highway 15-501.

The Village of Pinehurst is the largest municipality in Moore County and is regionally recognized as an outstanding residential community and, internationally as a major golf resort. Incorporated in 1980, the Village was founded in 1895 by soda fountain magnate James Walker Tufts who purchased 598 acres of land for $1.25 per acre to create a health resort in the Sandhills. Mr. Tufts wanted a first-rate, private resort and hired Frederick Law Olmsted (designer of Central Park in New York and the Biltmore Estate in Asheville) for the project dubbed "Tuftstown".



***James Walker Tufts founded Pinehurst as a private resort & spa***

Tuft dreamed of building a beautiful, healthful village – where those suffering from respiratory and other ailments could recuperate in the land of abundant sunshine and thought to be medicinal qualities of the pine-scented air. As patients' needs varied, Tuft built an assortment of cottages, rooming houses and hotels, later followed by a livery stable, fire department, laundry, markets, department stores and poultry/dairy farms. Tuft finally named the Village "Pinehurst" ("pine" for the trees and "hurst" for a rising plot of ground). Most of the original buildings are still in existence and can be toured today. The Tufts Archives is open to the public and free of charge.

***Given Memorial Library & Tufts Archives***

In 1900, Donald Ross was hired as the developer for golf at the Pinehurst Resort. Pinehurst Resort remained privately-held by the Tufts family until 1920 when a corporate form of ownership, Pinehurst, Inc., was obtained. By the late 1960's, the shareholders of Pinehurst, Inc., sold the property to the Diamondhead Corporation, who created seven thousand "membership" lots to sell, accompanied by the appropriate infrastructure – roads, water, sewer, etc. In 1980, pursuant to an Order of Incorporation, the Village of Pinehurst became an incorporated municipality. The resort property has changed hands several times over the years and world-renowned golf courses have been developed and expanded under each owner. Donald Ross eventually designed four golf courses that would mark their places in history, as would famed golfers such as Ben Hogan, Sam Snead, Byron Nelson, Arnold Palmer, Jack Nicklaus, Payne Stewart and many more.

***Statue memorializes Payne Stewart's 1999 US Open win***

*Pinehurst Resort*

In 1996, the Village of Pinehurst and Pinehurst Resort had the distinct pleasure of being given National Landmark status for their historical and significant role in United States golf history. The Village has also become the home of the North & South Golf Amateur (since 1901), PGA Championships, Ryder Cup matches, US Amateurs, Senior Open, and the 1999 and 2005 US Opens. In 2014, Pinehurst was the first venue in history to host the men's and women's US Open in back-to-back weeks.

Though known as the "Home of American Golf" (with more than forty-one courses, most being playable year round), Pinehurst is rich with history, artists, pottery, architecture and beautiful horse country. Unlike other burgeoning golf communities, Pinehurst retains a true small town atmosphere. It also hosts world championship matches in clay court tennis, croquet and yard bowling; and is the home of superior equestrian and dog facilities. Each fall, equestrian owners from the North and Midwest bring their jumpers, hunters and dressage horses to the area to take advantage of the mild climate and soft sand footing.

*Pinehurst Harness Track*

Pinehurst has enjoyed its resort status, boasting world-renowned golf facilities and a Village Center filled with the charm of the New England area. Shopping in the Village of Pinehurst and the nearby Towns of Southern Pines and Aberdeen, offers quaint boutiques and specialty shops as well as numerous restaurants and cafes. The quiet and tranquil atmosphere makes Pinehurst an excellent vacation destination as well as a wonderful place to live. Committed to offering top quality services to residents and visitors alike, the Village of Pinehurst strives to ensure that residents enjoy a wonderful quality of life and visitors have a memorable experience.

Several factors have contributed to major demographic and economic changes to the Village of Pinehurst in recent years. The close working proximity to the Research Triangle Park (Raleigh, Durham and Chapel Hill), Charlotte Metro area and Fort Bragg, have made Pinehurst an extremely desirable place to live and raise a family. From 1990 to 2000, the US Census Bureau indicated that Pinehurst's population grew by 91%, as compared to 27% for Moore County and 21% for North Carolina. This population growth is expected to continue, especially with changing demographics.

While Pinehurst remains largely a community based on retirement, there is a growing population of families with children relocating to the Village.

The Village's unique Sandhills location with its moderate year round climate has led to a large number of tourists and sports enthusiasts traveling through or visiting the area each year; consequently, some out-of-state tourists have begun to build summer/vacation homes in the area. In addition, the resort area has become a very popular retirement community. The influx of residents during 2008 to 2012 has resulted in the median household income being $66,436 in Pinehurst as compared to the state average of $46,450. Likewise, persons living below the poverty level are only 4.1% as compared to the 16.8% statewide. With senior citizens representing almost half of the population of the Village of Pinehurst, certainly health and wellness opportunities are in great demand.

Because of year-round tourism and rapid population growth, the leaders of the Village of Pinehurst have recognized the need for a Comprehensive Bicycle Plan that addresses both the current and future needs of their residents and visitors. This Plan will provide direction and purpose as the Village strives to meet the daily cycling needs of their community, as well as impact the citizenry of the Village and its surrounding area for many years to come. The *Village of Pinehurst Comprehensive Bicycle Plan 2015* addresses their vision by identifying specific goals and objectives and making recommendations for achieving them.

## Past and Current Municipal Efforts

### Village Greenway Master Plan

*The Village Greenway*

Pinehurst maintains an existing Greenway trail that is approximately six miles long and represents the first three phases of the Village Greenway Plan. The previously completed plan ultimately proposed twenty-four miles of planned trail. Part of the Greenway Project included the formation of the Village Greenway Habitat Committee. This group is working to make the

Pinehurst Greenway a place where people can learn about the native plants and animals. The Committee has conducted frequent surveys along the Greenway in order to catalog the diverse flora and fauna that can be found along the path.

***Bridge along the Village Greenway***

The Greenway Master Plan consists of a system of several loops and endpoints, which meander through a suburban landscape of parks, homes, open areas, recreation facilities and wooded tracts. The Greenway accommodates runners, walkers and cyclists. Currently golf cart use of the trail is prohibited. However, there has been public interest in possibly accommodating golf cart travel on certain parts of this multi-modal pathway system.

## Village of Pinehurst Engineering Standards and Specifications Manual

In August 2004, the Pinehurst Village Council adopted an Engineering Standards and Specifications Manual that specifies the minimum design standards for all new development within the jurisdiction of the Village. Section 4.0 of this Manual includes technical specifications for both sidewalks (minimum thickness of four inches, minimum clear-width of five feet) and for greenways (minimum six inches compacted, stone screenings, minimum clear-width of six feet). Standard details are also included in the Manual for Concrete Sidewalk, Brick Sidewalk and Greenways. The Manual has been amended on several occasions since its original adoption and continues to serve as the primary engineering reference document utilized in development within the Village.

## Pinehurst Development Ordinance (PDO)

The Pinehurst Development Ordinance, commonly referred to as the PDO, was recently updated and adopted by Village Council in October 2014. This document establishes various rules and regulations associated with development within the Village, including requirements for sidewalks and greenways. The current PDO requires sidewalks to be installed on one side of all new streets in new residential developments that serve eight or more dwelling units and on both sides of all new streets in non-residential developments. The PDO also establishes the definition of a greenway as “a linear open space, either privately-owned or owned by the Village or another unit of government, which may contain a trail for walking, bicycling, horseback riding or other passive recreation, but not for use by vehicles for purposes other than maintenance of the greenway.”

### Historic District Standards and Guidelines


The Village's Historic District Standards and Guidelines were originally adopted by Village Council in September 2006 and provide "design principles and standards" for structures and landscaping within the local historic district. The document is also utilized by the Village's Historic Preservation Commission (HPC) in reviewing proposed changes and new construction within the District. While the document does not provide design standards for sidewalks or walkways, it does reference that "original sand-clay and patterned brick sidewalks contribute to the character of some streetscapes in the District." Projects within the public right-of-way do not require approval from the HPC according to the Standards and Guidelines document.

## 1.3 OVERALL GOALS

The purpose of the Comprehensive Bicycle Plan is to create a document to guide the Village of Pinehurst with development criteria for the following phases of its proposed comprehensive bicycle system: (1) Planning, (2) Design, (3) Financing, (4) Implementation and (5) Maintenance.


While enhancing and prioritizing capital improvements/maintenance projects for the Village, the plan will include special consideration given to critical areas for bicycle transportation and safety as well as address the Americans with Disabilities Act (ADA) compliance issues.

The goals of the Village of Pinehurst Comprehensive Bicycle Plan 2015, which were developed with input from the study's Steering Committee, and input received at public meetings and through community surveys, are as follows:

**Goals and Objectives**

- Increase the options for bicycling as an alternate form of transportation within the Village of Pinehurst:
    - Plan bicycle routes with input from the community in mind

- Increase and improve the bicycle-related infrastructure
- Provide aesthetically pleasing landscaping and resting places along commonly used paths and routes
- Connect the bicycle network to common destination points
- Promote a "walking/biking culture" in Pinehurst

- Create a bicycle friendly community that is an important part of the urban structure:
  - Provide attractive, yet safe, bicycling *connections* from Village residential areas to nearby destinations
- Promote bicycling as a healthy exercise:
  - Develop and/or participate in more healthy programs such as "Eat Smart, Move More North Carolina", etc.
  - Partner with health and recreation providers to create healthy living programs and events that encourage and promote bicycling as a form of alternative transportation

- Create a bicycle environment that is friendly to all users - including seniors, disabled persons and children:
  - Provide ADA compliant facilities
  - Increase cycling safety with regard to vehicular traffic
  - Provide facilities for sitting/resting opportunities

- Improve connections between disparate parts of the Village:
    - Provide a network of on- and off-street bicycling facilities to accommodate a multitude of users
    - Provide bicycling connections between downtown Pinehurst and surrounding areas/destinations
    - Promote neighborhood connectivity
    - Provide equitable access to the bicycling network(s)
    - Provide bicycling access to schools, shopping areas and work places

- Promote bicycle safety:
    - Promote bicycle safety through educational programs both inside and outside the schools.
    - Design a bicycle network that can be safely traversed by all

## 1.4 SCOPE, METHODOLOGY AND PURPOSE OF PLAN

McGill was retained by the Village of Pinehurst to prepare a village-wide bicycle plan as a guide for identifying and prioritizing safe cycling linkages thereby, creating a viable bicycle network. Most areas within the Village limits lack sufficient cycling facilities. The Village recognizes the need to plan for the future by developing a cycling network, which provides connectivity for its users. Using a proactive approach (such as this) is imperative in establishing priorities for future facilities, reducing construction costs and implementing facilities in a logical manner.

The study area spans the Pinehurst Village limits and the immediate, surrounding extraterritorial jurisdiction (ETJ). Although the research will be focused primarily within the Village limits, it is important to understand the existing bicycle patterns into and out of Pinehurst and their destination points.

In order to comprehend the existing conditions, identify user needs and be able to recommend appropriate improvements in this plan, the following processes were used:

1. ***Inventory of the existing bicycling system:*** An inventory of Pinehurst's limited facilities that support bicycling was conducted - identifying existing safety issues.

2. ***Assessment of the needs of the cyclist:*** The needs of bicyclists and the apparent lack of connectivity to destination points were identified and evaluated through data collected via public meetings, surveys and direction provided by Village Staff and the Project Steering Committee.

3. ***Formulation of objectives and recommendations:*** Guidelines for the future development of facilities, repair of existing facilities and maintenance were created. Probable costs for all recommendations were provided.

4. ***Implementation of improvements by action-oriented method:*** Key bicycle linkages and needs were identified and prioritized. Possible funding sources for the Village to pursue were identified.

5. ***Examination and possible revision of current policies/programs:*** Guidelines and implementation of current policies and existing cycling programs were identified and addressed.

***Connectivity is crucial to any functional bicycle network***

These components provide justification for the proposed improvements. Also, any time that recommendations for improvements or new construction are made, these recommendations must be prioritized. Implementing all of the proposed improvements at one time, or in a short time frame, would be both cost-prohibitive and overwhelming. It is important that the most immediate necessities be recognized first as the implementation of capital improvements begins. In addition to facility needs, the formation of an implementation plan is an important short-term goal in establishing long-term objectives.

Bicycle facility-related needs – which are considered to be of the highest priority – are called critical needs. The critical facility needs for the Village are all focused on improving safety conditions for cyclists. In addition to bike lanes, bike shoulders and shared roadway improvements, other emphasis should be placed on immediately addressing unmarked crosswalks and inappropriate signage. The safety of cyclists is critical; it is the most important component of the bicycle facilities.

Bicycling facilities are the primary focus of this plan - in particular, bike lanes, bike routes, bikeable shoulders, side paths and shared roadways. Thus, the Village Bicycle

Plan delineates the (current and future) location, implementation and maintenance of the proposed facility improvements, thereby creating a cycling network that allows for connectivity within the Village as well as with its neighboring communities.

The improvements recommended in this Bicycle Plan are intended to be implemented over a period of time and will require creative funding mechanisms. Therefore, another significant short-term goal will be to identify improvement costs and funding opportunities, as well as prioritizing the improvements and projects.

## 1.5 IDENTIFYING PEER COMMUNITIES

In preparing this study, McGill, Kostelec Planning and the project Steering Committee identified several "peer communities" that relate to Pinehurst in terms of having a "residential resort" setting with numerous golf courses. These communities include:

- Coral Springs, Florida
- Naples, Florida
- Hilton Head Island, South Carolina
- Pebble Beach / Monterey, California
- Sun Valley / Ketchum, Idaho

This section contains a summary of key findings obtained through a review of bicycling-related plans, maps and other resources within these communities.

The peer communities review revealed that Pinehurst may be behind the curve in a number of overall on-street and off-street bicycling facilities when compared to Monterey, Hilton Head and Sun Valley; but is not substantially worse off than these peer communities in terms of planning and policy (Hilton Head Island being an exception). Only two of the five peer communities are designated as Bicycle Friendly Communities by the League of American Bicyclists (Hilton Head and Sun Valley); Coral Springs is part of Broward County's overall Bronze-Level Bicycle Friendly Community Award.

The regional approach to bicycling in these peer communities is evident through their planning history, availability of online resources and tools and active campaigns within each community to promote safety for bicyclists. While funding authority is different for municipalities in North Carolina due to NCDOT's control of many local roadways, the State's *Complete Streets* polices will help Pinehurst move toward rivaling these peer communities in terms of facilities. Having a plan is a solid first step toward gaining widespread support and coordinating planning and funding at the Federal, State and local levels.

The data and information that is readily available in North Carolina via the Pedestrian and Bicycle Crash Data tool is unrivaled by other states. No community-specific data was available from these communities to summarize and compare crash data or trends. Other than the Sun Valley/Ketchum area, none of the plans reviewed in these communities included such an analysis.

Figure 1.5 provides a summary of Key Findings in the Peer Communities, while Sections 1.6 through 1.10 provide additional information on the communities.

***Figure 1.5: Key Findings from Peer Communities***

| Community | Key Findings: | Notable Accomplishment |
|---|---|---|
| **Coral Springs, FL** ***Bronze-Level Bicycle Friendly Community (Broward County)*** | • Has virtually no multi-use pathways and has some on-street bicycling facilities.<br>• No existing bicycling or bicycle plan but has been involved with the MPO on regional bike planning efforts.<br>• Florida's 3-foot passing law has led to the city's own enforcement and education campaign. | • Regional bicycle routing interface that allows users to choose their route by their preference of routes (short, fast, low traffic, scenic)<br>• Development requirements to construct facilities and bike parking. |
| **Naples, FL** | • Has few on-street or off-street facilities.<br>• Planning was conducted through a regional countywide pathways plan. | • Is pursuing regional bicycle route implementation through the MPO. |
| **Hilton Head Island, SC** ***Silver-Level Bicycle Friendly Community*** | • Invested heavily in multi-use trails and sidepaths to link the community.<br>• Has become a bicycle-tourism destination that nearly rivals the economic impact from golf. | • A long-standing commitment to multi-use trails as a key element of the community has driven Hilton Head's success.<br>• The pathways are now a hub of the community and businesses and residences want to link to them. |
| **Monterey, CA** | • Has been proactively planning for bicycling for more than 15 years.<br>• Multi-use trails are the primary facility in place along with some limited on-street facilities.<br>• Efforts in the area are pursued from a regional perspective to link key routes, trails and destinations. | • Bicycle counts in Monterey at 20 locations.<br>• Cataloging of more than 100 designated bicycle rack locations. |
| **Sun Valley / Ketchum, ID** ***Silver-Level Bicycle Friendly Community*** | • The string of resort communities are planning for bicycling as one region focused on a rail-trail that is the bicycling spine of the region.<br>• Setting allows linkages from multi-use trials to hiking and mountain biking trails. | • Implemented a small-scale (one bike per station) bikeshare program.<br>• Coordinates bicycling promotion with transit services for service sector commuters. |

## 1.6 CORAL SPRINGS, FLORIDA

Most of the bicycle-related planning in Coral Springs has occurred through the metropolitan planning organization (MPO) for Broward County. The city's Comprehensive Plan contains several strong policy statements about improving bicycling and walking but the city has yet to develop a bicycle plan recommended in the Comprehensive Plan.

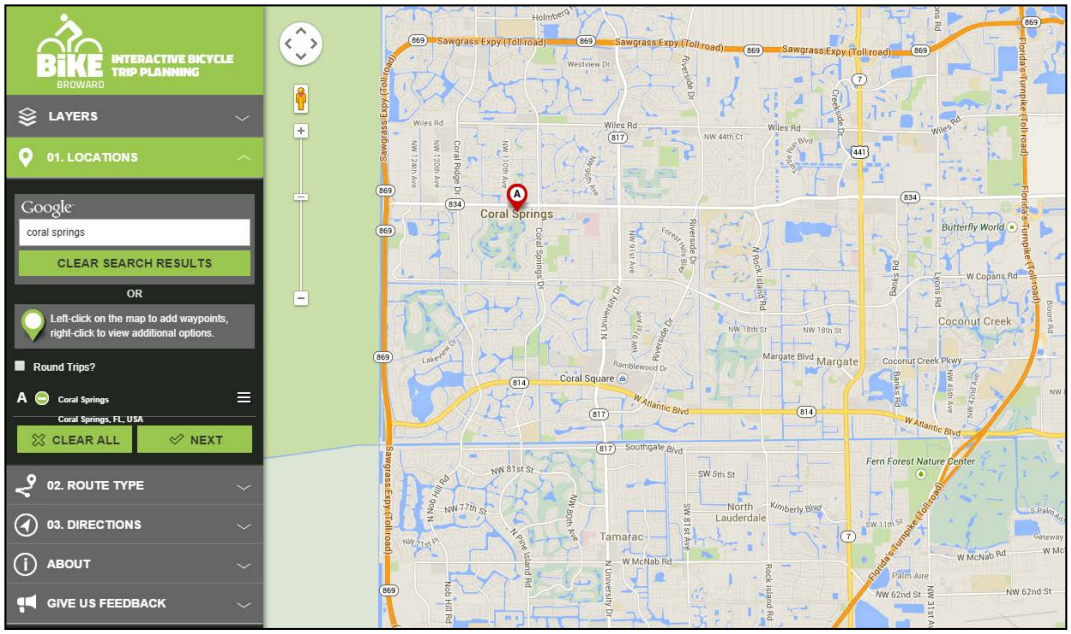
Coral Springs implements an annual "Move Over" bicycle safety campaign to help enforce Florida's law that requires motorists to allow three feet when passing a bicyclist. The strongest evidence of Coral Springs' actions relates to the requirements placed upon new development to incorporate the needs of bicyclists:

- Developers in Coral Springs are required to construct, repair or resurface adjacent bikeways and walkways as part of the development or redevelopment process.

- The City requires ample and secure bicycle parking at government buildings, schools, libraries, recreational facilities and significant commercial and multi-family developments.

- In the region, the Broward MPO manages an online interactive bicycle trip planning tool (See Figure 1.6 below). The user can enter a start and end location and then select from bicycle routes based on the following categories: short, fast, least interaction with traffic, and simple and scenic.

***Figure 1.6: Bike Broward Interactive Bicycle Trip Planning Tool***



## 1.7 NAPLES, FLORIDA

Like Coral Springs, much of the bicycle planning in and around Naples occurs at the county level through the MPO—Collier MPO. MPOs in Florida are restricted to one-county entities and the state does not have multi-county agencies such as Triangle J COG; therefore, much of this planning is coordinated at county levels for transportation. The Collier MPO 2012 Comprehensive Pathways Plan examines bicycle facilities, greenways and sidewalks in the region with an emphasis on coastal communities, including Naples.

The bicycle facilities summary indicated Naples has approximately twenty-four miles of roadways that include four miles of paved shoulders as well as six and one half miles of bicycle lanes. It was estimated that 44% of roadways in Naples had some type of bicycling facilities; 89% of the roadways have pedestrian facilities. There were no greenways identified in Naples but nearby Marco Island has almost seven miles of greenways.

***Figure 1.7: City of Naples Bicycle Map***

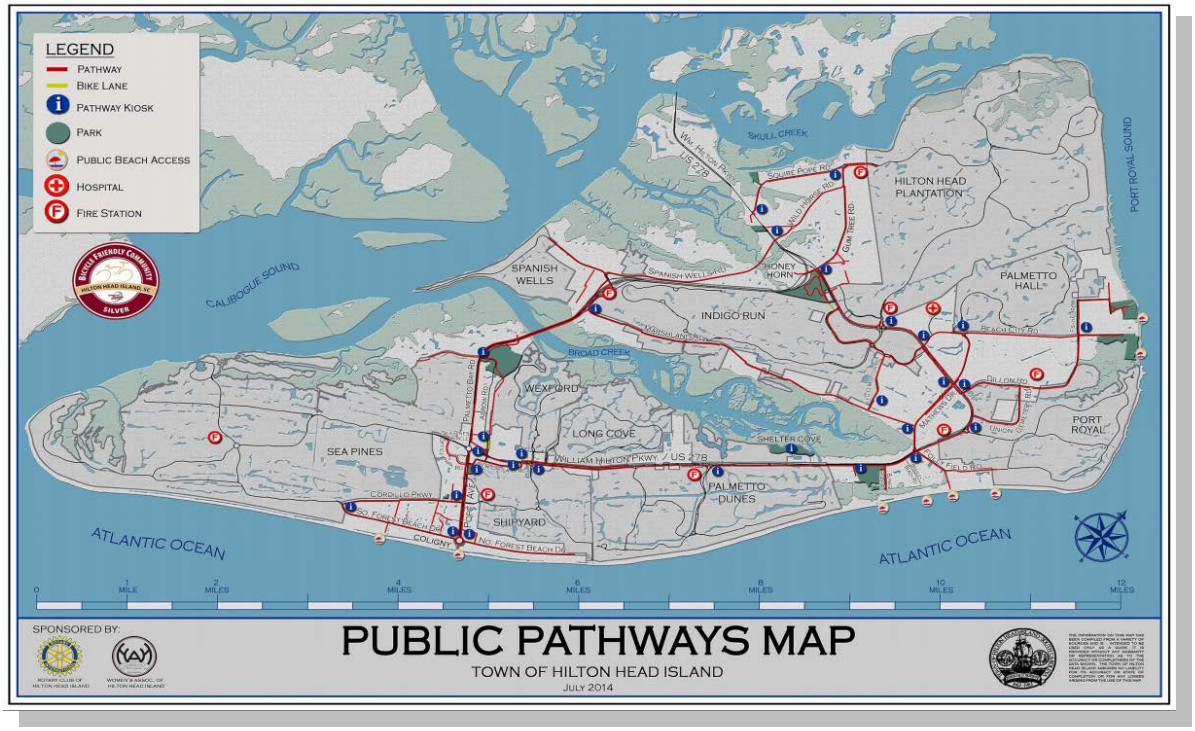
## 1.8 HILTON HEAD ISLAND, SOUTH CAROLINA

Hilton Head is considered a marquee destination for both golf and bicycling—a reputation that is founded in golf but has emerged as bicycling since concerted efforts began in the 1980s to develop an island-wide pathway system.

The Sea Pines Resort started the craze with pathways on the resorts, dubbed "leisure trails." With more than one hundred twelve miles of paved pathways, Hilton Head Island is a Silver-Level Bicycle Friendly Community, as designated by the League of American Bicyclists and spends more than $175,000 per year on maintenance of its pathway system.

As the pathway system has been linked to major destinations and to routes within gated communities (fifty of the pathway miles are within gated communities), the demand and usage of the system has skyrocketed. This is typical for communities to experience as they make the "tough decisions" (often the most expensive decisions) to build key linkages. An article in Hilton Head Monthly said that bicycle rentals at Sea Pines Resort have increased 25% since 2011. Hilton Head also has a Bicycle Ambassadors Program, a group of volunteers who patrol the pathways during peak seasons and offer information to visitors and provide mechanical assistance.

***Figure 1.8: Hilton Head Bicycle Path Map***



## 1.9 PEBBLE BEACH / MONTEREY, CALIFORNIA

The City of Monterey Bicycle Plan produced the most relevant effort in bicyclist planning. The 2009 Plan was an update to a 1998 effort as well as the County's 2005 bicycling plan. The population of Monterey was 32,000 when the plan was produced.

Key recommendations of the Plan include:

- Development of two bicycle boulevards (shared roadways that are optimized for bicycle traffic through safety enhancements along with targeted education efforts for motorist and bicyclists) to link downtown Monterey to area institutions and recreation trails. These are similar treatments to what is possible along some residential streets within Pinehurst that offer connectivity across the community or link parks, schools and other gathering places.

- Construction of bicycle lanes along North Fremont—a multi-lane arterial similar to NC 211 or NC 2 in Pinehurst.

It is evident from the Plan that the area has been actively planning for and monitoring bicycling activity as a municipality and a region for several years through regional transportation boards. One indicator of this is the bicycle count data contained in the plan. Monterey has data for twenty locations throughout the community and organizes those counts based on AM and PM peak periods. Monterey also cataloged the location of more than one hundred designated bicycle parking racks and approximate capacity of each.

***Figure 1.9: Pebble Beach/Monterey Area Bicycle Route Map***

## 1.10 SUN VALLEY / KETCHUM, IDAHO

The Sun Valley region of Idaho, which includes the cities of Ketchum, Sun Valley and Hailey as well as several resorts, focuses its efforts on linking its pathway system to the community's many in-town and natural area destinations.

A rail-trail serves as the spine of the bicycle routes system that connects the valley communities. Sun Valley has constructed its own pathway system to link to the rail-trail.

Blaine County Recreation District—a special purpose agency with its own elected board and taxing authority—manages the trail as well as the parks and recreation system and some mountain bike and hiking trails.

The Recreation District operates and maintains two closed loop pump tracks suitable for kids on balance bikes as well as adults looking to practice mountain biking skills. Both are adjacent to school properties.

The bicycling promotion system and the region's transit and transportation demand management services are both managed by MountainRides. MountainRides is also the regional transportation agency managing the "5B Bikeshare" program that has forty bicycles located at stations throughout the valley. The Bikeshare system is available seasonally and most bikes are located at single-rack stations. They can be rented via GPS and smartphone technologies.

**- END OF SECTION -**

# SECTION TWO: EVALUATING CURRENT CONDITIONS

## 2.1 OVERVIEW

*Active, involved communities promote bicycle-friendly environments for their residents & visitors*

In Section 2, the existing bicycle facility conditions in the Village of Pinehurst are inventoried and evaluated. To begin this process, information was gathered from a variety of sources, which included interviews, site analysis, a public questionnaire, community meetings, a community bike ride, relevant planning documents and direction from the Project Steering Committee and Village staff. The information gleaned from this initial research was later used to develop the final Village of Pinehurst Comprehensive Bicycle Plan.

In general, a bicycle-friendly environment indicates a strong and actively-involved community. Improving bicycling access between destinations within the Village of Pinehurst not only supports bicycling as a safe and healthy alternative to driving but also enhances the vitality of the entire community.

A viable bicycle transportation network is *essential* to the economic and social welfare of a sizable population within the community. Functional bicycle facilities strive for (but are not limited to) accommodating the following characteristics discussed in Section 1.3:

(1) Healthy lifestyles
(2) Alternative transportation
(3) Reduction of environmental impacts
(4) Safety
(5) Community identity

### User Demographics/Current Usage

According to the United States Census Bureau, the estimated population for the Village of Pinehurst in 2010 was 13,124 people. Census 2000 gauged the Village's population at 9,706, resulting in a growth between 2000 and 2010 of 35%. Recent data published by the North Carolina State Data Center estimates that the population increased to 15,525 in 2013, resulting in an 18% growth rate over a three year period. There are several suspected reasons for the rapid increase in population, such as:

1. The ever-increasing popularity of the resort area as both an adult sports mecca and a retirement community (with an extremely moderate climate) continues to lure residents on a full or part-time basis.

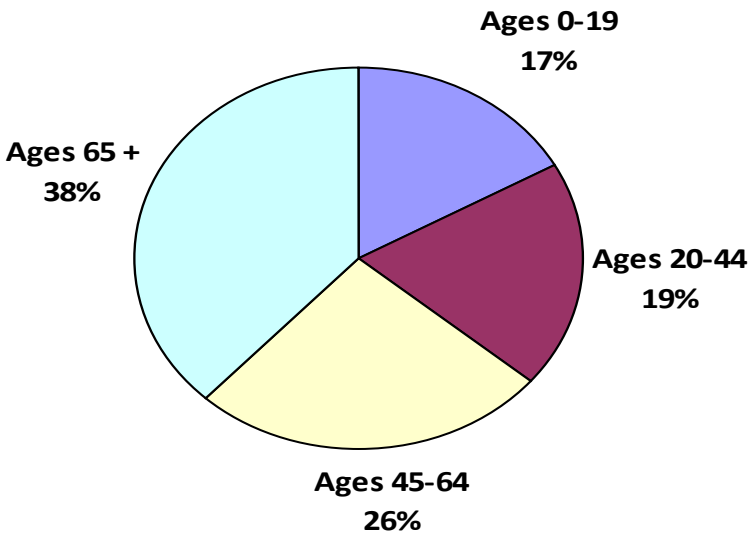
2. The life expectancy of the retirement-aged citizens continues to increase.

3. Although an economic downturn occurred during this decade, many senior citizens received retirement packages earlier than planned; thus, further increasing the number of possible retirees.

4. The closing of military bases in other parts of the country increased the military population of the Fort Bragg Army Base in nearby Fayetteville. The Village of Pinehurst is an attractive living area – on many levels – for those military families who can afford it.

The age breakdown of the Village of Pinehurst's population (based on the 2010 U.S. Census) is not typical to North Carolina. The "retired" population is by far the largest demographic for the Village, with adults between the ages of sixty-five and eighty-five supplying almost 38% of the population. It should be noted that a percentage of the senior population often utilizes alternate forms of transportation other than a personal motor vehicle.

**Age Distribution in Pinehurst (Per 2010 U.S. Census)**



Other important statistics revealed about Pinehurst include:

- The population density is approximately 940 people per square mile
- The daytime population change due to commuting is approximately + 3,931
- 4.1% of the population lives in poverty
- 69% of residences are considered "family households"
- There were only two pedestrian fatalities between the years of 1975-2011 and no bicycling fatalities.

## Physical Characteristics


As noted in Section One, The Village of Pinehurst is located in the "sandhills" of North Carolina, which generally divides the Piedmont area from the Coastal Plains and is the evidence of a former coastline (when the ocean level was higher or the land was lower). These beach deposits were formed approximately twenty million years ago during the Miocene Epoch. Typically, beach fossils/deposits can be found near the front edges of the Sandhills. The Coastal Plains are also "terraced" from ocean levels, but, none have been as long-lasting and as large as the dunes in the Sandhills.

Dry, sandy soils amid scrubby forests are typical of the Sandhills Region. Because the soils in this area are predominantly porous and sandy, the Sandhills suffers from drought; therefore, irrigation is normally required for agriculture. Some areas within the Sandhills are noted for peach production, primarily because peaches need a well-drained soil to prosper.

Prior to agricultural use, most of the Sandhills were forested with Longleaf Pine, Loblolly Pine, Turkey Oak and Blackjack Oak. In areas of extreme drainage, the forests are quite scrubby in appearance. Additionally, the Longleaf Pine begins to dominate in an area such as this – where frequent lightning-induced fires are typical.

The Sandhills region of North Carolina most notably refers to the area in and surrounding the municipalities of Pinehurst, Southern Pines and Aberdeen in Moore County. Pinehurst sits at an elevation of approximately 561 feet. There are no major rivers flowing through Pinehurst; however, there are several bodies of water, including Lake Pinehurst and Pinewild Lake. Four local thoroughfares are the predominant venues for transportation – US 15/501 (traveling north/south), NC 5 (traveling

north/south), NC 2 (traveling east/west) and NC 211 (traveling east/west). The Moore County Airport is situated approximately five miles to the northeast.

The area is home to dozens of churches and synagogues representing most religions and denominations. Universities are also in close proximity to Pinehurst. Sandhills Community College is located approximately four miles from the Village and major universities within a two hour driving distance include the University of North Carolina at Chapel Hill, Wake Forest University in Winston-Salem, North Carolina State University in Raleigh and Duke University in Durham.

## 2.2 LOCAL TRANSPORTATION NETWORK ASSESSMENT

Public transportation plays a vital role in enhancing the productivity and the quality of life in the United States. It promotes access to employment, community resources, medical care and entertainment in communities across America. Both those who *choose* to ride (and those who have no other choice) benefit from its presence. Since public transportation is also beneficial to cyclists, (by reducing congestion, air pollution and travel times) a description of Moore County's existing public transportation system is being included within this Bicycle Plan.

In urban areas, transit typically ranks as the second most used travel mode (after personal vehicles). North Carolina has one of the better highway systems in the nation and it has supported the emergence of the state as an economic power and population center. However, in urban areas, congestion and travel delays are occurring more frequently, even though North Carolina continues an aggressive highway building program, it appears that the state will be unable to keep pace with the demands placed on its capacity. With this in mind, area planners must work to meet both the current and future needs of transit.

### Existing Non-Pedestrian Transportation Network

#### MCTS (Moore County Transportation Services)


Moore County Transportation Services (MCTS) provides transportation services on an advanced reservation basis. Services for senior citizens, persons with disabilities, limited general public individuals and human service agencies are provided on a county-wide basis. Limited out-of-county services are provided for specialized care (for example: a trip to a specialized medical provider in the Triangle region).

MCTS is primarily controlled by an advisory board. The purpose of the Transportation Advisory Board (TAB) is to assist the MCTS in accomplishing its stated goal to provide safe and efficient transportation to the citizens of Moore County and promote community support for and participation in the MCTS department. The TAB functions include:

- Making recommendations to the Moore County Board of Commissioners regarding the MCTS system;
- Overseeing transportation for the clients of the human service oriented agencies located in Moore County in order to fulfill the County's fiduciary responsibilities to citizens by the most effective means;
- To provide advice and support to the MCTS Director regarding policy, planning and development of operational procedures and practices consistent with program policies.

Members of the Transportation Advisory Board are appointed by the County of Moore Board of Commissioners.

## Community Concerns, Needs and Priorities

In order to ensure a successful study, it is vital that the public be able to share their issues, needs and desires. The methodology used in establishing a Bicycle Plan for municipalities should always include citizen input.

To better understand the needs of facility users, three different methods were used to identify specific concerns/demands of Village residents. These methods consisted of conducting Steering Committee discussions, surveys and Community Workshops/Events. While the surveys and map exercises were good tools to record participant responses to specific questions, open discussion with citizens also contributed a great deal of information regarding the desires and concerns of local bicyclists.

### Steering Committee Discussions

To act as a *guide* for the development of the Bicycle Plan, a Steering Committee was formed during the initial planning process to establish a vision and identify the needs and priorities of pedestrians. The steering committee acted as the principal advisory body to McGill Associates and was composed of members from the Village staff, Village Council, NCDOT and local citizens. The names of Steering Committee members can be found in

the Acknowledgments at the beginning of this document. A total of five Steering Committee Meetings were held during the preparation of this plan.

During an initial Steering Committee meeting to solicit input on the bicycle/pedestrian environment in the Village, members were divided into small groups and given maps along with colored dots and markers. The members were asked to check the maps for inaccuracies, and to mark cycling destinations, problem intersections and gaps in the current network. They were also asked to draw where they would like to see new sidewalks, greenways and bike lanes. The results of this exercise - and those from the Community Workshops - are recorded in the following paragraphs.

## Community Workshops

Bicycle and Pedestrian Public Input was sought during two advertised, formal public workshops held at the Village Hall. These sessions were designed to provide drop in service for local residents that wished to attend and participate in either mapping exercises identifying needs and desires or open discussion to share opinions and suggestions.

Community workshops were also held during special events including a Live After 5 event and the Parks and Recreation Fall Festival to provide the public an opportunity to be involved in the bicycle planning process. This also assured a good crowd from which to attract participants for the workshop exercises.

Other community outreach occurred at a Community Bike Ride, where participants rode common local routes as a group and discussed the opportunities and barriers along each route.

### Community Workshop and Open House #1

Over forty-five people participated in the initial workshop held at Village Hall on September 16, 2014. Meeting participants could drop in during either morning or afternoon meeting times. Participants were invited to fill out a bike/pedestrian survey, to participate in a mapping analysis exercise and/or an open discussion. A copy of the combined Bicycle/Pedestrian Plan survey can be found in Appendix A. The map exercise was used to initiate discussions about existing pedestrian and cycling corridors, needed facilities and dangerous conditions in Pinehurst.

*1st workshop held at Village Hall*

The consensus at this workshop is that the Pinehurst Greenway should be expanded to connect with the Downtown, surrounding neighborhoods and common destinations. Other popular ideas included having paved sidewalks in the residential areas tie to the

Greenway. Additional paths in which people were concerned with included the existing sand/clay paths in the historic Village area and the possibility of improving these paths.

Citizens also reported difficulty using the existing greenways and paths for biking due to the surface material. The major concern for participants during the workshop was if proposed improvements would follow the existing Pinehurst Greenway Plan recommendations calling for a wide cross-section for gravel paths. The most popular idea from participants was for narrower sidewalks (5 feet to 6 feet) to be installed where appropriate within neighborhoods that should connect with the larger Greenway trails.

Dangerous Intersections that were identified by the community included:

- Numerous intersections along NC 211, NC 5/Beulah Hill Road and NC 2
- Juniper Creek Road and US 15/501
- Pinehurst Trace and US 15/501
- Monticello Drive and Morganton Road

**Community Workshop #2**

*Public Input during Live After 5 Event*

The second community meeting took place during a Live After 5 event on October 10, 2014 in Downtown Pinehurst. Approximately forty participants stopped by the Bicycle/Pedestrian Plan booth and shared ideas and concerns for the system in Pinehurst. Participants were asked to review, comment and share their ideas about the existing and proposed biking facilities and conditions. Participants were also asked to complete a survey to collect more detailed information regarding their cycling experience in Pinehurst and their suggestions for improving the system.

**Community Workshop #3**

*Fall Fest 2014*

The third community meeting took place at the Pinehurst Parks and Recreation Fall Festival on October 24, 2014 at Cannon Park. Participants were asked to review, comment and share their ideas about the existing and proposed biking facilities and conditions. Participants were also asked to complete a survey to collect more detailed information regarding their cycling experience in

Pinehurst and their suggestions for improving the system. Approximately thirty people participated in the open discussions, mapping exercise and/or completed a survey.

**Community Workshop and Open House #4**

The fourth and final community meeting was also held at Village Hall on December 4, 2014. This meeting was attended by roughly fifty residents, who were provided with the current results of the survey/questionnaire, given the opportunity to fill out their own survey and provided with preliminary recommendations and future bike corridors to be included within the plan. Attendees were also given the opportunity to express comments and/or concerns regarding existing facilities, ask questions about the plan and recommendations and view various maps that are intended to be included within the plan.

**Community Bike Ride**

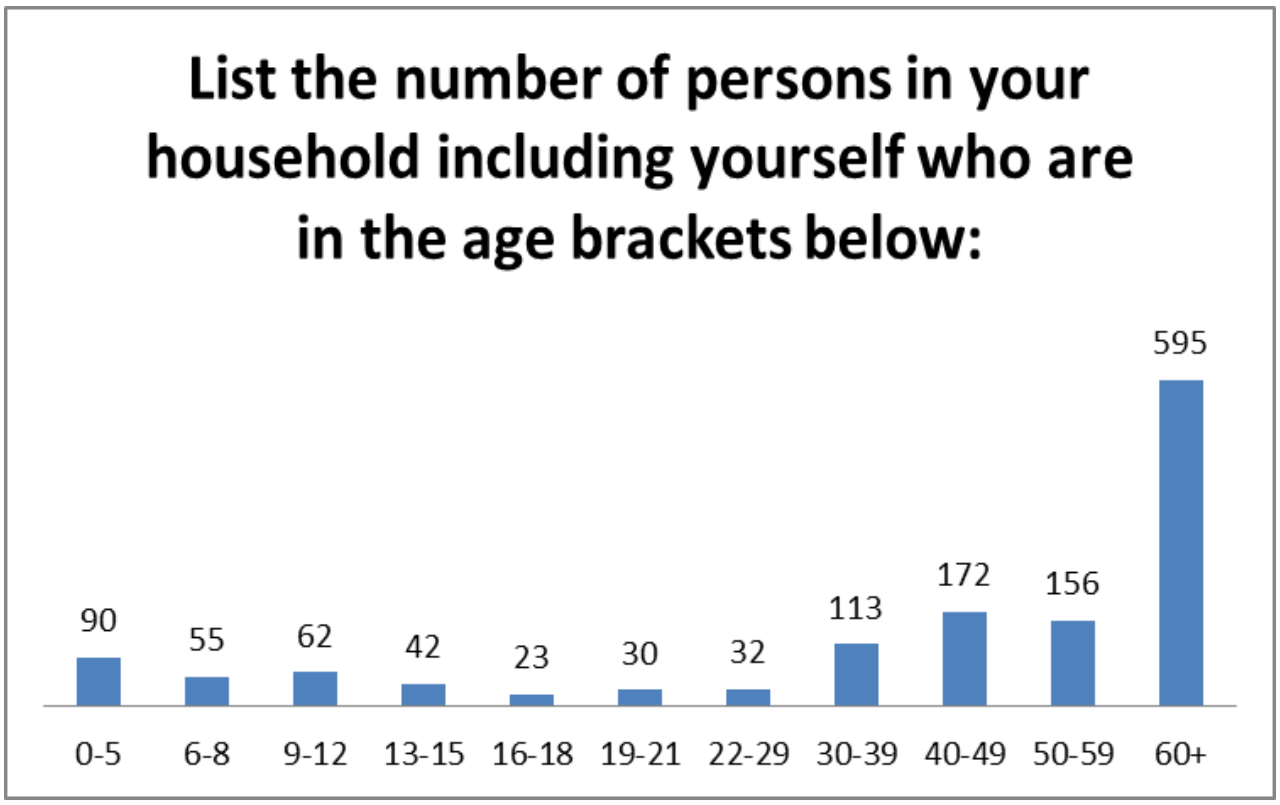
As part of developing this plan, a Community Bike Ride was held on September 13, 2014 beginning at the Village Hall. Approximately twenty local cyclists of all ages attended to learn more about the plan and discuss local cycling habits and destinations within Pinehurst. The ride included several "trips" around Pinehurst to local destinations and frequent stops to discuss concerns about each route and items that would make the route safer and more enjoyable. Participants in the Bike Ride were also asked to take the Bicycle/Pedestrian Survey that had been generated for this project.

## Pedestrian/Bicycle Survey

To further solicit input from the public about the current bicycling opportunities in Pinehurst, a public survey was conducted by means of a questionnaire, which was made available to residents via Community Meetings, by pick-up at Village Hall and via the internet from a link on the Village's main web page. The survey, which can be found in Appendix A, was designed to solicit opinions on both *general* and *specific* concerns in the Village of Pinehurst. Approximately 600 surveys were received representing approximately 1,370

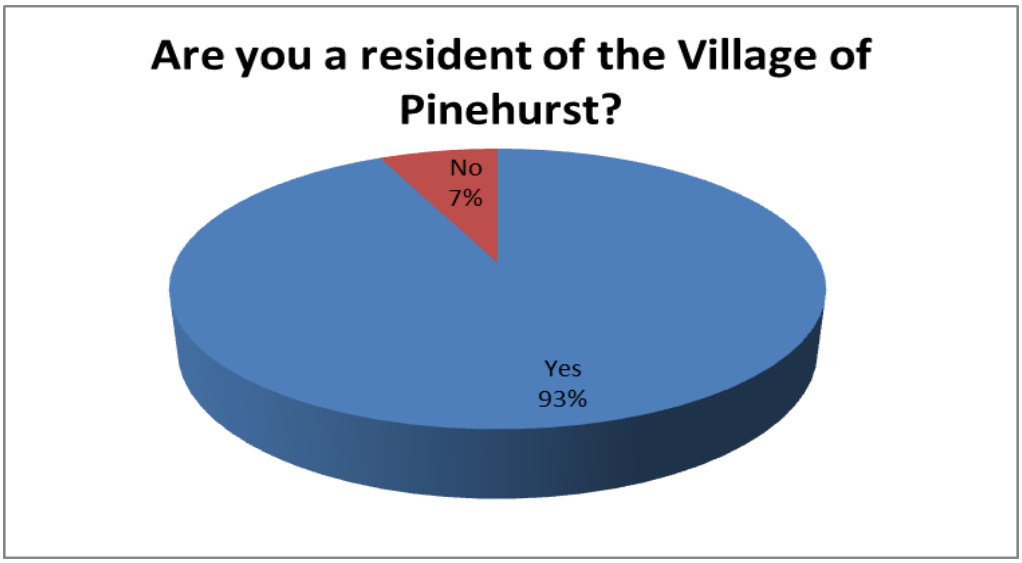
individuals (calculated based on responses to questions regarding number of people in the respondent's household).

The survey questions and a summary analysis for each are pictured in the next few pages. Survey responses to pedestrian-specific items have not been included (at the request of NCDOT), but are provided and discussed further in the separate Comprehensive Pedestrian Plan.

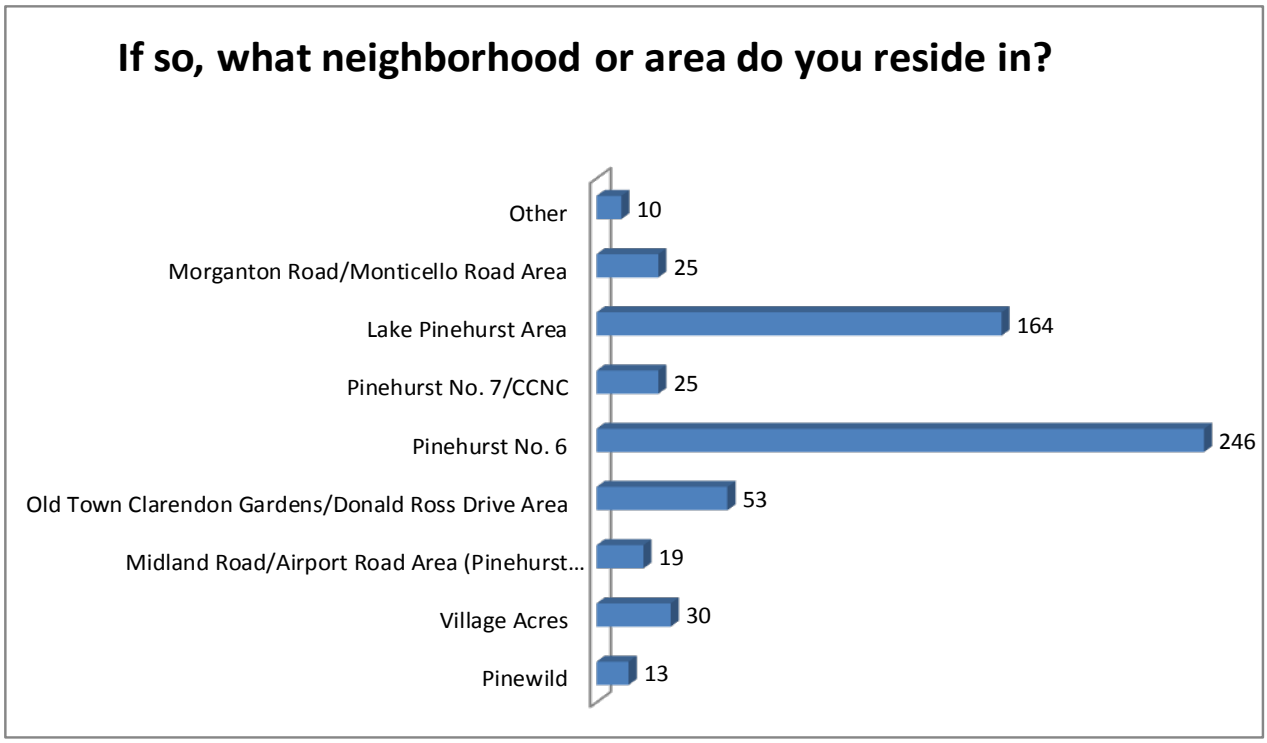



As indicated in the graphic above, the majority of survey participants were adults age 60 and above (approximately 48%). While all age groups were represented, this outcome reflects the typical profile for Pinehurst (47% of residents are age 60+).

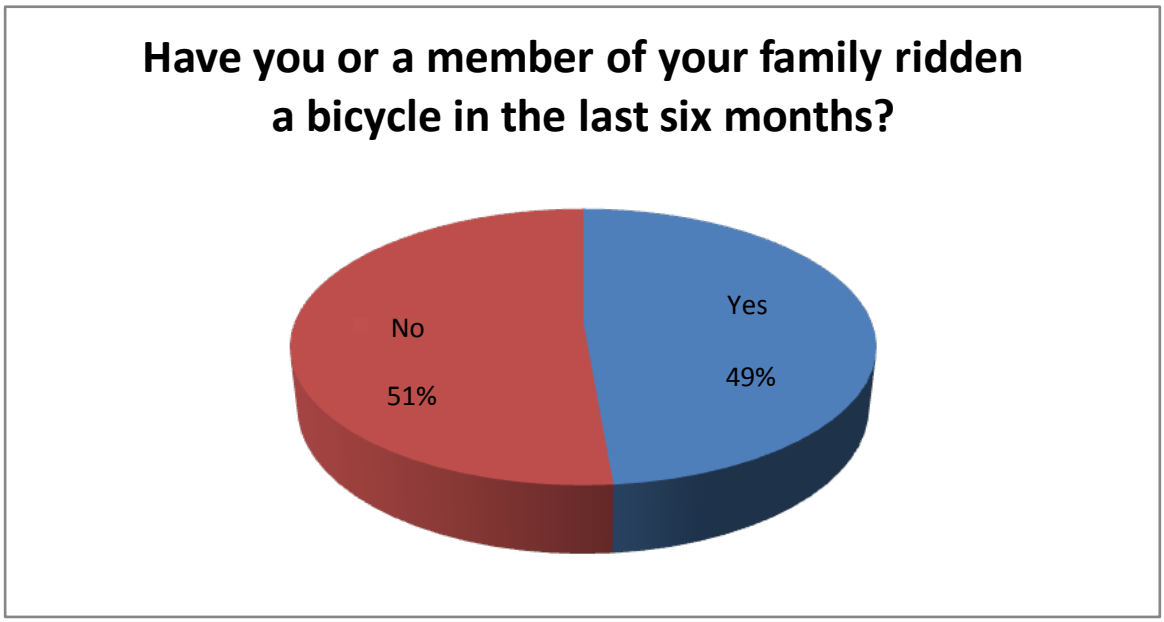
The majority of survey participants were residents of Pinehurst.

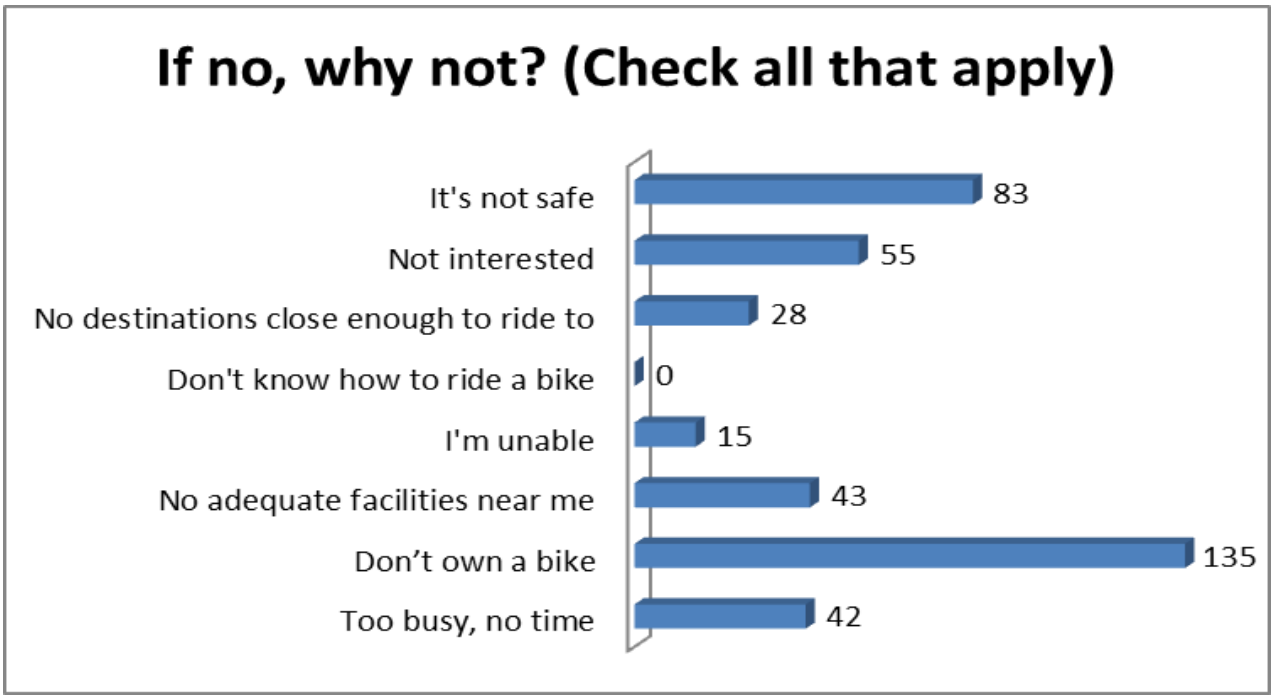



As indicated in the graphic below, participants from all of Pinehurst chose to participate in the survey, however, the majority of surveys were provided by residents identifying with Pinehurst Number 6 and the Lake Pinehurst Area.

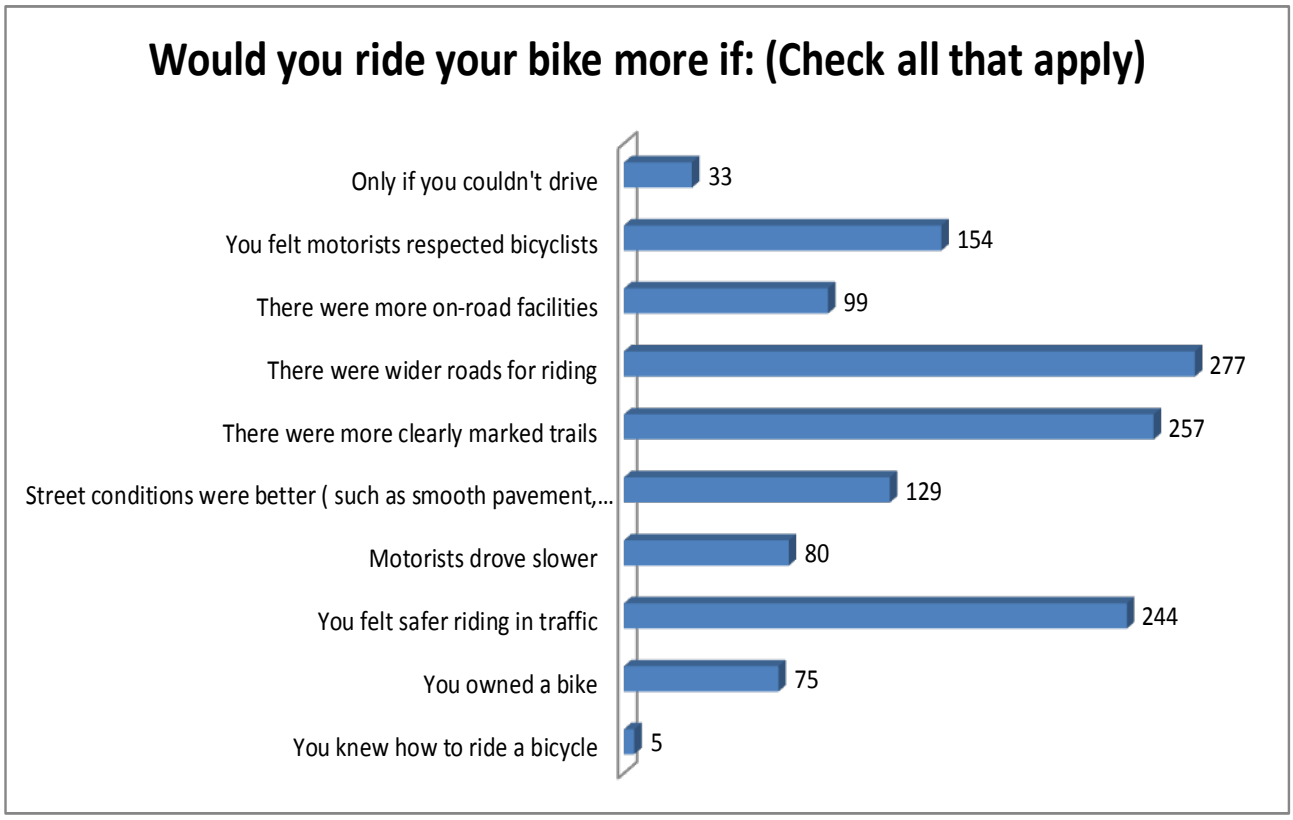


Approximately half of survey responses indicated riding a bike within the last six months, those that hadn't ridden reported not doing so either because they didn't own a bike or felt riding in Pinehurst was not safe, were not interested in riding or didn't feel adequate facilities were located near them.

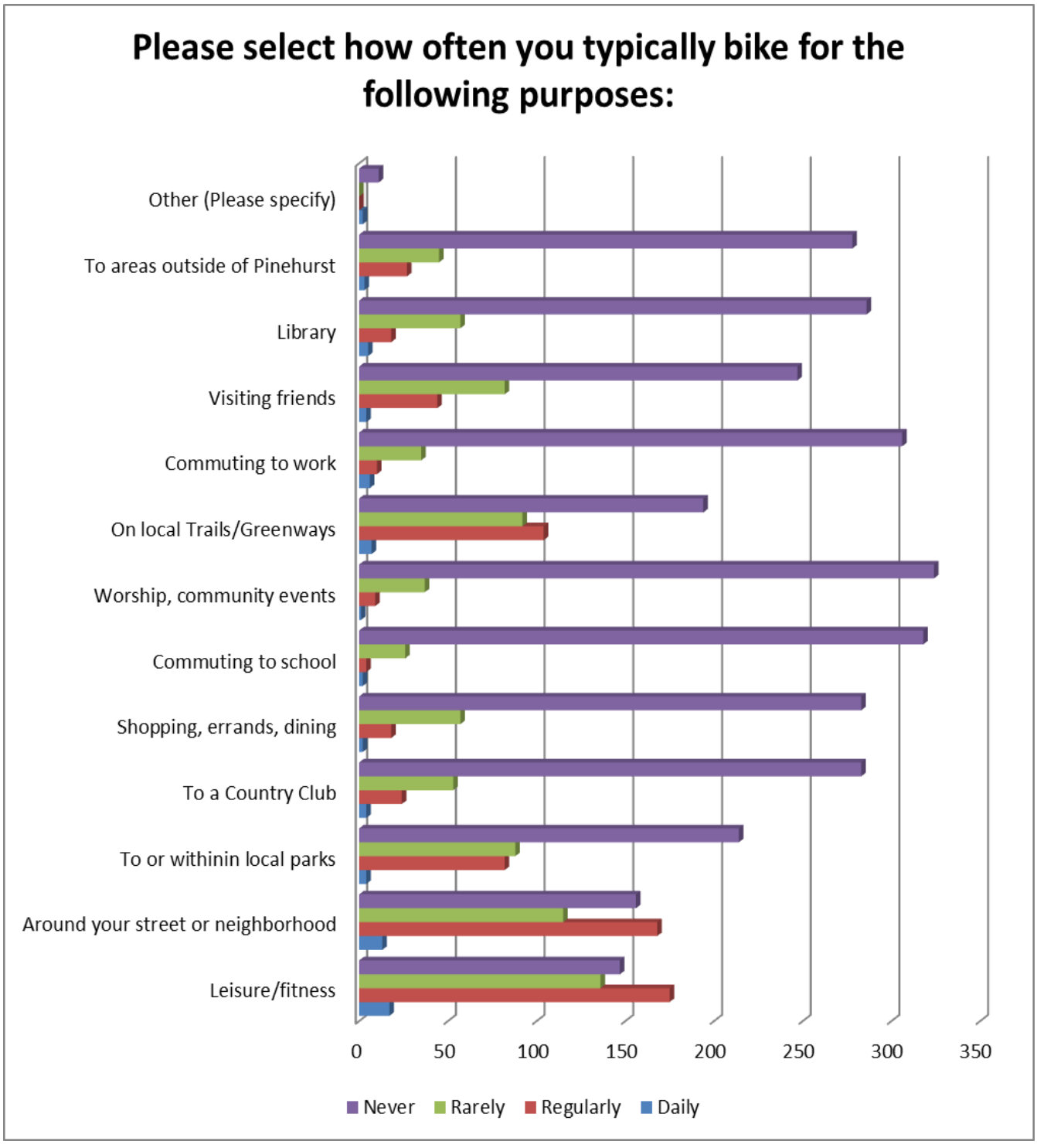



Other reasons included a lack of time, inability to ride or the perception that desired destinations were not close enough in proximity to ride to.

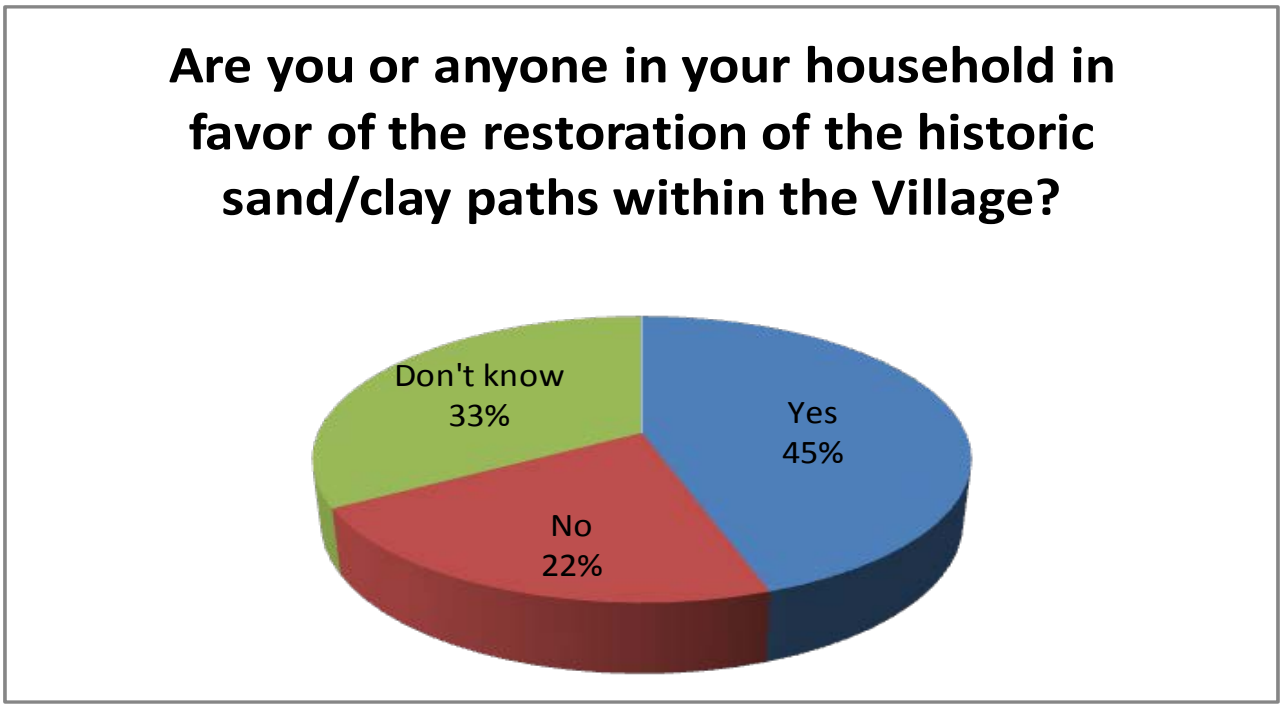

Would you ride your bike more if: (Check all that apply)
Only if you couldn't drive
33
You felt motorists respected bicyclists
154
There were more on-road facilities
99
There were wider roads for riding
277
There were more clearly marked trails
257
Street conditions were better ( such as smooth pavement,...
129
Motorists drove slower
80
You felt safer riding in traffic
244
You owned a bike
75
You knew how to ride a bicycle
5

Survey responses indicate that riding for leisure/fitness and riding around neighborhood streets were the major reasons for riding a bike in Pinehurst.

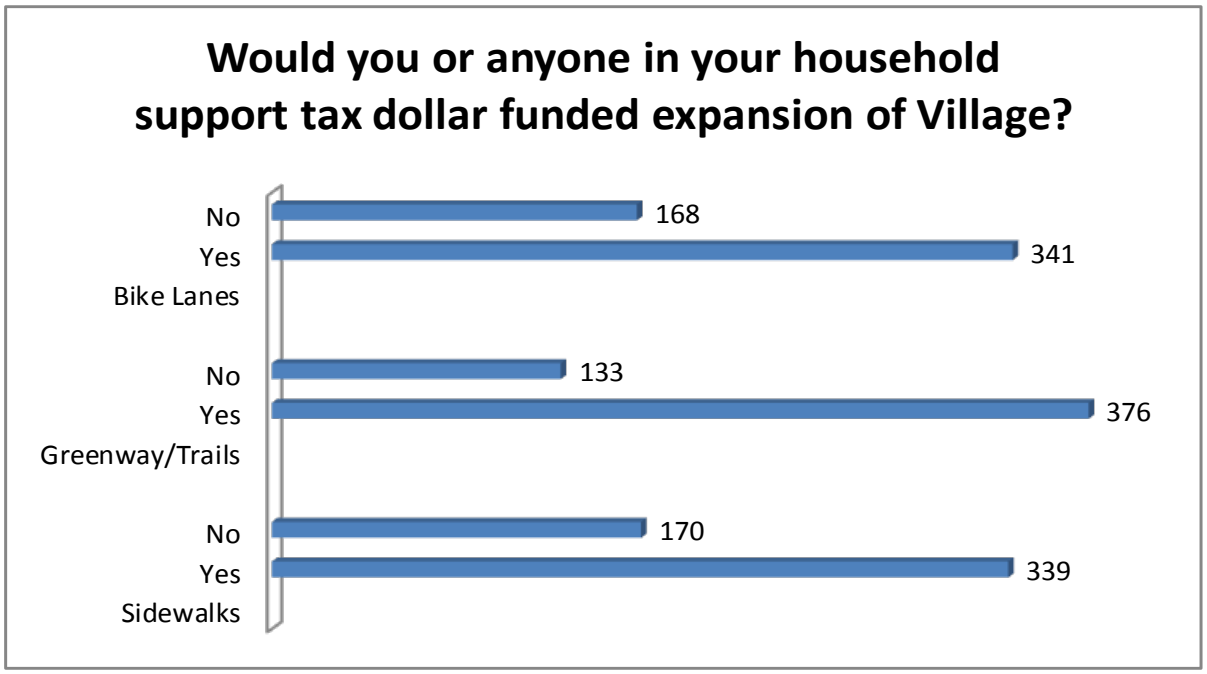


More than two thirds of respondents indicated a desire to walk or bike more if better and/or safer facilities were provided.


While 45% of those surveyed were in favor of restoring the historic sand/clay paths within the Village, 22% were not in favor of restoration. However, 33% of survey participants were not certain whether or not the historic paths should be restored. This level of uncertainty should be further explored by the Village prior to deciding a course of action regarding the restoration of the historic sand/clay paths.



The majority of survey respondents reported being in favor of tax dollar funded expansion of the bike lanes, Greenways/Trails and Sidewalks in the Village, with Greenway/Trails being the highest percentage.




## Additional Comments

The survey/questionnaire also gave participants the option of providing additional written comments related to bike and pedestrian facilities in Pinehurst. Questions were asked about suggested bike lane and trail routes, physical barriers that prevent the safe use of the existing system, the Village's best investment in walking/bicycling facilities and any additional comments that the respondent had. Common themes associated with the written comments include:

- More connectivity is needed between residential areas and destination points, such as Downtown Pinehurst and neighboring communities.
- Praise to the Village for the existing greenway system, trails at the Arboretum and trails at Rassie Wicker Park.
- A desire for more sidewalks in residential neighborhoods and the opinion that existing roads are too narrow and that walking/biking in residential areas is generally unsafe. Some resistance to sidewalks in front yards was noted due to small lot sizes.

- A preference for off-street biking opportunities in lieu of bike lanes within existing streets.

- The current greenway system is generally good for walking but not for biking (particularly with training wheels) or pushing a stroller.

- Safety concerns for walkers and cyclists along Linden Road, particularly those that utilize the roadway in lieu of the greenway.

- A need for signalized crosswalks across major highways (15-501, 211, etc.).

- Many respondents don't like the idea of having to drive somewhere to safely walk or bike.

## Analysis

The survey generally indicates that residents are interested in bicycling within Pinehurst, but that safety concerns are preventing many from regularly riding a bike. Many also feel that there is a lack of connectivity to common destinations within the Village and that not enough biking facilities exist to safely access these destinations. The survey indicated strong support for expanding the current pedestrian/bicycle system, in Pinehurst, including the need for improvements to the existing pedestrian/bike system as well as the need for expanding these systems in the future.

Other reasons for improvements to the bicycling system include the growing trend of healthy living and fitness as they relate to improving quality of life. Access to facilities was a common theme coming from the responses and many comments were made related to the need for expanding both pedestrian and bicycling facilities.

# 2.3 INVENTORY AND ASSESSMENT OF EXISTING BICYCLE FACILITIES

### Assessment of Local Bicycling Conditions in Pinehurst

The current bicycling system in Pinehurst does not contain any dedicated facilities or special route markings for bicyclists. Those wishing to bike on area roads have to share the road with motorists and other vehicles. In addition, the area's greenways are unpaved and not conducive to many types of bicyclist travel, but they are used by bicyclists as they are oftentimes the only connecting facility or they are where bicyclists feel most comfortable riding.

Some residential areas within the Village of Pinehurst benefit from the recent development of the Pinehurst Greenway. These areas along the Greenway now have access to the recently completed sidewalks along Highway 211 and Linden Road. The

Greenway is best-suited for low speed bicycling and bicycles with wider gauge tires; road bikes with narrow tires are not suited for sand or gravel pathways.

The historic Village areas offer the best on-street bicycling conditions within the Village due to its low volume, low speed and shaded streets. One who wishes to comfortably bike for recreation or to reach destinations within this area find a very pleasant place to ride. Unfortunately, there is very poor connectivity to get to the downtown from residential and business areas just outside the historic Village area. Village businesses may benefit by being accessible via a bicycling network consisting of facilities, pavement markings and route signage that links the various tourist attractions, resorts, government facilities, hotels, restaurants, residential areas, the hospital, etc.

On busier roads and highways, there is limited shoulder width to accommodate bicyclists and there are no continuous routes with shoulders wide enough (4 feet or 5 feet) for bicycling. The “enclosed” feel of some streets due to tree canopy and narrow travel lane widths make routes such as Linden Road and Highway 2 more suitable for bicycling than Highway 5 or Highway 211. On streets with an enclosed feeling, motorists tend to drive slower due to close proximity of trees and motorists in other travel lanes. This does not mean that less confident bicycle riders will feel comfortable in those situations, rather those bicyclists who are comfortable riding on-road are less subject to hazards than on “wide open” routes.

## Bicycling Trip Characteristics

Bicycling trips are generally characterized as short and long distance trips, made for transportation or utilitarian purposes. Since residential areas within the Village are without dedicated bicycling facilities, there are few trips made for transportation purposes. Kids may bike on local streets and residents may ride short loops for short recreational trips. Long distance recreational rides may begin in these areas but often end up on more rural settings. A number of residents voiced frustration during community meetings about having to use their car to drive to a separate location to access the Greenway.

The common idea shared by participants of the community meetings is that all the residential areas within the Village have access to at least one bicycle route within their neighborhood that connects to the Greenway or other bicycle routes. Due to right-of-way constraints, a dedicated bicycle lane or bikeable shoulder is not feasible in most residential areas; therefore, a network of "shared lane markings" is recommended to raise awareness of the presence of bicyclists on these routes. State highways and other collector and arterials roads may accommodate bicycle lanes in the future and provide on-street connections to area Greenways.

*Village Arboretum*

The Village Arboretum offers dedicated, picturesque recreational paths near the Village Hall. These paths connect with the Pinehurst Greenway. The Greenway currently offers approximately six miles of well-maintained path and is beginning to serve as an important connecting component for alternative transportation through the Village.

The Pinehurst Greenway is currently gravel/sand in many locations, limiting accessibility for some bicyclists. As sections of this system are considered for paving for A.D.A. compliance or other reasons, this important asset to the Village will serve as a critical unifying component linking neighborhoods and resort areas with shopping areas, job sites, schools, parks, doctors' offices, the Hospital and other nearby communities.

Sites that either generate or have the potential for generating bicycle traffic include:

- **First Health Moore Regional Hospital & Fitness Center** – There are nearby greenway connections and some local streets suitable for bike travel.
- **Sandhills Community College** – There are no facilities leading to the College along Airport Road, but this Plan recommends a sidepath or bikeable shoulders connecting to the facility and the Southern Pines greenway.
- **Rassie Wicker Park** – There are pathways leading to the park from the Village Hall and Arboretum. On-street shared lane bicycle routes could connect the Village Green area to the Park.
- **Village Arboretum** – Both paved and non-paved paths traverse this Park which is accessible from the Village Hall.
- **Village Hall** – There are pathways nearby from Rassie Wicker Park.
- **Harness Track/Fair Barn** – No bicycle routes lead to these locations.

- **Pinehurst Greenway** – The Pinehurst Greenway connects to Rassie Wicker Park, Cannon Park, Given Memorial Park, Highway 211 and eventually moves beyond the FirstHealth campus to adjacent residential properties.

- **Given Memorial Library** – The Library is accessible via many of the Village's residential streets that offer a pleasant environment for bicycling and may be combined with on-street pavement markings or route signage to heighten motorists to the awareness of bicyclists and provide a wayfinding system to reach the area.

- **Pinehurst Elementary School** - A recently updated portion of sand/clay path provides pathway connectivity from the adjacent residential community.

- **Various resorts within the Village** – Some are connected with the Greenway system while others remain on the periphery accessible via low speed, low volume routes. Others are inaccessible via on-street bike routes or are along or require crossing of high speed, high volume streets to access.

A map that includes the areas described above is provided at the end of this section.

Shopping destinations are scattered throughout the Village, but the main shopping areas that currently generate or could potentially generate bicyclist traffic are:

- **Market Square Retail Areas** – This symbolic downtown within Pinehurst has a mix of fair to good condition sidewalks that extend from the center of the square to nearby residential areas. The paved sidewalks typically lead to historic sand/clay paths.

- **Olmsted Village** – This popular destination is not located within the Village limits but is frequently used by Pinehurst residents. The recent widening of Highway 211 included the construction of new concrete sidewalks on both sides of the road that terminate at Olmsted Village near the intersection of Highway 211, NC Hwy 5 and Central Park Avenue.

Busy roadways pose a major barrier for cyclists trying to walk from one point to another. The roadways with the highest Annual Average Daily Traffic counts (according to NCDOT 2013 AADT) in the Village of Pinehurst are summarized in Table 2-1.

**Table 2-1**
**Busiest Roadways in Pinehurst**

| Road | From | To | Distance (Miles) | Existing Road Condition | Approx. Width | AADT |
|---|---|---|---|---|---|---|
| US Highway 211 | Traffic Circle | Pinewild Entrance | 4.0 | 2 Lanes, each way Divided | 72' (w/median) | 13,000 west of Highway 5, 11,000 east of Highway 5, 12,000 at Traffic Circle |
| NC 5 | Hwy 211 | Holly Pines Drive | 2.7 | 2 Lane | 24' | 7,800 at NC 211, 17,000 south of Hwy 2, 10,000 at Trotter Drive |
| US Highway 15/501 | Juniper Lake Road | Voit Gilmore Lane | 3.4 | Varies from 2 lanes, to 2 Lanes Each Way Divided, to 2 Lanes with Center Turn Lane | Varies | 11,000 North of Juniper Lake, 16,000 North of Circle, 26,000 South of Circle, 25,000 North of Morganton |
| NC 2 (Midland Road, Palmetto Road) | NC 5 | Station Avenue | 3.1 | Varies from 2 lanes, to 2 Lanes Each Way Divided | Varies | 5,200 East of Carolina Vista, 8,700 west of Traffic Circle |
| Linden Road (SR 1115) | NC 5 | Pine Vista Drive | 2.0 | 2 Lane | 18-20' | 3,600 west of NC 5 |

There are a number of intersections along these typically busy corridors that have a perception of being unsafe because of the volume and/or speed of vehicular traffic that cyclists must navigate. Most of these intersections do not have signals or crosswalks.

The exception is the intersections on Highway 211 that were recently improved by NCDOT. These intersections are equipped with both crosswalks and ped-heads.

To create a bicycle-friendly transportation system in the Village of Pinehurst, existing corridors will have to be strengthened to improve connectivity, repairing existing facilities and providing safe and efficient paths across busy vehicular corridors. Additional corridors need to be provided to connect major portions of the Village (east to west and north to south) and to serve as neighborhood connectors. New connectors need to be provided to reach important destinations, especially near public schools, parks and popular commercial areas.

## Mapping

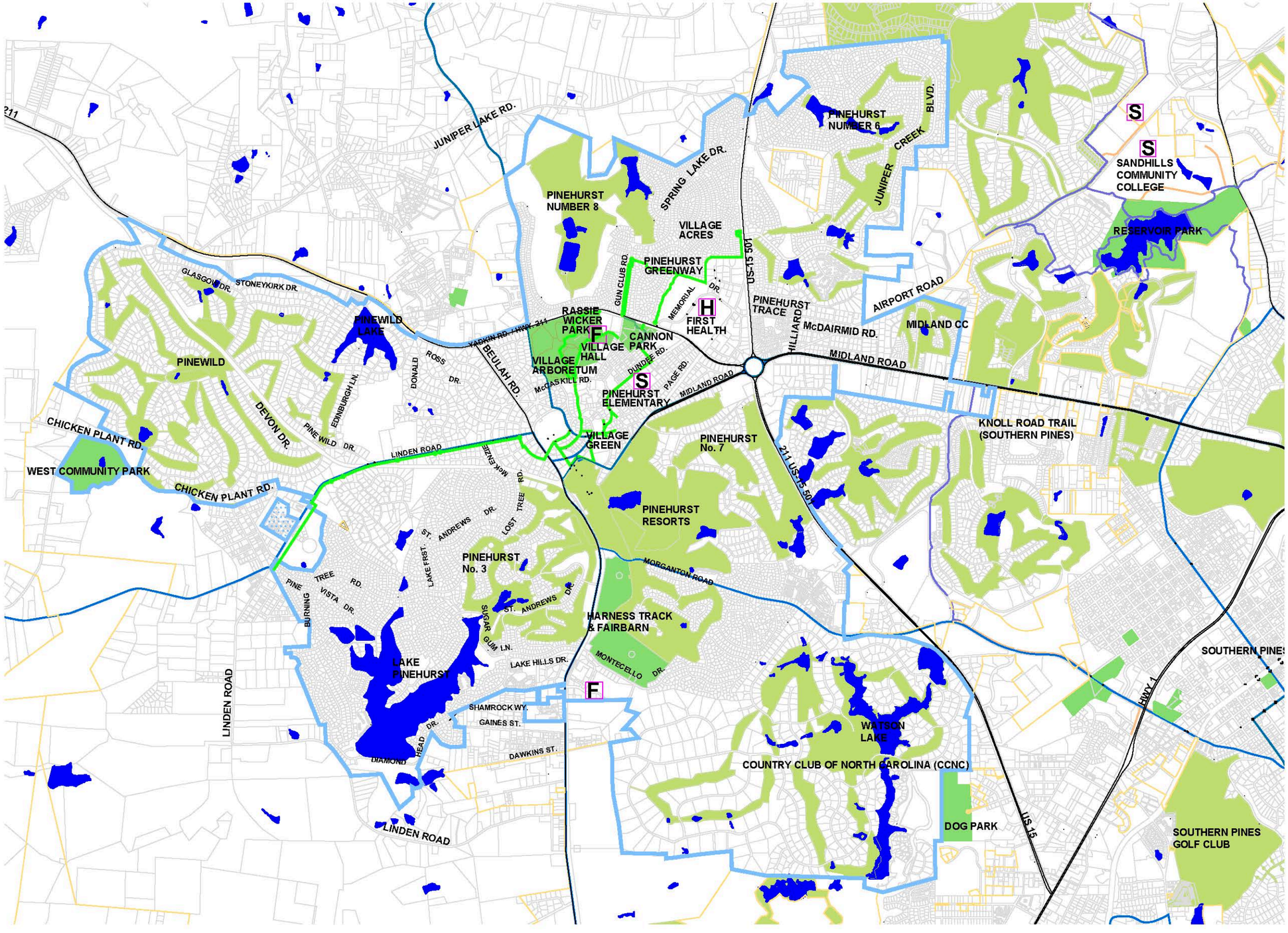
Map 2-1 provides an inventory of the existing bicycle network in Pinehurst, and neighboring communities, as well as common destinations.

**- END OF SECTION -**

# Village of Pinehurst
# North Carolina

## 2015 Comprehensive Bicycle Plan

**Figure 2-1**




- Existing Park Facility
- Golf Course
- Existing Pond/Lake
- Existing Greenway Trail
- Existing State Bike Route
- Moore County Bike Touring Route
- Existing Southern Pines Greenway Trail
- Village of Pinehurst
- Pinehurst ETJ
- S Existing School
- H Existing Hospital
- F Existing Fire Station

W E S

3,500 0 1,750 3,500 7,000

GRAPHIC SCALE 1 INCH = 3,500 FEET

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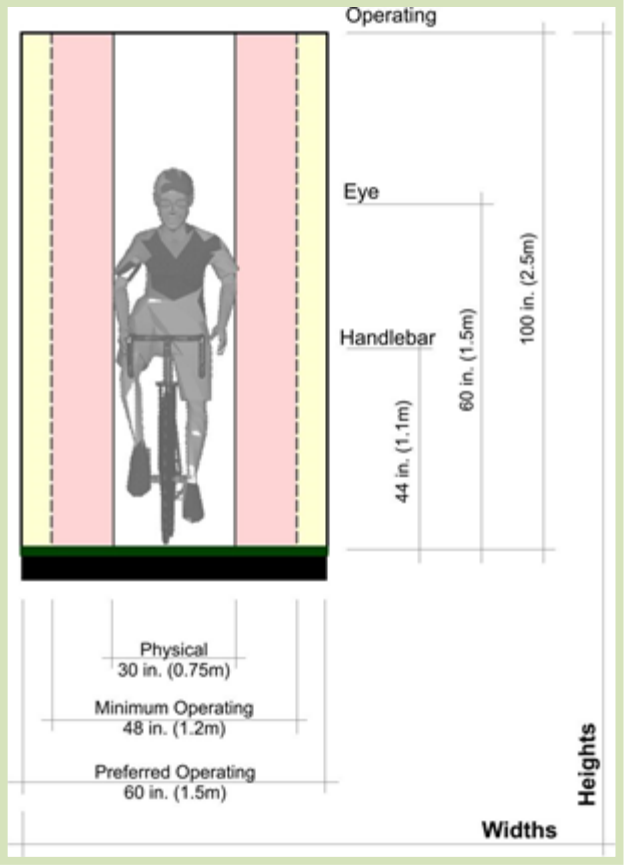
# SECTION THREE: BICYCLING DESIGN GUIDE

## 3.1 DESIGNING FOR BICYCLISTS




Designing for bicyclists is very different than simply designing facilities for bikes. A bicycle is an inanimate object incapable of movement without human power. Properly designed facilities are constructed in a manner that indicates the designer understands what it is like to be a bicyclist moving through a space. Due to the physical exposure a bicyclist has when compared to a motorist, it is important to acknowledge the physical characteristics of a bicyclist. AASHTO notes that "understanding bicyclists' operating characteristics is therefore essential to design facilities that minimize the likelihood of injury."

For the same reasons that motor vehicle travel lanes are made wider when truck traffic is higher, the design for bicyclists should also reflect the type and volume of bicyclists. People for Bikes, a nationwide advocacy organization, unveiled a new approach to designing bicycling facilities in 2014 with their "Build it for Isabella" campaign. In traditional traffic engineering parlance, the "design vehicle" is what determines how a street is designed. "Isabella" is the design user for bicycling facilities, a twelve year old girl who is ready to explore her neighborhood by bike.

The "Build it for Isabella" approach builds upon the growing knowledge base of bicyclist types, which acknowledges there are at least four distinct types of attitudes people have toward bicycling that were identified in an Oregon study ("Four Types of Transportation Cyclists", Portland Bureau of Transportation, http://www.portlandoregon.gov/transportation/article/158497). They are:

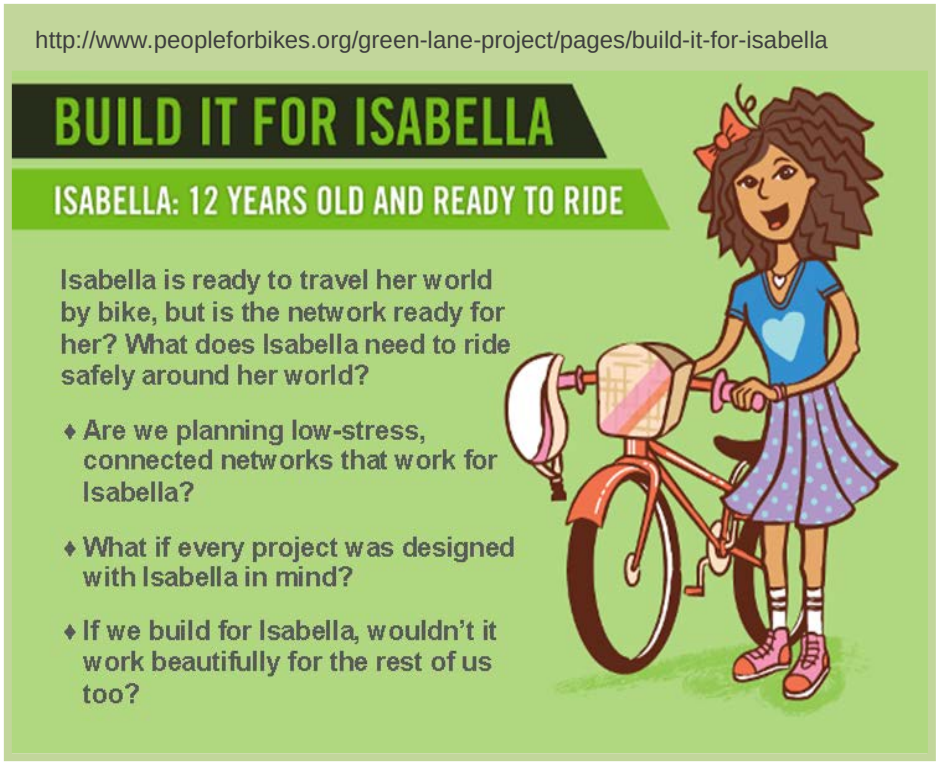
- **Strong & Fearless:** These bicyclists often ride regardless of roadway conditions and riding is a strong element of their identity.

- **Enthused & Confident:** These riders are comfortable sharing the road with automobile traffic but prefer to do so while riding in their own facility (e.g. bike lanes).

- **Interested but Concerned:** They are curious about riding a bike but are reluctant to ride where they do not feel safe. They may already mountain bike or use greenways.

- **No Way, No How:** This group is not interested in bicycling due to either a lack of interest, inability to ride, or concerns about topography and safety. How can we introduce them to bicycling?

We heard from each of these riding perspectives during the community bicycle ride for the Pinehurst Comprehensive Bicycle Plan. Several riders expressed a desire to have facilities separated from motor vehicle traffic and even the most confident riders in the group expressed a desire for their own space on many of the roadways in the area due to traffic speeds and volumes.




It is imperative that we assess the needs of bicyclists from each of these four perspectives when considering how we design for Isabella. A safe bicycling network allows bicyclists in one category to potentially move up into a category of more confident riders. Some bicyclists attitudes may float between these categories based upon their unique situation. Bicyclists who are strong and fearless when riding by themselves, "may be interested but concerned" at the prospect of riding a bicycle with their child.

Strong and fearless or enthused and confident riders may have a "no way, no how" attitude if it means they have to travel along a section of highway that is either off limits to bicyclists or where no facilities exist next to high speed traffic. This does not mean that every facility on every street must accommodate Isabella; rather we should strive to build a bicycling network that provides parallel routes to major streets where less confident riders can still feel safe. There will also be constraints and traffic conditions that inhibit a bicyclist's willingness to ride in certain situations.

As bicyclist types are changing, so are the bicycles they are riding, which means that a four foot lane is barely adequate to accommodate a diverse range of bicyclists. A common design application in North Carolina is to default to a four foot bicycle lane because the prevailing standards state this as a minimum, and precedence has been set with building bicycling and walking facilities to meet only these minimum standards.

While this may suit the Strong and Fearless rider, it ignores the need and comfort of others who have less fearless attitudes about cycling. We rarely build motor vehicle lanes to the minimum width (e.g. you will almost never see a new nine foot travel lane built on a North Carolina street or highway).

## Applying Complete Streets


Just because a street has sidewalks and bike lanes does not always mean it is "complete" from the perspective of safely accommodating all users of all ages and abilities. Careful consideration must be given to the needs of bicyclists and how they interact with traffic along different routes. Destinations along or near a proposed bicycle route are important to understand the type of bicyclists that can be expected.

NCDOT's "Complete Streets Planning and Design Guidelines," adopted in 2012, helps guide the department to consider all road users when upgrading roadways or changing configuration. However, due to various factors these accommodations cannot always be made. One example in Pinehurst is the Historic District, which makes adding capacity to streets like Highway 2 and Highway 5 through Pinehurst more difficult. Similarly, as NC 211 was recently widened without consideration of future bicycle users, it makes adding these facilities much more difficult. The addition of bike lanes or bikeable shoulders is most likely to occur during resurfacing, with Pinehurst and NCDOT working together on the design.

Given these realities and as noted in the introduction to this chapter, the corridor-specific recommendations contained later in this report are both short-term and long-term in nature. The short-term recommendations are geared toward pavement markings, signage and route designation while long-term recommendations reflect more substantial infrastructure upgrades.

The route recommendations also include major influences on the demand for bicycle traffic, the NCDOT Complete Streets cross section that best fits the existing corridor and a planning-level cost estimate. A planning level bicycle quality of service (or level of service analysis) was conducted based on existing conditions.

While the Complete Streets guidelines are helping direct NCDOT, it is still imperative that Pinehurst and its residents remain diligent about how bicyclists and pedestrians are accommodated on projects.

The Village of Pinehurst should work closely with its local NCDOT Division 8 office to express the desire for Complete Streets during the project development process. It should also be familiar with the Division's resurfacing schedule to ensure bicyclists are given full consideration.

## Environmental Review

Any project that utilizes federal funding, either through NCDOT-led efforts or Pinehurst-led projects, will require an environmental analysis. During this process, the designation of the Historic District will likely have a major impact on the type of recommendations that could be pursued. It is imperative that Pinehurst and NCDOT include statements about the purpose and need for active transportation facilities along these routes during the early stages of the project so they are not eliminated during the environmental review process (if major upgrades occur).

Projects outside the Historic District will also require an environmental review if using federal funds and it is equally important to include bicycling and walking facilities as part of the purpose and need. Right-of-way acquisition on projects outside the Historic District is not likely to pose as much of a challenge to implementation as those within the Historic District.

## NCDOT's Bicycle Policy

In addition to the State's Complete Streets policy, NCDOT operates under an adopted Bicycle Policy that stems from the State's 1974 Bicycle and Bikeways Act. (http://www.ncdot.gov/bikeped/download/bikeped_laws_Bicycle_Policy.pdf).

Some important elements of the bicycle policy for Pinehurst to remember when projects are pursued are:

- 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.

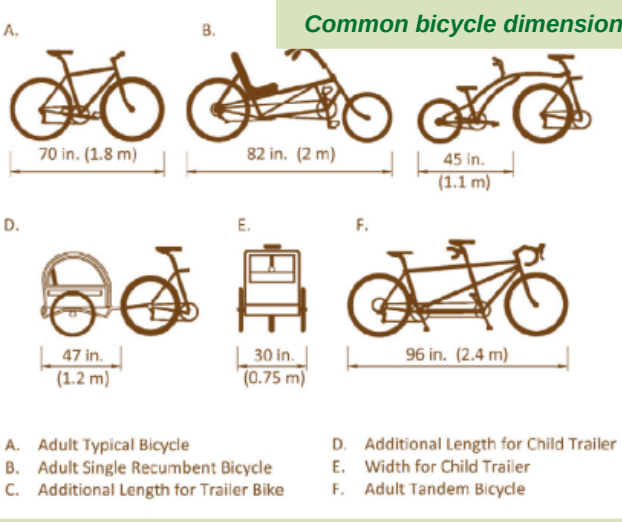
- All bicycle facilities…shall conform with the (State) adopted Design Guidelines for Bicycle Facilities on State-funded projects, and also with guidelines published by the American Association of State Highway and Transportation Officials (AASHTO) on federal aid projects.

- Paved shoulders shall be encouraged as appropriate along highways for the safety of all highway users and should be designed to accommodate bicycle traffic.

## 3.2 DESIGN GUIDANCE FOR BICYCLING FACILITIES

As prescribed in NCDOT's Bicycle Policy, most of the prevailing guidance on the design of bicycling facilities stems from AASHTO. In 2012 the organization published its *Guidelines for the Development of Bicycle Facilities*, which serves as the foundations for the design guidance contained in this chapter. The Village of Pinehurst should purchase this document to have on-hand for future discussions with NCDOT and other interested parties.

***Common bicycle dimensions***




The other prevailing design guidance for transportation engineers is the *Manual on Uniform Traffic Control Devices* (MUTCD), which sets the standards for traffic control practices across the United States. The application of MUTCD is why speed limit signs look the same in most states and the striping and signage along highways and streets is consistent. The most recent MUTCD was adopted in 2009 (and was amended in 2012) and includes the most comprehensive set of considerations for signage and pavement markings for bicyclists. Engineers, in most cases, are hesitant to deviate from its guidance due to fears of litigation.

In some instances, NCDOT's own design guidelines have identified features that are more bicycle friendly, such as how to determine appropriate bikeable shoulder width based on the speed of adjacent motor vehicle traffic. Where appropriate, these design elements are incorporated below.

This section is intended to be a high-level primer on bicycle facility design as much more detailed information is available through AASHTO's guidance, the Manual on Uniform Traffic Control Devices and other state and federal publications.

The important thing to note is that as the bicycling culture is changing in America, the design standards are also evolving rapidly and new guidance is being published frequently. It is important to check with NCDOT's Division of Bicycle and Pedestrian Transportation to learn about new standards and how they are being used within NCDOT.

Bicycling speeds are also important to include as many improvements, particularly at intersections, may not fully consider the speed that it takes the common user or bicyclist type to get through that intersection. It also influences how greenways are designed in terms of curb radii as they meet the street. Common bicycle speeds are shown in Figure 3-1.

**Figure 3.1 - Common Bicycle Speeds**

| Bicyclist Type | Feature | Value |
|---|---|---|
| **Typical Upright Adult Bicyclist** | Speed, paved level terrain | 8-15 mph |
| | Speed, downhill | 20-30 plus mph |
| | Speed, uphill | 5-12 mph |
| | Perception reaction time | 1.0-2.5 seconds |
| | Acceleration rate | 1.5-5.0 feet per second |
| | Deceleration rate on dry level pavement | 8.0-10.0 feet per second |
| | Deceleration rate for wet conditions | 2.0-5.0 feet per second |
| **Recumbent (Lying Down) Bicyclist** | Speed, level terrain | 11-18 mph |
| | Acceleration rate | 3.0-6.0 feet per second |
| | Deceleration rate | 10.0-13.0 feet per second |

## Bicycle Lanes

A bicycle lane is defined by AASHTO as a "portion of roadway that has been designated for preferential or exclusive use by bicyclists by pavement markings and signs. It is intended for one-way travel, usually in the same direction as the adjacent traffic lane."

*Bicycle lane along NC 107 near Cullowhee*

The bicycle lane is the most common application for dedicated bicycling facilities and typically ranges in width from four feet to six feet adjacent to a motor vehicle lane (this width does not include the width of the gutter pan as it is not usable space for a bicyclist).

Four foot wide lanes are most appropriate on low-speed streets such as collectors where there is not as much discrepancy in the speed of the bicyclist versus the speed of the motorist. On higher speed facilities, the width should be greater (five feet on 35 mph to 45 mph streets; six feet on streets with speed limits greater than 45 mph).

## Bikeable Shoulders

Bikeable shoulders are similar to bike lanes except there is no curb and gutter and the shoulder may or may not be marked as a bike lane. It is defined as a "portion of roadway contiguous with the traveled way that accommodates stopped vehicles, emergency use and lateral support for the roadway surface. Shoulders that are four foot (less than 35 mph speed limit) or five foot (35 mph to 45 mph speed limit) are

considered bikeable because they are a width similar to a bike lane." (NCDOT Bicycle Facilities Guidelines – 1994)

## Shared Lane Markings (or sharrow)


The use of shared lane markings has become more popular on streets where adding a bicycle lane or shoulder is not feasible or planned. A shared lane marking is defined by AASHTO as a "pavement marking symbol that indicates an appropriate bicycle positioning in a shared lane, which is a lane of traveled way that is open to both bicycle and motor vehicle travel."

Shared lane markings send other messages to bicyclists and motorists:

1) That a bicycle has a right to use the lane and the lane should be shared

2) Positions a bicyclists in a travel lane with on-street parking in a location where they can avoid opening car doors

3) Positions a bicyclist in a travel lane without on-street parking in a location where they are not squeezed out or riding along the right edge of pavement.

Special care should be taken when marking a shared lane. MUTCD recommends a ten foot or eleven foot distance from the center of the marking to the curb face when on-street parking is present. However, local conditions may vary and necessitate placing the marking further out into the travel lane or in the middle of the travel lane.

## Shared Use Pathways/Sidepaths

Common design principles for shared use pathways and sidepaths are covered elsewhere in this plan. For bicyclists needs, however, there are some special considerations when designing and building multi-use trails. A pathway that accommodates bicycling should be ten feet wide at minimum (eight feet is allowed in short, constrained sections) but twelve foot or fourteen foot wide pathways are preferred in high volume areas or near parks and schools.

A common response to building greenways is that some residents and officials feel that giving a bicyclist a separated trail will "get them off the road." This may be true for less confident riders but a trail should not be seen as a substitute for on-road facilities as some bicyclists will prefer to be on the road in most situations.

Some special considerations on shared pathways include:

*Note the sidepath along a state highway. The width of ramps where the path meets the street should be the same as the pathway*

- A firm and stable surface that can accommodate a wide variety of bicycle types. Narrow tires on road bikes can make travel unsafe on gravel or sand paths.

- Sidepaths should be placed in areas where there are few driveway cuts or low potential for future driveway cuts. Motorists do not expect two-way bicycle traffic on a pathway crossing a driveway.

- Curb ramps and crosswalks at intersections of greenways and other pathways should be a width that conforms to the width of the pathway.

## Other Treatments

- **Signed Bicycle Routes**

Neighborhood bicycle routes or bicycle wayfinding is becoming more popular on streets where there is not the need for dedicated bicycling facilities. In a similar fashion as Pinehurst has signed and marked its greenway, the Village may pursue designating a neighborhood bicycle route or historic bicycle tour of Pinehurst through a system of pavement markings and/or signage.


*Signs for the Lake Norman Bicycle Route in Davidson*

Given Pinehurst's desires to keep signage to a minimum, the standard "green on white" bicycle route marking systems are not recommended. Other low profile signs or markings are recommended.

- **Bicycle Boulevards**

Bicycle boulevards are street segments, or a series of contiguous street segments, that are modified to accommodate through bicycle traffic and minimize through motor vehicle traffic. Bicycle boulevards are best suited for street sections that link major destinations like a park or school to a greenway or other major bicycling facility where a dedicated greenway connection is infeasible or a bicycle lane is not practical due to the low-speed, low-volume nature of the street. Bicycle boulevards typically consist of special signage and

pavement markings denoting them as a space where bicyclist movement is prioritized.

- **Green Lanes**

*A green marking can be used in situations where conditions are not typical, such as a contraflow lane or more where motor vehicle traffic merges across a bike lane*

Painting a bicycle lane or sections of a bicycle lane with green paint is becoming a more popular treatment to help visually offset the bicyclist's space of the roadway as a way to improve safety and visibility. The most common treatment of green bicycle lanes is applying the paint where a motorist is merging across a bicycle lane, either at an intersection to reach a right-turn only lane or at a freeway interchange. Green lanes require special permission from Federal Highway Administration as they are not yet universally accepted in prevailing design standards.

- **Cycle Tracks**

The applications of cycle tracks, which are separate dedicated facilities for bicyclists within a street right-of-way are increasingly popular on urban streets. Think of it as a multi-use trail but located within the street. Another example of this is a bicycle lane placed between an on-street parking lane and the curb rather than on the motor vehicle travel lane side of the parking lane. The only location where this appears to be possible in the future in Pinehurst would be if portions of the four lane section of Highway 2 are converted to a two lane section, then a cycle track could be considered on the south side of the street utilizing one of the travel lanes.

## 3.3 OTHER BICYCLIST ACCOMMODATIONS

Parking lots and driveway entrances/exits are surprisingly hazardous for bicyclists. Motorists are not conditioned to notice bicyclists in these environments. Sometimes novice cyclists will "cut through" parking areas to avoid perceived hazards on the road and engage in bad practices such as cutting across parking aisles. Driveway entrances sometimes have channelized islands that allow motorists to make high-speed turns into a parking lot that can pose hazards for both cyclists and pedestrians.

## Bicycle parking

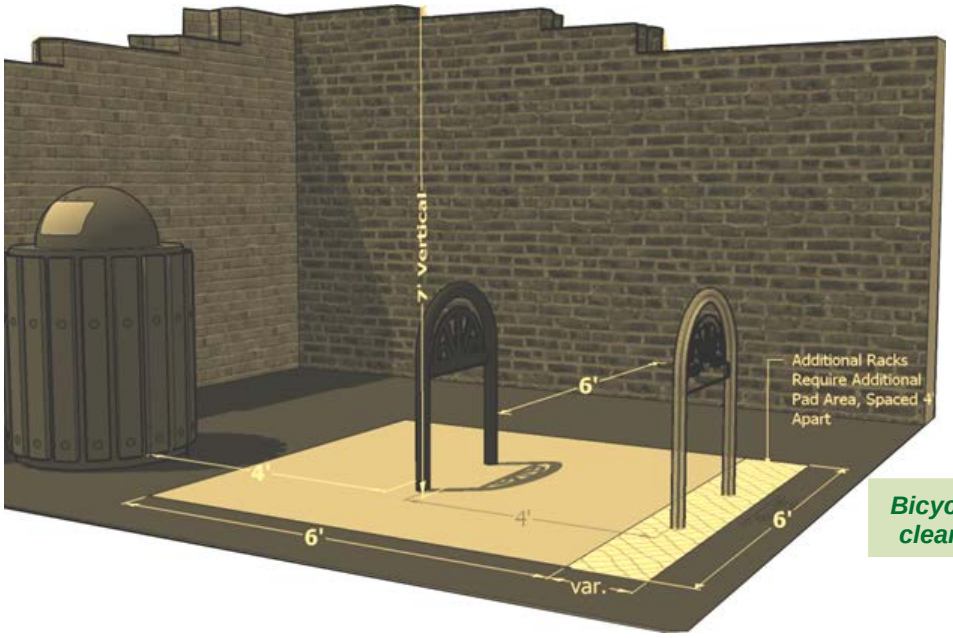
Bicycle parking racks come in a variety of shapes and styles, thanks to some vendors catering to special markets for event centers, universities (with specific mascots), municipal icons and artists.

However, the basic rack styles are still a variant of the "post-and-loop" design like those shown in green below. These styles are easily recognizable as usable bicycle racks instead of works of art and help prevent two bicycles rubbing up against each other.

***Design Considerations & Dimensions for Bicycle Parking***


In contrast, the popular "wave" rack style at far right generally only supports the bicycle at one point, as does the comb rack (second from right), often seen at public schools. Regardless of the specific style, a thick (ten inch) concrete base should be constructed for each bicycle parking station.

Note also that bicycle parking areas should have minimum six foot horizontal clearances on all sides to ensure that each rack can be used properly and at least a seven foot vertical clearance (see graphic on the following page). A shorter horizontal clearance (minimum: four foot) may be used behind the rack - note that bicycles are to park parallel to the rack, not "through" them for post-and-loop designs.

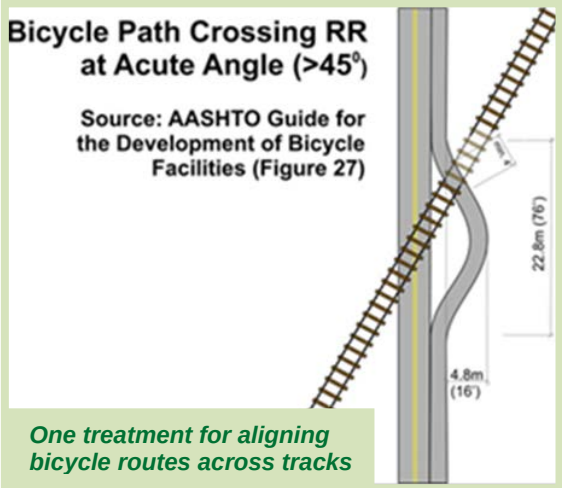



***Bicycle rack clearances***

## Crossing Railroad Tracks

Most railroad tracks and on-road bicycle paths will cross at a near-90 degree angle. Bicycles crossing tracks at a less than 45 degree angle should consider the treatment shown at right, which calls for a realignment of the bicycle path to create a more perpendicular approach angle.

Some communities have begun using shared-lane markings (sharrows) to indicate to bicyclists the most suitable way to cross a railroad track that is within an urban street where improvements such as those shown at right are not feasible.



*One treatment for aligning bicycle routes across tracks*

## Drainage Grates & Utility Covers

Drainage grates can pose a serious hazard for bicyclists, particularly on older streets where the design and placement of drainage grates did not consider the potential use of bicyclists. Grates with openings that are parallel to the curb cause the wheels on bicycles (particularly those with narrow tires) to fall into the grates and result in a crash.

On new construction projects, grates should be placed only within the gutter pan of the street with grate openings that are perpendicular to the curb and direction of travel. On older streets, the jurisdiction in control of that street should be requested to retrofit the grates with new grates with openings that are perpendicular to the curb. Another retrofit treatment is the welding of straps across the grate perpendicular to the direction of travel, which narrows the opening of the grate to prevent the bicycle wheel from falling into the opening.

Grates and utility covers (“manholes”) create different problems for bicyclists as roadways sink or are re-surfaced. Grates and utility covers should be flush with the roadway and should be replaced or reconfigured when NCDOT or a municipality resurfaces a street so they remain flush with the pavement.

Utility covers can pose problems on greenways as many of them are constructed along sewer easements. As with roadways, the utility covers should be flush with the trail surface and (where possible) outside of the travel way.

## Rumble Strip

The addition of rumble strips along highways causes great concern among bicyclists due to the way in which these rumble strips are placed on the shoulders of high speed roadways. The shoulders are the only suitable area for bicyclists to travel due to the speed differential.

To account for the needs of bicyclists, rumble strips should be placed as close to the edge line or fog line of the highway to maximize the space available for the bicyclist along the highway. Design standards for most four lane highways leave enough room along the shoulder (typically five feet or greater) for the bicyclists to operate outside the area of the rumble strips.

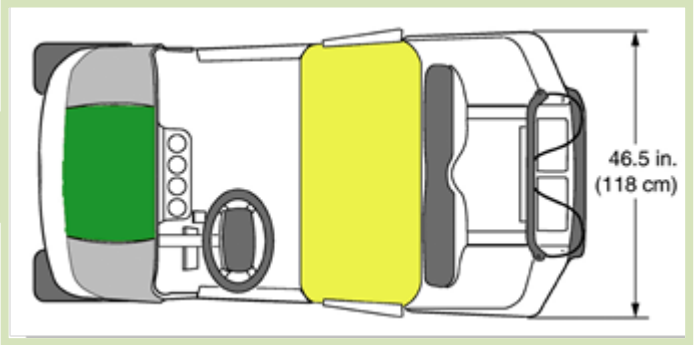
## 3.4 GOLF CARTS, BIKEWAYS & GREENWAYS


There is concern in many communities like Pinehurst, particularly those with golf courses or destinations where there is demand from residents and visitors using golf carts, about what happens when bicycle traffic mixes with golf cart traffic.

Pinehurst does not allow golf carts on its greenways, which is a wise decision given the limitations of the existing greenway system in terms of width of trail segments and presence of a soft surface.

In general, the two modes should be able to peacefully co-exist along paved multi-use trails if adequate width is given for all users to safely pass one another. The top operating speed of most golf carts is 15 mph, however, an average speed of 12 mph for golf cart and bicycle traffic is preferred on a multiuse trail due to the nature of its use and presence of pedestrians. All users should yield to pedestrians on a trail and the general rule is that bicyclists yield to golf carts if both are present on a trail due to the operating width of the cart.

*Typical width of a golf cart*




Coweta County, Georgia addressed the use of golf carts in its greenway master plan with special designation given to trails where golf cart use was allowed. Golf cars are allowed only on hard surface trails where the trail width is a minimum of ten feet. No motorized vehicles are allowed on soft surface trails.

Peachtree City, Georgia has a ninety mile greenway system that allows golf carts and places a 20 mph speed limit on those carts (also requires them to be registered).

*Golf carts are commonly used for maintenance or patrol of greenways*

Golf carts or similar vehicles are used as patrol vehicles in many communities with expansive greenway systems, which shows that their use of trails can be safely done when there is respect among all users.

The Recommendations chapter of this plan notes the difficulties faced in Pinehurst with achieving a fully-connected bikeway or greenway network due to constraints with existing rights-of-way and the Historic District designation. Paving the existing greenway trails is not supported by most residents because they feel it is counter to the historic sand-clay path network. Unless portions of the greenway system are paved and widened to be at least ten feet in width, golf cart use should remain restricted along the greenway system.

If bike lanes or bikeable shoulders are pursued on major routes in Pinehurst, there is the potential for golf cart use of this space but restrictions on golf carts related to legal road uses would still apply. It is not recommended that golf carts be expected to operate in a single direction five foot wide shared bicycle lane. Golf carts are typically four feet wide, which gives only six inches on either side of the cart for shy distance from either the edge of pavement or the travel lane.

## 3.5 RAILS WITH TRAILS

One solution—albeit a complex one—for golf carts moving in and around Pinehurst is the use of "rails with trails" along the existing railroad track that runs parallel to Linden Road between Pinewild and the intersection with Highway 5. Rails with trails are multi-use trails placed alongside active railroad lines and within the railroad right-of-way. There are nearly fourteen thousand miles of rails-with-trails in the United States (including three in North Carolina) with 39% of the mileage along active rail lines. Based on aerial photography, there appears to be room on either side of the rail line up to the Highway 5 overpass to incorporate a trail alongside the rail line.

This would require negotiation over use of the space and liability with the Aberdeen, Carolina and Western Railway. The common design elements of rails with trails are:

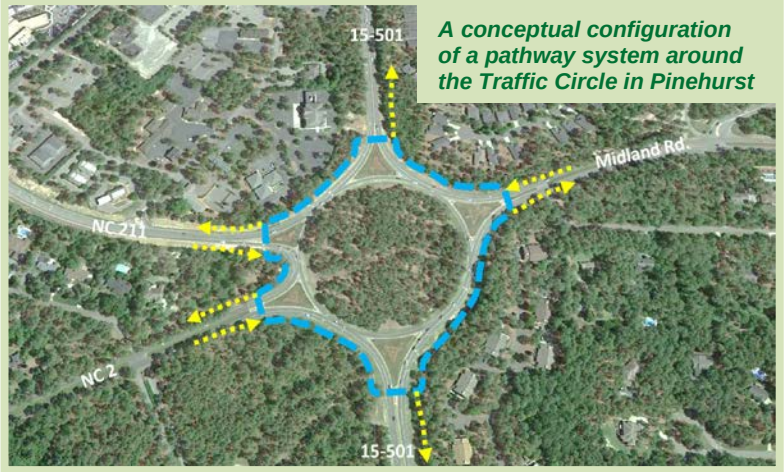
- Vertical barrier, such as a fence, between the pathway and the rail road tracks.
- Eliminating or reducing opportunities for crossing the railroad by trail users, oftentimes restricted to where other roadways cross or at the terminus of the trail.

Across the United States, rails with trails are very safe. The Rails to Trails Conservancy 2012 report found only one recorded fatality involving a rail-with-trail user and just two reports of injuries over a twenty year period. This includes one hundred sixty-one rail-with-trails facilities in forty-one states. The Conservancy notes that "trail builders and advocates need to be equipped with risk management tools and compelling examples of successful rails-with-trails to help assuage concerns about safety and liability often expressed by the railroad." The Conservancy has several online resources available for communities wishing to pursue rails-with-trails. (www.railstotrails.org)

## 3.6 BICYCLING & ROTARIES


*Separated facilities are commonly used to channel bicyclists at large roundabouts*

The primary "Traffic Circle" in Pinehurst (at the intersection of Highways 15/501, 211 and 2) poses many challenges to both motorists and bicyclists. There is also regular confusion when visitors approach the Circle because it does not function like most traffic circles that are called "roundabouts" in the United States. It is a traffic "rotary" and has several design features that differ from roundabouts. Roundabouts are generally viewed as safer as and more accommodating to bicyclists than traditional signalized intersections because the speed of traffic at entry or yielding into the flow of traffic is done at a speed more comparable to a bicyclist's speed of travel. This occurs due to the tight radius of the roundabout and deflection angles at the point of entry that slow vehicle traffic. There are also options for "slip ramps" that allow bicyclists to exit the roadway and navigate the perimeter of a roundabout on a pathway shared with pedestrians.




*A conceptual configuration of a pathway system around the Traffic Circle in Pinehurst*

The characteristics of traffic rotaries that make it difficult are that operating speeds are higher than roundabouts because of the larger radius of the rotary and lack of meaningful deflection angles. While roundabouts are designed to decrease weaving among motorists while in the circle, traffic weaving is unavoidable in rotaries. All of these pose issues for most bicyclists and this is why the Traffic Circle in Pinehurst is such a barrier. Traffic rotaries like the Circle can be designed to accommodate bicyclists via a separated perimeter pathway network. This is a common treatment in Europe, particularly in The Netherlands and Denmark.

## 3.7 EMERGING TRENDS

The Pinehurst Comprehensive Bicycle Plan is a document that emphasizes prioritizes over a ten year timeframe. As noted earlier, the rapid evolution of bicycling culture is changing how design professionals consider bicyclists. It is likely that design guidance that is current as of early 2015 may be out-dated when some recommendations of this plan are implemented.

Prevailing design guidelines will always be a step or two behind the prevailing needs of bicyclists and it is difficult for designers to justify treatments that are not part of adopted design guidelines due to liability concerns. This section summarizes some emerging trends in bicycle facility design and organizations that are addressing the emerging trends.

### ***WalkBikeNC* Implementation**

There are several recommendations contained in North Carolina's statewide pedestrian and bicycle plan that could influence how NCDOT and other communities across the state implement future designs for bicycling facilities. Governor McCrory's *Vision25* document on the state's future for transportation recommends implementation of the statewide plan.

Pinehurst should keep track of the progress of this as well as subsequent updates to the state's *Complete Streets Planning and Design Guidelines* to ensure the most modern application of treatments for bicyclists is accommodated.

### NACTO Urban Bikeway Design Guide

The National Association of City Transportation Officials (NACTO) has recognized that prevailing guidance from AASHTO is not well-suited for bicycle mobility in urban areas. They developed this design guide as a way to account for those unique needs. The NACTO guide is available online for free and includes several innovative treatments, many of which are acceptable applications within what MUTCD allows.

Cycle tracks and colored bicycle lanes are prevalent in the Design Guide, as are various treatments for bicycle boulevards and how to accommodate bicyclists at intersections.

WalkBikeNC recommends NCDOT endorse this design guide so that communities and NCDOT are comfortable with applying some of its concepts. Many communities across the country, including Charlotte, have already endorsed it.

## MUTCD Updates

The Manual on Uniform Traffic Control Devices is updated periodically and the last update was in 2009. Previous updates occurred in 1988, 2000 and 2003; therefore, we are in a phase where another update is likely to occur prior to 2020. The growing trend for more inclusive bicycling facilities is likely to lead to the incorporation of more specific guidance on accommodating bicyclists and changes to some existing treatments.

**- END OF SECTION -**

# SECTION FOUR: BICYCLING EDUCATION AND ENCOURAGEMENT

## 4.1 EDUCATION AND BICYCLING

The type of educational programs that should be offered to residents and visitors of Pinehurst vary greatly by the intended audience, notably the age and abilities of the bicyclist. No matter what improvements are made to the roadways, if bicyclists and motorists are not adhering to the rules of the road, crashes will occur and the bicyclist will suffer worse injury due to their lack of the protective shield that motorists have. Therefore, it is extremely important to have ongoing training programs for both children and adults. It is also important to continue efforts for the Pinehurst greenway system so children and novice riders have places to ride and learn.

Reaching out to adults helps build behavior patterns that can translate to children becoming more aware of bicycling. Teaching children also helps to develop safer drivers in the future and can serve as a motivating influence on parents.

The recommendations developed in this chapter have been organized by the various user types based on age groups rather than on detailing of specific educational programs, for which there are a variety of online sources.

Organizations such as the NCDOT Bicycle Program, League of American Bicyclists, Safe Routes to Schools National Partnership, National Highway Traffic Safety Administration (NHTSA) and several state-level bicycle advocacy organizations have online materials and videos that can be distributed to students as well as parents.

*Even young children can learn basic riding skills from bike rodeos*

Not all of these endeavors should fall on the shoulders of Pinehurst, rather groups such as the Sandhills Cycling Club, Moore County Schools, FirstHealth Moore Regional Hospital and other area municipalities can offer opportunities to partner on implementing several of these programs.

### Young Children

It is important that any educational program takes into consideration the cognitive ability of children as young children are unable to determine the speed of a vehicle. Children below the age of eight operate their bicycles on sidewalks, greenways or on low volume streets, therefore their actions are most similar to those of pedestrians. They do not always understand how to determine when or where it is safe to cross the roadway and they are so small that motorists may not see them until it is too late.

Children younger than 3rd grade age are best-served learning to always dismount from their bike and hold hands with an adult to cross the road. The most common crashes involving young children occur because they dart out into the roadway without looking. This usually happens because they are concentrating on an object they have an interest in, such as a dog. Children of this age may not think they are entering a roadway and don't sense or understand the dangers.

Learning to come to the edge of the roadway, then stop and look about before entering the road is a very important lesson. Young children need to learn where to safely bike and walk along a road as well as how to share the sidewalk with others.

When dealing with bike skills, the target should be on awareness that driveways are where cars travel. They need to stop and look both ways for cars entering and exiting the drive before proceeding.

Educational methods to target children of this age group should include:

- Joint parent/child programs to teach proper skills
- Instructional videos, such as Willie Whistle, which is available from the National Highway Traffic Safety Administration (NHTSA)
- Participation in Safe Routes to Schools programs such as bicycle trains and walking school buses
- Coloring books designed specifically for bicycle education of young riders
- How-to booklets on proper bicycling sizing and riding on 2 wheels

***Pinehurst Elementary School's Safe Routes to School events are a thriving success!***

## Third Grade to Fifth Grade Children

By the time children are in third, fourth or fifth grade, their cognitive skills have developed to where they can begin to determine when it is safe to dismount their bicycle and cross the street without holding an adult's hand. This age group still needs to be reminded about looking both ways as there is still a tendency to dart into the roadway. This occurs because they assume that it is safe to enter the street because the first person in the group made it through. They forget to look for themselves.

Children of this age who are self-taught or have spent most of their time riding in their driveway or on residential streets are more likely to ride facing traffic, either because their parents told them to do so or they confuse the walking against traffic rule with the

bicycle rules that specify riding with the flow of traffic. Parents and children falsely believe if they see the cars eye-to-eye they can get out of the way to avoid a crash; however, the motorist has no time to wait until it is clear to pass them and must react more quickly.


This is the key message for children of this age as they can now begin to judge speed and understand dangers before they occur. Their hearing is more defined and they can start making judgment as to the proper way to maneuver on the street.

Therefore, this is the age where they should be learning hand signals, bike handling skills such as starting and stopping under control, and making turns. Children at this age can be perfecting their balance and avoiding hazards. Riding a bike on a quiet road with a parent is acceptable and a parent may want to begin talking with this child about what they are doing and observing while driving to begin the understanding of cause and effect and how traffic rules are applied.

Educational methods to target children of this age group should include:

- Riding skills taught as part of the educational curriculum in elementary schools
- Bicycle rodeos at the schools or as part of special events
- More advanced videos, such as “Ride Smart: It’s Time to Start”, available through NHTSA
- Participation in Safe Routes to Schools programs such as Bicycle Trains and Walking School Buses

## Middle School Age Children

By the time a child has reached middle school age, the parent should be taking advantage - when driving with the kids in the car - to talk about what they are doing while driving, what they see as problems that could occur on the road and what decisions they are making. This provides children with a foundation for understanding the rules of the road, sharing the road concepts and how to handle various situations.

Children are great observers of their parent’s behavior. This age is when kids begin to think about doing things on their own; they crave independence and are willing to travel anywhere and everywhere they can on their bicycle. With that, they need good judgment and the experience to understand how their behavior and what they do will affect what happens on the road. This is also when kids become more courageous about riding at night or at dusk, which necessitates lights, reflectors and reflective clothing for safety.

They need experiences in a safe environment to practice their skills and to perfect them as they build upon skills learned at the elementary school level and increased cognitive abilities to make judgments about potentially hazardous situations. Specific on-road skills such as signaling before turns and rear gazing before turning while practicing on a simulated streetscape, along with opportunities to interact with other types of traffic, will give them more experience so they can be safe. It will also prepare them for being good drivers who know how to interact safely on the street.


At this stage, specific educational opportunities should include:

- Full-length bicycle rodeos
- Reading and writing assignments related to bicycle safety
- Poster contests
- Use of more advanced instructional videos such as “Bike Safe. Bike Smart.”
- Traffic Skills 101 courses with adults or parents for more advanced or experienced riders
- After school riding clubs

**Let’s Go NC!**


The *Let’s Go NC!* program is an educational curriculum intended for school-age children to teach them how to walk and bike safely. The program is intended to give children essential skills they need to enjoy healthy and active lifestyles.

*Let's Go NC!* provides teachers, parents and PTA’s an all-in-one package of lesson plans, materials, activities and instructional videos that encourage children to learn about and practice fundamental skills that build safe habits. This program, developed for NCDOT’s Division of Bicycle and Pedestrian Transportation Division and Safe Routes to School Program by NC State University, is a free program with materials and videos available online.

## Adults


Once children have progressed beyond middle school age, they can be included in many adult-specific educational and outreach modules. Most adult bicyclists have not had any training in appropriate riding behaviors, even though most have had driver's education training and possess a driver's license.

Providing training for adults is important because their fears often keep them from trying to use a bicycle for transportation or recreation. The most common behaviors for adults are riding too close to the road edge, not being predictable or not letting others know their intentions. Some adults still adhere to the "ride against traffic" dictum from their childhood. They may also be riding on sidewalks or not watching where they are going when operating in mixed traffic or along a greenway.

The most direct method of adult education is the Traffic Skills 101 course developed by the League of American Bicyclists. The course, along with associated Traffic Skills 201 and Commuter Skills courses, is taught by certified League Cycling Instructors to give adults the skills and confidence needed to ride comfortably in traffic.

*The Community Ride serves as an educational opportunity for adult bicyclists*

Offering these classes should be part of any total education program. Courses typically last six hours and include classroom discussion, parking lot skills and a short ride on the road. Discussions include how the rules of the road apply to bicyclists, how and where to ride in specific traffic situations, how to be predictable and skill practice in avoiding collisions. There is also a video developed by the League of American Bicyclists for adults that is available through the League or a NHTSA video "Bicycle Safety Tips for Adults."

Other adult-specific educational programs should include:

- Organized rides for novice riders, such as the Sandhills Cycling Clubs Friday Night Social Ride
- Integration of bicycle-related questions on driver's license exams
- Take-home handouts to children who participate in bicycle rodeos or other programs

- Parent-specific outreach while their children are participating in bicycle rodeos
- "Silver Wheels" programs to encourage older adults to ride their bicycles
- Educational outreach with law enforcement officials
- Outreach at community events such as downtown or music festivals
- Promotion of safe riding skills through materials distributed as part of organized rides or special event rides, such as the Tour de Moore


***Positive campaign messages for motorists encourage safe biking practices on the roadways***

## Motorists

It is almost impossible to change the behaviors of motor vehicle drivers once they have been behind the wheel for a few years. Even in the most advanced bicycling cultures in the United States, there is a still a challenge posed to bicyclists by motorists who feel that they own the roadway.

The increased use of mobile phones for purposes other than making phone calls has created a new set of problems for bicyclists. North Carolina banned texting while driving in 2009 but it remains a problem and a concern for bicyclists.

The most influential way to have an impact is to reach new drivers through driver's education classes. The present driver's education programs do not spend much time on bicycle and pedestrian safety or how to maneuver a car with other roadway users. Many of the driver education teachers in North Carolina are under contract through an independent company and not the Department of Education or Department of Transportation.

Involvement from the law enforcement community can also contribute to advanced education of motorists and bicyclists. Involving law enforcement officers in Traffic Skills 101 courses to review applicable traffic laws and teach participants of nuances in North Carolina laws can be more effective than an instructor simply reciting state code.

## League Cycling Instructors (LCI)

The cycling community in Pinehurst and Moore County should consider development of a bicycle education program for children and adults that is similar to programs already in place in places like Buncombe County, NC. For example, there are ten individuals in Buncombe County certified by the League to teach bicycle training courses. Having individuals with this certification gives a community many advantages, the first being a

first-rate curriculum from the League of American Bicyclists that has been tested across the United States and provides materials that are age appropriate.

Another important component of this certification is insurance coverage provided to LCIs through the League. Participants in traffic skills classes and parents whose children are taking part in a bicycle rodeo are concerned about safety during the event and organizers are concerned about liability.

**Documentation**

Documenting the work in this area will help improve programming, justify future funding, assist in grant applications and provide a barometer by which progress is made in creating a bicycling culture in Pinehurst and Moore County. Simply documenting the number of children and adults engaged in these educational programs also provides government staff and elected officials with justification for continued support throughout the community.

It is also important to develop pre- and post-tests when conducting classes in the public schools to help gauge student retention and improve the program. Test questions need to be the same to determine what has been learned as well as asking what the children remember from the class. It is also important to document how many children and what age children are involved with educational programs. This information is also essential when applying for Bicycle Friendly Community status through the League of American Bicyclists.

## SECTION 4.2 ENCOURAGING BICYCLING

Developing encouragement programs to complement educational efforts and engineering investments helps promote usage of the system and makes people feel safer when they decide to try bicycling. Making it easy and fun to ride for transportation can increase bicycle mode share. Sandhills Cycling Club, FirstHealth Moore Regional Hospital and Pinehurst Elementary School have already established a track record for encouragement activities, most notably through organized weekly rides and Safe Routes to School events.

Building upon these encouragement programs is critical to building awareness of bicycling. Encouragement efforts can also provide a highly visible outreach mechanism to showcase the accomplishments of Pinehurst, the County and local advocates as they pursue more long-range facilities investments.

This section outlines some major encouragement programs and recommendations. Many recommendations also include a pedestrian element - as many programs are designed to promote active living through both bicycling and walking.

## Safe Routes to School (SRTS)

In 1969 about half of all students walked or bicycled to school. Today, however, more than half of all children arrive at school in private automobiles and only 15% of school trips are made by walking or bicycling.

Designed to address these dramatic statistics, the Safe Routes to School Program was organized to create and promote safe walking and bicycling in order to improve safety near schools, promote active lifestyles, and reduce pollution and congestion caused by school traffic during arrival and departure times. The first Safe Routes to School program debuted in Europe in the 1970s and the first program in the United States began in the Bronx, New York in 1997. Less than fifteen years later, the Safe Routes to School Program has become both a federally-funded and grassroots national movement.

*The Safe Routes to School program's success in Pinehurst illustrates its power as a successful encouragement technique*

A SRTS program is a school-based effort that involves young students, teachers, law enforcement officers and parents in the development of school safety and encouragement initiatives such as Walk to School Day, bicycle trains, Walking Wednesdays, pedestrian safety assemblies and bicycle rodeos. SRTS funding is also available for various facility investments and other activities.

These programs can help engage children in safe walking behaviors and encourage more bicycling and healthier lifestyles. Common steps to creating a successful program are to kick-off with an event on International Walk-to-School Day, then subsequently work with PTA members, teachers and students to identify needs and program ideas while incorporating encouragement measures and education into the school curriculum for students to learn safe walking and bicycling skills and the benefits of an active lifestyle.

The Safe Routes to School program at Pinehurst Elementary School is already a strong program that encourages students to walk or bike to school. The advancement of the area's greenway network can only serve to strengthen this program.

## Themed Rides

The concept of organizing themed rides can be a fun experience and add to the comfort factor of riding bicycles. Options for Pinehurst and the area include organizing some type of bicycle-based history or culinary tour. This could be organized in cooperation with restaurants throughout the area who offer bite size samples of their food in exchange for a small promotional fee.

Similar rides to coffee shops or other unique destinations could be incorporated into the ride. Holding group rides where participants dress in costumes or that is held to celebrate special days such as St. Patrick's Day or Halloween can develop group camaraderie and encourage riders to enjoy the spirit of riding. Given the history of the area, a special ride devoted to touring and learning about places of historical significance would be another option.

## Bicycle Wayfinding Systems and Route Maps

More and more communities are using pedestrian and bicycle wayfinding systems to provide visitors and residents with directional and distance information to major landmarks, parks and other local attractions. Given Pinehurst's attractions, cultural destinations and parks, a similar system would be very useful.

Depending on the distances between attractions, it is advisable to combine bicycle and pedestrian wayfinding systems, recognizing that some bicycle-based destinations may only be accessed from on-street routes and may then have to be combined with auto-oriented wayfinding.


*Bicycle wayfinding systems are comprised of small signs pointing bicyclists to destinations along bicycle-friendly routes*

Bicycle and pedestrian wayfinding signs should be at a height of at least seven feet, with a font and orientation appropriate for viewing by those traveling at the speed of a pedestrian or bicyclist. Distance information should be provided in blocks or miles and kiosks with a map can be useful for visitors. Such a system could incorporate local themes, allowing area artists an opportunity to design sign templates. Opportunities for private-public partnerships exist, such as working with area retailers or B&B's along the route to sponsor signage and/or complementary brochures in exchange for a mention in the guide.

## Healthy Living Initiative

One of the major characteristics of a bicycle-friendly community is to have a body of citizens, municipal staff and elected leaders who are engaged in and educated about the economic, health and general quality of life benefits of a bicycle-friendly community.

The health-related workshops for this Plan included a discussion on possible partnerships to promote a healthier Pinehurst community.

Additionally, educational activities could be held at the Village Hall, such as presentations on pedestrian and bicycle friendliness, to learn about the projects, programs and policies that can encourage a more bicycle and pedestrian friendly city.

Several national organizations including the National Center for Bicycling and Walking (www.bikewalk.org), Walkable Communities, Inc. (www.walkable.org), Complete Streets initiative (www.completestreets.org) and Safe Routes to School National Partnership (http://saferoutespartnership.org/) provide resources such as speakers, handouts, guides and publications which can be used for the education and encouragement component of the event. Local businesses might be asked to encourage employee participation in workplace walking clubs and events, along with the promotion of a local walking route and corresponding map.


Within North Carolina, resources are available through NCDOT's statewide plan for walking and bicycling (http://www.ncdot.gov/bikeped/planning/walkbikenc/) and the statewide walking and bicycling advocacy group BikeWalk NC (http://www.bikewalknc.org/). This program could also be promoted in local schools, health centers and at City/County events. A "Fitness Challenge" event and/or regular senior cycling/walking program could also be incorporated.

## Bike to Work Day

Bike month is each May and National Bike to Work Day is usually held the 3rd Friday of May. The League of American Bicyclists has a packet to assist in starting a bike to work event in your town. This can be accessed through their web site www.bikeleague.org.

Encouragement programs can also be developed locally as well. One example in North Carolina is a program that provides awards like the Golden Sneaker (for walkers), Golden Spoke (for cyclists) and Golden Wheel (for carpoolers and bus riders) who choose non-single occupancy vehicle rides. Programming usually includes breakfast stations with free coffee and treats on the specific day and education classes to give people more confidence to try a new travel mode that day. Some communities have awards for the most creative commute and most decorated bicycle.

## Other Encouragement Activities

- **Bike and Walk to School Days**
  October is International Walk & Bike to School Month. The premise of this program is to encourage children to walk and bike to school as a way to increase physical activity, help children develop an understanding of their environment and to become

more healthy and independent. When it is safe to walk and bike to school, this is an encouragement program; when it is not already safe it is important to hold a safety workshop and audit with a variety of community leaders, school officials and parents to develop an understanding of the needs, concerns, challenges and opportunities to make it safe.

- **Work with Active Routes to School**
  Active Routes to School is a project supported by a partnership between NCDOT and the NC Division of Public Health. In this program, project coordinators work across the State to encourage elementary and middle school students to be physically active at school and to make it easier for the students to bike and walk to school. Additional information can be found at http://www.communityclinicalconnections.com/What_We_Do/Active_Routes_To_School/_downloads/Active_Routes_to_School_Backgrounder_Project_Manager_4.6.2015.pdf

- **Valet parking through bike corrals**
  Organized community festivals is a way to develop secure parking, education about your programs and provide a way to get feedback from the general public. It also adds a fun element to the festival. Besides providing the service, you definitely want to use this opportunity to educate the public about your programs and collect email addresses. Make colorful posters and have them laminated for durability. It is also important to document how many bikes are parking each time this service is provided and how many volunteers have worked, including their hours.

*Bicycle corrals or valet parking for bikes make it easier for bicyclists to attend special events*

- **Documentation**
  An important component of any of these programs is documenting how many people are served through them. Tallying comments as to why people participate, what works and what doesn't are all important to expand bicycle-related encouragement programs. Knowing how groups and individuals achieve their goals helps understand the community from a bicycling perspective and can help groups like Sandhills Cycling Club and other partners determine how effective it has been. Documentation also helps with future funding pursuits.

## SECTION 4.3 CONCLUSIONS

As previously noted, the Village of Pinehurst recently underwent a comprehensive and lengthy process that ultimately resulted in the adoption of an updated Pinehurst Development Ordinance (PDO) by Village Council. Section 1.2 of the new ordinance lists one of the goals as being to "Establish meaningful open space and trails system that supports pedestrian and bicycle connectivity throughout the community and allows residents to become active participants in the public realm."

In order to promote bicycling within Pinehurst, it is recommended that the Village periodically re-examine their goals and requirements within the PDO as part of future updates. The Village should also consider the development of a Bike and Pedestrian Advisory Committee (BPAC) to assist staff and council with future endeavors. The BPAC can also be used to work closely with local businesses (and resorts) to regulate and/or encourage more bicycle ridership.

One of the first steps that Village Council can take to further develop the goals noted in Section 1.2 of the PDO is to formally adopt both the Comprehensive Bicycle and Pedestrian Plans. In addition, future modifications to the PDO could include a simple reference to the "most recent adopted plan(s)" allowing the Village to revise and/or update the plans in the future with no need to modify the ordinance.

**- END OF SECTION -**

# SECTION FIVE: SAFETY AND ENFORCEMENT

## 5.1 SAFETY

Pinehurst prides itself on being a safe community and has received accolades as an Outstanding North Carolina Traffic Safety Community by AAA Carolinas (as shown in the image below) for several years. The efforts taken by Pinehurst to uphold itself as a safe community are evident in the *Village of Pinehurst Community Survey Findings*:

- 98% cite Safety and Security as a very important reason for choosing to live in Pinehurst
- 69% say their Safety and Security needs are being met
- 58% rate the overall feeling of safety as "Excellent"
- 77% feel safe walking in business areas of Pinehurst
- 81% feel safe walking alone in their neighborhood during the day

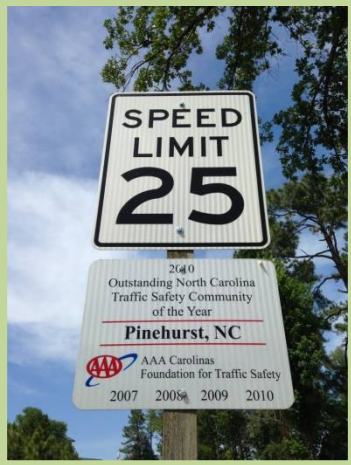
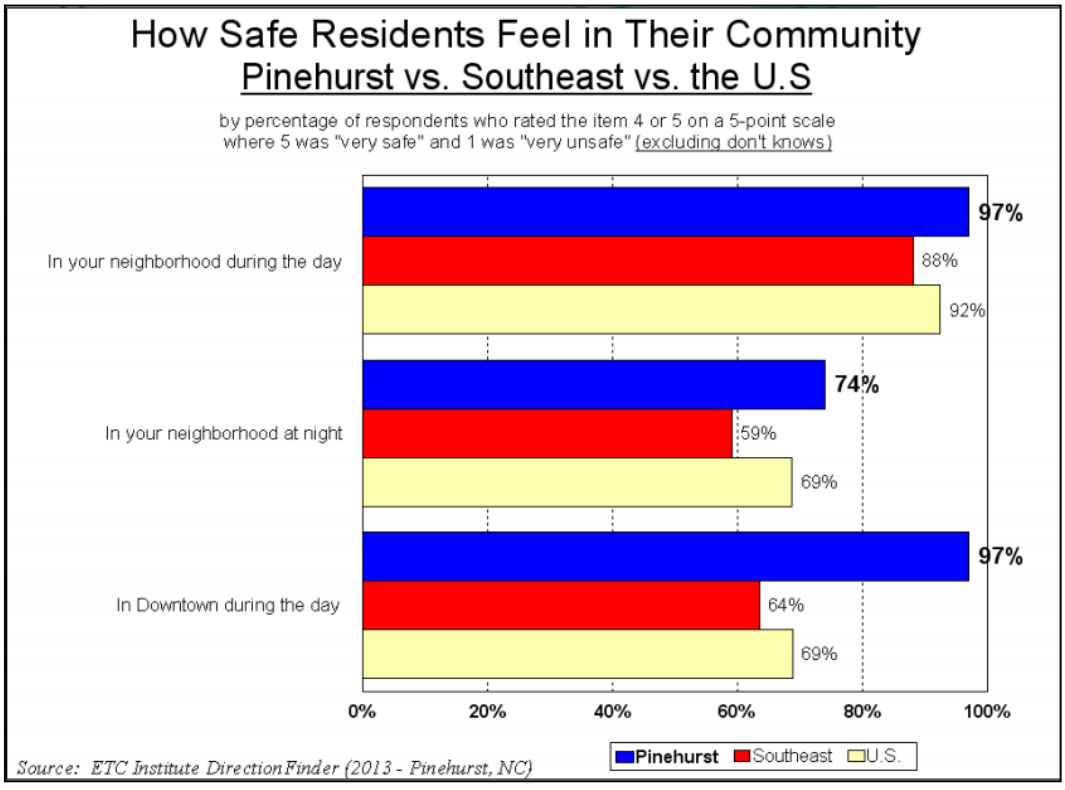



**Figure 5-1: Safety in Pinehurst Compared to the Southeast**



## 5.2 BICYCLIST AND PEDESTRIAN CRASH ANALYSIS

Pinehurst's reputation as a safe community is also reflected in the crash data related to walking and bicycling. According to crash data compiled by NCDOT and analyzed by the Highway Safety Research Center at UNC Chapel Hill, Pinehurst had thirteen pedestrian crashes and sixteen bicyclist crashes from 1997 through 2012. There was one disabling injury to a pedestrian and one bicyclist fatality.

The low number of crashes involving pedestrians and bicyclists make it difficult to draw conclusions from the data in terms of factors such as vehicle speed, motorist behavior, location-based safety needs or bicycle and pedestrian behavior. Pinehurst defines itself as a "residential resort" community, which means that the nighttime population base is relatively stable throughout the year but the daytime population - due to the draw of the resort and supportive land uses - causes the population to rise, which includes an increase in vehicular traffic and, most likely, pedestrian and bicyclist traffic. This makes it difficult to produce accurate rates of crashes in relation to population, which is the case in many similar communities across the State.

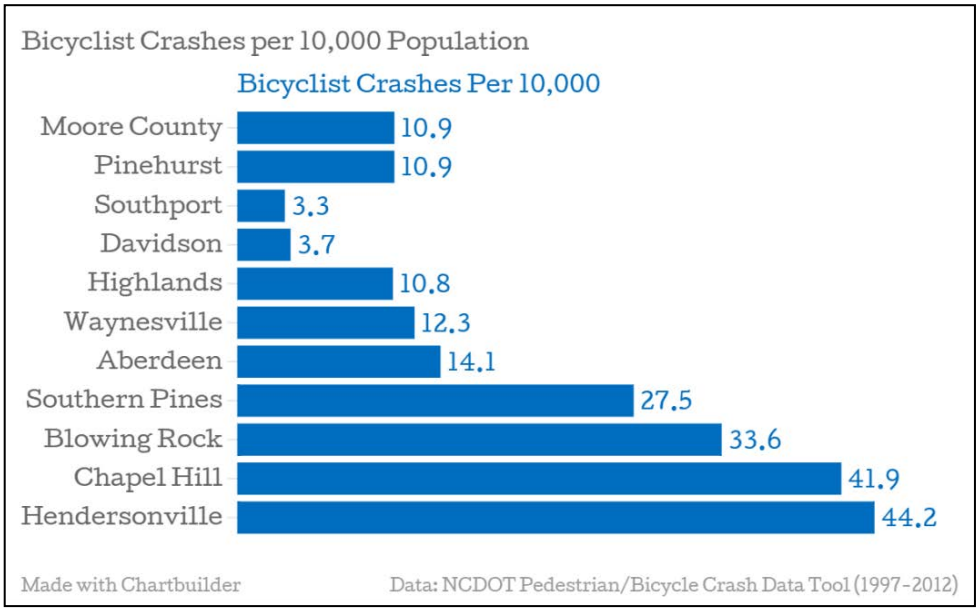
### Bicyclist Crashes

Figure 5-2 includes a comparison of Pinehurst bicyclist crash rates per ten thousand population over a fifteen year period as compared to Moore County, other Moore County communities and other communities across North Carolina that have similar characteristics to Pinehurst. Pinehurst rates the same as Moore County as a whole with 10.9 bicyclist crashes per ten thousand population and lower than other Moore County communities. Pinehurst bicyclist crash rates are generally lower than other peer communities in North Carolina but notably higher than Davidson and Southport.

Notable Bicyclist Crash Statistics:

- 10 of the 16 crashes occurred on streets with a posted speed limit between 30 and 35 mph
- 8 of the 16 crashes occurred on streets or highways managed by NCDOT
- 9 of the 16 drivers involved were over the age of 50
- 5 of the 16 crashes occurred on Thursdays

**Figure 5-2: Bicyclist Crashes per 10,000 Population**

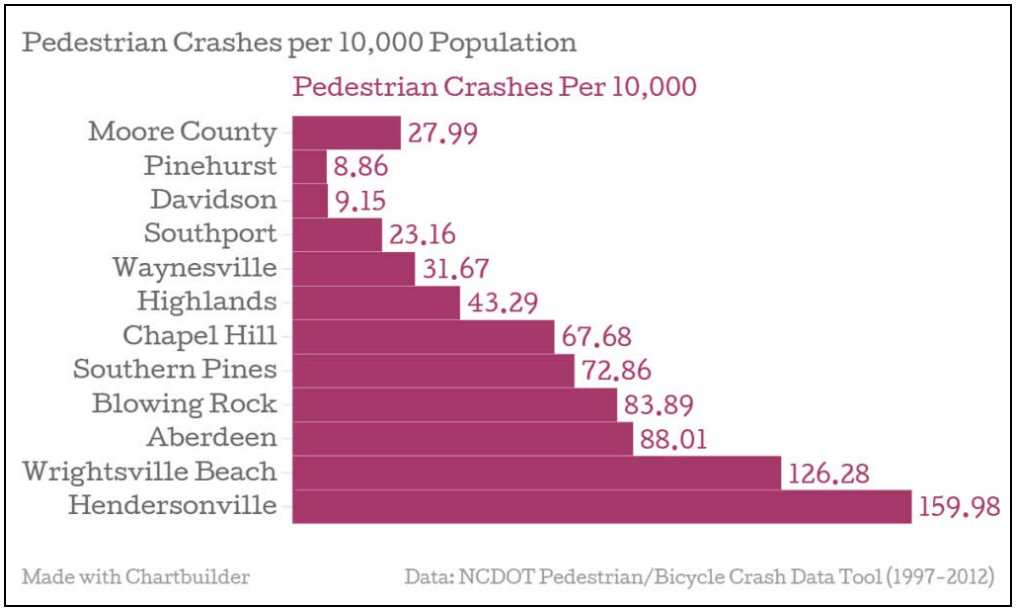



## Pedestrian Crashes

Figure 5-3 includes a comparison of Pinehurst pedestrian crash rates per ten thousand population over the same time period with the same communities identified for bicyclist crash comparison. Pinehurst has the lowest rates (8.86 crashes per 10,000) when compared to other peer communities in North Carolina and a rate that is notably lower than Moore County as a whole (27.99 crashes per 10,000).

- 10 of the 13 crashes occurred on streets with a speed limit of 35 mph or less
- 8 of the 13 crashes occurred on local streets
- 4 of the 13 crashes occurred off-street in public areas or parking lots
- 5 of the 13 drivers involved in crashes with a pedestrian were over the age of 70
- 4 of the 13 crashes occurred on Fridays

**Figure 5-3: Pedestrian Crashes per 10,000 Population**




## 5.3 ENFORCEMENT ACTIONS FOR BICYCLIST SAFETY

There are a number of documented approaches to law enforcement that enhance the safety of bicyclists. Most of these involve simply targeting existing enforcement of traffic laws to locations where there is high bicyclist traffic or a documented history of vehicle conflicts.

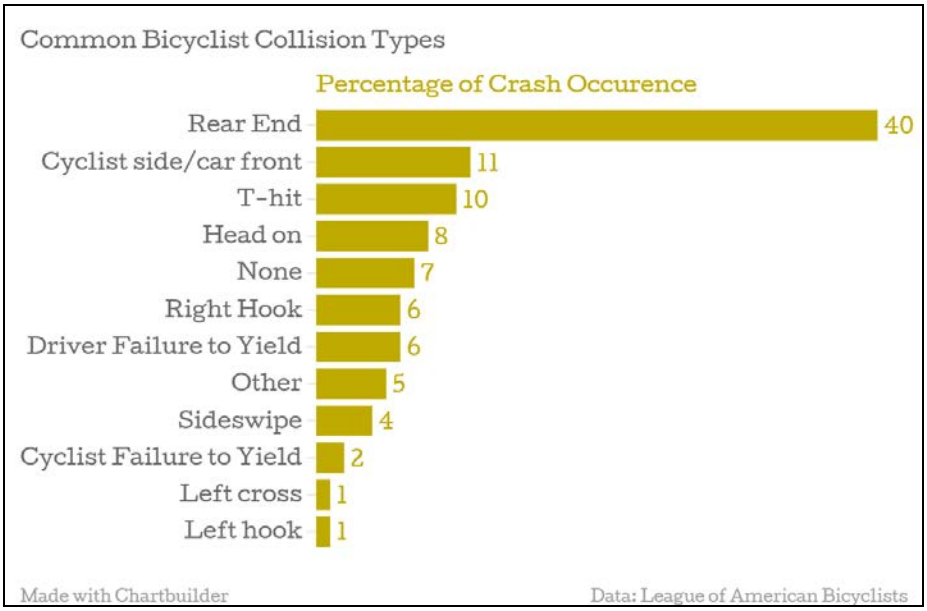
Bicyclist safety needs are unique and are best addressed based on the needs of the individual mode. Rarely do conflicts occur between bicyclists and pedestrians in the same space and the likelihood of serious injury or death is almost non-existent because of the speed at which each mode operates.

**Bicyclist Safety Efforts**

Bicyclist safety and enforcement of laws in North Carolina remains difficult due to State laws that are considered weaker than most states when it comes to bicyclist rights and safe passing enforcement. As shown in Figure 5-4, the most common bicyclist/motorist crash is a rear-end collision. This leads to campaigns that focus on bicyclist visibility but the research indicates this is not as effective as perceived. Motorist behavior and motorists seeing bicyclists is also an emphasis and more research is being conducted into distracted driving as an emergent issue in highway safety.

A comprehensive guide for bicycling safety could easily comprise the bulk of this report. Various resources from NCDOT and the League of American Bicyclists are available to help communities better promote bicycling safety and a quick web search can yield several such publications.

**Figure 5-4: Common Bicyclist Collision Types**




## Safe Passing

*BikeWalkNC,* the statewide advocacy organization for active transportation, has published its summary of safe passing[1]. They note that narrow two-lane State roads are important travel routes for commuting and recreational bicyclists. When there is little or no shoulder and the travel lane is narrow, competent drivers recognize that there isn't room to pass within the bicyclist's lane, therefore they wait until the oncoming lane is clear of traffic for an adequate distance before moving into the next lane to pass.

In many places where this occurs, a solid yellow centerline is striped to discourage passing of other motor vehicles. Traffic engineers place this striping where there is not adequate distance to safely pass a motor vehicle that is traveling near the maximum posted speed limit. But in the real world, drivers recognize that the distance required to pass a slow moving bicyclist is a small fraction of this distance, and invariably ignore the striping in favor of weighing the safety and convenience of passing under the existing conditions. Drivers routinely cross solid centerlines to pass bicyclists safely, and police routinely ignore this as long as the passing driver does not create a danger for oncoming traffic.

Law enforcement officers are often asked this question, and are often uncomfortable responding. In states lacking clarifying language in the traffic laws, police may struggle to find legal support for ignoring solid centerlines when conditions are clearly safe for passing. Some states – Colorado, Maine, Mississippi, Ohio, Pennsylvania and Wisconsin, for example – have traffic laws explicitly allowing drivers to cross a solid

[1] http://www.bikewalknc.org/2014/08/safe-passing-and-solid-centerlines/

centerline to pass a bicyclist under safe conditions. BikeWalk NC recommends that North Carolina adopt similar language. In the meantime, police in North Carolina are in the same position as those in states such as Florida and Texas, where police have turned to the laws that govern driving around disabled vehicles and fallen trees to justify not ticketing prudent drivers. In North Carolina, this is § 20-146 (a)(2):

> *§ 20-146. Drive on right side of highway; exceptions.*
>
> *(a) Upon all highways of sufficient width a vehicle shall be driven upon the right half of the highway except as follows:*
>
> *(1) When overtaking and passing another vehicle proceeding in the same direction under the rules governing such movement;*
>
> *(2) When an obstruction exists making it necessary to drive to the left of the center of the highway; provided, any person so doing shall yield the right-of-way to all vehicles traveling in the proper direction upon the unobstructed portion of the highway within such distance as to constitute an immediate hazard…*

N.C. Highway Patrol 1st Sgt. Brian Gilreath provided the following explanation quoted in the 8/19/2014 *Asheville Citizen-Times*:

- *As long as you don't affect the movement of oncoming traffic — that's where common sense comes in — you're allowed to go left of center to avoid hazards and obstructions in the roadways," Gilreath said. "Take for example if a farmer drops a bale of hay in the roadway, and you need to go around it. Even though you're left of center, you have not violated the law. […] An officer would have a hard time convincing a judge that you're supposed to ride behind a bicyclist for 10-15 miles… [Citizen Times, 8/19/2014]*

This aligns with the pragmatic interpretation that the Florida Department of Law Enforcement approved for the Florida Bicycle Law Enforcement Guide:

- *The prohibition of passing in a no-passing zone does not apply when an obstruction exists making it necessary to drive to the left of the center of the highway [§316.0875(3)]. Thus, when a cyclist is traveling so slowly as to constitute an "obstruction," a motorist may cross the center line in a no-passing zone to pass the cyclist if the way is clear to do so, i.e., when it can be seen that any oncoming traffic is far enough ahead that the motorist could finish passing before coming within 200 feet of an oncoming vehicle.*

## Visibility

Visibility, particularly in poor weather conditions and at night, is a common problem for bicycle riders who are dependent on a bike for transportation. Many bicyclists do not

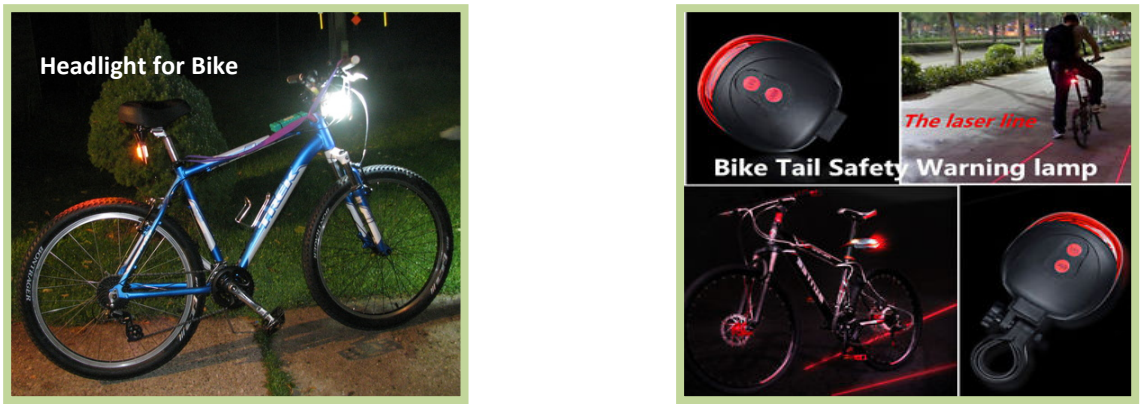
have the resources to invest in reflective clothing and LED lighting for their bikes and are left to ride in their work attire and on a bike that may or may not have reflectors.

As shown in Figure 5-5, communities such as Asheville and others around the Country, used grant funding to purchase lights that be attached in various locations on bicycles. Law Enforcement is provided with the lights and a brochure on safe riding practices to give to bicyclists who are observed riding in conditions where poor visibility is an issue. Figure 5-6 shows different enforcement safety attachments bicyclists can use for safety lighting.

**Figure 5-5: Lights Given out to Bicyclists Used as an Enforcement Technique**


**Figure 5-6: Light Attachments for Bicyclists' Safety**

***Front of Bicycle*** ***Back and Sides of Bicycle***




*http://bikelights-uk.blogspot.com/2013/11/why-rear-bike-lights-are-as-important.html*

## What about enforcement for bicyclists?

There is a common misconception among motorists that bicyclists do not follow prevailing traffic laws. While there is a proportion of bicyclists for whom this is true, studies have shown that the percentage of bicyclists failing to obey traffic laws is no different than motorists, motorcyclists and truck drivers that also fail to obey prevailing law.

That being said, law enforcement should seek to enforce traffic laws for all road users, bicyclists and motorists alike. Bicyclists are expected to act like motorists at intersections, obeying stop signs and red lights. They should be warned or cited in egregious situations, just as motorists. In groups, bicyclists tend to engage in "group think" when it comes to actions and this can sometimes lead to some members of a group not yielding right-of-way when appropriate. It is incumbent upon riding groups to enforce traffic laws among their riders.

## Watch for Me NC


Watch for Me NC is a comprehensive program, run by NCDOT in partnership with local communities, aimed at reducing the number of pedestrians and bicyclists hit and injured in crashes with vehicles. The program involves two key elements:

- Safety and educational messages directed toward drivers, pedestrians and bicyclists (examples provided on this page)
- Enforcement efforts by area police to crack down on some of the violations of traffic safety laws

Local programs are typically led by Municipal, County or Regional Government staff with the involvement of many others, including pedestrian and bicycle advocates, City planners, law enforcement agencies, engineers, public health professionals, elected officials and others. NCDOT piloted the program in Wake, Durham and Orange Counties (Triangle Area) in 2012. In 2014, communities were asked to apply for Watch for Me NC funding to become partner communities. Any community is allowed to use the materials developed for the program, which are available at: http://www.watchformenc.org/.


Pinehurst should work with Moore County and other towns within the County, as well as Sandhills Community College, to submit during a future grant cycle. Some partnerships that were awarded during the 2014 campaign are:

- Chowan County/Edenton (pop. 14,800)
- Craven County/New Bern (pop. 104,000)
- Jackson County/Sylva/Western Carolina University (pop. 40,500; enrollment 10,300)

- New Hanover County/Wilmington/UNC-Wilmington (pop. 209,000; enrollment 13,900)
- Pitt County/Greenville (pop. 172,600)
- Watauga County/Boone/Appalachian State University (pop. 51,900; enrollment 17,900)

**- END OF SECTION -**

# SECTION SIX: HEALTH IMPACTS OF BICYCLING AND WALKING

In order to encourage healthy living through bicycling and walking, a community must create an environment where people feel safe enjoying those modes for recreation and transportation. Drivers are not always accustomed to driving through areas with significant pedestrian traffic in combination with more vehicular turning movements and other distractions. Drivers who are merely passing through Pinehurst or its neighborhoods may see the presence of bicyclist and/or pedestrian traffic as an inconvenience.

A health assessment was conducted as part of this Pinehurst Comprehensive Bicycle Plan and the accompanying Comprehensive Pedestrian Plan to hone in on potential health-related outcomes - both positive and negative - of increasing investment and promotion in active transportation facilities. While the Pedestrian Plan has been completed as a separate document, this section discusses health impacts of both bicycle and pedestrian facilities, since their assessments were completed concurrently.

## 6.1 HEALTH CONDITIONS

Little health specific data is available to evaluate for Pinehurst as much of the analysis on local health conditions is based on countywide surveys led by the Moore County Health Department. The Health Department has generated a Community Health Assessment (2013) and State of the County Health Report (2012) that summarizes health conditions among Moore County's population and recommends focal points of intervention to address these findings.

Emerging issues in Moore County related to the potential for increased biking and walking include:

1. Cancer, heart disease and cerebrovascular disease (stroke) remain the three leading causes of death for the years 2006 through 2010.

2. 21% of respondents to the Moore County CHA survey report no leisure time physical activity in the past month.

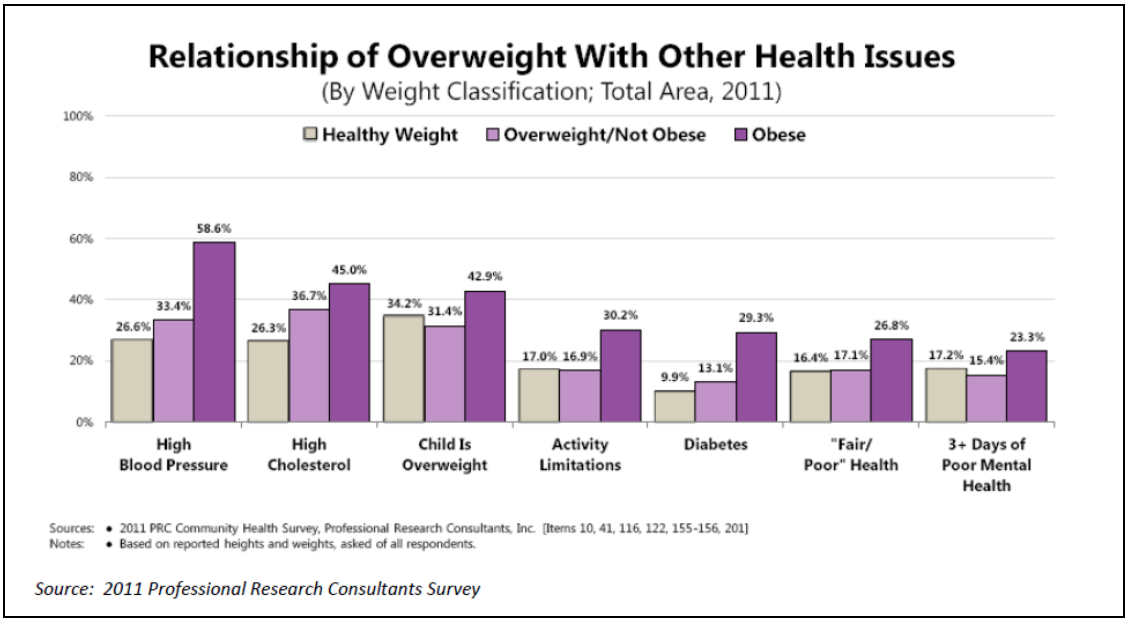
3. 55% of respondents exercised fewer than three times per week for at least thirty minutes per session.

4. Moore County should expand collaboration to respond to rising obesity and physical inactivity rates.

What is also known and is a clear focal point for area stakeholders is the link between physical activity (ie. walking and bicycling) and the role activity plays in maintaining a healthy weight. Furthermore, maintaining a healthy weight and lifestyle has direct and indirect consequences on chronic diseases that are also of acute interest in the community.

Figure 6-1 provides a graphical representation of health issues for various weight classifications.

**Figure 6-1: Relationship of Overweight with other Health Issues (Moore County, CHA 2013)**




*Source: 2011 Professional Research Consultants Survey*

Moore County is not alone in its quest to improve healthy weight rates among its population. The County as well as most others throughout North Carolina are all attempting to intervene where possible to turn the tide of unhealthy weights. Though the County ranks near the top quartile for percentage of "overweight", it is near the bottom third in percentage of "obese". See Figure 6-2 below.

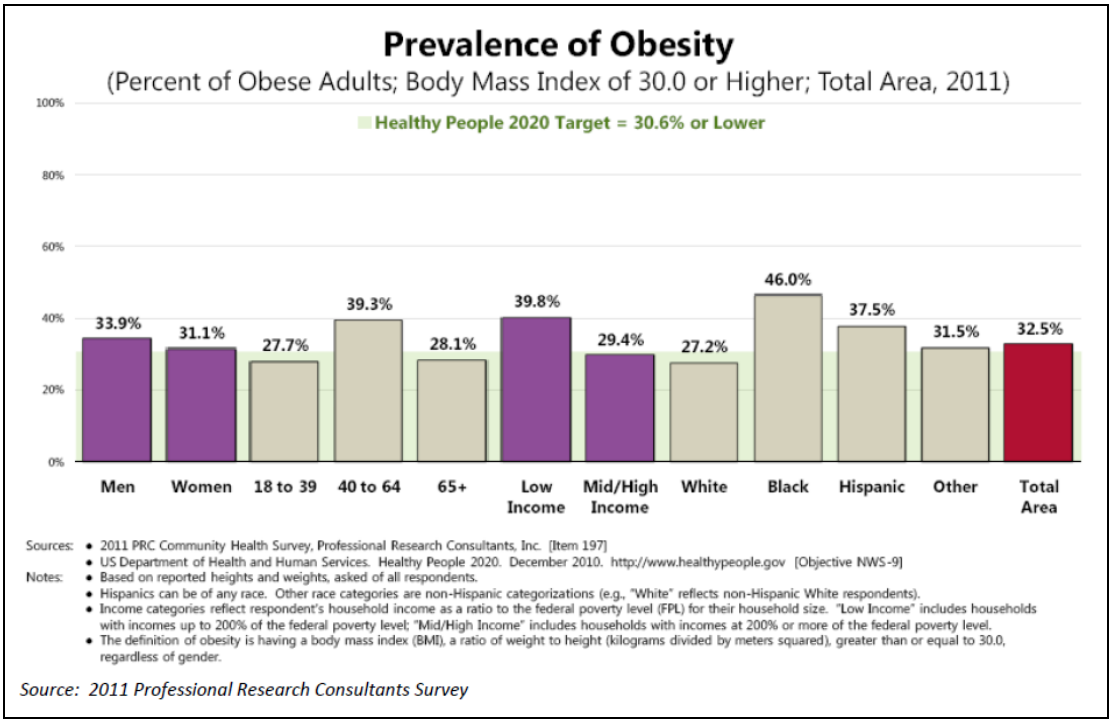
**Figure 6-2: Moore County Comparison for Rates of Overweight & Obese (Moore County, CHA 2013)**

| NC-NPASS 2011, % Overweight/Obese, 2-4 Years | | | | |
|---|---|---|---|---|
| County/State | % Overweight | Rank | % Obese | Rank |
| Moore | 14.8% | 27th | 16.4% | 64th |
| Carteret | 17.5% | 68th | 10.9% | 6th |
| Chatham | 18.4% | 82nd | 17.9% | 84th |
| Haywood | 19.1% | 91st | 12.4% | 15th |
| Stanly | 13.7% | 15th | 15.4% | 44th |
| North Carolina | 16.2% | -- | 15.7% | -- |

*Source: 2011 NC-NPASS*

Figure 6-3 provides a prevalance of obesity for various factors.

**Figure 6-3: Prevalence of Obesity**
**(Moore County, CHA 2013)**




While Pinehurst-specific information is not available, by using demographic factors related to "social determinants of health," we can identify themes that indicate where the health impacts of bicycling and walking could be most needed for Pinehurst's population. According to the Centers for Disease Control and Prevention (CDC), the social determinants of health are "the circumstances in which people are born, grow up, live, work, and age, as well as the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics."

From a social determinant of health perspective, the following demographic details compiled via the 2010 US Census for Pinehurst point to potential vulnerable populations when compared to findings from the Moore County Community Health Assessment:

- The Non-White population total is 8.4% (1,300 of Pinehurst's approximately 15,000 residents)
- 47% of Pinehurst's population is over the age of 65, a percentage notably higher than 23.7% of Moore County's population
- 14.9% of Pinehurst residents rent their house or apartment
- 51.4% of persons age 25 or over have not obtained a Bachelor's (or higher) degree

Persons who are part of these social cohorts are those most likely to experience negative impacts to their health as a result of these attributes. Conditions that exist today however, can be improved to try and mitigate negative impacts on particular cohorts through infrastructure investment. Infrastructure in the form of pedestrian and bicycle facilities has afforded people legitimate transportation options, and has also improved roadway safety for all users and increased the efficiency of the overall network. By making such investments, rates for active transportation rise through increased participation; this participation impacts health. Increased bicycling and walking is shown to increase several aspects of a person's life, as shown in Figure 6-4 below.

**Figure 6-4: Health Outcomes of Increased Walking and Bicycling**

| Health Outcome/Determinant | Direction and Extent | Likelihood | Distribution | Quality of Evidence |
|---|---|---|---|---|
| **Stress reduction** | ▲▲ | **Likely** | **Effect linked to green/natural spaces** | *** |
| **Exposure to nature** | ▲▲ | **Likely** | **Residents within 1.5 miles of greenways/trails** | * |
| **Fewer cars on local roads** | ▲▲ | **Likely** | **Bicycle commuters** | |
| **Housing values** | ▲▲▲ | **Likely** | **Homes within 3200 ft. of trails** | *** |
| **Business attraction** | ▲▲ | **Likely** | **Depends on industry** | *** |
| **Retail access** | ▲▲ | **Likely** | **Related industry (i.e. bike shops)** | ** |
| **Physical Activity** | ▲▲▲ | **Likely** | **Residents living in neighborhoods with complete and extensive sidewalk network/bicycle facilities** | *** |
| **Physical activity with increased street and pedestrian connectivity** | ▲▲▲ | Likely | Not specified | *** |

In Pinehurst, projects aimed at increasing walking and bicycling fall under three principal categories: Pedestrian Facilities, Bicycle Facilities and Greenways. To provide insight into each recommendation and to describe the positive and possible negative health consequences of constructing them, the following Figures 6-5, 6-6 and 6-7 are provided for pedestrian, bicycle and multi-use facilities:

**Figure 6-5: Health Benefits of Walking, Bicycling and Multi-Use Investments**

| Facility Type: *Pedestrian* | Description | Broad Health Benefits |
|---|---|---|
| ***New Sidewalks*** | Constructing new sidewalks compliant with ADA standards where they currently do not exist is a cornerstone of a walkable and active community. New sidewalk will vary in width where pedestrian use is higher and should be built with adequate roadway buffer space where warranted. | ↑ Provides stable and predictable walking surface<br>↑ Heightens profile and presence of pedestrians to motorists<br>↑ Can be usable space for providing street furniture, signage, vegetation<br>↑ Is not prone to flooding, roadway debris or rutting like gravel or dirt surfaces<br>↓ Initial construction can generate noise, dust and potential stress |
| ***Crosswalks*** | Providing a designated space for pedestrians to cross a street either at an intersection or mid-block is the intended use for crosswalks. Crosswalk design can range from simple paint schemes, to more complex design including the use of pedestrian or traffic signals, pedestrian countdown signals, auditory devices and refuge islands. | ↑ Fosters pedestrian movement at predictable locations<br>↑ Allow accessibility to particular land uses<br>↑ Heightens awareness for pedestrian presence to drivers<br>↑ If used with an elevated platform, can calm traffic and reduce severity of possible crash<br>↓ Without maintenance, crosswalks can lose both reflective properties and visual prominence<br>↓ Crosswalks generally put pedestrians in direct line with motorists. Use is principally dependent on driver compliance |

**Figure 6-6: Health Benefits of Walking, Bicycling and Multi-Use Investments**

| Facility Type: *Bicycle* | Description | Broad Health Benefits |
|---|---|---|
| ***Shared Lane Markings/Shared lane arrows (Sharrow)*** | Shared lane markings or "sharrows" are painted stencils placed on streets at regular intervals to align bicyclists in the appropriate location and to heighten the awareness of motorists as to the high probability of bicyclists' presence. Share lane marking are generally used on medium volume streets, with on-street parking, or when bicycle lanes cannot be adequately used due to space limitations. | ↑ Help to increase bicyclist profile on a street segment<br>↑ Promote bicyclists alignment away from "door zone"<br>↑ Gives some assurance to bicyclists that they are welcome to use street space<br>↓ Do not provide true separation from vehicles<br>↓ If not maintained, can fade eliminating effectiveness |
| ***Bike Lanes*** | Bicycle lanes are painted lanes placed on streets to define a dedicated area for bicyclists to ride. Bike lanes are often used on heavier volume streets or on streets with heavier traffic volumes. | ↑ Provide a dedicated on-street space for bicyclists<br>↑ Can help "calm" traffic by narrowing through way<br>↑ Accommodates multiple bicycle types<br>↓ Do not provide a true separation from vehicles<br>↓ If street widths vary and bike lane width not maintained to a safe width, use can be diminished<br>↓ If not maintained, can fade eliminating effectiveness |

**Figure 6-7: Health Benefits of Walking, Bicycling and Multi-Use Investments**

| Facility Type<br>*Multi-use* | Description | Broad Health Benefits |
|---|---|---|
| ***Complete Streets*** | A "complete street" is one designed, considerate, and given appropriate space for all users including motorists, bicyclists and pedestrians. In addition, a street is deemed "Complete" if it adequately considers and optimizes adjacent land uses, is designed for a context sensitive travel speed, and provides amble buffer space between uses. | ↑ Gives ample space for pedestrians and bicyclists, fostering and promoting active modes.<br>↑ An attractive and vibrant street can attract more use and users<br>↑ Buffer space and design limits high vehicle speeds, conflicts with defenseless users<br>↓ All elements of the street need to be maintained to ensure continued intentions |
| ***Separated Pathway*** | Greenway routes are constructed to ADA standards, are generally outside of roadway right of ways and span through open space, riverways or through designated easements. Greenways are free of vehicle traffic, but can intersect roads and accommodate all user types both pedestrian and bicyclists. | ↑ Removes user from roadways<br>↑ Dedicated pedestrian/bicyclist space<br>↑ Connects land uses other than by roadway<br>↑ Provides stable walking surface<br>↓ If isolated, perception of danger heightened<br>↓ User type variability could lead to bike/pedestrian, or bike/bike crashes<br>↓ If outside of peripheral vision of motorists, crashes rates at intersection increased |
| ***Natural path*** | A natural path is one that is without a paved or artificial surface and can be used by pedestrians and bicyclists. Natural paths are generally built with minimal enhancements, can be near roads or streets, or in natural landscape settings like hills, or river or lake shorelines | ↑ Removes users from roadways<br>↑ Dedicated pedestrian/bicyclist space<br>↑ Immerses users in a natural setting<br>↑ Lower cost to construct<br>↓ Surface can become unpredictable or unstable without normal maintenance<br>↓ Can be limited due to weather events such as flooding or soiling |

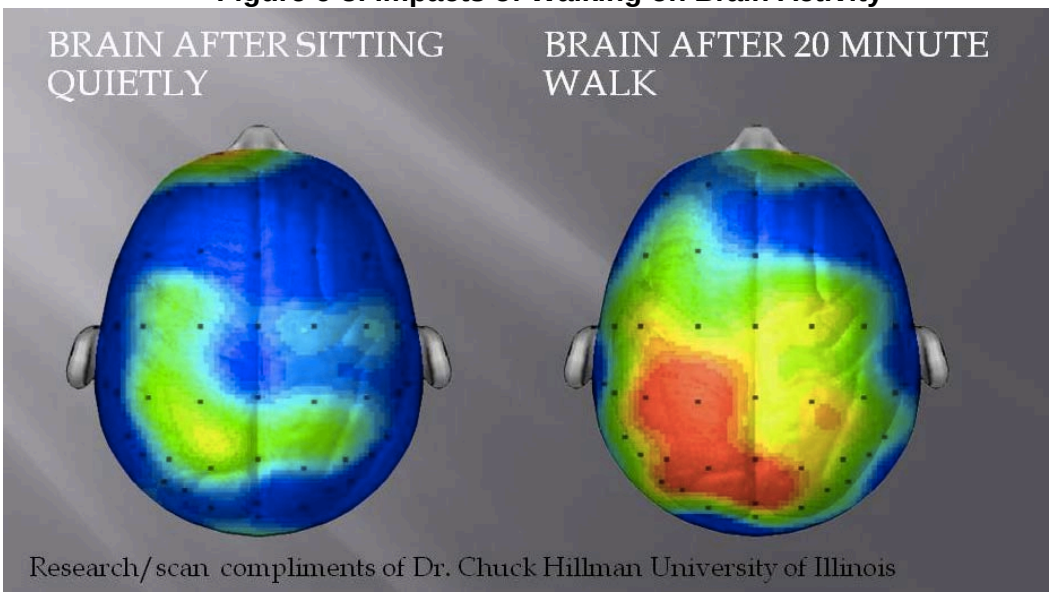
## 6.2 THE 7 DIMENSIONS OF HEALTH AND WELLNESS

When we think about *health*, whether individual or public, we often limit our associations with the term to general topics such as healthcare, physical activity and nutrition. We think about the common mantras from our peers and healthcare professionals - *Don't forget your annual checkup. Run this many miles per day. Eat this, not that.* We often forget, or perhaps never even realize, that true and complete health is about so much more.

According to the World Health Organization, health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." This means that achieving complete health entails much more than merely reaching optimal physical health.

In other words, health is holistic. It is made up of many interconnected components that must all be achieved individually in order to obtain overall health. These components can be easily organized into what is known as *The Seven Dimensions of Health*: physical; social; economic and occupational; environmental; spiritual; emotional; and intellectual. These dimensions are interrelated and each has the ability to strongly influence the others. Further, walking and bicycling have impacts that extend beyond the physical dimension of health, as illustrated in this section.

**Figure 6-8: Impacts of Walking on Brain Activity**




The implementation of active transportation methods, specifically walking and biking, has been proven to help both individuals and communities thrive in each of these seven dimensions and ultimately achieve total health. During the health workshop that was held as part of this Plan, participants identified several destinations within Pinehurst that promote healthy living through the lens of the 7 Dimensions. Figure 6-9 includes the

results of this exercise along with definitions of the dimensions of health and the implication of bicycling and walking on health.

**Figure 6-9: Dimensions of Health & Wellness and Implications for Bicycling & Walking in Pinehurst**

| Dimension of Health & Wellness<br>*Pinehurst Destinations by Dimension* | Definition | Implications of Bicycling & Walking |
|---|---|---|
| **Physical**<br>*Rassie Wicker Park*<br>*Cannon Park*<br>*Pinehurst Resort*<br>*Neighborhoods*<br>*Sandhills CC*<br>*FirstHealth Complex*<br>*Greenway Trails* | The ability to maintain a healthy quality of life that allows us to get through our daily activities without undue fatigue or physical stress. The ability to recognize that our behaviors have a significant impact on our wellness and adopting healthful habits (routine check-ups, a balanced diet, exercise, etc.) while avoiding destructive habits (tobacco, drugs, alcohol, etc.) will lead to optimal Physical Health and Wellness. | • Low-impact and easy way to improve physical health that can be enjoyed by people of all ages.<br>• Gives your heart, blood vessels and lungs a good workout, as well as increased cardiovascular fitness; increased strength and flexibility; improved joint mobility; improved posture and coordination; and decreased body fat.<br>• One of the best ways to reduce the risk of health problems such as stroke, heart disease, some cancers, diabetes and arthritis.<br>• 30 minutes of moderate walking per day five days a week can help ensure a longer, healthier and happier life.<br>• One hour of walking may increase your life expectancy by two hours. |
| **Social**<br>*Rassie Wicker Park*<br>*Cannon Park*<br>*Pinehurst Resort*<br>*Neighborhoods*<br>*Village Center*<br>*Sandhills CC*<br>*Elementary School*<br>*Greenway Trails*<br>*Tufts Library* | The ability to relate to and connect with other people in our world. Our ability to establish and maintain positive relationships with family, friends and co-workers contributes to our Social Health and Wellness. | • Creates shared sense of community by making an activity that is also transportation a social event.<br>• Provides mobility to members of a community who may not have access to a private vehicle.<br>• People who live in walkable areas with less traffic statistically have more friends than those who live in areas with heavy traffic.<br>• Very few members of a community are excluded from its benefits. |
| **Economic/ Occupational**<br>*Pinehurst Resort*<br>*Village Center*<br>*Sandhills CC*<br>*Shopping Centers* | The ability to get fulfillment from our jobs or career fields while still maintaining balance in our lives. Our desire to contribute in our careers to make a positive impact on the organizations we work in and to society as a whole. | • Physically active people save an average of $500 per year on healthcare costs.<br>• Walkable and bikeable communities are becoming more valuable and stimulating economies through increased property values, job creation, local spending, and tourist spending.<br>• Improves an employee's attitude and work ethic and increases motivation and productivity.<br>• People who walk or bike regularly are overall mentally and physically healthier, and therefore enjoy their jobs more and work more efficiently, contributing to an overall increase in occupational health. |

| Dimension of Health & Wellness<br>*Pinehurst Destinations by Dimension* | Definition | Implications of Bicycling & Walking |
|---|---|---|
| **Environmental**<br>*Rassie Wicker Park*<br>*Cannon Park*<br>*Pinehurst Resort*<br>*Sandhills CC*<br>*Greenway Trails* | The ability to recognize our own responsibility for the quality of the air, the water and the land that surrounds us. The ability to make a positive impact on the quality of our environment, be it our homes, our communities or our planet. | • Pollution-free modes of transportation with reduction of carbon emissions, noise pollution and water pollution.<br>• Walking and bicycling facilities are an efficient use of space. Over 20 times as many people can travel in the same space when walking as compared to in a car.<br>• Significantly reduces an individuals' ecological footprint.<br>• Leads to greater appreciation for being in contact with nature and recognizing personal effects on the quality of the environment. |
| **Emotional**<br>*Rassie Wicker Park*<br>*Cannon Park*<br>*FirstHealth Complex*<br>*Greenway Trails*<br>*Sandhills CC* | The ability to understand ourselves and cope with the challenges life can bring. The ability to acknowledge and share feelings of anger, fear, sadness or stress; hope, love, joy and happiness in a productive manner. | • Physical activity has also been proven to benefit the emotional and mental well-being of individuals.<br>• Americans identify "relaxation and peace" (stress reduction) as the 2nd most prevalent benefit they experience from physical exercise.<br>• Walking specifically has been shown to reduce the decline of cognitive performance among the elderly.<br>• Promotes a good night's sleep – an essential element of maintaining good emotional health – more effectively than many other popular physical activities. |
| **Intellectual**<br>*Sandhills CC*<br>*Elementary School*<br>*Tufts Library* | The ability to open our minds to new ideas and experiences that can be applied to personal decisions, group interaction and community betterment. The desire to learn new concepts, improve skills and seek challenges in pursuit of lifelong learning. | • Associated with better cognitive performance by children in school.<br>• Gives people a chance to slow down and step away from their stress, their to-do lists, and their TVs and clear their mind so they can think about other things in life.<br>• Linked to improving the cognitive functions of adults, and decreasing the rate of cognitive decline among the elderly.<br>• Improves intellectual health simply through the challenge of making it a part of their regular daily activity. |
| **Spiritual**<br>*Rassie Wicker Park*<br>*Area churches*<br>*Sandhills CC* | The ability to establish peace and harmony in our lives. The ability to develop congruency between values and actions and to realize a common purpose that binds creation together. | • Relaxing recreational activities are linked to spiritual wellness.<br>• Natural environments have a great spiritual meaning and represent a strong sense of place, typically associated with memories of special times spent outdoors.<br>• Can strengthen a person's identity and help them define who they are by allowing them to be themselves and express their personality – a very important aspect of spiritual health. |

**- END OF SECTION -**

# SECTION SEVEN: BICYCLE ROUTES & RECOMMENDATIONS

## 7.1 BICYCLE ROUTES & TYPES

Creating a complete network of on-street bicycling facilities in Pinehurst will be a challenge due to the existing street configurations and rights-of-way, combined with the Historic District designation and likelihood that some investments could result in a removal of a row of pine trees on one or both sides of a street.

Therefore, a comprehensive bicycling network in Pinehurst will be more likely comprised of a combination of both long-range infrastructure upgrades (where possible) and short-term pavement marking or signage projects that link disconnected greenway segments or provide on-street linkages between destinations on low-volume, low-speed streets.

The terms used to describe recommendations outlined in this chapter are listed below:

- **Bicycle Lane:** A portion of roadway that has been designated for preferential or exclusive use by bicyclists by pavement markings and signs. It is intended for one-way travel, usually in the same direction as the adjacent traffic lane.

- **Bicycle Route:** A roadway or bikeway designated by the jurisdiction having authority, either with a unique route designation or with Bike Route signs, along which bicycle guide signs may provide directional and distance information.

- **Bikeable Shoulder:** A portion of roadway contiguous with the traveled way that accommodates stopped vehicles, emergency use and lateral support for the roadway surface. Shoulders that are 4-foot (less than 35 mph speed limit) or 5-foot (35 mph to 45 mph speed limit) are considered bikeable because they are a width similar to a bike lane.

- **Shared-Lane Marking (or Sharrow):** A pavement marking symbol that indicates an appropriate bicycle positioning in a shared lane, which is a lane of traveled way that is open to both bicycle and motor vehicle travel.

- **Shared Roadway:** A roadway that is open to both bicycle and motor vehicle travel.

- **Sidepath:** A shared use path or greenway located immediately adjacent and parallel to a roadway, similar to a sidewalk but intended for use by pedestrians and bicyclists.

The following corridors within or connecting to Pinehurst were identified during the planning process as those routes that are popular among local bicyclists and may be subject to short- or long-term infrastructure improvements:

- Highway 2, from Highway 5 to Station Avenue

- Highway 5, from Holly Pines Drive to Highway 211
- Highway 211, from the Traffic Circle to the Pinewild Entrance
- US 15/501, from Juniper Lake Road to Voit Gilmore Lane
- Airport Road (SR 1843), from Highway 2 to Gaeta Drive
- Linden Road (SR 1115), from Pine Vista Drive to Highway 5
- Morganton Road (SR 1205), from Highway 5 to US 15/501
- Murdocksville Road (SR 1209), from Highway 211 to Juniper Lake Road
- Page Road from NC 2 to US 15/501

Recommendations for each of these corridors and maps of each corridor are provided later in this section. In some cases, both short term and long term recommendations have been provided. Maps show the short term recommendations since they would likely be the first items implemented within this plan.

Most of the streets and highways recommended for long-range improvements in this Plan are under the jurisdiction of NCDOT. Therefore, coordination of improvements with NCDOT will need to occur as projects are proposed.

Several other streets around the Village are more suitable for bicycling in their current configuration and may be subject to designation of neighborhood or Village bicycle routes in combination with planned greenway routes to help serve those who are uncomfortable riding on busier roads. Most of these routes are located on roads maintained by the Village though some NCDOT coordination will also be necessary.

## 7.2 SHARED LANE MARKING ROUTES

The easiest and least costly short-term improvements in Pinehurst consist of installing shared lane markings, or "sharrows," along several of the two-lane roads. A shared lane marking can be painted in the travel lane of a roadway to mark it as a shared space and raise the awareness of the presence of bicyclists. Sharrows, in a Pinehurst context, can be used to mark bicycle routes between places such as the Village Green and Cannon Park or they can be used to mark an on-street route along a residential street to connect to the Greenway.


*Example of a shared lane marking in nearby Southern Pines*

Sharrows could also serve as an alternate marking for bike routes within the bounds of the Historic District in lieu of signage.

The MUTCD recommends that shared lane markings be installed every two hundred fifty feet along a route and at intersections. The MUTCD also states the purpose of shared lane markings as helping to:

- Assist bicyclists with lateral positioning in a shared lane with on-street parallel parking in order to reduce the chance of a bicyclist's impacting the open door of a parked vehicle
- Assist bicyclists with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane
- Alert road users of the lateral location bicyclists are likely to occupy within the traveled way
- Encourage safe passing of bicyclists by motorists
- Reduce the incidence of wrong-way bicycling

Sharrows are typically applied using thermoplastic marking kits that can be purchased and installed by Village Public Works personnel or contracts. In general (based on recent bid prices in North Carolina), sharrows can cost up to $6,500 per mile to install plus approximately $500 per intersection (markings and labor).

Corridors within Pinehurst recommended for shared lane markings are:

- Highway 2 from Highway 5 to Station Avenue
- Linden Road, from NC 5 to Pine Vista Drive
- Juniper Creek Boulevard, loop between US 15/501 and Spring Lake Road
- Gun Club Road/Spring Lake Drive, from NC 211 to US 15/501
- Pine Vista/Lake Hills/Diamondhead/Burning Tree/Lake Forest/Sugar Gum/ St. Andrews/Lost Tree from NC 5 to Linden Road and McKenzie Road
- Memorial Drive, from NC 211 to US 15/501
- Monticello Drive, from NC 5 to Morganton Road
- Page Road, from NC 2 to NC 211

In addition, a Village Shared Lane Route is recommended to mark a route that links the Village Green area to Pinehurst Resort, Rassie Wicker Park, Pinehurst Elementary School and Cannon Park along these streets: Carolina Vista Drive, McCaskill Road, Magnolia Road, Rassie Wicker Drive, McKenzie Road and Rattlesnake Trail.

Map 7.2 highlights the areas recommended for Shared Lane Markings in Pinehurst.

PLAN

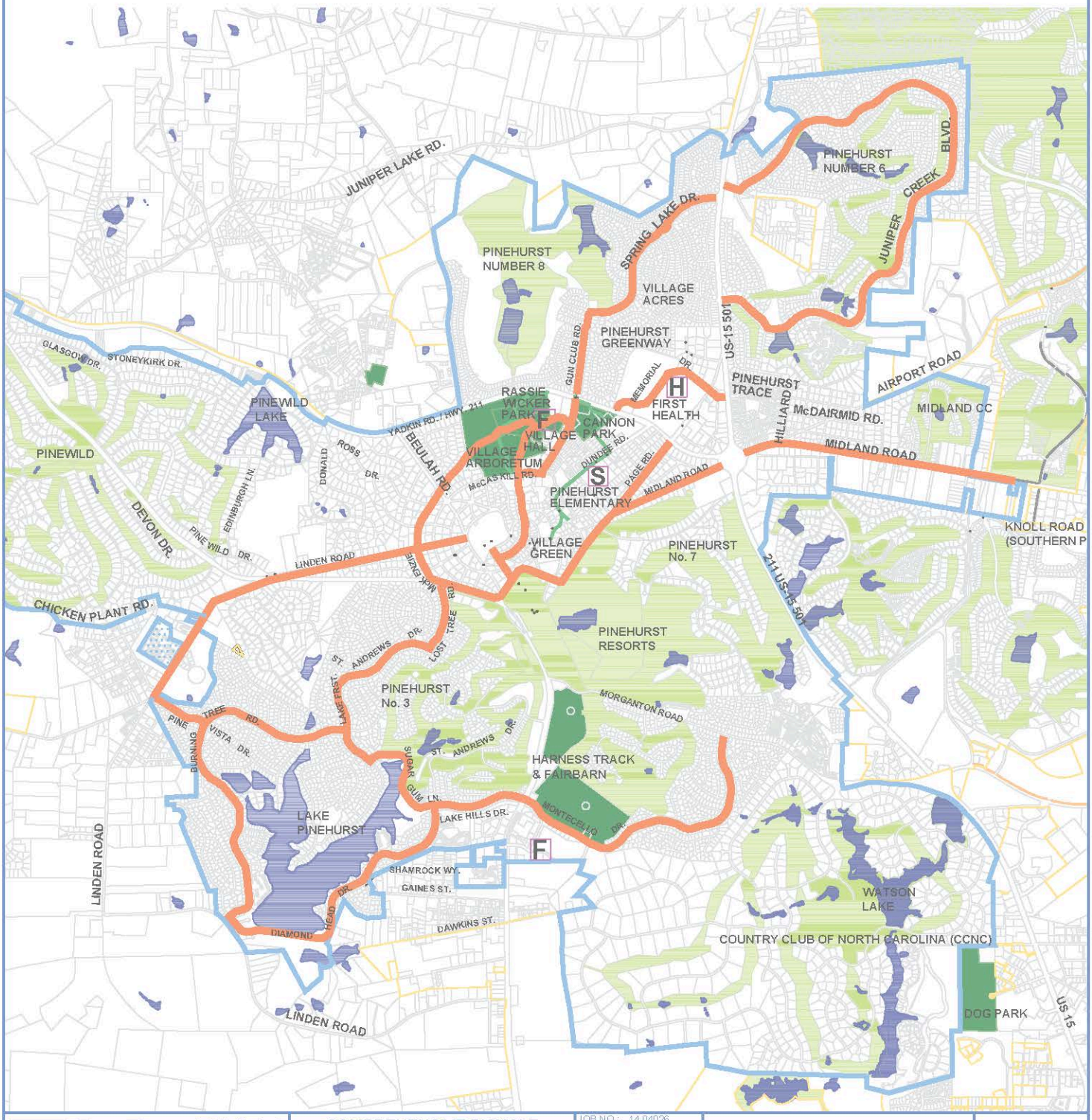
4000 0 2000 4000 8000

GRAPHIC SCALE 1 INCH = 4000 FEET

Proposed Bike Shared Lane Markings

Village of Pinehurst Limits

Village of Pinehurst ETJ Limits

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COMPREHENSIVE BICYCLE PLAN 2015

# VILLAGE OF PINEHURST

PINEHURST, NORTH CAROLINA

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DATE: MARCH, 2015
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PROPOSED SHARED LANE MARKINGS

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## 7.3 MAJOR ROUTE RECOMMENDATIONS

More costly investments involve adding pavement width to many of the area's roadway to link streets within Pinehurst to nearby communities, existing or planned greenway linkages and various destinations. The addition of five-foot shoulders that can be marked as bicycle lanes are the primary recommendation along most routes since many of Pinehurst's major streets lack curb and gutter and are not proposed to have them.

*Shoulders marked as bicycle lanes on NC 107 in Jackson County*

These recommendations are contained in the individual route profiles listed on the following pages. The proposed improvement includes designation as a bike lane (preferred) or, at minimum, a bikeable shoulder that is wide enough to be marked as a bicycle lane.

The advantage in marking them as a bicycle lane is that it indicates to motorists and bicyclists where they can be positioned on the roadway. The dedicated space can make bicyclists feel more comfortable along the roadway if adequate width is given in consideration of the speed of adjacent traffic. The advantage in not marking them as bicycle lanes is that bicyclists may use the vehicular travel lane in the event of debris or deteriorating pavement without motorists expecting them to strictly adhere to staying in the bicycle lane. The addition of shoulders can be generally accommodated for $200,000 to $250,000 per mile (based on recent bid prices for NCDOT projects). Typically, the addition of shoulders is done as a standalone project or as part of a major roadway resurfacing project.

On streets where there is existing tree canopy and/or pine trees close to the street, it is recommended that no improvements be made unless NCDOT pursues a "modernization project" to improve safety along the route since Pinehurst's trees are such an integral part of its identity.

The project profiles include several features for Pinehurst to use in future funding initiatives and discussions with NCDOT:

- Route description
- Short- and long-term recommendations (where applicable)
- Cost estimates for short-term recommendations based on recent bid prices for similar facilities in North Carolina – note that these are rough estimates and can vary significantly due to a number of factors, including topography, right-of-way, existing trees, environmental study costs, etc.

- Project length
- Bicyclist quality of service (QOS) analysis, including existing QOS and modeled QOS based on the recommended improvement (see info in next paragraph below)
- The NCDOT Complete Streets cross section that best fits the proposed improvement (see www.completestreetsnc.org)
- Major influences on bicyclist traffic and destinations along or near this route
- Individual project maps – note that these individual maps are screen shots of the larger Proposed Bike Lanes, Shared Markings and Roadway Sidepaths Map in Appendix B

## Quality of Service Analysis

The analysis conducted to identify the likely degree of improvement for comfort of bicyclists for the various infrastructure-related projects was based on Quality of Service analysis tools developed for the Florida Department of Transportation and recognized through AASHTO's Guidelines for the Development of Bicycle Facilities.

Data was obtained for Pinehurst streets to use in this analysis, which included traffic volumes, posted speed limits, roadway width, number of travel lanes and existing facilities for bicycling. Data was also used from similar corridors in Moore County where existing traffic volumes were not available via NCDOT's online traffic count maps.

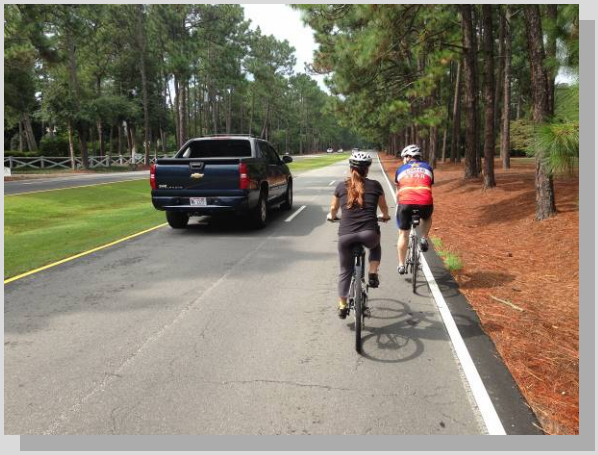
Each project corridor was evaluated for existing conditions to develop the baseline QOS score. The long-term recommendations were then evaluated based on proposed conditions as if they were implemented in the current year (as there is no way to assume future conditions related to speed and other roadway characteristics in the scope of this plan). This score is reflected in the "As Proposed" score for each project.

The following tables provide the individual route profiles and accompanying recommendations:

# Highway 2, from Highway 5 to Station Avenue

**Context**

Highway 2 is the main east-west route through the historic part of the Village. The two-lane route transitions to a four-lane road at Kelly Road/Page Road. It is a four-lane road from this point, through the Circle to Station Avenue on the border with Southern Pines. West of the Circle, it is a low-speed, but higher volume arterial route. East of the Circle, it is a higher-speed and high volume route. The Southern Pines Bicycle Plan recommended wide outside lanes along the route but it is undergoing study by NCDOT.



**Short-Term Recommendations**

There are few options to add facilities such as bikeable shoulders or bicycle lanes along the route due to various constraints. Based on existing traffic volumes, the installation of shared-lane markings is recommended to establish increased awareness for the presence of bicyclists.

**Cost Estimate[1]: $20,000**

**Long-Term Recommendations**

Work with NCDOT to identify feasible options for section east of the Circle during their upcoming study. Wide outside lanes should be discouraged in favor of bikeable shoulders.

A more progressive analysis of future volumes along Highway 2 in the existing four-lane section would be necessary to determine if four-lanes are needed. Traffic volumes near the Circle have increased by only 1,700 since 1999, so a road diet might be feasible. This would allow designation of the outside lane as a bicycle lane, a combined bike/pedestrian lane or a cycle track. The cost estimate would vary depending on the facility choice.

**Length:** 3.1 miles

**Quality of Service:**
Existing: C (3.27)
As Proposed: A (1.77)

**Traffic Volume (2013)**
5,200 east of Carolina Vista
8,700 west of Circle

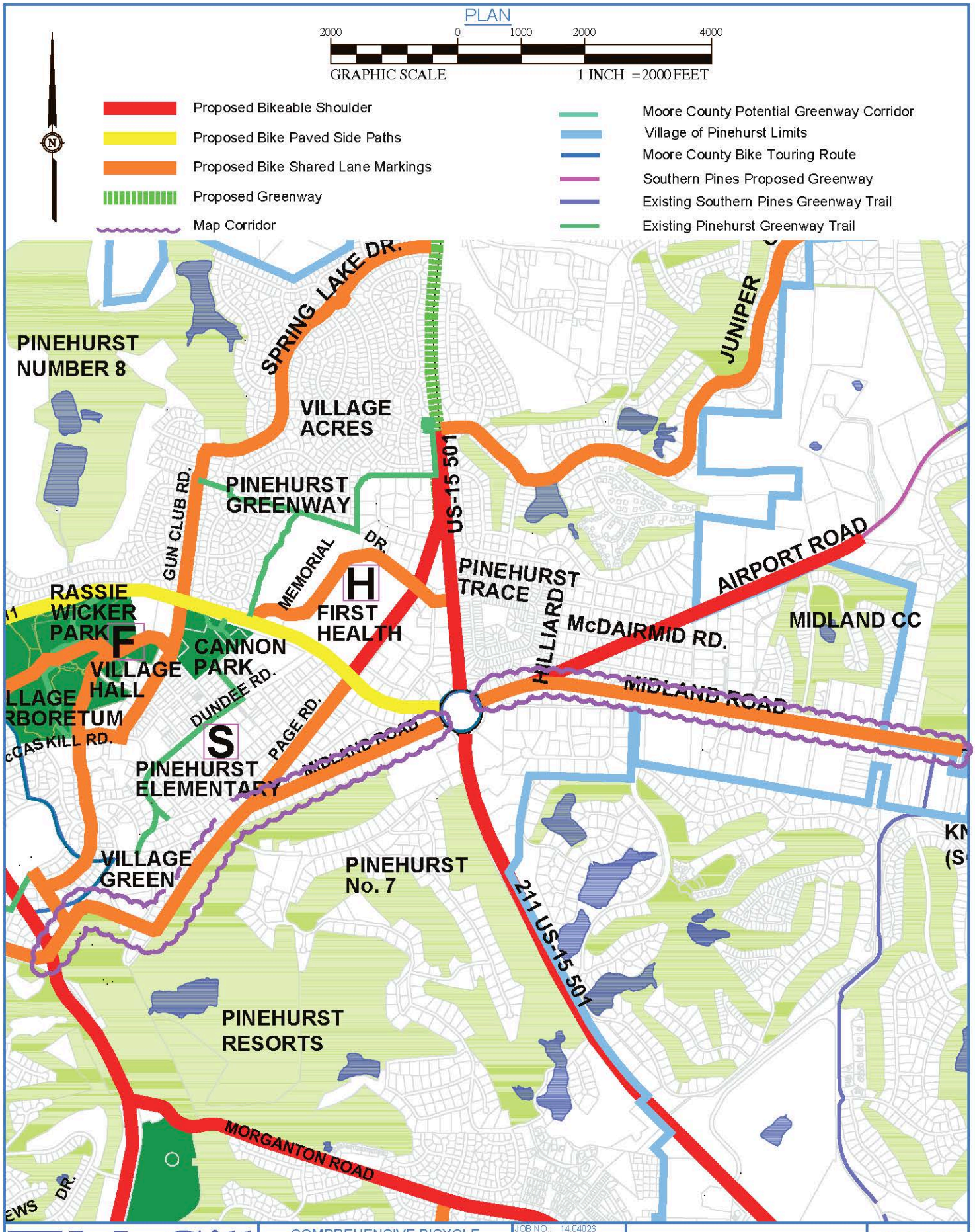
## Influences

- Pinehurst Resort
- Village Center
- Historic neighborhoods
- Linden Road route
- Through recreational bicyclists

**Urban/Suburban Boulevard**

*See attached Map 7.3.1.*

[1] Cost estimates provided are preliminary opinions of probable cost and may vary significantly. We cannot and do not guarantee that bids will not vary from the estimates.

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COMPREHENSIVE BICYCLE PLAN 2015

# VILLAGE OF PINEHURST

PINEHURST, NORTH CAROLINA

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HIGHWAY 2
FROM HIGHWAY 5 TO
STATION AVENUE

SHEET
7.3.1

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# Highway 5, from Holly Pines Drive to Highway 211

**Context**

Highway 5 is the main north-south route through the historic part of the Village, skirting Pinehurst Resorts. The two-lane route has various right-of-way constraints through the Historic District. It is a high- volume arterial route near Highway 2 but traffic volumes are lower on the north and southern limits of the Village. The railroad bridge is a major constraint just south of the Highway 2 intersection.


**Short-Term Recommendations**

Add bikeable shoulders (4 or 5-feet; 5 preferred) north of McKenzie drive in the short term, given right-of-way clearance and lack of major constraints in this section. Install shared lane markings along the entire route where shoulders do not exist.

**Cost Estimate[1]: $100,000**

**Long-Term Recommendations**

Add bikeable shoulder (5-foot) from McKenzie Drive, south through the Highway 2 intersection and to the southern Village limits will require more detailed study and investment.

**Cost Estimate[1]: $700,000**

**Length:** 2.7 miles

**Quality of Service:**
Existing: D/E (3.67-4.28)
As Proposed: B (2.07-2.68)

**Traffic Volume (2013)**
7,800 at NC 211
17,000 south of Hwy 2
10,000 at Trotter Dr.

**Influences**

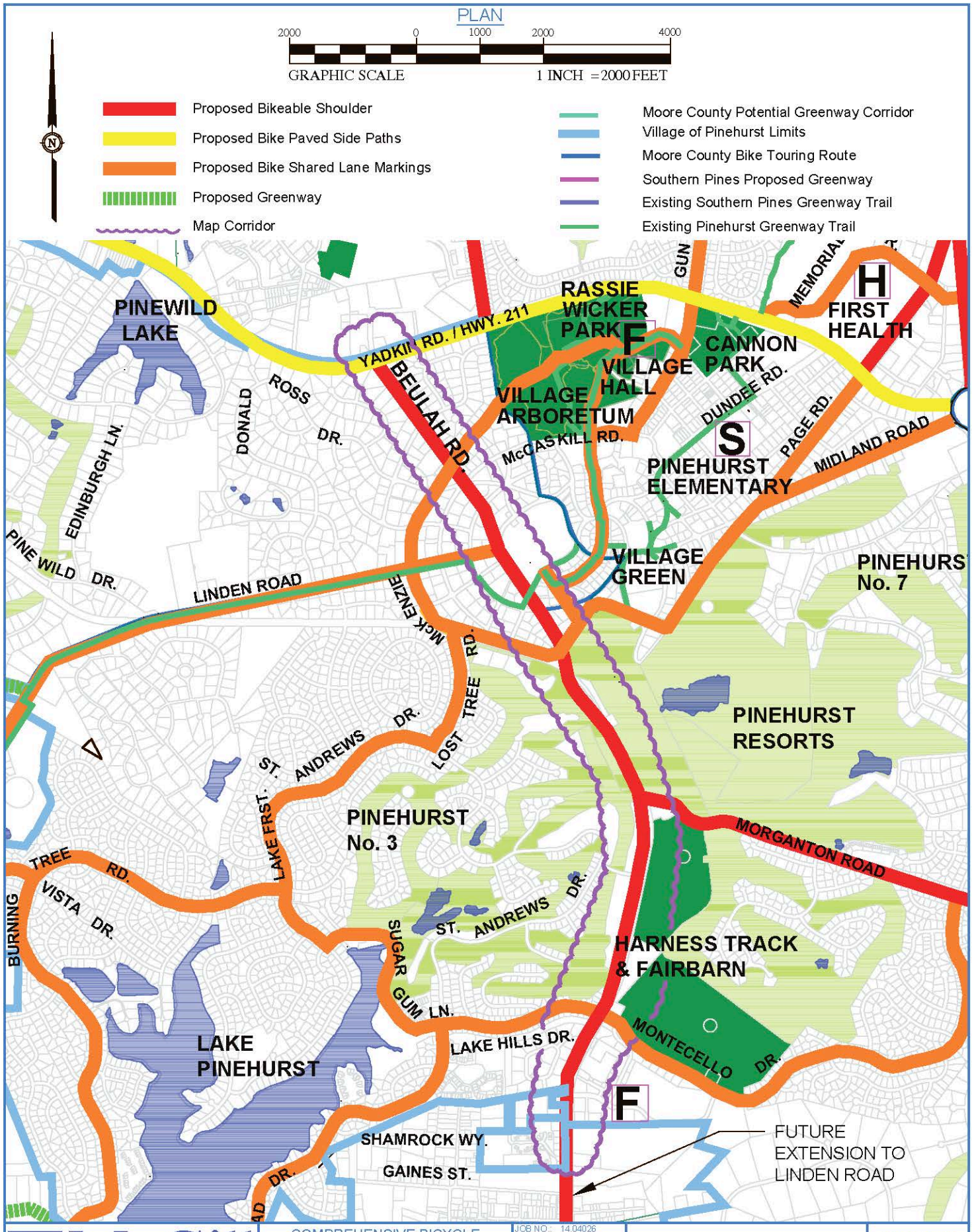
- Pinehurst Resort
- Village Center
- Historic neighborhoods
- Linden Road route
- Through recreational bicyclists

completestreets

**Rural Avenue**

*See attached Map 7.3.2. Note that the map shows bikeable shoulders to Holly Pines Drive and extending to the future greenway at Linden Road.*

[1] Cost estimates provided are preliminary opinions of probable cost and may vary significantly. We cannot and do not guarantee that bids will not vary from the estimates.

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COMPREHENSIVE BICYCLE PLAN 2015

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HIGHWAY 5
FROM HIGHWAY 211 TO
HOLLY PINES DRIVE

SHEET
7.3.2

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# Highway 211, from the Traffic Circle to the Pinewild Entrance

**Context**

Highway 211 was recently upgraded to a four-lane divided highway through Pinehurst, with curb, gutter and sidewalk. The access-controlled corridor is a high-speed, high-volume facility with traffic signals at major roadway crossings. The current Greenway section crosses Highway 211 near Rattlesnake Trail and Gun Club Drive.

Conditions are not suitable for on-street bicycling along Highway 211, but the south side of the corridor is optimal to be upgraded to include a sidepath instead of a sidewalk.


**Short-Term Recommendations**

Upgrade existing sidewalks on the south side of Highway 211 to include a 10-foot paved pathway (may be 8-foot in areas constrained by guardrail) while preserving the existing buffer between the street and sidewalk.

Upgrade curb ramps at locations where the sidepath links to a greenway to include ramps that are the same width as the pathway.

An extension from NC 5 to the Pinewild entrance could be considered as a route to get bicyclists, walkers and potentially golf carts from the area into Village streets.

**Cost Estimate[1]:**

- NC 5 to Circle: $250,000 to $300,000
- Pinewild entrance to NC 5: $2.2 million

**Influences**

- Cannon Park & Rassie Wicker Park
- FirstHealth Moore Regional Hospital
- Shopping areas along NC 211
- Village Center
- Existing/planned greenways

**Length:**
1.8 miles (NC 5 to Circle)
2.2 miles (Pinewild entrance to NC 5)

**Quality of Service:**
Existing: D (3.66)
As Proposed: A (1.95)

**Traffic Volume (2013)***
13,000 west of Highway 5
11,000 east of Highway 5
12,000 at the Circle
* Pre-widening

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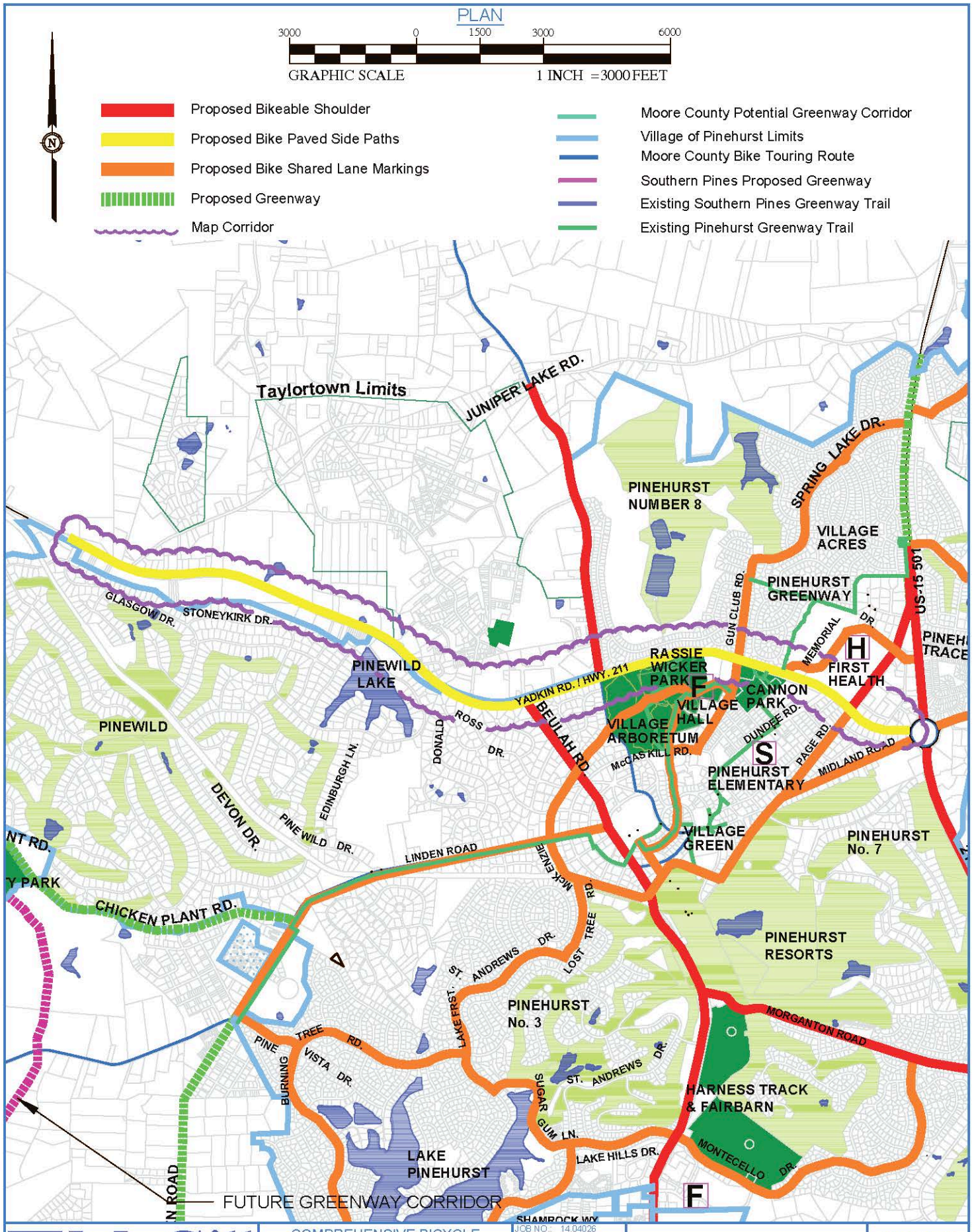
**Urban/Suburban Parkway**

*See attached Map 7.3.3.*

[1] Cost estimates provided are preliminary opinions of probable cost and may vary significantly. We cannot and do not guarantee that bids will not vary from the estimates.

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COMPREHENSIVE BICYCLE PLAN 2015

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HIGHWAY 211
FROM TRAFFIC CIRCLE TO
PINEWILD ENTRANCE

SHEET
7.3.3

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# US 15/501, from Juniper Lake Road to Voit Gilmore Lane

**Context**

US 15-501 is a principal arterial that bisects Moore County and serves several of its communities. It is a four-lane road in various configurations south of Memorial Drive.

The Southern Pines Bicycle Plan recommended a sidepath near the Circle to connect to Midland Road and provide a linkage to the FirstHealth Moore Regional Hospital Area.

**Short-Term Recommendations**

Work to add bikeable shoulders (4-feet; 5 preferred) along the route through Pinehurst with an emphasis on areas north of the Circle to link to existing and planned greenways. The Village's 2015 Pedestrian Plan includes a new greenway extension from Forest Drive to Juniper Lake Road, and the new shoulders could be utilized to connect to the new greenway.

**Cost Estimate[1] (Bikeable Shoulders to Forest Drive): $850,000**

**Cost Estimate[1] (Greenway Extension Forest Drive to Juniper Lake Road): $600,000**

**Long-Term Recommendations**

Work with Southern Pines to identify potential of constructing a sidepath along the east side of the highway.

**Cost Estimate: $3.4 million (paved)**

**Influences**

- Shopping areas along US 15/501
- FirstHealth Moore Regional Hospital
- Pinehurst Resort and other communities
- Southern Pines
- Existing/planned greenways

**Length:** 3.4 miles

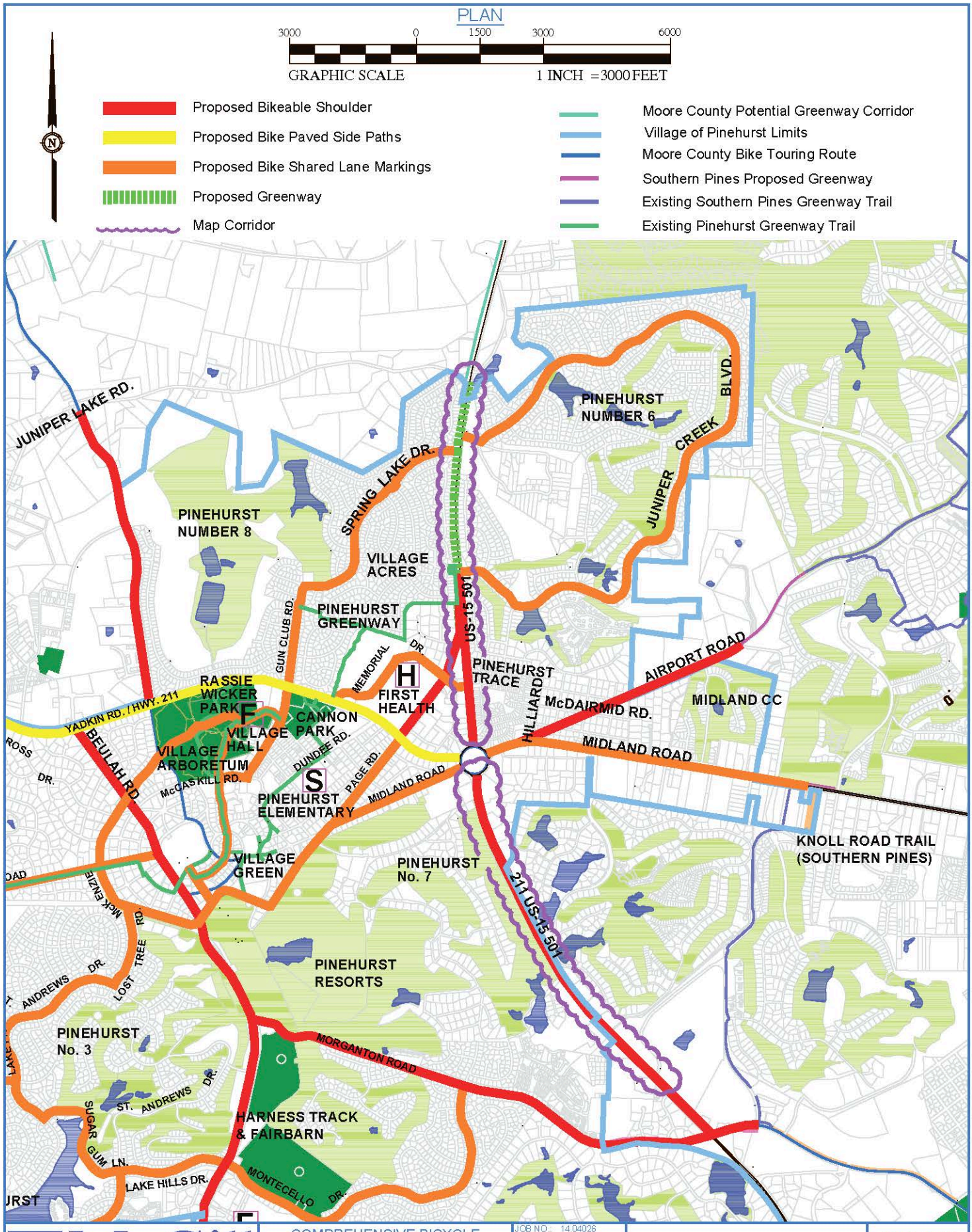
**Quality of Service:**
Existing: D (4.03)
As Proposed: A (1.97)

**Traffic Volume (2013)**
11,000 north of Juniper Lk
16,000 north of Circle
26,000 south of Circle
25,000 north of Morganton Rd

**Urban/Suburban Parkway**

*See attached Map 7.3.4. Note that this map shows the short term recommendation.*

[1] Cost estimates provided are preliminary opinions of probable cost and may vary significantly. We cannot and do not guarantee that bids will not vary from the estimates.

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# VILLAGE OF PINEHURST

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U.S. 15/501
FROM JUNIPER LAKE ROAD TO VOIT GILMORE LANE

SHEET
7.3.4

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# Airport Road (SR 1843), from Highway 2 to Gaeta Drive

## Context

Airport Road connects NC 2 to Sandhills Community College and Reservoir Park in nearby Southern Pines. The Southern Pines Greenway terminates along the north side of the road approximately 1.3 miles east of the Highway 2 (Midland Road) intersection.


### Long-Term Recommendations

Work with Southern Pines and NCDOT to identify a suitable route for a greenway extension to link to the Southern Pines greenway. This may be pursued through development of properties along the north side of the road.

If the greenway remains unpaved, bikeable shoulders or bike lanes should be added along Airport Road.

Consider a micro-path that connects to Turner Road to Pinehurst Trace Drive and provides a connection between these neighborhoods and the hospital. This connection allows bicyclists and other greenway users to avoid the Circle area.

**Cost Estimate[1]:**

- Greenway (unpaved): $200,000 to $300,000
- Bikeable shoulders: $200,000 to $250,000
- Micropath connection: $5,000 to $15,000

**Influences**

- Sandhills Community College
- FirstHealth Moore Regional Hospital
- Through recreational bicyclists
- Existing/planned greenways

**Length:** 1.0 miles

**Quality of Service:**
Existing: C (3.50)
As Proposed: A (1.84)

**Traffic Volume (2013)**
6,100

**Rural Avenue**

*See attached Map 7.3.5.*

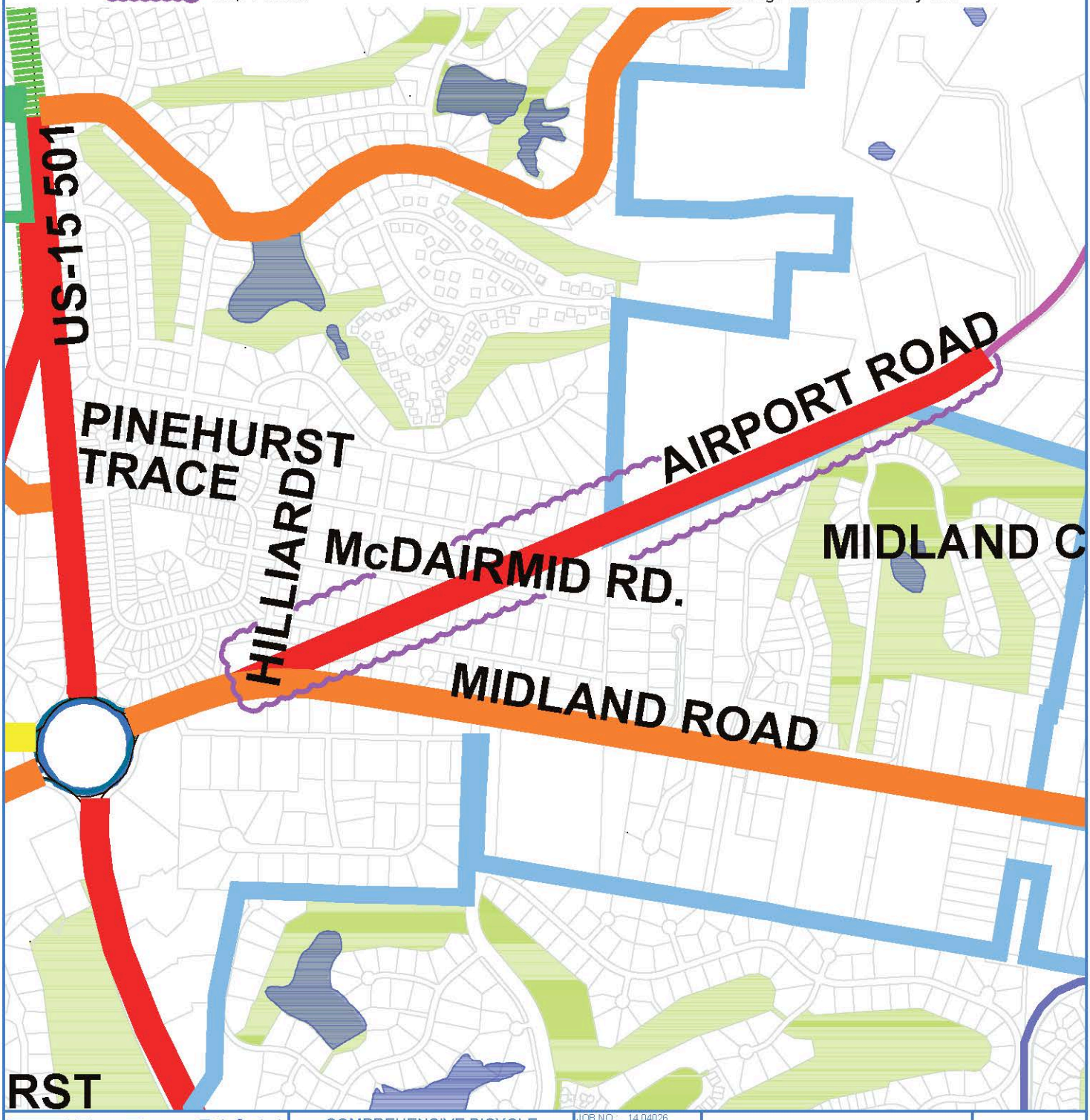
[1] Cost estimates provided are preliminary opinions of probable cost and may vary significantly. We cannot and do not guarantee that bids will not vary from the estimates.

PLAN

1000 0 500 1000 2000

GRAPHIC SCALE 1 INCH =1000 FEET

- Proposed Bikeable Shoulder
- Proposed Bike Paved Side Paths
- Proposed Bike Shared Lane Markings
- Proposed Greenway
- Map Corridor
- Moore County Potential Greenway Corridor
- Village of Pinehurst Limits
- Moore County Bike Touring Route
- Southern Pines Proposed Greenway
- Existing Southern Pines Greenway Trail
- Existing Pinehurst Greenway Trail

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COMPREHENSIVE BICYCLE PLAN 2015

VILLAGE OF PINEHURST

PINEHURST, NORTH CAROLINA

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AIRPORT ROAD
FROM HWY. 2 TO GAETA DRIVE

SHEET
7.3.5

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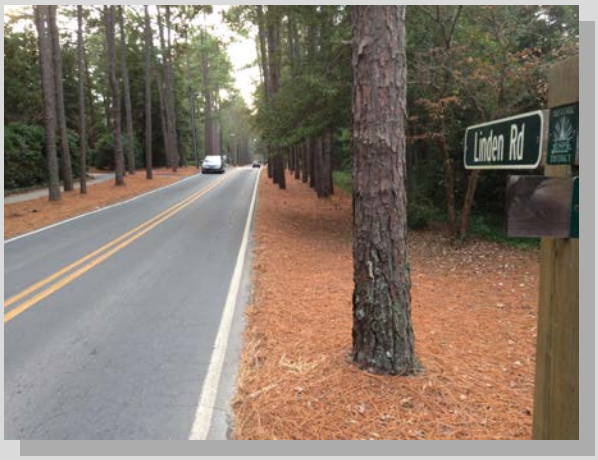
# Linden Rd (SR 1115), from Pine Vista Drive to Highway 5

**Context**

Linden Road is one of the most challenging routes in Pinehurst in terms of strategies to accommodate bicyclists. The challenges lie in the existing tree canopy along the route that also provides for a shaded route with a vertical enclosed feeling. It is a popular recreational bicycle route.

The greenway that parallels the street is not conducive to bicycle travel. There is also demand along the route from golf cart users in Pinewild.




**Recommendation**

Due to the sensitive nature of standalone recommendations for Linden Road, Pinehurst should not pursue immediate action along the route. Adding bike lanes or bikeable shoulders would require removing a row of pine trees on both sides of the street and disrupt the historic feel of the route.

If, at some time in the future, the street is proposed for improvements by NCDOT to alleviate safety concerns due to the proximity of the trees then Pinehurst may consider this an opportunity to add shoulders or bike lanes. Shared lane markings are recommended as a short term improvement.

A rail-with-trail option may exist between Pinewild and the Pinehurst Resort to accommodate a multi-use trail along the railroad tracks to accommodate bicyclists, golf carts and other users. This would require long-term negotiations with the Aberdeen Carolina and Western railroad to implement but would be a more suitable option for demand along the route. An overpass or at-grade intersection would have to be constructed at NC 5.

**Influences**

- Pinehurst Resort
- Village Center
- Pinewild
- Through recreational bicyclists
- Golf cart users

**Length:** 2.0 miles

**Quality of Service:**
Existing: C (3.14)
As Proposed: A (1.64)*
** If bike lane/shoulder.*

**Traffic Volume (2013)**
3,600 west of NC 5

completestreets

**Rural Avenue**

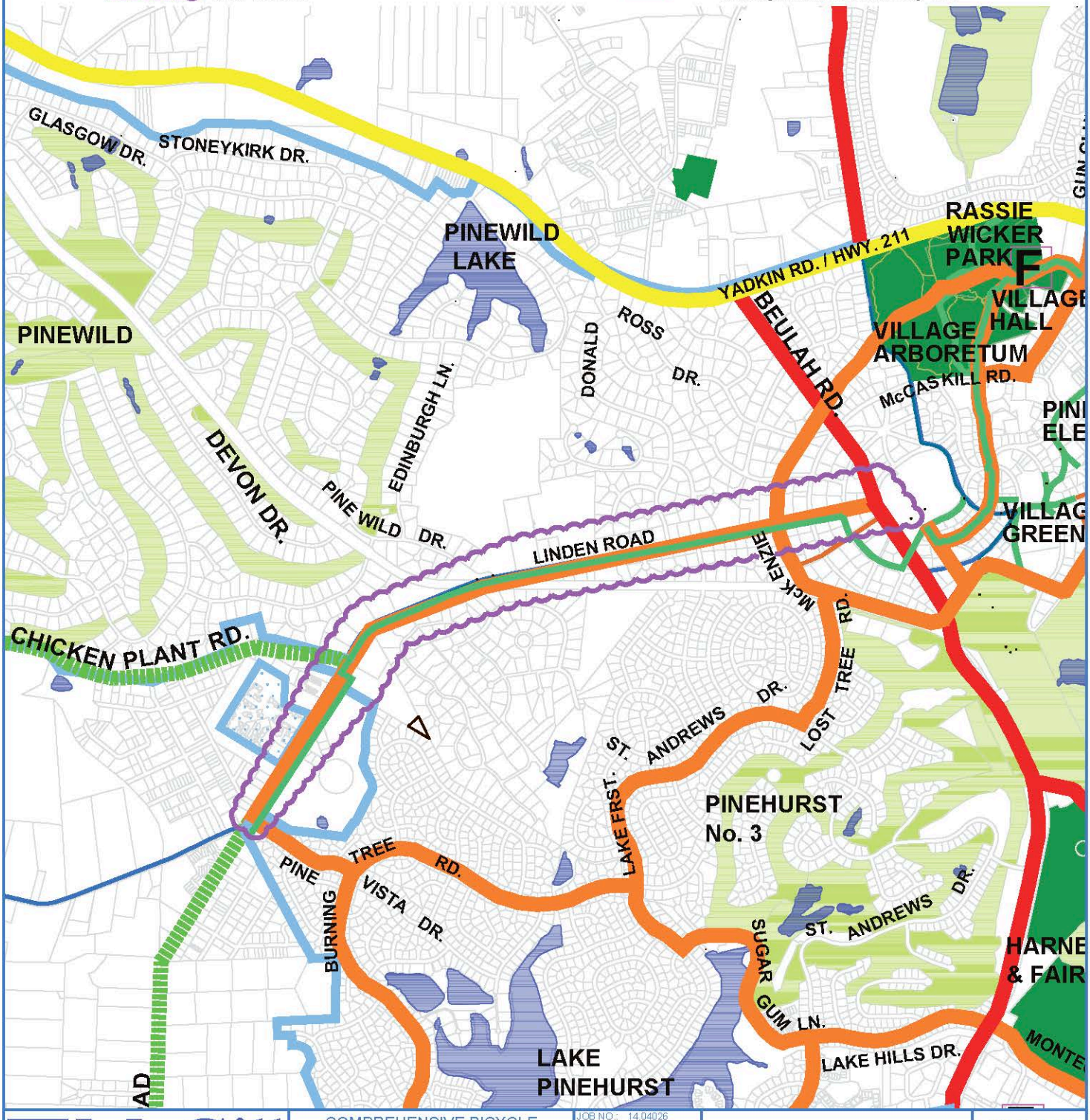
*See attached Map 7.3.6.*

PLAN

2000 0 1000 2000 4000

GRAPHIC SCALE 1 INCH = 2000 FEET

- Proposed Bikeable Shoulder
- Proposed Bike Paved Side Paths
- Proposed Bike Shared Lane Markings
- Proposed Greenway
- Map Corridor
- Moore County Potential Greenway Corridor
- Village of Pinehurst Limits
- Moore County Bike Touring Route
- Southern Pines Proposed Greenway
- Existing Southern Pines Greenway Trail
- Existing Pinehurst Greenway Trail

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VILLAGE OF PINEHURST

PINEHURST, NORTH CAROLINA

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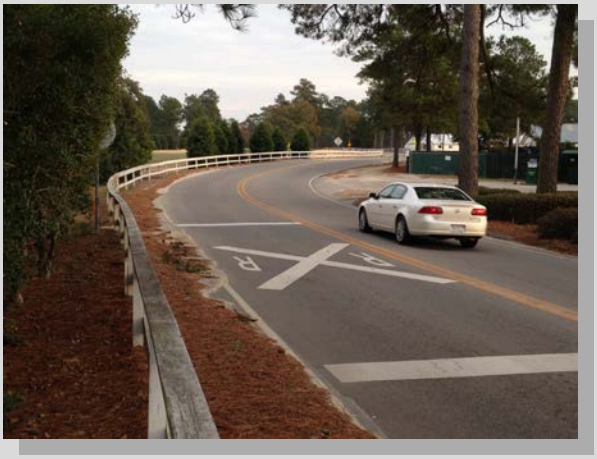
LINDEN ROAD
FROM PINE VISTA DRIVE
TO HWY. 5

SHEET
7.3.6

# Morganton Road (SR 1205), from Highway 5 to US 15/501

## Context

Morganton Road is a primary east-west route connecting Pinehurst to Southern Pines as well as various neighborhoods that access the route. The route has some constraints in the area where it bisects Pinehurst Resort but some opportunities may exist for bike lanes or shoulders if sidewalks (recommended in the Pedestrian Plan) are constructed on one side. It would link these areas to shopping areas along US 15/501 and planned sections of the Southern Pines greenway.



## Long-Term Recommendations

Construct bike lanes or bikeable shoulders along Morganton Road. Based on prevailing road conditions these should be 5-foot wide lanes (may be reduced in resort area to 4-foot to account for constraints).

**Cost Estimate[1]: $625,000**

**Length:** 2.2 miles

**Quality of Service:**
Existing: D (3.81)
As Proposed: A (2.31)

**Traffic Volume (2013)**
9,000 east of NC 5
15,000 west of 15/501

## Influences

- Pinehurst Resort
- Area neighborhoods
- Shopping areas along US 15/501
- Existing/planned greenways

**Rural Avenue or Rural Boulevard**

*See attached Map 7.3.7. Note that the map shows interconnectivity with a proposed Southern Pines greenway on Morganton Road.*

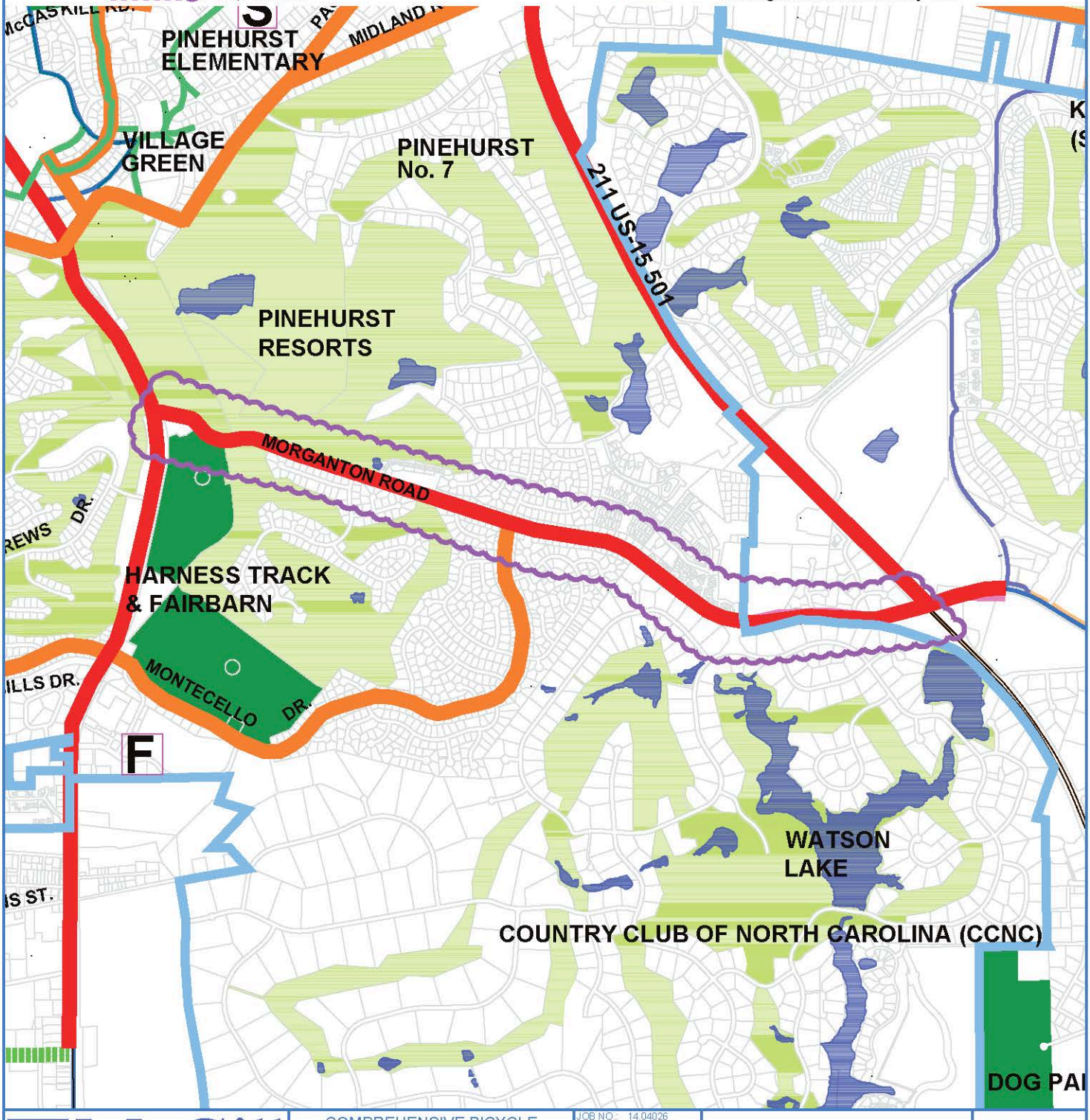
[1] Cost estimates provided are preliminary opinions of probable cost and may vary significantly. We cannot and do not guarantee that bids will not vary from the estimates.

PLAN

2000 0 1000 2000 4000

GRAPHIC SCALE 1 INCH = 2000 FEET

- Proposed Bikeable Shoulder
- Proposed Bike Paved Side Paths
- Proposed Bike Shared Lane Markings
- Proposed Greenway
- Map Corridor
- Moore County Potential Greenway Corridor
- Village of Pinehurst Limits
- Moore County Bike Touring Route
- Southern Pines Proposed Greenway
- Existing Southern Pines Greenway Trail
- Existing Pinehurst Greenway Trail

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COMPREHENSIVE BICYCLE PLAN 2015

VILLAGE OF PINEHURST

PINEHURST, NORTH CAROLINA

JOB NO.: 14.04026
DATE: MARCH, 2015
DESIGNED BY: MSA
CADD BY: WW
DESIGN REVIEW: ___
CONST. REVIEW: ___
14.04026 bike ped plan.dwg

MORGANTON ROAD
FROM HWY. 5 TO HWY. 15/501

SHEET
7.3.7

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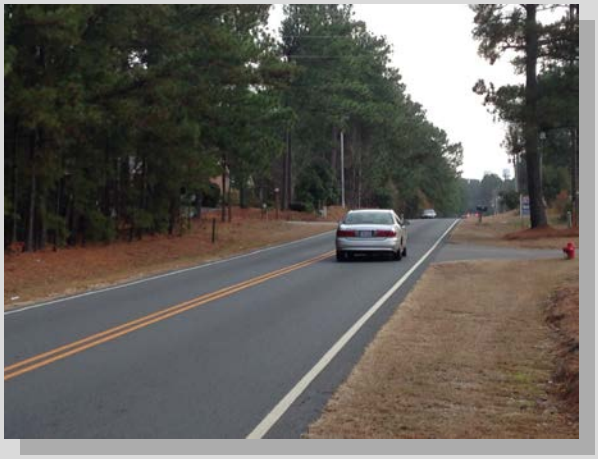
# Murdocksville Road (SR 1209), from Highway 211 to Juniper Lake Road

## Context

Murdocksville Road is a secondary north-south route that links Pinehurst to recreational bicycle routes in Moore County. Route upgrades could be considered as part of future resurfacing projects but the route likely remains a low priority route when compared to others in and near Pinehurst.



## Recommendations

Work with NCDOT on a future resurfacing project to add bikeable shoulders or bike lanes along the route (5-foot preferred)

**Cost Estimate[1]: $375,000**

**Length:** 1.5 miles

**Quality of Service:**
Existing: C (3.43)
As Proposed: A (0.50)

**Traffic Volume (2012)**
4,200

## Influences

- Pinehurst Resort
- Village Center
- Historic neighborhoods
- Through recreational bicyclists

**Rural Road**

*See attached Map 7.3.8.*

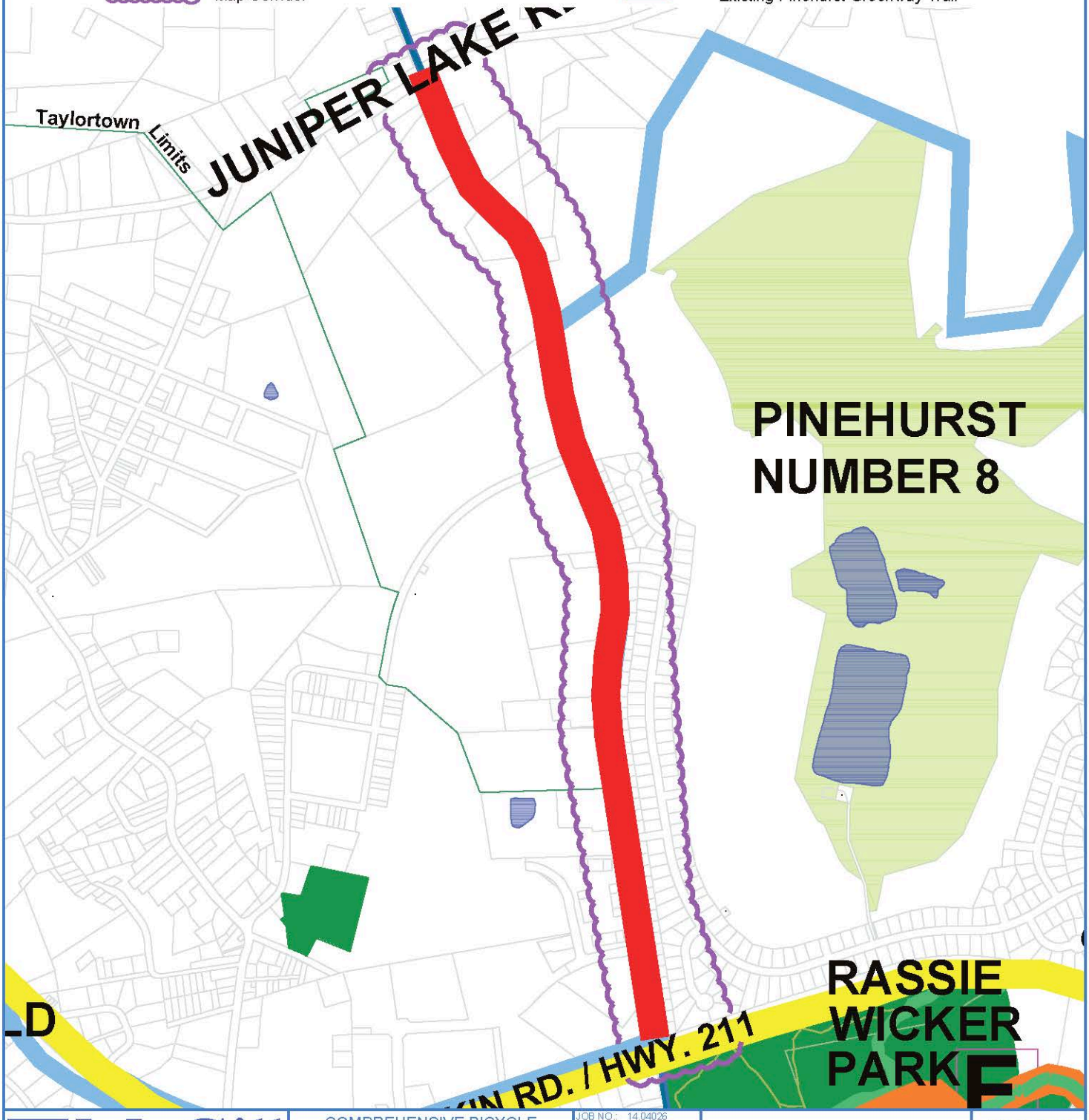
[1] Cost estimates provided are preliminary opinions of probable cost and may vary significantly. We cannot and do not guarantee that bids will not vary from the estimates.

PLAN

1000 0 500 1000 2000

GRAPHIC SCALE 1 INCH = 1000 FEET

- Proposed Bikeable Shoulder
- Proposed Bike Paved Side Paths
- Proposed Bike Shared Lane Markings
- Proposed Greenway
- Map Corridor
- Moore County Potential Greenway Corridor
- Village of Pinehurst Limits
- Moore County Bike Touring Route
- Southern Pines Proposed Greenway
- Existing Southern Pines Greenway Trail
- Existing Pinehurst Greenway Trail

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14.04026 bike ped plan.dwg

MURDOCKSVILLE ROAD FROM HWY. 211 TO JUNIPER LAKE ROAD

SHEET 7.3.8

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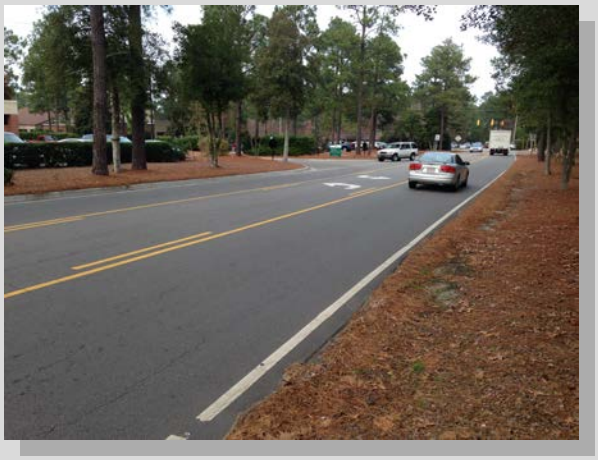
# Page Road (SR 1208), from NC 2 to US 15/501

## Context

Page Road provides an important connection between NC 211 and US 15/501. Historically a cut-through for motorists, the route could be conducive to bicyclists avoiding the Circle area. Greenway linkages are planned or already exist nearby.



## Long-Term Recommendations

Construct bike lanes (5-foot) along the route between Memorial Drive and US 15/501 with connections to nearby greenways (existing or planned). Install shared lane markings from NC 211 to Memorial Drive. These improvements should be considered along with or after other nearby greenways or sidepaths are constructed and special attention should be given to intersection improvements at existing signals.

**Cost Estimate[1]: $100,000**

**Length:** 0.5 miles

**Quality of Service:**
Existing: C (3.13)
As Proposed: A (1.97)

**Traffic Volume (2011)**
5,900

## Influences

- Shopping areas along NC 211
- FirstHealth Moore Regional Hospital
- Village Center connections
- Existing/planned greenways
- Through recreational bicyclists

**Rural Avenue**

*See attached Map 7.3.9.*

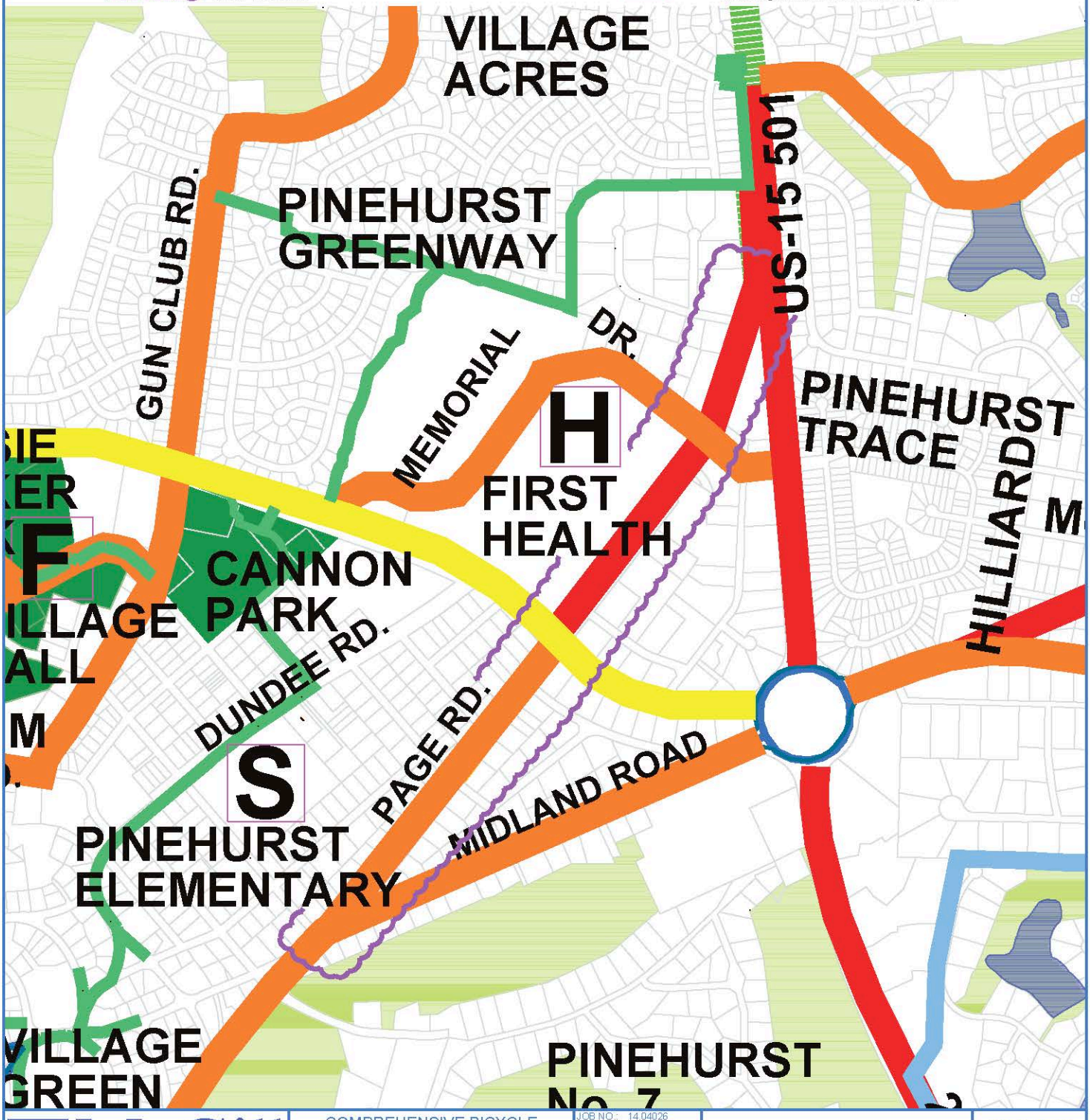
[1] Cost estimates provided are preliminary opinions of probable cost and may vary significantly. We cannot and do not guarantee that bids will not vary from the estimates.

PLAN

1000 0 500 1000 2000

GRAPHIC SCALE 1 INCH = 1000 FEET

- Proposed Bikeable Shoulder
- Proposed Bike Paved Side Paths
- Proposed Bike Shared Lane Markings
- Proposed Greenway
- Map Corridor
- Moore County Potential Greenway Corridor
- Village of Pinehurst Limits
- Moore County Bike Touring Route
- Southern Pines Proposed Greenway
- Existing Southern Pines Greenway Trail
- Existing Pinehurst Greenway Trail

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DATE: MARCH, 2015
DESIGNED BY: MSA
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DESIGN REVIEW: ___
CONST. REVIEW: ___
14.04026 bike ped plan.dwg

PAGE ROAD
FROM NC 2 TO HWY. 15/501

SHEET
7.3.9

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## 7.4 ADDITIONAL GREENWAY PROJECTS

As noted previously, this Comprehensive Bicycle Plan was prepared in conjunction with a Pedestrian Plan for the Village of Pinehurst. The corresponding Pedestrian Plan includes recommendations of several greenway extension projects that are also included as part of this Bicycle Plan, since bicycling is currently a permitted use on the Pinehurst Greenway system. New greenway extensions are recommended in the following areas:

- West side of US 15/501 from Forest Drive to Juniper Lake Road
  *(Previously shown on Map 7.3.1)*

  Total Length: 4,600 LF
  Estimated Cost[1]: $600,000

- Chicken Plant Road from Linden Road to West Pinehurst Community Park

  Total Length: 7,000 LF
  Estimated Cost[1]: $900,000

- Linden Road from Pine Vista Road to NC 5

  Total Length: 19,800 LF
  Estimated Cost[1]: $2.56 million

*The proposed greenway routes on Chicken Plant Road and Linden Road are depicted on Maps 7.4.1 and 7.4.2.*

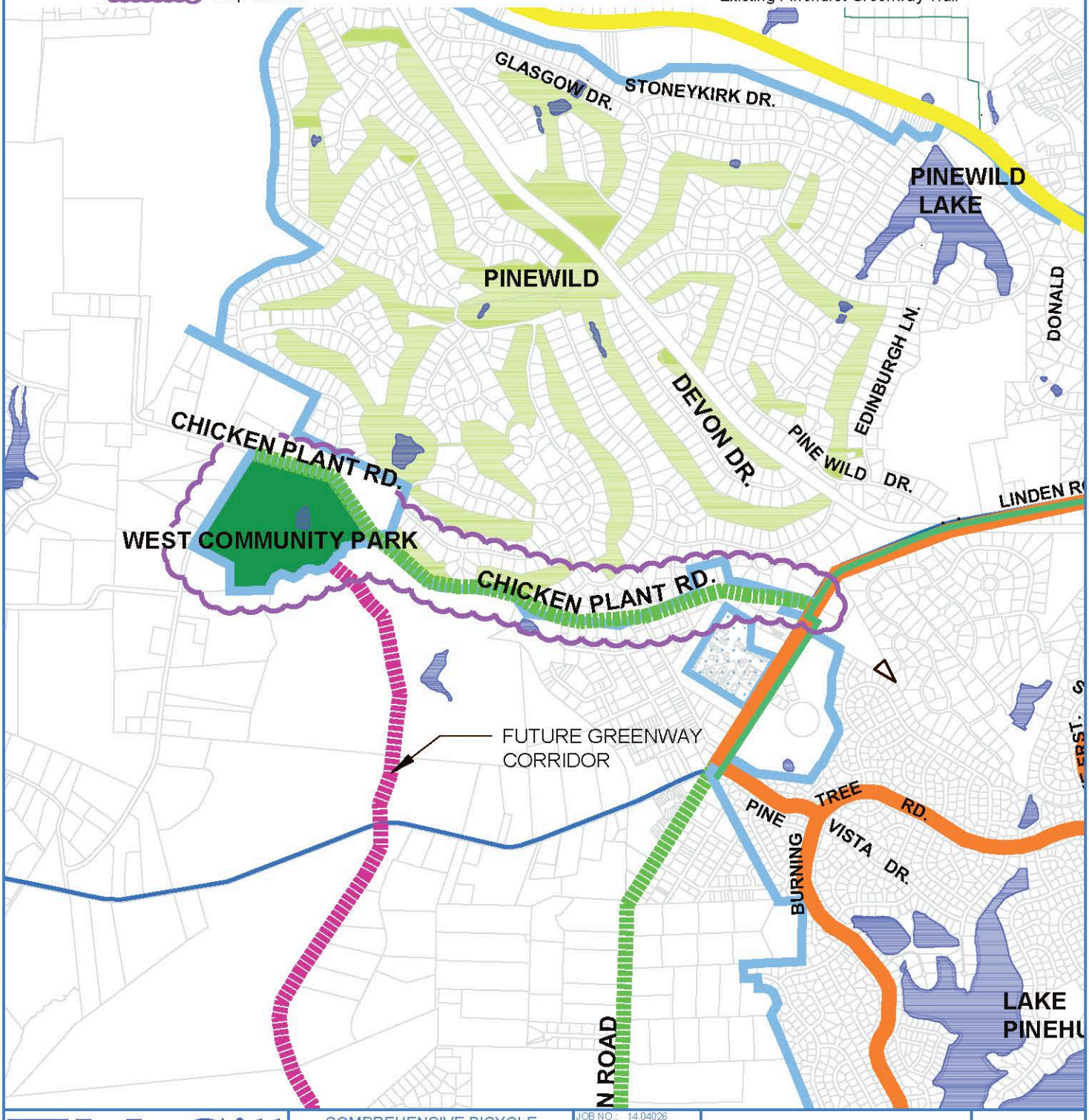
[1] Cost estimates provided are preliminary opinions of probable cost and may vary significantly. We cannot and do not guarantee that bids will not vary from the estimates.

PLAN

2000 0 1000 2000 4000

GRAPHIC SCALE 1 INCH = 2000 FEET

- Proposed Bikeable Shoulder
- Proposed Bike Paved Side Paths
- Proposed Bike Shared Lane Markings
- Proposed Greenway
- Map Corridor
- Moore County Potential Greenway Corridor
- Village of Pinehurst Limits
- Moore County Bike Touring Route
- Southern Pines Proposed Greenway
- Existing Southern Pines Greenway Trail
- Existing Pinehurst Greenway Trail

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CHICKEN PLANT ROAD GREENWAY

SHEET 7.4.1

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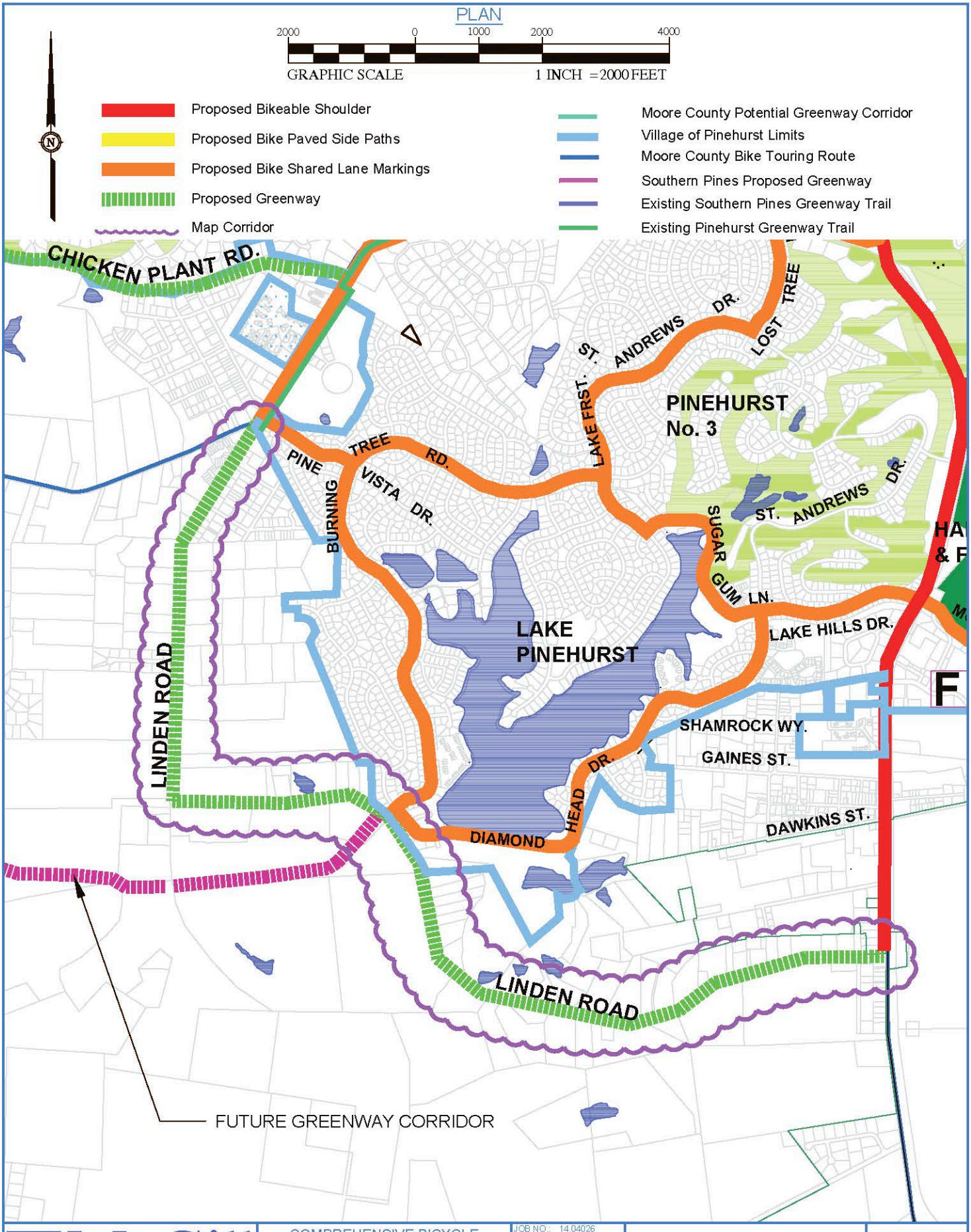


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LINDEN ROAD GREENWAY

SHEET 7.4.2

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## 7.5 THE "TRAFFIC CIRCLE"

The "Traffic Circle" at US 15/501, NC 211 and NC 2 has been a focus of many transportation debates over the past several decades. NCDOT continues to evaluate the Traffic Circle and connecting links to consider how to improve vehicular traffic flow in and around the traffic rotary.

As confusing and frustrating as the Traffic Circle is for motorists, it is equally as confusing and frustrating, combined with being unsafe, for people on foot or traveling by bike. Few places are challenged with such a traffic rotary in the United States which is why an immediate and obvious solution has not been implemented.

The European methods for navigating active transportation modes around or through such rotaries consist of either bypassing them altogether via overpasses and underpasses (a very costly option that physically separates the modes) or placing multi-use pathways around the periphery of them (a less costly option that still requires pedestrians and bicyclists to utilize at-grade crosswalks).

The low-cost option that has some potential is the routing of a multi-use trail around the periphery of the Traffic Circle with crosswalks placed far enough back from the entry points to the circle so that motorists do not have to simultaneously process how to enter the Traffic Circle while also watching out for pedestrians and bicyclists.

A conceptual routing of this pathway is shown on the following page and is meant as a starting point for future discussions regarding how to accommodate pedestrians and bicyclists. The BLUE lines illustrate a potential pathway network and the yellow arrows denote bike route recommendations contained in this plan.

On some legs there is the potential to move the crosswalks back to the nearest signal. This may not be much of an inconvenience for bicyclists but can represent a timely out-of-direction travel route for pedestrians. At minimum, the crosswalks could be set back at least 175 feet from the entry to the circle at a point that minimizes the cross distance and maximizes visibility. The distance from the Traffic Circle entry to end of the taper of the vehicular entry/exit lane is between 175 and 200 feet in its existing configuration.

Z-crossings that force pedestrians and bicyclists to "face" motorists while in the crosswalks are also recommended given the complexities in navigating the area (see Figure 7-6). A vertical barrier such as shrubbery or fencing should be constructed along the periphery of the Traffic Circle and on walk/bike route leading up to crosswalks. This discourages pedestrians and bicyclist to "cut" corners on the circle or attempt to cross into the center.

Future improvements could include at-grade crossings on secondary legs of the Traffic Circle with underpasses or overpasses along higher volume legs.

**Figure 7-5: Conceptual circumferential pathway route around the "Traffic Circle"**

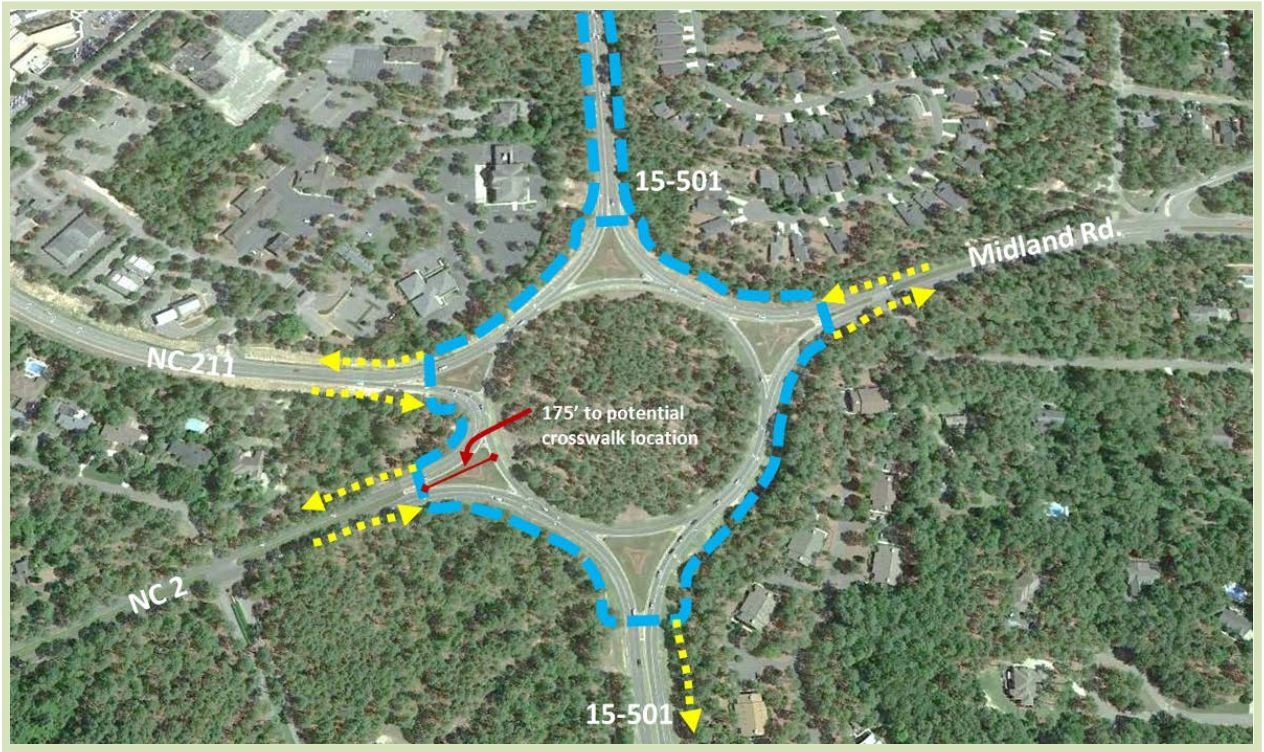



**Figure 7-6: Example of a z-crossing at a roundabout crosswalk in Hilton Head, South Carolina**


**- END OF SECTION -**

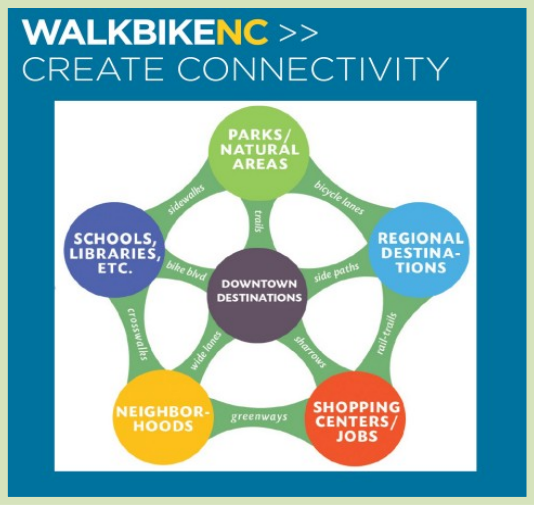
# SECTION EIGHT: IMPLEMENTATION AND EVALUATION

## 8.1 OVERVIEW

Completion of the Pinehurst Comprehensive Bicycle Plan is only one step in creating a bicycle-friendly community. The implementation of this Plan will require a coordinated effort amongst Village officials, leaders, and citizen volunteers as well as follow-up plans and studies on more specific improvements. This chapter provides a series of actions and steps for moving forward with the recommendations of the Plan, as well as potential funding sources and partners for proposed projects.

The implementation strategies of the Bicycle Plan are closely aligned with areas the State of North Carolina identified for Bicycle and Pedestrian Safety Strategies through a series of summits in 2011 and reflected in the statewide *WalkBikeNC* plan. The major action initiatives identified through those summits to help guide NCDOT and other state agencies through the next decade were:

- Fully implement Complete Streets
- Address multi-modal funding
- Retrofit existing facilities
- Require more from all road users
- Increase public awareness through education
- Connect transportation and land use
- Improve law and strengthen enforcement




*Source: http://walk21vienna.com*

Each of these themes is addressed within the Pinehurst Comprehensive Bicycle Plan. This can help stakeholders articulate to local, regional and state leaders that the implementation of this Plan is consistent with what has been identified at the State level.

## 8.2 ACTION STEPS FOR IMPLEMENTATION

Completing the action steps listed below helps guide development of the proposed bicycling network and creates a supportive program and policy environment for a more bicycle-friendly Pinehurst. These steps will be crucial in moving forward with the overall recommendations of the Comprehensive Bicycle Plan.

### 1. Adopt the Plan

This is the first stage of implementation**.** The Plan should be forwarded to regional and state decision-makers, such as the Triangle J Council of Governments (COG) and NCDOT Division office, for inclusion in other regional planning and development processes. Neighboring communities such as Southern Pines and Aberdeen should also receive a copy for consideration when their local plans are updated.

- Partners: Village of Pinehurst, Moore County, NCDOT and Triangle J COG

### 2. Identify Resurfacing Projects for Potential Shoulder Widening

NCDOT and Village of Pinehurst resurfacing projects offer an opportunity to add bikeable shoulders to corridors identified in the plan. Pinehurst should communicate regularly with NCDOT Division staff to determine when routes will be subject to resurfacing. Pinehurst may be required to contribute funding as a partner to these projects based on state policy limitations.

- Partners: Village of Pinehurst, NCDOT and Triangle J COG

### 3. Continue to Emphasize Complete Streets

Now that Pinehurst has a current Comprehensive Bicycle Plan and Comprehensive Pedestrian Plan, the community can work toward incorporating the themes of these plans into other plans and policy updates. The continuing efforts to enhance and preserve the Historic District offer an opportunity to restore Pinehurst to its roots where walking and bicycling were an important mode for the area.

- Partners: Village of Pinehurst, Historic Preservation Commission, Sandhills Cycling Club and Pinehurst Resorts

### 4. Develop Supportive Education and Enforcement Programs

*Source: http://ncdot.gov*


Bicycle facilities alone will not lead to a bicycle-friendly community. A variety of program recommendations are highlighted in this plan to promote a bicycling culture. Ideally, programs and policy priorities should be implemented alongside infrastructure improvements, but the community should recognize that programs such as installing signage or wayfinding can occur several years before major infrastructure improvements are made.

- Partners: Village of Pinehurst, Pinehurst Police Department, Moore County Health Department, Pinehurst Elementary School, FirstHealth Moore Regional Hospital and Sandhills Cycling Club

### 5. Establish an Annual Budget for Plan Implementation

With completed plans in place, Pinehurst can consider establishing an annual budget allocation for bicycling and walking improvements. While capital projects tend to garner the most attention from resources and public input perspective, other efforts such as signage, shared lane markings and promotional items are also important. The Village can start small and work these improvements into the budget over time as resources allow.

- Partners: Village of Pinehurst

### 6. Measure Performance

This chapter identifies methods by which the Village of Pinehurst, Sandhills Cycling Club and others can track the performance in implementation of the Plan, which can help justify funding pursuits and strengthen the ability of the community to gain funding from various sources. These efforts include regular surveys, counting users along popular bicycling routes and greenways and, participation in Safe Routes to School events.

- Partners: Village of Pinehurst, Pinehurst Elementary School, FirstHealth Moore Regional Hospital and Sandhills Cycling Club

### 7. Complete the Bicycle Friendly Community Application

*http://www.coronado.ca.us/eGov*

In the year following adoption of the Plan, the community should complete and submit a Bicycle Friendly Community application to the League of American Bicyclists. The application requires input from a variety of data sources, many of which are included in this Plan. Even if the community does not receive official status on its first attempt, the feedback from the League and potential for Honorable Mention status can inspire local leaders to implement other Plan recommendations. The League will reach out to local members to provide input and the Sandhills Cycling Club could help the community complete the application.

- Partners: Village of Pinehurst and Sandhills Cycling Club

## 8.3 PRIORITY PROJECTS

The ranking of the major infrastructure-based projects in the Pinehurst Comprehensive Bicycle Plan is meant to be a list that guides where the Village could invest in independent projects. Recommendations such as shared lane markings are not evaluated as they are considered more programmatic and require only signage and pavement markings.

The challenge in creating a prioritized list for bicycling projects is the limited direct influence the Village has on state highways. With sidewalks and greenways, the Village is free to pursue improvements outside the roadway configuration. On-street bicycling facilities, however, require the addition of pavement and sometimes right-of-way to the existing roads. The on-street capital projects in Pinehurst are all located on streets and highways managed by NCDOT.

A multi-criteria evaluation method was developed to evaluate the recommended projects in the plan. The goal of this method was to order the projects so that Pinehurst could determine where best to place its resources and pursue project partnerships with NCDOT. The criteria listed below reflect those criteria applied throughout the planning process to identify projects. Each category has a maximum number of points that can be assigned. These scores are then combined to get a project score.

| Maximum Points per Category | EVALUATION CRITERIA FOR CATEGORIES |
|---|---|
| 20 | **Safety:** Combination of traffic volumes and speed to account for potential exposure. High volumes and high speeds receive most points. |
| 15 | **Level of Service improvement:** Improvement in level of service over existing conditions. Project with greatest improvement receive most points. |
| 10 | **Links to Greenways:** Provides a link to existing and planned greenways. Linkages to the existing, most bikeable greenways receive the most points. Links to planned greenways receive fewer points. |
| 10 | **Proximity to Parks:** Located within a ¼-mile, ½-mile or 1-mile bicycling radius to existing public parks. Project within shortest distance receive the most points. |
| 10 | **Proximity to Schools:** Located within a ¼-mile, ½-mile or 1-mile bicycling radius to existing public parks. Project within shortest distance receive the most points. |
| 10 | **Proximity to Village Center & Other Community Gathering places:** Located within a ¼-mile, ½-mile or 1-mile bicycling radius to existing public parks. Project within shortest distance receive the most points. |
| 10 | **Ease of Implementation:** Based on existing right-of-way and likelihood or ease of improvement. |
| 10 | **Likely Health Impact:** Based on feedback from health workshop on areas in most need of improvement or routes that provide linkages to several health-related destinations. |
| 5 | **Partnership Potential:** Based on opportunities to partner with stakeholders other than the Village to address implementation. |
| 100 | **Potential Total Points per Project** |

The project profiles contained in the detailed "Major Route Recommendations" section of Chapter 7 of the Pinehurst Comprehensive Bicycle Plan are ranked through this process and are shown in Figure 8-1 below. In general, those projects that provided for separation from vehicle traffic and high vehicular speeds along with providing a key linkage to parks, Pinehurst Elementary School and the Village Center ranked high in this process.

**FIGURE 8-1: Pinehurst Projects Priority Ranking**

| Project Ranking | *PINEHURST PROJECTS PRIORITY RANKING* | Total Points | Safety | Level of Service Improvement | Links to Greenways | Proximity to Parks | Proximity to Schools | Proximity to Village Ctr & Other | Ease of Implementation | Likely Health Impact | Partnership Potential |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Maximum Points** | **100** | **20** | **15** | **10** | **10** | **10** | **10** | **10** | **10** | **5** |
| | **Project Name** | | | | | | | | | | |
| 1 | NC 211 from Traffic Circle to Pinewild ** | **88** | 20 | 15 | 10 | 10 | 5 | 3 | 10 | 10 | 5 |
| 2 | US Highway 15/501 from Forest Drive to Voit Gilmore Lane | **76** | 20 | 15 | 5 | 5 | 10 | 3 | 3 | 10 | 5 |
| 3 | US 15/501 from Forest Drive to Juniper Lake Road * | **75** | 20 | 15 | 10 | 5 | 0 | 3 | 7 | 10 | 5 |
| 4 | NC Highway 2 from NC 5 to Station Avenue | **65** | 10 | 10 | 7 | 3 | 10 | 10 | 3 | 7 | 5 |
| 5 | NC Highway 5 from Holly Pines to NC 211 | **62** | 15 | 10 | 7 | 5 | 0 | 10 | 5 | 7 | 3 |
| 6 | Morganton Road from NC 5 to US 15/501 | **57** | 20 | 15 | 3 | 0 | 7 | 3 | 3 | 5 | 1 |
| 7 | Page Road from NC 2 to US 15/501 | **53** | 10 | 5 | 10 | 3 | 5 | 5 | 7 | 5 | 3 |
| 8 | Airport Road from NC 2 to Gaeta Drive | **49** | 15 | 10 | 10 | 0 | 0 | 3 | 3 | 5 | 3 |
| 9 | Linden Road from Pine Vista Drive to NC 5 (greenway or bike lanes) * | **34** | 15 | 5 | 5 | 0 | 0 | 5 | 0 | 3 | 1 |
| 10 | Murdocksville Road from NC 211 to Juniper Lake Road | **32** | 5 | 15 | 0 | 3 | 0 | 0 | 5 | 3 | 1 |
| 10 | Chicken Plant Rd from Linden Rd to West Pinehurst Community Park * | **32** | 5 | 10 | 10 | 0 | 0 | 0 | 3 | 3 | 1 |

**** Denotes a greenway project***

***** Denotes a sidepath project***

## What this ranking means

Having a prioritized list of projects helps Pinehurst and its partners determine which improvements to pursue immediately for funding. No ranking method is perfect as there is no way to account for all the factors that lead to implementation in an orderly manner. For on-street bicycling projects, the ranking method is more complex as it may turn out

that NCDOT is resurfacing a street where there is a low-ranking project. In instances like this, it would be foolish to miss an opportunity to implement a project from the plan simply because it does not rank as high as a project that might take another 10 years to complete.

Pinehurst should proceed with discussing these priorities during its budget cycle, with the NCDOT Division office and the COG, to determine the best course of action and funding sources to consider for implementation.

## 8.4 EVALUATION

Transportation-based projects, programs and policies are some of the most measurable aspects of the built environment in that an organization or municipality can track the progress of investments and policy changes. Given the economic uncertainty in many communities and within funding sources, non-profits, cities, MPOs and DOTs are finding value in tracking the performance of a variety of actions. For communities like Pinehurst, methods of tracking the performance of projects, programs and policies can not only lead to easy material to include in a Bicycle Friendly Community application, but communities that show measurable progress in the implementation of their plans, can also find themselves in a more strategic position to receive funding from grants or other pursuits.

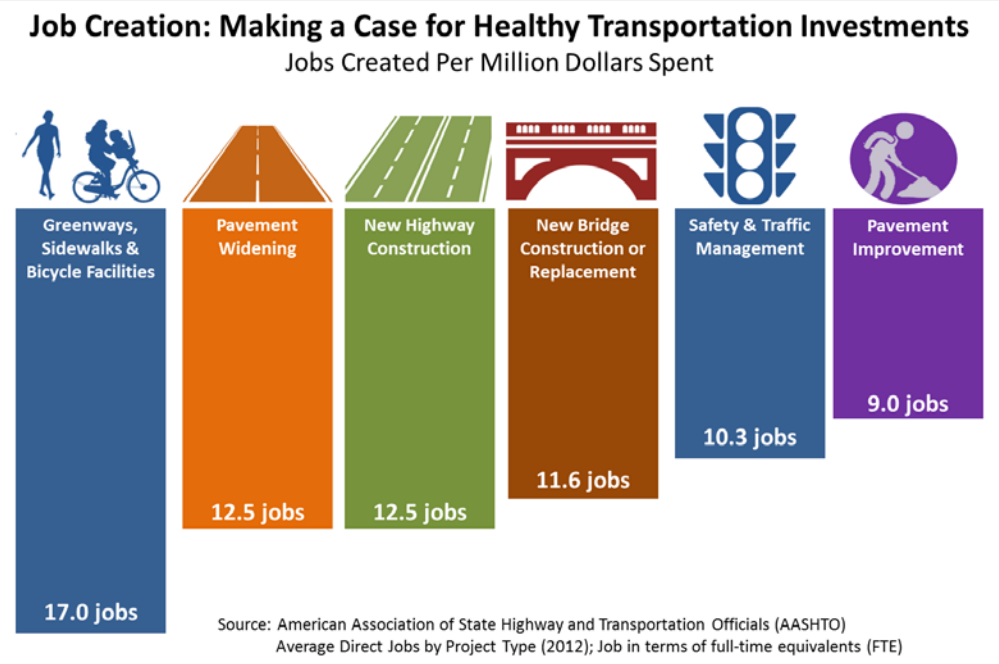
Performance should not be confused with prioritization, as performance is measured as a change over a period of time, not a ranking of strategies. Performance for bicycling and related endeavors can fall into many categories, each of which is in turn measured by some criterion.

The table below depicts several performance areas that Pinehurst and its partners could consider to measure and document performance of itself, NCDOT's investments in the Village, and outreach efforts.

| PERFORMANCE MEASURE | FREQUENCY (EVERY 1 OR 2 YEARS) |
|---|---|
| **Percentage of Bicycle Facilities Addressed from Plan** | 2 |
| **Miles of Designated Routes, Shoulders/Lane, Greenways** | 2 |
| **Number of Bicycle Racks** | 2 |
| **Signage Added along Routes** | 2 |
| **Participants in Bike to Work and Bike to School Rides** | 1 |
| **Participants in Themed Rides** | 1 |
| **Number of Bicycle Route Maps Distributed** | 1 |
| **Number of Crashes (by level / total)** | 2 |
| **Bicycle Counts** | 1 to 2 |
| **Funding allocated to bicycle-related projects and programs** | 1 |

## 8.5 FUNDING

Facilities for people who bike are constructed – and therefore funded – through a number of avenues and there are even more funding sources to pursue for programmatic implementation measures. Funding is generally divided into five categories of sources: local, state, federal, non-profit and private funding. The following section describes some of the more prominent sources in each category that Pinehurst could tap for implementation of this plan. As shown in the illustration below, there is a strong economic/job creation argument to be made.




### Local Funding

Pinehurst can establish an annual budget line item specifically for bicycling and walking improvements. A specific budget item is the most direct way to ensure that funding for such facilities is available, but sometimes a municipality's budget may be too limited to finance this work. Bicycling facilities can also be built through "incidental" with any new projects or improvements, such as parks and recreation facilities, libraries, schools, and new roads. In addition, future private development should be reviewed for adequate bicycling access, connections and parking.

Municipalities often plan for the funding of bicycling and greenway facilities or improvements through development of Capital Improvement Programs (CIP). Typical capital funding mechanisms include the following: capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds.

This section highlights common sources of funding; however, these are in a constant state of flux due to transportation funding discussions occurring at the state and federal levels. Triangle J COG and NCDOT are able to provide the latest information on these funding options.

**State and Federal Funding**

NCDOT is restricted from expending state funds on standalone bicycling projects, even when those projects or upgrades are essential along state-managed roads. This limitation makes it difficult for implementation of North Carolina's Complete Streets policy to occur without local contributions. Bicycling-related upgrades may occur along state-maintained roads when major investments are made, such as highway or intersection widening.

It is important to track changes or adjustments in these programs through the COG as funding allocations and programs are in flux on a regular basis and partially driven by the status of the Federal government's transportation funding acts that are intended to be updated on a semi-regular basis.

**Transportation Alternative Program (TAP)**

North Carolina receives an annual allocation of TAP funds from the federal government. Bicycling and greenway improvements are eligible expenses under this program. Due to state restrictions, the full 20% match required on these funds must be borne by the municipality. Pinehurst should work through the COG and with other regional municipalities to develop strategies to help the state utilize these funds.

**Powell Bill Funds**

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. New sidewalks or replacement of existing sidewalks are an eligible expense for these funds.

**Recreational Trails Program**

The Recreational Trails Program (RTP) is a grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. This program's intent is to meet the trail and trail-related recreational needs identified by the Statewide Comprehensive Outdoor Recreation Plan.

## North Carolina Parks and Recreation Trust Fund (PARTF)

The fund was established in 1994 by the North Carolina General Assembly and is administered by the Parks and Recreation Authority. Through this program, several million dollars each year are available to local governments to fund the acquisition, development and renovation of recreational areas. PARTF funds are allocated through the North Carolina Trails Program to help fund beach accesses, state trail systems, and local trail construction efforts. The projects in this plan that create connections to parks are a good match for PARTF funds.

## Non-Profit / Private Funding

Another method of funding sidewalks and greenways is to partner with public agencies, private companies, local hospitals or hospital foundations, and/or not-for-profit organizations. Most private funding sources offer limited grants and public-private partnerships engender a spirit of cooperation, civic pride and community participation.

The key to the involvement of non-profit and private partners is to make a compelling argument for their participation. Major employers and developers could be identified and provided with a "Benefits of Walking, Bicycling and Greenways" handout for themselves and their employees. Very specific routes that make critical connections to place of business would be targeted for private partners' monetary support following a successful master planning effort.

Potential partners include major employers which are located along or accessible to sidewalks, bicycle routes or greenways. Name recognition for corporate partnerships could be accomplished through trailhead signage or interpretive signage along greenway systems. Utilities often make good partners and many trails now share corridors with them. Money raised from providing an easement to utilities can help defray the costs of maintenance. It is important to have legal counsel review the agreement and verify ownership of the subsurface, surface or air rights in order to enter into an agreement.

## Volunteer Work

It is expected that many citizens will be excited about the continued development of Pinehurst's greenway system and this is already evident in the energy level of those involved with this Plan. Individual volunteers from the community can be brought together with groups of volunteers form church groups, civic groups, scout troops and environmental groups to work on route and greenway development on special community work days. Volunteers can also be used for fund-raising, maintenance, and programming needs.

**- END OF SECTION –**

# APPENDICES

# APPENDIX A

# BIKE AND PEDESTRIAN SURVEY

# VILLAGE OF PINEHURST - BIKE AND PEDESTRIAN SURVEY

The **Village of Pinehurst** is in the process of preparing Comprehensive Bicycle and Pedestrian Plans and would like your input! This survey is intended to obtain information on local bicycling and walking habits, conditions, and needs in order to help guide the plans, which will ultimately produce recommendations to improve bicycling and walkability across the Village. We also want to know why you do not ride a bicycle or walk more and what would entice you to do so. Please take a few minutes to complete the following survey, which will help determine priorities in our community. Please limit one survey completed per household. Instructions for returning a hard copy of the survey are provided at the end of the document, or you may complete this survey on-line at **www.vopnc.org**

**Are you a resident of the Village of Pinehurst?** o Yes o No

**If so, what neighborhood or area do you reside in?**

o Pinewild o Old Town/Clarendon Gardens/Donald Ross Drive Area o Lake Pinehurst Area
o Village Acres o Pinehurst No. 6 o Pinehurst No. 7/CCNC o Morganton Road/Monticello Road Area
o Midland Road/Airport Road Area (Pinehurst Trace/Pinedale/Midland CC) o Other_____

**If you are not a resident, where do you live?**_____

**List the number of persons in your household including yourself who are in the age brackets below:**

0-5___ 6-8___ 9-12___ 13-15___ 16-18___ 19-21___ 22-29___ 30-39___ 40-49___ 50-59___ 60+___

**Have you or a member of your family ridden a bicycle in the last six months?** o Yes o No

**If no, why not? (check all that apply)**

o Too busy, no time o Don't know how to ride a bike o Don't own a bicycle o Not interested
o No adequate facilities near me o No destinations close enough to ride to o It's not safe
o I'm unable o Other_____

**Would you ride your bike more if: (check all that apply)**

o You knew how to ride a bicycle
o You owned a bike
o You felt safer riding in traffic
o Motorists drove slower
o Street conditions were better (such as smooth pavement, less debris)
o There were more clearly-marked trails
o There were wider roads for riding
o There were more on-road facilities
o You felt motorists respected bicyclists
o Only if you couldn't drive
o Other:_____

**Please select how often you typically bike for the following trip purposes:**

| Daily | Regularly | Rarely | Never | |
|---|---|---|---|---|
| o | o | o | o | Leisure/fitness |
| o | o | o | o | Around your street or neighborhood |
| o | o | o | o | To or within local parks |
| o | o | o | o | To a Country Club |
| o | o | o | o | Shopping, errands, dining |
| o | o | o | o | Commuting to school |
| o | o | o | o | Worship, community events |
| o | o | o | o | On local Trails/Greenways |
| o | o | o | o | Commuting to work |
| o | o | o | o | Visiting friends |
| o | o | o | o | Library |
| o | o | o | o | To areas outside of Pinehurst |
| o | o | o | o | Other (Please specify) _____ |

**Please select how often you typically walk for the following trip purposes:**

| Daily | Regularly | Rarely | Never | |
|---|---|---|---|---|
| o | o | o | o | Leisure/fitness |
| o | o | o | o | Around your street or neighborhood |
| o | o | o | o | To or within local parks |
| o | o | o | o | To a Country Club |
| o | o | o | o | Shopping, errands, dining |
| o | o | o | o | Commuting to school |
| o | o | o | o | Worship, community events |
| o | o | o | o | On local Trails/Greenways |
| o | o | o | o | Commuting to work |
| o | o | o | o | Visiting friends |
| o | o | o | o | Library |
| o | o | o | o | To areas outside of Pinehurst |
| o | o | o | o | Other (Please specify) _____ |

**Have you or anyone in your family ever participated in the Walking School Bus program at Pinehurst Elementary School?** o Yes o No

**Do you think there are enough signalized pedestrian crosswalks in Pinehurst?**
o Yes o No o Don't Know

**Overall, how would you rate the condition of existing pedestrian crosswalks in the Village of Pinehurst?**
o Excellent o Good o Fair o Poor/not safe o Don't know

**Would you or your family members walk or bike to or within any of the previously listed destinations (schools, parks, greenways, etc.) if better and/or safer facilities were provided?** o Yes o No

**If so, which ones?**

_____

**What routes for alternative transportation (bike lanes, trails, etc. including both on and off road), if any, are most needed in the Village of Pinehurst? (Please list below or skip if you don't know)**

_____

**Are you or anyone in your household in favor of the restoration of the historic sand/clay paths within the Village?** o Yes o No o Don't Know

**Would you or anyone in your household support tax dollar funded expansion of Village**:
Sidewalks o Yes o No Greenway/trails o Yes o No Bike lanes o Yes o No

**Please list any physical barriers (gaps in sidewalks, lack of curb cut/ramp, utilities in path, etc.) that you feel may prevent the safe use of existing sidewalks or greenway trails within the Village of Pinehurst. If you don't know of any, leave blank.**_____

_____

**What do you feel has been the Village of Pinehurst's best investment in walking or bicycling facilities? If you don't know, leave blank.**_____

**Please list any additional comments you may have:**_____

_____

November 1, 2014, is the deadline for returning this survey by mail to the Village of Pinehurst, 395 Magnolia Road, Pinehurst, NC 28374; by FAX to (910) 295-1853; by hand delivery to – Village of Pinehurst **Parks and Recreation Department or by email to – parksandrec@vopnc.org.** Please check the Village website's Calendar of Events for dates of future community meetings.

# APPENDIX B

# PROPOSED BIKE LANES, SHARED LANE MARKINGS, AND ROADWAY SIDEPATHS

# Village of Pinehurst
# North Carolina

## 2015 Comprehensive Bicycle Plan

**Exhibit B**
**PROPOSED BIKE LANES,SHARED LANE MARKINGS, AND ROADWAY SIDEPATHS**

- Existing Park Facility
- Golf Course
- Existing Pond/Lake
- Existing Greenway Trail
- Existing State Bike Route
- Pinehurst Proposed Greenway Path
- Pinehurst Future Greenway Path
- Proposed Paved Roadway Sidepaths
- Proposed Shared Lane Markings
- Proposed Bike Lanes/Bikeable Shoulders
- Moore County Potential Greenway Corridor
- Moore County Bike Touring Route
- Southern Pines Proposed Greenway
- Existing Southern Pines Greenway Trail
- Village of Pinehurst
- Pinehurst ETJ
- S Existing School
- H Existing Hospital
- F Existing Fire Station

3,500 0 1,750 3,500 7,000
GRAPHIC SCALE 1 INCH = 3,500 FEET

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