

SEPTEMBER 2020  
*DRAFT*



TOWN OF  
CARRBORO  
UPDATED  
BIKE PLAN



## ACKNOWLEDGEMENTS

Thank you to the local residents, community leaders, and government staff that participated in the development of this Plan through meetings, workshops, events, comment forms, and plan review. Special thanks to those who participated as steering committee members, listed below.

### PROJECT STEERING COMMITTEE

The Steering Committee was made up of local residents, government staff, and community members.

- Colleen Barclay, Carrboro Bicycle Coalition
- Lisa Brown, Carrboro Northern Transition Area Advisory Committee
- Becki Cleveland, Carrboro Recreation and Parks Commission
- Chris Colvin, Carrboro Resident
- Ray Enoch, Carrboro Fire-Rescue Department
- Barbara M Foushee, Carrboro Board of Alderman
- Lyndsay Gavin, Environmental Advisory Board
- Rachel Gaylord-Miles, Carrboro Planning Board
- Tyler Gilmore, Orange Literacy - ESOL Program Coordinator
- Linda Haac, Carrboro Transportation Advisory Board
- Kevin Hicks, Triangle Bikeworks
- Charlie Hileman, Carrboro Resident
- Brent Hobby, Carrboro Police Department
- Barbara Jessie-Black, PTA Thrift Shop
- Rachel Kelley, Carrboro Resident
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- Dale McKeel, DCHC MPO
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- Galen Poythress, Carrboro Recreation and Parks Department
- Donnie Rhoads, Chapel Hill Police Department
- Steve Rogers, NCICL (North Carolina Interscholastic Cycling League)
- Tamara Sanders, Clean Machine Bike Shop
- Lee Schimmelfing, Orange County Resident
- Jon Scott, Carrboro Resident
- Daniel Snipes, Carrboro Public Works Department
- Kurt Stolka, UNC Chapel Hill Transportation and Parking
- John Vine-Hodge, NCDOT Division of Bicycle and Pedestrian Transportation
- Anahid Vrana, Carrboro Northern Transition Area Advisory Committee
- Josh D Worshofsky, Carrboro Resident
- Kathryn Zeringue, NCDOT Division of Bicycle and Pedestrian Transportation



Division of  
Bicycle &  
Pedestrian  
Transportation



**Prepared for the Town of Carrboro, North Carolina**

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Cover art adapted from the League of American Bicyclists' Bicycle Friendly Community Program

Prepared by Alta Planning + Design  
Adopted by the Town of Carrboro on \_\_\_\_\_.





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# 1 THE VISION



*Photo Credit: The Town of Chapel Hill*



## 2020 VISION STATEMENT:

*“Envisioning Carrboro as a place where biking is accessible, safe, and convenient for everyone between the ages of 8 to 80.”*

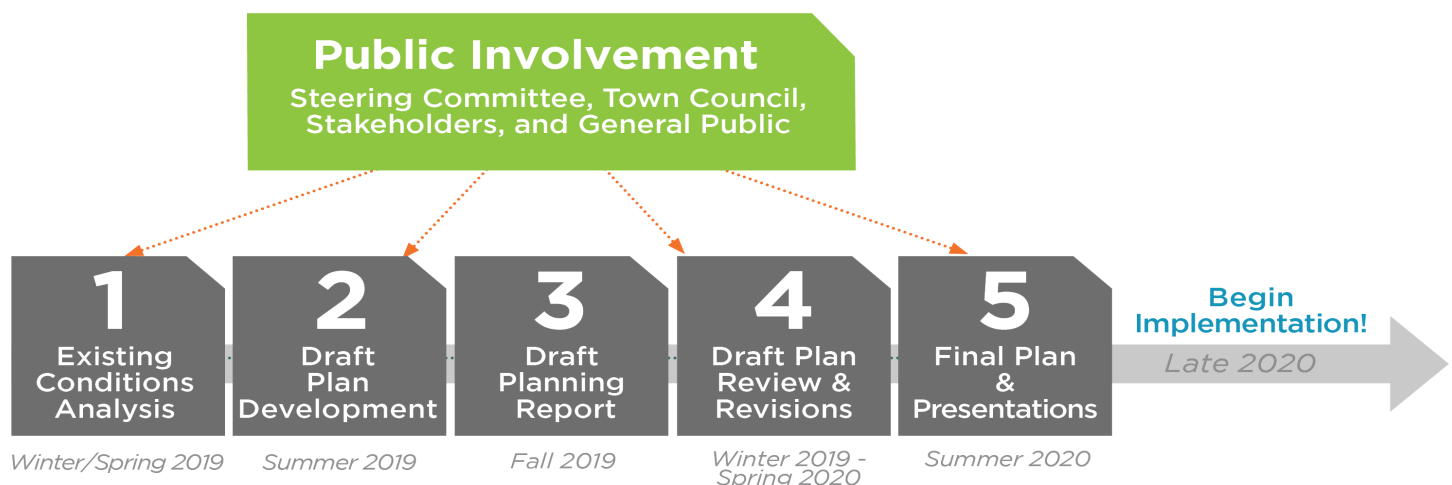
## PROJECT BACKGROUND

The Town of Carrboro is a bikeable community because of its long-standing commitment to biking as a safe and efficient form of transportation. The 2020 Carrboro Bicycle Plan is a new plan, based on the 2009 Bicycle Plan, showing the Town’s continued commitment. The new Vision Statement is a simplification of the 2009 vision.

While Carrboro is one of the most bikeable places in North Carolina today, the Town is dedicated to evaluating opportunities for improvement to ensure biking in Carrboro is safe, fun and accessible for all ages and abilities.

The graphic below illustrates the planning process for this Updated Bike Plan. This plan aims to:

- » **Engage** an active steering committee of stakeholders to guide the planning process
- » **Develop** an Equity Framework to ensure all residents are considered
- » **Recommend** projects and programs that are grounded in realistic implementation
- » **Present** a final plan that is a reflection of community needs and national best practices.





## REFLECTION ON THE 2009 PLAN

The previous Carrboro Bicycle Plan, adopted in 2009, was the first of its kind for the Town. Despite having bike lanes since the 1970s, bicycle infrastructure was largely implemented as opportunities arose and policies developed incrementally rather than through a comprehensive vision. This process was guided by a clear vision statement, which also outlined the goals and objectives of the Bicycle Plan. The vision proposed for this updated Plan (p5) is effectively a distillation of that previous statement shown below.

Despite the benefits of such a vision, the rate of growth of Carrboro's bicycle network has slowed in recent years. This could be due to any number of factors including the implementation of easier projects first, the difficulty associated with installing bicycle facilities on roads which are not maintained by the town, and changes to funding mechanisms. This updated Plan reassesses the existing conditions, identifies new projects, and provides updated design standards to account for advancements in bicycle facility design which have occurred over the past 10 years.

*“Carrboro will be a place that is bicycle-friendly; where people have an accessible, safe, and convenient option of bicycling for transportation, recreation, and health; where bicycle lanes and greenways provide a connected system within and outside Town; where future development provides access and facilities for bicyclists; where bicycle transportation is the easy choice; and where programs educate, inspire, and encourage residents and enforce safe bicyclist and motorist behavior.”*



## EXISTING PLANS AND DOCUMENTS

The following plans and documents, both local and regional, have been reviewed as part of the updated Plan. More information about these plans can be found in the Appendix.

- » **CONNECT 2045 (2019)** - The Triangle's Metropolitan Transportation Plan
- » **NC 54 Safety Study (2019)** - Bike-Ped Safety analysis in Carrboro-Chapel Hill
- » **NC 54 W Corridor Study (2018)** - Carrboro-Graham Corridor Assessment
- » **203 S Greensboro Project (2018)** - Orange Co. Southern Branch Library
- » **Carrboro Economic Sustainability Plan (2017)**
- » **Carrboro Downtown Parking Plan (2017)**
- » **Carrboro Community Climate Action Plan (2017)**
- » **Carrboro Bicycle Program Review (2016)**
- » **Carrboro Bike Parking Ordinance (2015)**
- » **Carrboro Affordable Housing Goals and Strategies (2014)**
- » **Carrboro Safe Routes to School Plan (2012)**
- » **Morgan Creek Greenway Study (2010)**
- » **Bolin Creek Greenway Concept Plan (2009)**
- » **Carrboro Bicycle Plan (2009)**
- » **Residential Traffic Management Plan (2006)**
- » **Downtown Traffic Circulation Study (2005)**
- » **Carrboro Vision 2020 Plan (2000)**



## PLAN GOALS

These goals build upon the vision statement and help to inform this Plan’s analysis and recommendations. As shown below, there is no other single type of investment in Carrboro that could support this many issues related to quality of life.



### ENHANCE CONNECTIVITY

Create a network of bike routes that allow Carrboro residents and visitors to access activity centers and surrounding communities by bike.



### CREATE A POSITIVE ECONOMIC IMPACT

Recognize the economic benefits of a bicycle-friendly community, and capitalize on the return on investment for bike infrastructure.



### PROTECT THE ENVIRONMENT

Reduce the level of transportation-related greenhouse gas emissions in Carrboro.



### ADVANCE EQUITY

Create a network of bike routes that allow ALL Carrboro residents to safely and easily access parks and activity centers by biking and strive to make Carrboro a place where cycling rates are not predictable by race.



### ENHANCE HEALTH

Provide transportation options and recreational opportunities that promote an active lifestyle.



### INCREASE SAFETY

Address the safety and level of comfort of the transportation system for people who bicycle; Reduce the number of bicycle crashes, injuries, and fatalities over time.



### INCREASE LIVABILITY

Implement complete street solutions which will incorporate all modes, including bicycles, to support healthy, safe, and bikeable neighborhoods.





## BENEFITS OF INCREASED BICYCLING

By increasing the rates of bicycling, we can help to improve people's health and fitness, increase the livability of our community, decrease automobile dependency, improve environmental conditions by reducing greenhouse gas emissions, and develop a greater sense of community.

The following section outlines the many benefits of bicycling and this Plans main themes: connectivity, economic benefit, environment, equity, health, and safety.



Photo credit: BikeCarrboro



Photo credit: Carrboro Recreation and Parks Department



## Connectivity

Almost all of Carrboro falls within a 2-mile radius of its town center (roughly at Town Hall), meaning that many of the Town's centers of employment, recreation, education, shopping, and culture are within a reasonable bicycling distance of one another.

Similarly, nearby destinations such as UNC Chapel Hill, the Town of Chapel Hill, and rural Orange County are all within a similar bicycling distance. The challenge becomes making safe, comfortable, and convenient bikeways and greenways across these distances, which is a goal of this Plan.

**60%** of all driving trips **made in the U.S.** are shorter than five miles (see chart below), indicating an opportunity to shift those trips to bike trips with a connected, low-stress network.

**26%** of young people **nationally** (aged 16 to 34) don't have a driver's license and rely on other means of transportation according to the National Household Travel Survey.

### United States Daily Trip Distances

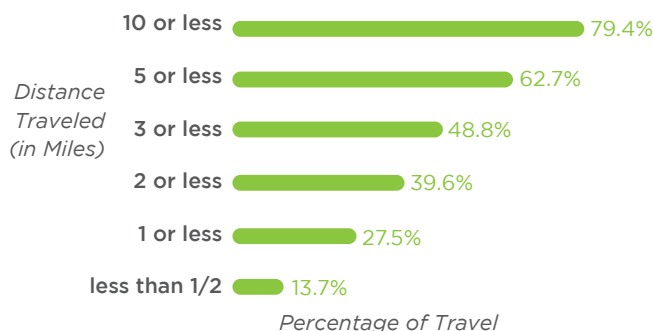
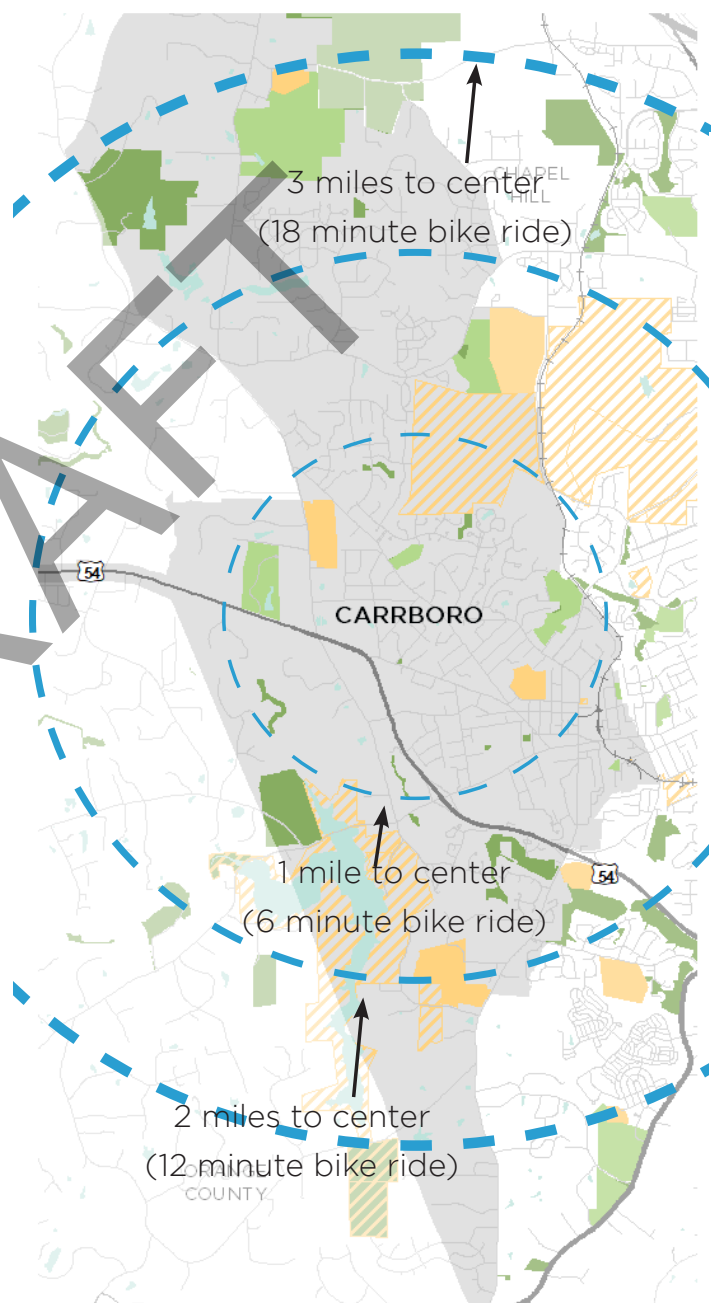


Chart from the Bicycle and Pedestrian Information Center, [www.pedbikeinfo.org](http://www.pedbikeinfo.org)

### MAP 1: EXAMPLE TRIP DISTANCES & BICYCLE RIDE TIMES IN THE CARRBORO AREA







## Economic Impact

There are many economic benefits of biking in the form of tourism, development and maintenance of facilities, increased property values, commercial activity, and infrastructure savings.

Below are some key economic trends related to bicycling and greenway trails:

- » In North Carolina, every \$1.00 of initial trail construction supports \$1.72 annually from sales revenue, sales tax revenue, and benefits related to health and transportation.\*
- » A study of the behavioral effects of completing a critical link in the American Tobacco Trail (ATT) found that with the connection installed over I-40, use of the ATT increased by 133%, with an additional \$3.7 million spent annually on goods and services for those using the trail.\*
- » Nationally, cities report higher retail sales along bicycling corridors. In San Francisco, 66% of merchants reported increased sales after bike lanes were installed on Valencia Street.\*\*
- » The raw cost for the installation and maintenance of bicycle facilities is negligible compared to those same costs for cars and highways, although bicycle projects do require local match with NCDOT.
- » Bicycling, when it can be used in a community as a viable form of transportation, can at least partially replace car ownership and maintenance, keeping household disposable income available for other important wants and needs.

\*Institute of Transportation Research and Education, 2017.

\*\*People for Bikes

***“Trails can be associated with higher property value, especially when a trail is designed to provide neighborhood access and maintain residents’ privacy. Trails, like good schools or low crime, create an amenity that commands a higher price for nearby homes. Trails are valued by those who live nearby as places to recreate, convenient opportunities for physical activity and improving health, and safe corridors for walking or cycling to work or school.”***

- Headwaters Economics  
([www.headwaterseconomics.org/trail](http://www.headwaterseconomics.org/trail))



*Carrboro's identity as a bicycle-friendly town influences the businesses in the area.  
Photo credit: Open Eye Cafe/Carrboro Coffee Roasters*



## Environment

Bicycle facilities, greenways, and other trails can help increase rates of bicycling (and walking) to reduce rates of driving and thus reduce greenhouse gas emissions; a goal of the Town's climate action plan. Off-road facilities, like greenways, eliminate most opportunity for conflicts with motorized vehicles, which can help encourage newer people bicycling to leave their cars at home. With careful design, greenways can be incorporated into natural areas and act as natural buffer zones that protect streams, rivers, and lakes by filtering pollutants, minimizing runoff from impervious surfaces and limiting soil erosion. Greenways and trails

also help guide movement of people walking and bicycling through natural areas and preserve sensitive areas. Simultaneously, these can provide the community with safe and appealing opportunities to access the outdoors can spur environmental stewardship and the appreciation of the natural beauty in Carrboro and the surrounding region. Increased time spent outdoors in nature has been shown to increase wellbeing and provide health benefits, both physically and mentally.

### ENVIRONMENTAL HEALTH BENEFITS OF WALKABLE AND BIKEABLE COMMUNITIES

#### CURRENT U.S. ENVIRONMENT & HEALTH STATISTICS



##### ASTHMA IS THE LEADING CHRONIC DISEASE IN CHILDREN

and the number one reason for missed school days

(CDC)



##### Exposure to TRAFFIC EMISSIONS

is linked to exacerbation of **ASTHMA, REDUCED LUNG FUNCTION, ADVERSE BIRTH OUTCOMES** and childhood **CANCERS**

(CDC)



**40% OF ALL TRIPS** in the U.S. are **TWO MILES OR LESS**, and two-thirds of them happen in cars

(NHTS, 2009)

#### ENVIRONMENT & HEALTH BENEFITS



A minimum of **20 MINUTES OF PHYSICAL ACTIVITY, 3X WEEK, STRENGTHENS THE LUNGS**, including those of individuals living with asthma

(US National Lib of Medicine)



**IF 8% MORE CHILDREN LIVING WITHIN 2 MILES OF A SCHOOL WERE TO WALK OR BIKE TO SCHOOL**, the air pollution reduced from not taking a car would be **EQUIVALENT TO REMOVING 60,000 CARS FROM THE ROAD** for one year

(Pedroso, 2008, SRTS)



**BIKING 2 MILES**, rather than driving, **AVOIDS EMITTING 2 lbs. OF POLLUTANTS**, which would take 1.5 months for one tree to sequester.

(EPA, 2000 and NC State, 2001)



## Equity

According to the American Community Survey, about 8% of Carrboro households do not have access to an automobile (2017). Of the households without an automobile, 43% are of minority race/ethnicity (2015). Households without access to vehicles are not well-served by auto-oriented transportation solutions and require walking, bicycling, and transit infrastructure.

Similarly, children under 16, seniors who no longer drive, and people with disabilities who cannot drive deserve

safe ways to access community destinations without depending on an automobile.

Automobile dependent communities in the United States spend over \$8,500 of their household income on transportation compared to households living in communities with more accessible land use and more multi modal systems. In those communities, it was found that approximately \$5,500 of household income went to transportation costs according to a 2000 study.<sup>1</sup>

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1 Barbara McCann (2000), Driven to Spend; The Impact of Sprawl on Household Transportation Expenses, STPP ([www.transact.org](http://www.transact.org))



Photo credit: Scott Scala



Photo credit: BikeCarrboro



## Health

A growing number of studies show that the design of our communities—including neighborhoods, towns, transportation systems, parks, trails and other public recreational facilities—affects people's ability to reach the recommended daily 30 minutes of moderately intense physical activity (60 minutes for youth).

### CURRENT U.S. HEALTH STATISTICS



**80%** of Americans **DO NOT ACHIEVE** the recommended 150 minutes per week of **MODERATE EXERCISE**

(CDC)



**2/3** of Americans **ARE OVERWEIGHT OR OBESE**

(CDC)



**CARDIOVASCULAR DISEASES** are the **#1 CAUSE OF DEATH** in the United States

(American Heart Association)



**61%** of American adults 65 years or older **HAVE AT LEAST ONE ACTIVITY-BASED LIMITATION**

(CDC)



**1 in 5** Americans report their **STRESS LEVELS AS EXTREME**

(American Psychological Association)



On average, **CHILDREN** spend more than **7.5** hours per day **IN FRONT OF A SCREEN**

(Kaiser Family Foundation)

### HEALTH BENEFITS



Residents of **WALKABLE AND BIKEABLE COMMUNITIES** are as **LIKELY TO MEET PHYSICAL ACTIVITY GUIDELINES** compared to those who do not live in walkable neighborhoods

(Frank, 2005)



For every **0.6 MILE WALKED** there is a **5% REDUCTION IN THE LIKELIHOOD OF OBESITY**

(Frank, 2004)



**20 MINUTES WALKING OR BIKING** each day is associated with

**21% LOWER RISK OF HEART FAILURE FOR MEN** and **29% LOWER RISK FOR WOMEN**

(Rahman, 2014 and 2015)



**PHYSICAL ACTIVITY HELPS PREVENT OR DELAY ARTHRITIS, OSTEOPOROSIS AND DIABETES**, while helping maintain balance, mental cognition, and independence

(NIH-National Institute on Aging)



**BIKE COMMUTERS REPORT LOWER STRESS LEVELS** compared to auto commuters

(New Economics Foundation)



Youth who engage in **60 MINUTES** of moderate to vigorous **PHYSICAL ACTIVITY** daily have **BETTER COGNITIVE PROCESSING, ATTENTION SPANS, ACADEMIC PERFORMANCE AND SELF-ESTEEM**

(Institute of Medicine)





## Safety

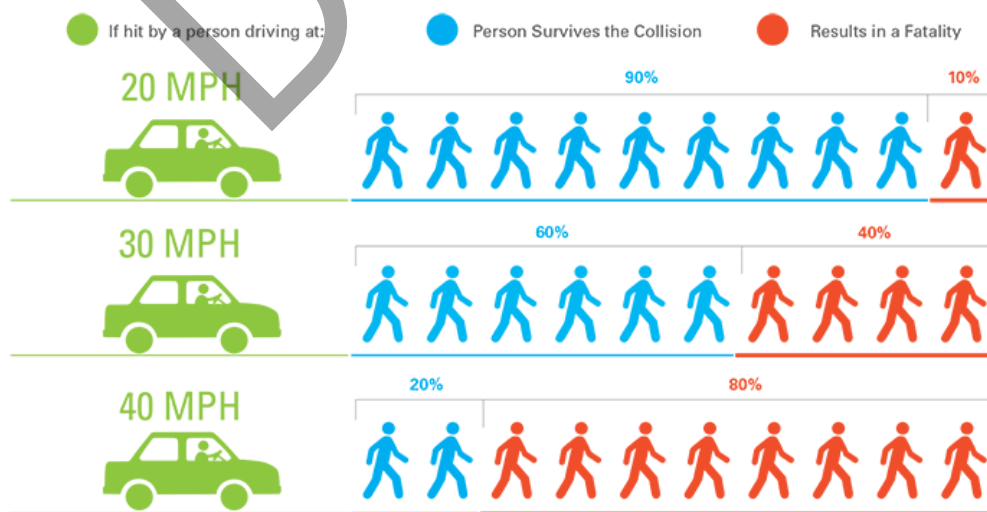
There are many factors that influence the safety, both perceived and actual, that people who bicycle experience.

The following is an example of different safety strategies:

- » Before and after studies of bicycle lane installations show a crash reduction of 35 percent (CMF ID: 1719) for vehicle/bicycle collisions after bike lane installation.
- » Simply getting more people on bicycles is in itself a safety measure. Shifts from driving to active modes tend to reduce total per capita crash rates in an area, thus providing a safety benefit.
- » Straightforward reduction of speed limits can have a profound effect on safety, and comfort for people who bicycle or walk (as seen in the graphic below).

From 2012 through 2016, Carrboro had an average of 4 reported bike crashes per year. During those 5 years, the lowest number of reported bike crashes was in 2016 with 1 crash and the highest number of reported bike crashes was in 2015 with 7 crashes.

Statewide, North Carolina had an average of 935 bike crashes per year during those same 5 years. (North Carolina Pedestrian and Bicycle Crash Data Tool, [pedbikeinfo.org](http://pedbikeinfo.org))



Source: SFMTA Vision Zero, Institute of Transportation Engineers, US Dept. of Transportation

# 2 BIKING IN CARRBORO TODAY



*Photo Credit: The Recyclery NC*





## PROGRESS SINCE THE 2009 BIKE PLAN

The Town of Carrboro's 2009 Bike Plan included a list of implementation action steps, the results of which are listed below.

### ***Completed Action Steps***

- » Expanded bike parking requirements in Land Use Ordinance
- » Added multiple on-road bikeways, completing several priority projects
- » Formation of the Carrboro Bicycle Coalition
- » Worked to ensure people who bicycle are incorporated into future transit service planning and design
- » Continued "Basics of Bicycling" course
- » Promoted Bike Month and created additional activities
- » Continued school crossing guard program and expansion evaluation
- » Used Census Data to determine new mode share
- » Create a maintenance request system for bicycle-specific facilities

### ***On-Track Action Steps***

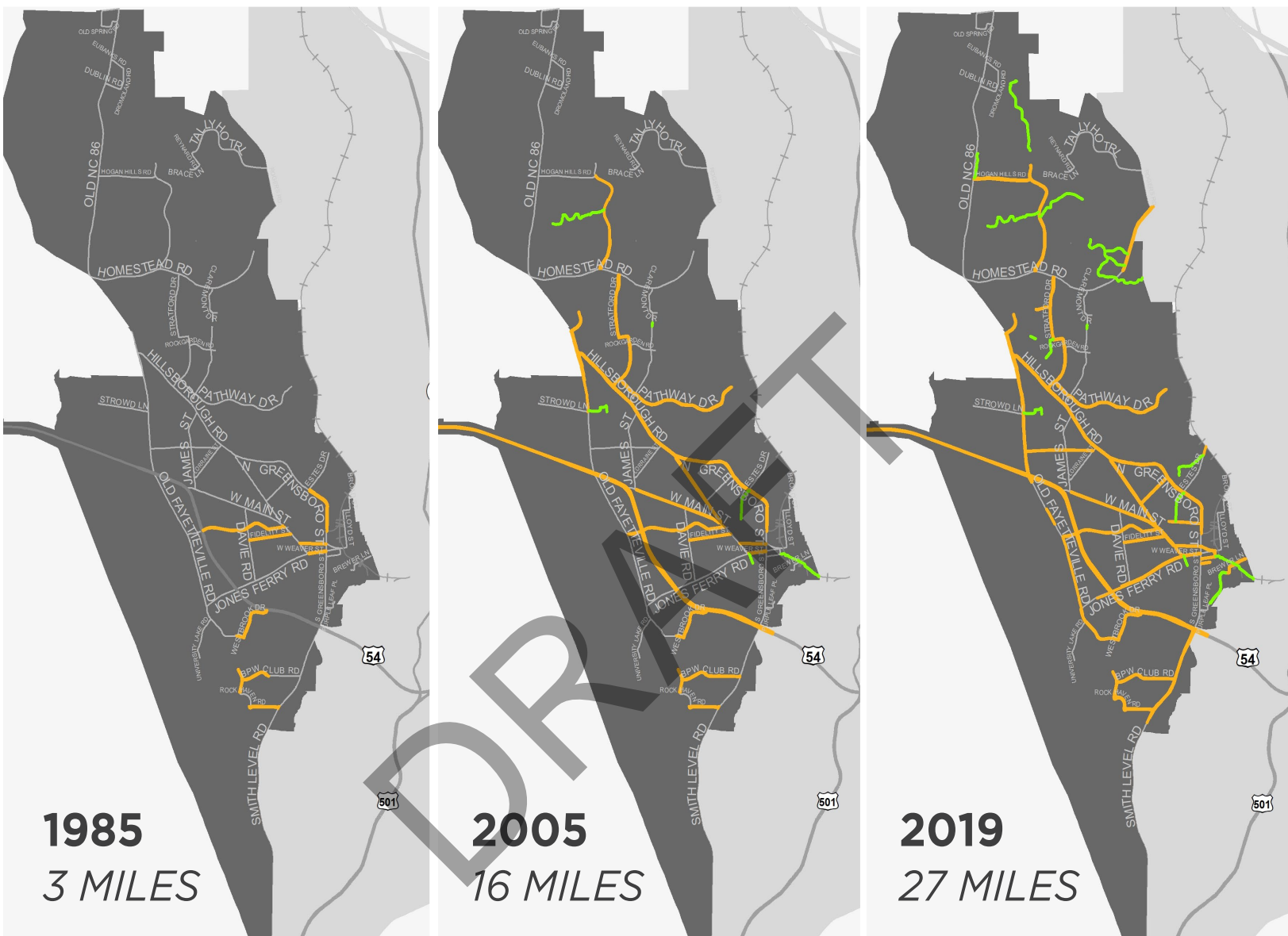
- » Hosted training sessions for Town engineers and planners
- » Partnered with DCHC MPO and other organizations for training programs
- » Ensured bike facilities are part of new bridge design
- » Improved signage and mapping
- » Launched traffic calming public education program targeting all roadway users
- » Enhanced enforcement of unsafe behavior
- » Developed educational bike map
- » Applied for additional Safe Routes to School funding
- » Developed bicycle rodeos, summer bike camps, and other bike events
- » Used greenways and bike facilities for events
- » Supported the ReCYCLery program
- » Enforced illegal actions by people who drive related to bike safety
- » Created bike patrol positions
- » Regularly reviewed and updated bicycle-related policies
- » Completed updated Plan with 5-10 years
- » Reach out to Spanish-speaking population

### ***Incomplete Action Steps***

- » Develop brochures, articles, newsletters, and billboards
- » Initiate training sessions for local-law enforcement
- » Increase number of League Cycling Instructors
- » Host own bike riding tours/races
- » Research crashes and initiate crash reduction programs
- » Measure new facilities as constructed and report on facility quality
- » Create bicycle ambassador program
- » Provided incentives for employees who commute by bike



## MAP 2: BIKEWAY NETWORK GROWTH



## 2019 NETWORK MILEAGE BY FACILITY TYPE

### Shared Use



5 miles

### Bike Lanes



16 miles

### Sharrow



2 miles

### Wide Shoulder



4 miles



## CARRBORO BIKEWAYS TODAY

*Smith Level Road - 2009*



*Smith Level Road - 2009*



*Smith Level Road - Today*



*Estes Drive*



*Wilson Park Trail*



*Libba Cotton Bikeway*



*Weaver Street*



*N Greensboro Street*



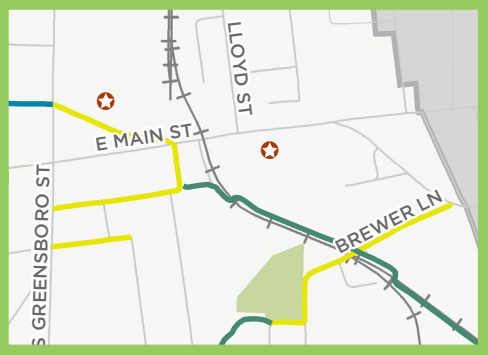


# Map 3: Appendix B-20 of 78 Existing Network

## EXISTING BIKE NETWORK

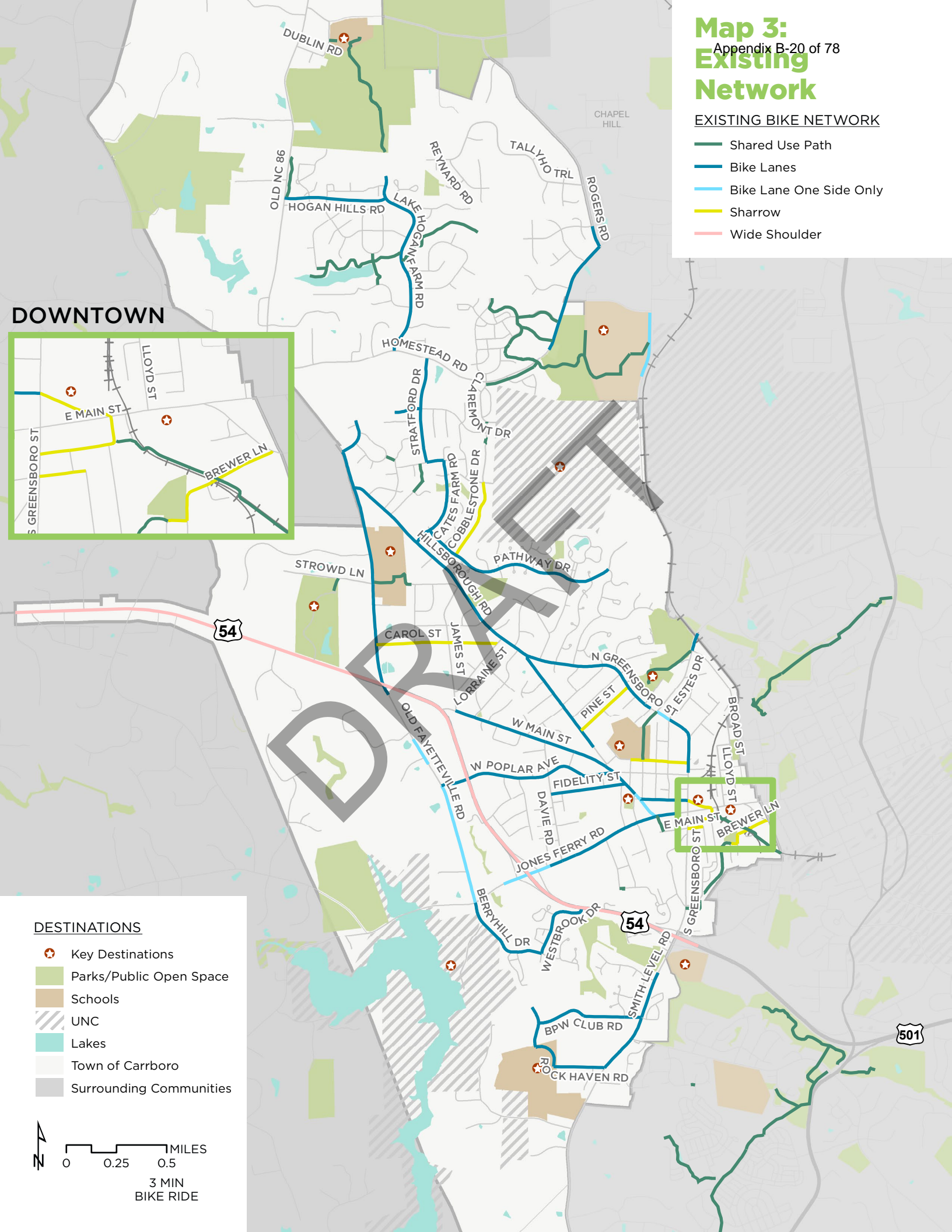
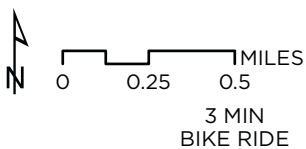
- Shared Use Path
- Bike Lanes
- Bike Lane One Side Only
- Sharrow
- Wide Shoulder

## DOWNTOWN



## DESTINATIONS

- Key Destinations
- Parks/Public Open Space
- Schools
- UNC
- Lakes
- Town of Carrboro
- Surrounding Communities



# Map 4: Appendix B-21 of 78 Existing and In Development Network

## EXISTING BIKE NETWORK

- Shared Use Path
- Bike Lanes
- Bike Lane One Side Only
- Sharrow
- Wide Shoulder

## IN DEVELOPMENT NETWORK

- Separated Bike Lanes
- Bike Lanes
- Neighborhood
- Shared Use Path
- Crossing Improvement

## DEVELOPMENT STATUS

- In Development

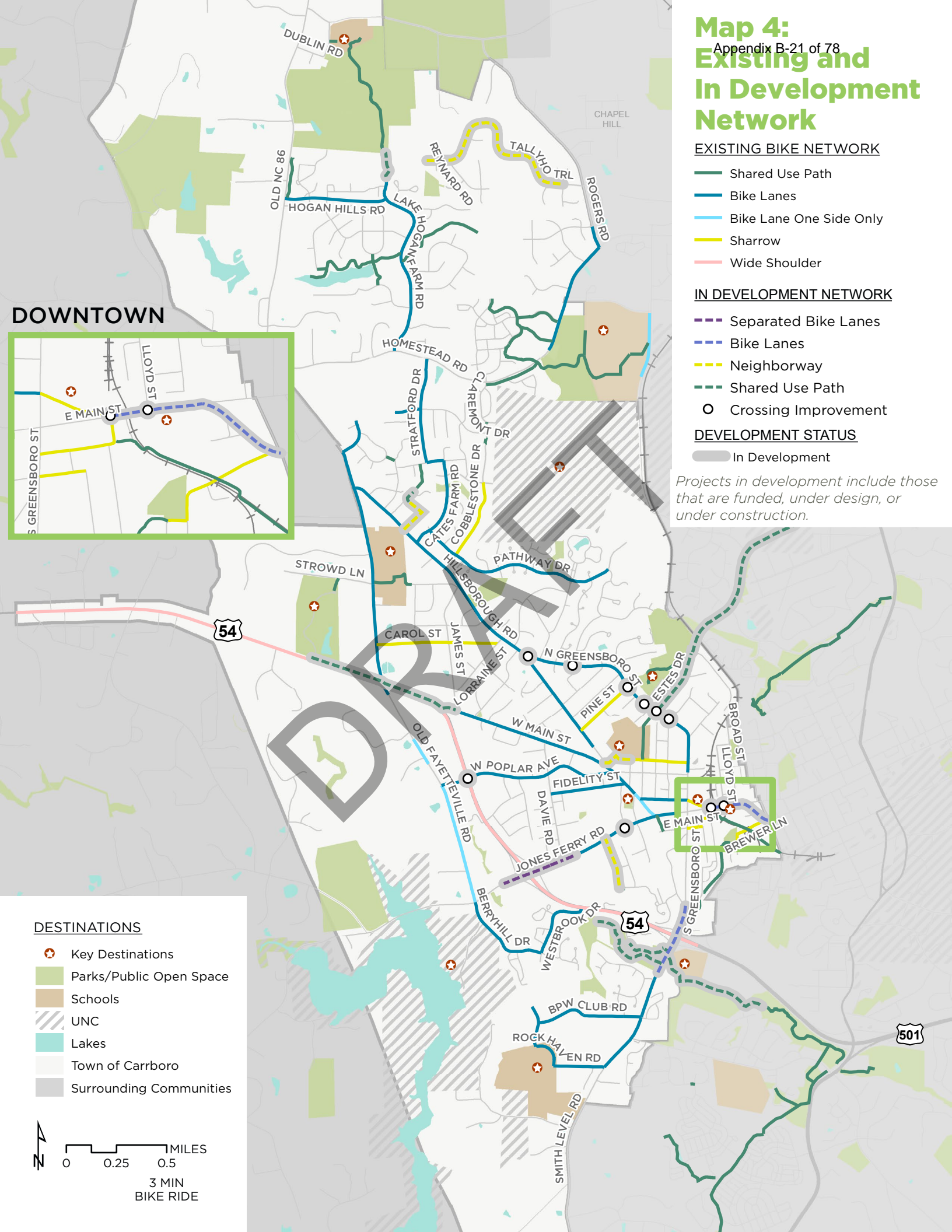
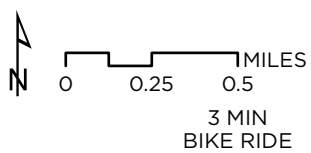
Projects in development include those that are funded, under design, or under construction.

## DOWNTOWN



## DESTINATIONS

- Key Destinations
- Parks/Public Open Space
- Schools
- UNC
- Lakes
- Town of Carrboro
- Surrounding Communities





## EQUITY ANALYSIS

Without access to transportation, people in Carrboro will have a harder time getting to work, buying healthy food, seeing a doctor, going to school, or connecting with others.

The equity analysis considers populations that may experience poor financial, health, and housing circumstances, and/or physical or communication limitations that prevent fulfilling basic needs without safe, convenient transportation options.

The map to the right reflects the average of six equity indicators with higher concentrations of:

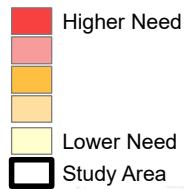
- » Households living below or near the poverty line
- » Households without access to a vehicle
- » Non-White populations
- » People with limited English proficiency
- » People without a high school diploma
- » Children and senior citizens

These groups are more likely to be dependent on multimodal transportation such as bicycling, walking, or taking public transit thus resulting in a greater need for active transportation resources. Integrating this equity analysis into the development of the bicycle network and the prioritization of the network will further Carrboro's efforts of being a welcoming and inclusive environment that enhances the overall social, physical and mental well-being of the community.

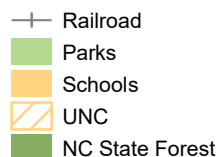
## Map 5: Equity Analysis

Appendix B-22 of 78

### EQUITY ANALYSIS



### BASE LAYERS

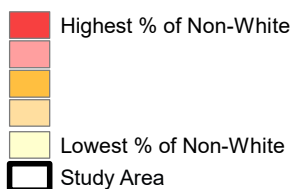


0 1 2 MILES





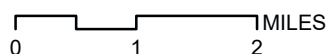
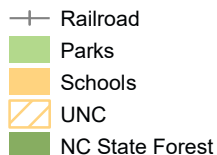
## Map 6: Equity Analysis (Non-White Populations)



The Town of Carrboro is also a committed member of the Government Alliance on Race and Equity (GARE), a national network of government working to achieve racial equity and advance opportunities for all. GARE members make a commitment of achieving racial equity, focus on the power and influence of their own institution, and work in partnership with others. This commitment seeks to put racial equity at the forefront of all policies and decision-making including those involving bicycle infrastructure and associated programs.

A key wrinkle in the assessment of demographic data within Carrboro is that Census Block Groups which over low density areas tend to be quite large. Because of this, they do not fall entirely within Carrboro's Town Limits and assuming that the data for the block group is perfectly analogous to the area within Carrboro may or may not be true.

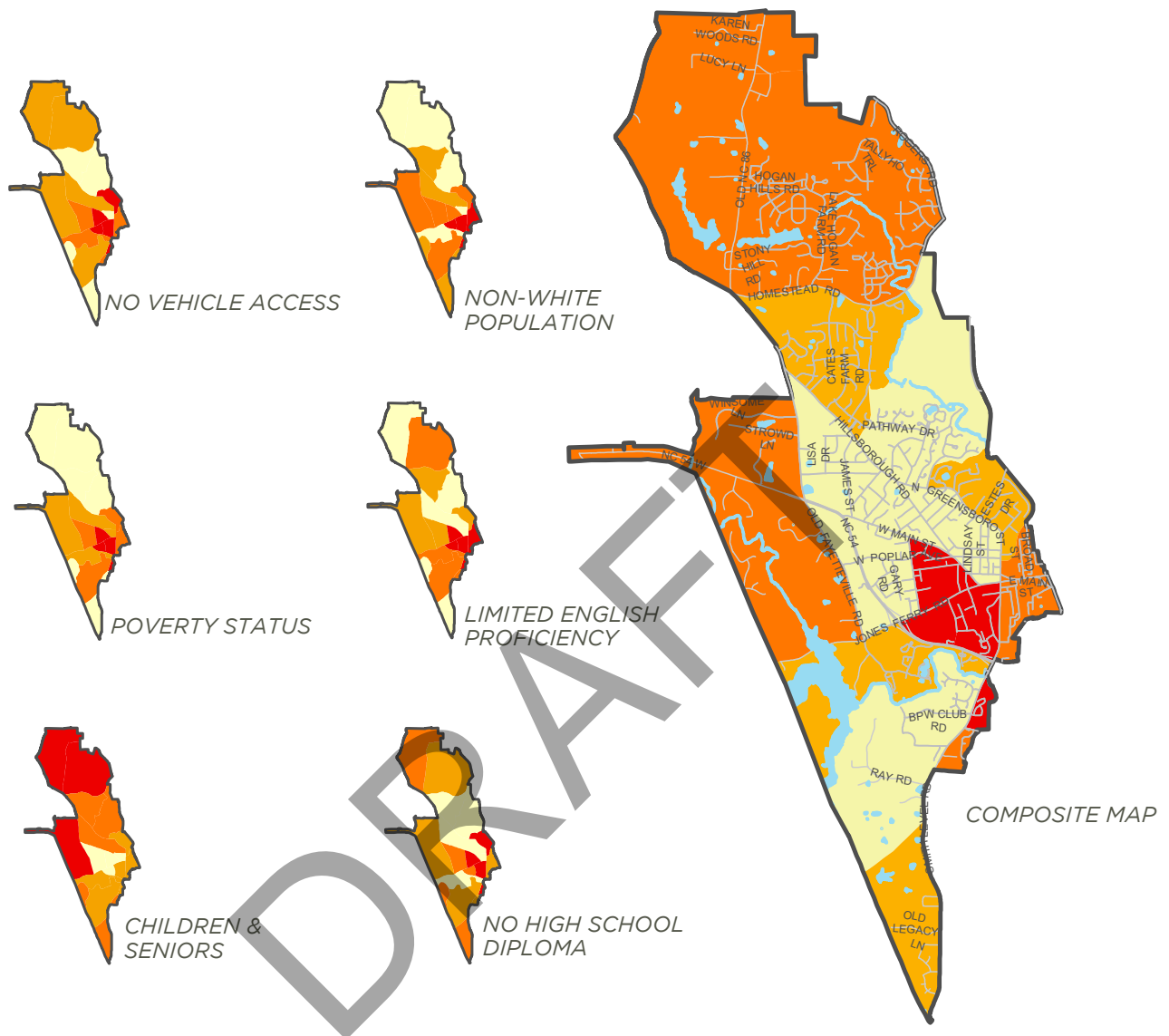
### BASE LAYERS



### 2019 U.S. Census Data for Carrboro

<b>Population</b>	21,190
<b>Race</b>	White (70%); Black or African-American (11.8%); American Indian and Alaska Native (0.9%); Asian (10.6%); Two or More Races (4.3%); Hispanic or Latino (8.1%)
<b>Median Age</b>	32.3
<b>Bicycle Mode Share</b>	4.8% (2018 ACS)

## COMPOSITE MAP INPUTS



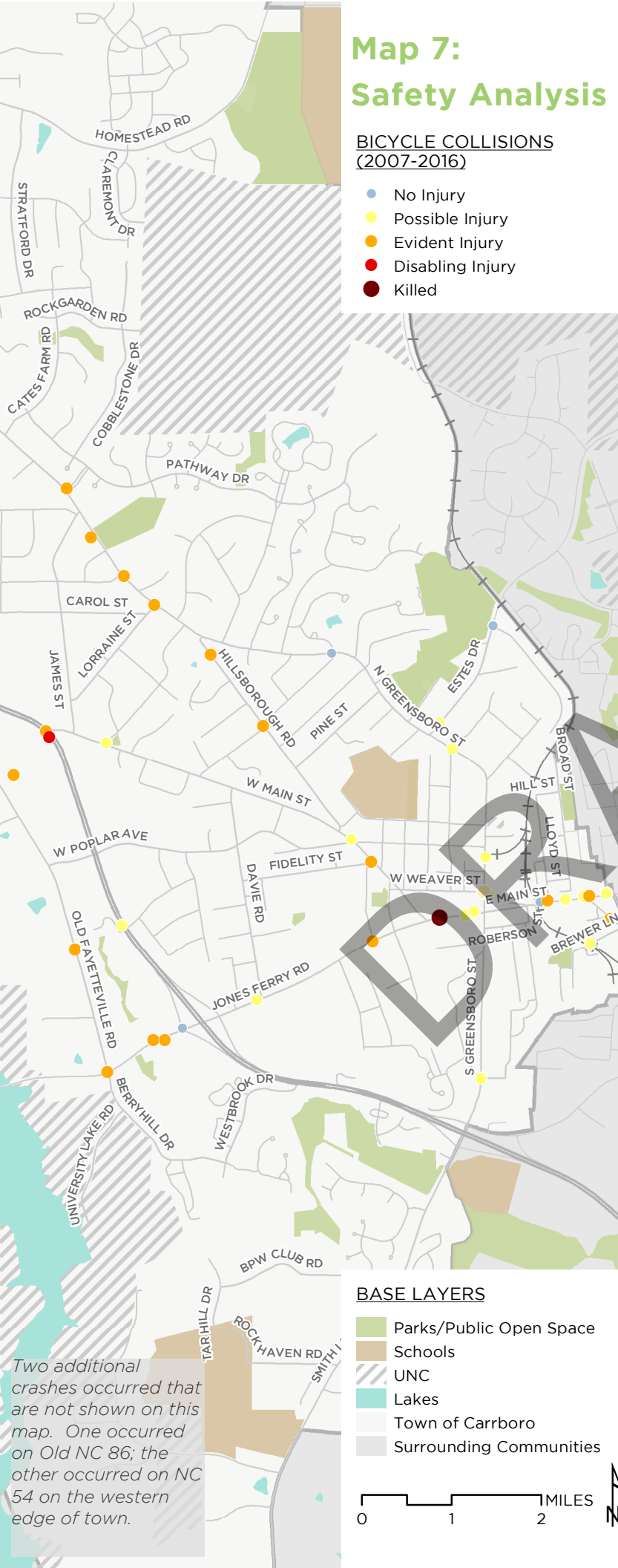
The figure above displays all six component maps (Poverty Rate, Vehicle Access, Non-white Populations, Limited English Proficiency, People without a HS Diploma, and Young and Old People). These individual maps were provided in the interest of transparency, as it can be somewhat challenging to understand the inputs for the composite map, shown on p22.

The key takeaways from the individual maps are that there are block groups with a high concentration of 5 out of 6 indicators near the center of Carrboro. The exception is Young and Old People, which tend to have higher concentrations in the north and west areas of the Town. This is reflected in the Composite map as 5 of the 6 block groups in the top two need tiers are within a mile of the center of Town. More details on the Equity Analysis can be found in the appendix.

## Map 7: Safety Analysis

### BICYCLE COLLISIONS (2007-2016)

- No Injury
- Possible Injury
- Evident Injury
- Disabling Injury
- Killed



### BASE LAYERS

- Parks/Public Open Space
- Schools
- UNC
- Lakes
- Town of Carrboro
- Surrounding Communities

0 1 2 MILES

## SAFETY SUMMARY

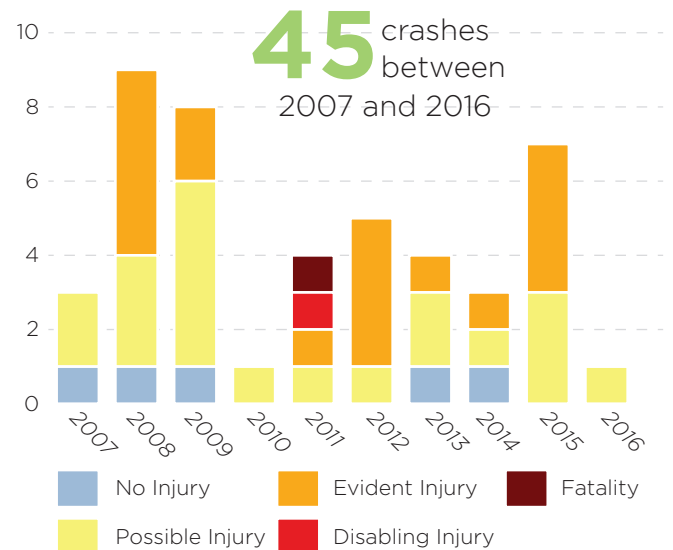
Crash data for the 10-year period from 2007 through 2016 indicates that all of the recorded accidents involving a person on a bike occurring within the downtown commercial district and surrounding residential neighborhoods.

The following corridors have the highest frequency of bicycle related crashes in Carrboro:

- » Jones Ferry Road
- » Hillsborough Road
- » West Main Street
- » W Rosemary Street
- » N Greensboro Street
- » Estes Drive

**48%** of all bicycle crashes occurred in or immediately adjacent to areas of Town with the highest need (top two of the five tiers as expressed in the equity analysis on p22). This represents only 25% of the land area of the Town.

## REPORTED BICYCLE CRASHES BY YEAR



## LEVELS OF TRAFFIC STRESS (LTS)

The level of traffic stress for people who bicycle is determined based on factors including posted speed limit, street width, and the presence and character of bicycle lanes. The pictures to the right generalize the scale of the four levels of traffic stress.

Generally, lower stress roadways can be found in the downtown core and in residential areas.

The greater number of lanes and higher posted speeds impact the ability of bicycle lanes to decrease stress. Where possible, separation should be considered, especially along high-stress corridors such as:

- » Old Fayetteville Road
- » Main Street
- » Hillsborough Road
- » N Greensboro St
- » Jones Ferry Road
- » Smith Level Road
- » Homestead Road

**LTS 1:** Strong separation from all except low speed, low volume traffic. Simple crossings. Suitable for children.

**LTS 2:** Except in low speed / low volume traffic situations, people on bikes have their own place to ride that keeps them from having to interact with traffic except at formal crossings. Physical separation from higher speed and multilane traffic. Crossings that are easy for an adult to negotiate. Tolerable for the "Interested but concerned" group (see page 33)

**LTS 3:** Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic. Tolerable for the "enthused and confident"

**LTS 4:** Involves interaction with higher speed traffic or close proximity to high speed traffic. Only for the "strong and fearless"

### LTS 1



*Comfortable for all ages and abilities*

### LTS 2



*Comfortable for most adults*

### LTS 3



*Comfortable for people who bicycle confidently*

### LTS 4



*Uncomfortable for most*

*LTS ratings and table directly from the 2012 Mineta Transportation Institute Report 11-19: Low-Stress Bicycling and Network Connectivity*



# Map 8: Level of Traffic Stress

Appendix B-27 of 78

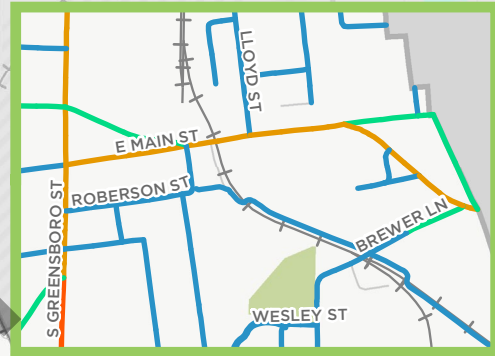
## LEVEL OF TRAFFIC STRESS

- 1 (Most Comfortable)
- 2
- 3
- 4 (Least Comfortable)

## OTHER STREETS

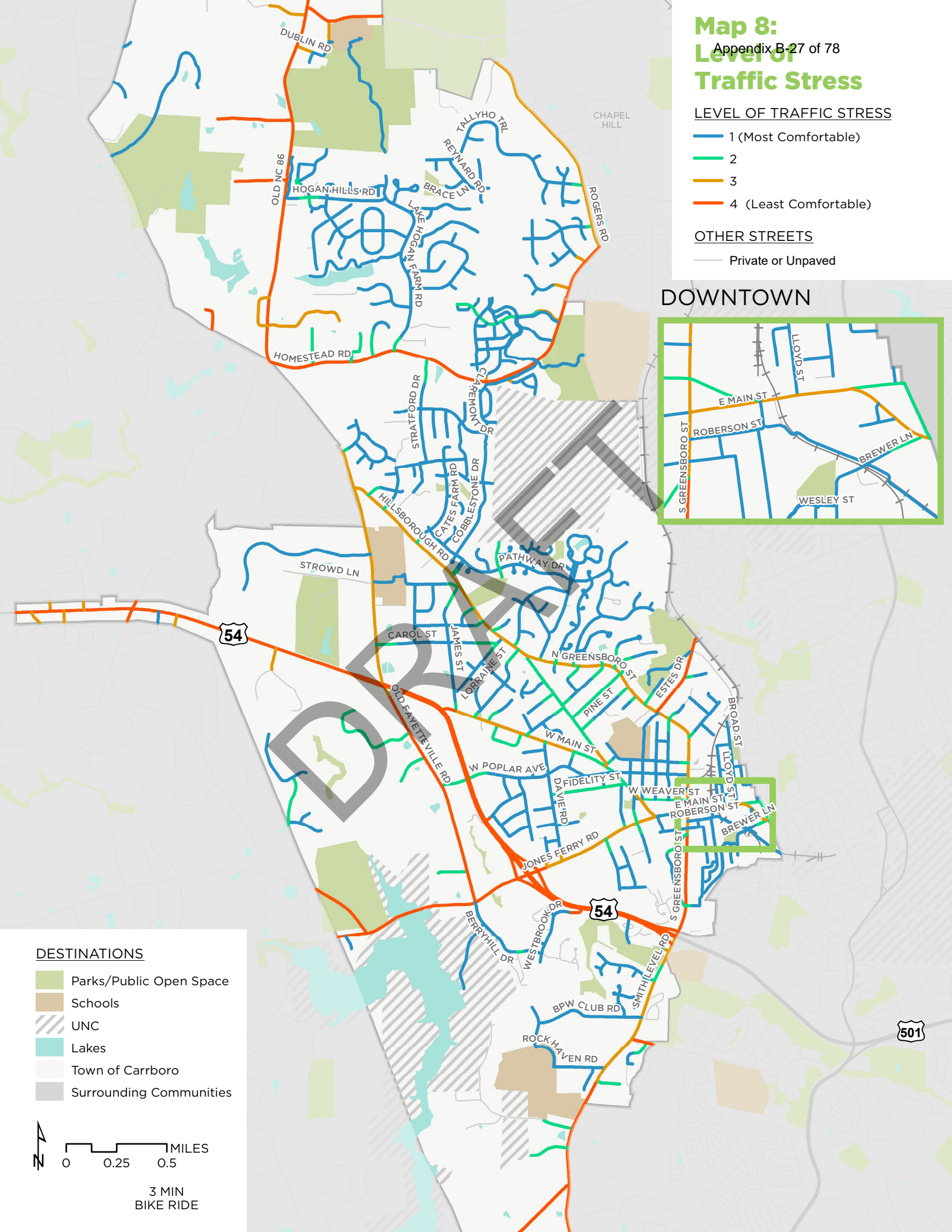
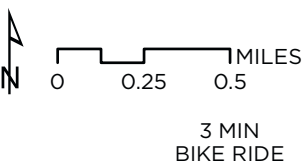
Private or Unpaved

## DOWNTOWN



## DESTINATIONS

- Parks/Public Open Space
- Schools
- UNC
- Lakes
- Town of Carrboro
- Surrounding Communities



## KEY OPPORTUNITIES & CONSTRAINTS

A variety of physical opportunities and constraints either improve conditions for people on bikes or present barriers, respectively.

» **Overall Transportation Network:**

The majority of streets have low to moderate traffic, with notable exceptions, such as NC 54 and Main Street. The busiest section of roadway is NC 54, from Jones Ferry Road to S. Greensboro Street, with over 34,000 vehicles per day.

» **Physical Barriers:** A major barrier to bicycle travel is NC 54, as a high-traffic volume 4-lane divided state highway, with limited access to people bicycling and walking. Additionally, Jones Ferry Road and Main Street intersect in the heart of downtown Carrboro and feed traffic to E Main Street and onto W Franklin Street, the main corridor in Chapel Hill. The railroad that runs north/south through the eastern side of Town is also challenging to bicycle connectivity.

» **Topography:** The presence of steep or challenging terrain may discourage some bicycle riders. Roads such as Estes Drive, Spring Valley Road, Cates Farm Road, Cobblestone Drive, S Greensboro Street, and Barrington Hill Road have challenging topography.

» **Regional Connectivity:** Orange County offers a variety of biking experiences including several bike routes suitable for day rides. Primary routes near Carrboro include Old Greensboro Road and Dairyland Road. The opportunity exists for Carrboro to develop a bikeway connection to both the Town of Chapel Hill and the Town of Hillsborough. NC 2 (Mountains to Sea State Bike Route) connects through downtown Carrboro as well.



*NC 54 through Carrboro*



*Steep hills on Cates Farm Rd*



*Connections to County and State Bike Routes*

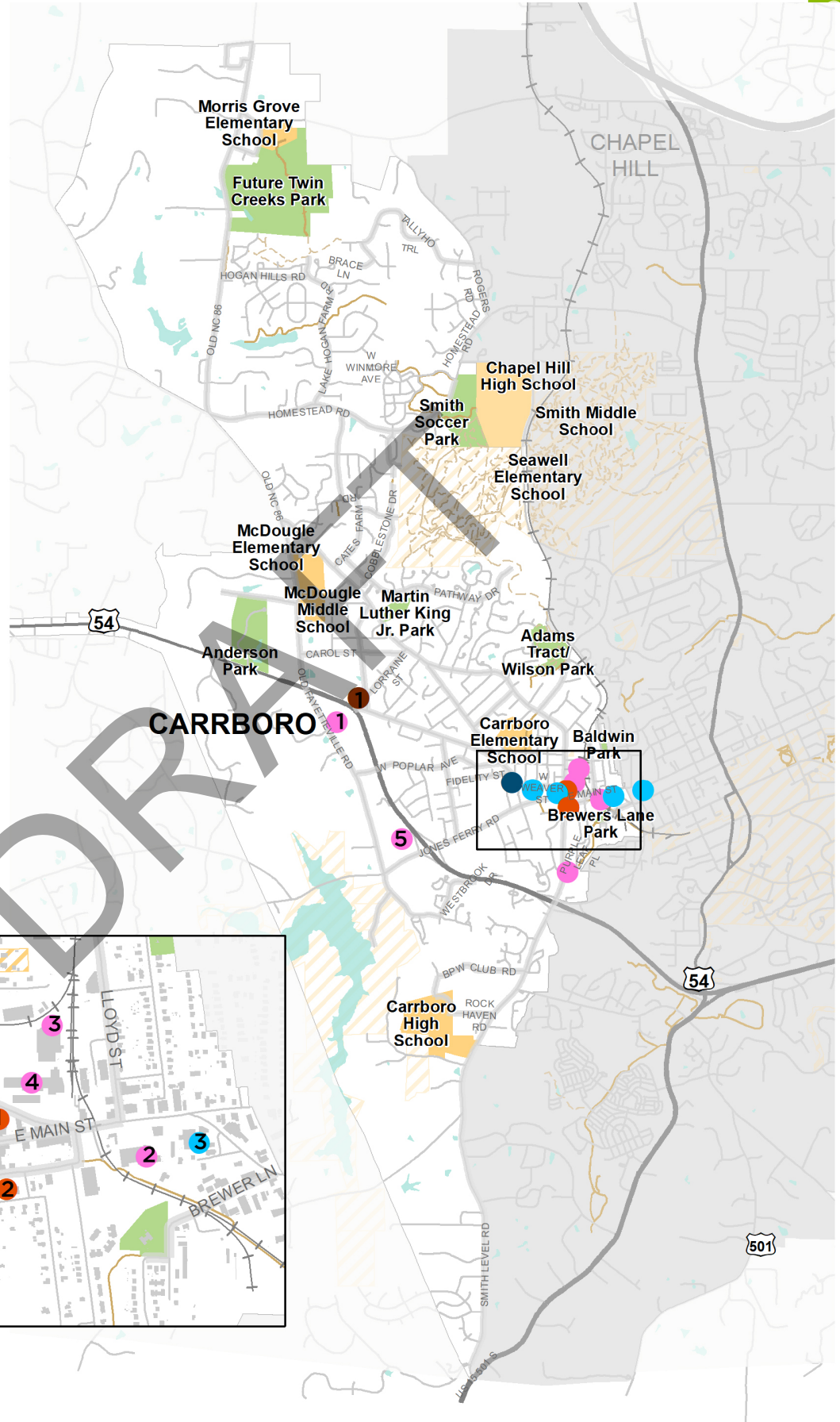
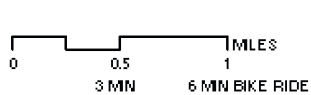
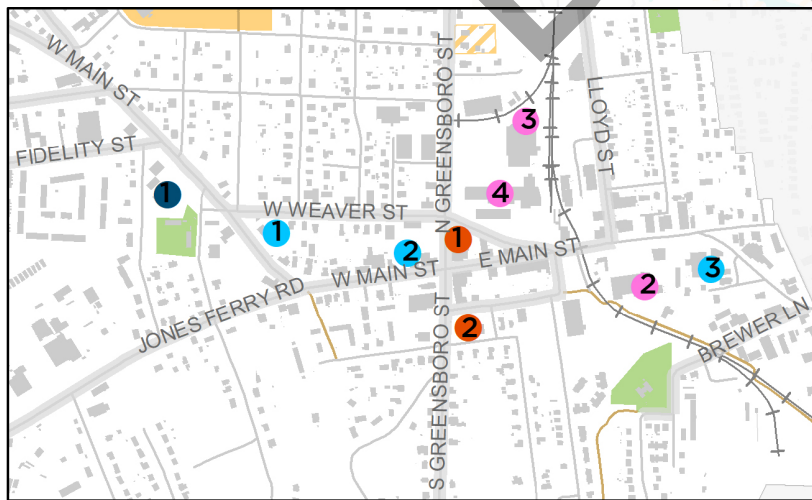


## Map 9: Destinations

### DESTINATIONS

- **Bike Shop**
  - 1 - PARcycles, Inc
  - 2 - The Clean Machine
  - 3 - Back Alley Bikes
- **Shopping Center**
  - 1 - Carrboro Plaza
  - 2 - 300 E Main
  - 3 - Harris Teeter
  - 4 - Weaver Street Market/  
Carr Mill Mall
  - 5 - Food Lion/  
Willow Creek Shopping Center
- **Library**
  - 1 - OC Public Library/  
Century Center
  - 2 - OC Southern Branch Library  
(Future)
- **Points of Interest**
  - 1 - Carrboro Town Hall
- **Post Office**
  - 1 - Carrboro Post Office

- Lakes
- Parks
- Schools
- UNC
- Railroad
- Streets



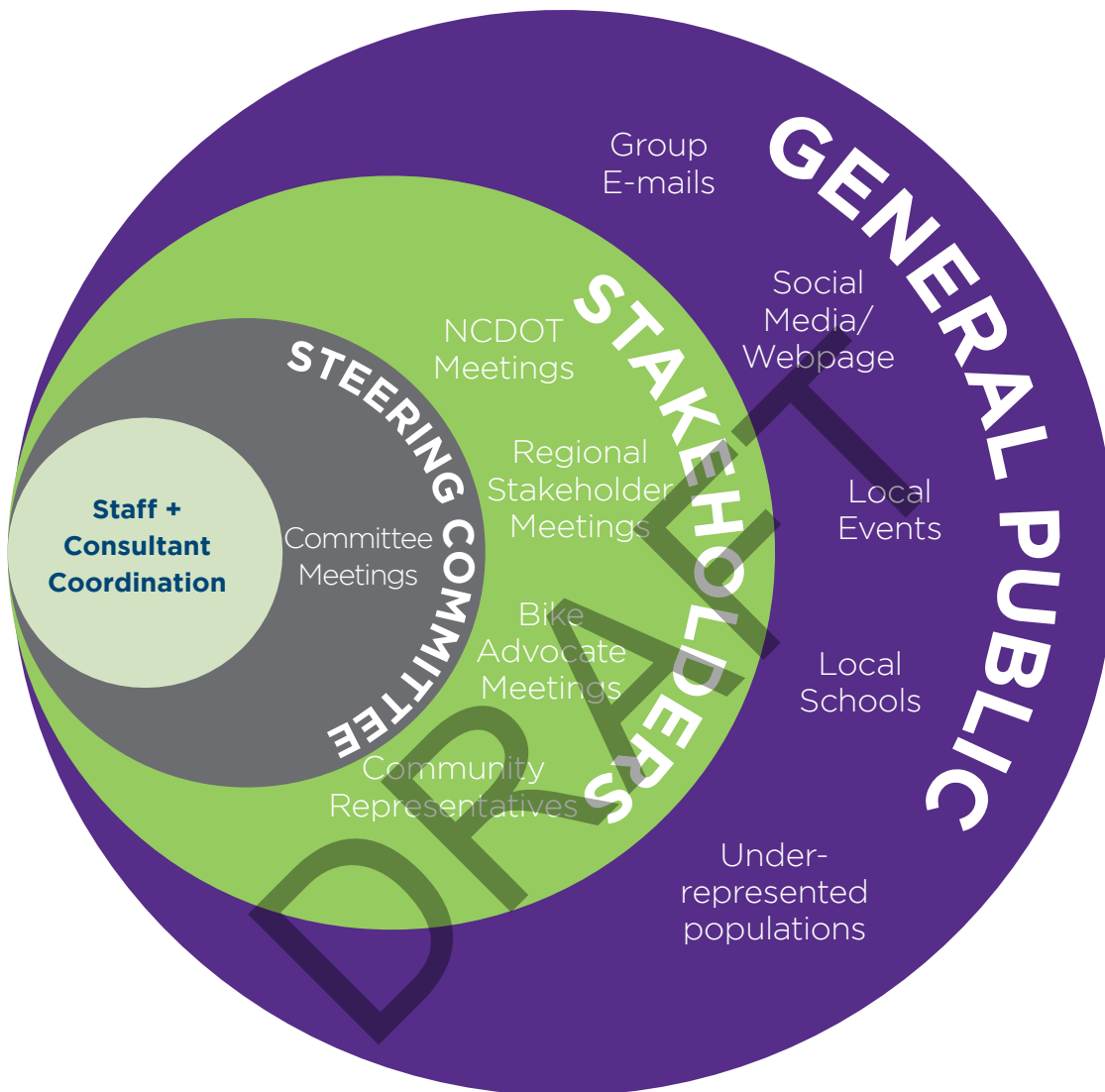
# 3 WHAT WE HEARD







## PUBLIC PROCESS OVERVIEW



- 5 STEERING COMMITTEE MEETINGS**
- 4 OUTREACH SESSIONS AT LOCAL EVENTS**
- 7 STAKEHOLDER INTERVIEWS**
- 30 STEERING COMMITTEE MEMBERS**
- 439 PUBLIC COMMENT FORMS**

Local residents, bicycle advocates, community leaders, and government staff were selected to help guide the public input process. The thirty-person committee met on four separate occasions to provide input and direction on the elements of this Plan including recommendations for priority projects.

Stakeholder interviews were conducted with:

- » NCDOT
- » Regional Stakeholders
- » Karen/Burmese Community
- » Youth Council
- » Bike Advocates
- » 20+ Year Carrboro Residents

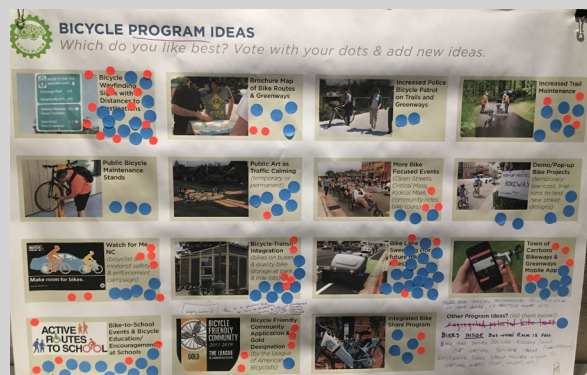


*The steering committee meetings were interactive to encourage idea sharing during each meeting.*

Project materials were placed at the Clean Machine, a local Carrboro bike shop to allow an easy way for the community to share their ideas and thoughts. Participants marked up a map with their network ideas, shared information on their comfort level bicycling and their preferred facility type. Separated bicycle lanes received the most votes, with buffered bicycle lanes close behind.

The public voted with dots for their favorite bicycle program ideas. The top three programs were:

- 1 Bike **wayfinding signs** with distances to destinations
- 2 Bike lane **sweeping** (for future bike lanes)
- 3 **Bike-to-school** events & bike education/encouragement at schools



## TYPES OF PEOPLE WHO BICYCLE IN CARRBORO

Although some people who bicycle will ride on any road, regardless of an available bikeway (“strong and fearless”), a much larger portion of the population will ride only where there is a high-quality bikeway (“interested but concerned” population). Understanding this concept has led communities to

design more low-stress bikeways that provide the high-quality experience the majority of people who bicycle desire.

The chart below shows a “typical” national distribution of people who bicycle compared to the survey results of this planning effort.





## WHAT WE HEARD

A significant portion of feedback was taken from the community survey that was developed for this Plan. Over 400 responses from all segments of the community were gathered and the project team took every effort to ensure a representative sampling of the community was reached. The responses below are taken directly from the responses received, hence some inconsistent wording.

### My favorite place to bike in Carrboro is....

- » the awesome trails like:
  - » Libba Cotten Bikeway
  - » Frances Shetley Bikeway
  - » Wilson Park Trail
  - » Carolina North Forest trails
- » the existing bike lanes on Greensboro Street, West Main Street, and Hillsborough Road
- » on low-traffic neighborhood roads
- » to Downtown Carrboro and destinations like Weaver Street Market and the Farmers' Market
- » to elementary schools, such as:
  - » Carrboro Elementary School
  - » Morris Grove Elementary School
- » to Maple View Farms!
- » the streets that have bike lanes!
- » everywhere!

### The most difficult place to bike in Carrboro is...

- » intersections! Especially:
  - » Weaver Street at North Greensboro Street
  - » Weaver Street at Main Street
  - » Estes Drive Extension at North Greensboro Street
- » crossing NC 54 and the lack of bike infrastructure on S Greensboro Street to Smith Level Road
- » streets with no separated bike lanes like:
  - » Old Fayetteville Road
  - » E Main Street
  - » Homestead Road
  - » Hillsborough Road
- » when the bike lane ends
- » riding over railroad tracks
- » going to school
- » going to Weaver Street Market



Weaver Street Market bike racks are often full.



NC 54 is challenging for many people who bicycle.  
Photo Credit: NC 54 Corridor Safety Study

## *I would bike more if...(Responses from survey & comment form)*

There were better routes connecting Carrboro and Chapel Hill. Taking Main street onto Rosemary or Franklin is unpleasant and dangerous, not to mention disjointed in terms of cycling "facilities". The Cotten Bike path is nice, but Cameron Ave doesn't take me to many of the places I want to go.

There were more separated trails or physically separated lanes. I have young children and while I'm comfortable biking on roads myself, I'm scared to take my kids on the roads since they are lower down and less visible in the bike trailer or tandem bike attachment.

Bikes had a clearer route through intersections.

The roads were cleared more quickly of debris after storms and after people put their leaves and tree branches in them - it is dangerous to have to go into the street to avoid them

The bikeable network was connected. Often one unsafe stretch will prevent me from biking at all.

There were more bike lanes and more green trails (or green trails connected by bike lanes). As a family with 2 kids and 4 bikes, we enjoy recreational riding - but it tends to be more a case of drive to a place, for example to the community center, to take the Bolin creek trail, or to the Northern Forest to the pumpkin loop. I would probably bike more as a commuter, if it were safe, and more lanes.

Motorists were educated about how to avoid dangerous situations when passing people bicycling.

The #1 thing that would make me bike more is more people bicycling on the road. The critical mass and the natural visibility of a lot of people bicycling is the best encouragement.



# 4 THE FRAMEWORK



Mayor's Bike Ride  
Photo Credit: The Town of Carrboro



## INTRODUCTION

While transportation infrastructure – roads, bikeways, trails – are critical for improving bicycling, other components must also be used to create a truly bike-friendly Carrboro. This Plan incorporates these strategies to make bicycling safe, comfortable, and fun.

Non-infrastructure recommendations are organized according to two distinct categories:



### Policies

Policies add political backing and institutionalize recommendations and design guidelines into town codes. Policies may be specific to infrastructure elements or may be broad and include multiple jurisdictions and stakeholders.



### Programs

Programs can engage the broader community to encourage more people to bike, educate community members on rights and responsibilities, and enforce traffic laws to improve safety for all modes.

## KEY PARTNERS

Numerous partners, ranging from public to private to non-profit, will be essential for rolling out a variety of programs. Some of these are shown below:

- » Town of Chapel Hill
- » GoChapelHill
- » BikeCarrboro
- » The Bicycle Chain/Clean Machine
- » The ReCYCLery
- » Orange County
- » The YMCA
- » Chapel Hill-Carrboro City Schools
- » Back Alley Bikes
- » Carrboro Business Alliance
- » Parcycles, Inc



*Helmet Fitting & Bike Maintenance Event organized by BikeCarrboro and the Clean Machine  
Photo Credit: Molly De Marco*



POLICIES

STRATEGIC PRIORITIES

**Expand Bike Parking Requirements**

High quality and convenient bike parking is a necessary component to encourage bike ridership.

**Shared Mobility Policy**

The Town will need to stay up-to-date on trends related to bike share, scooter share, and the like and ensure policies reflect community goals.

**Tactical Urbanism Policy**

Create a streamlined permitting process to allow community partners to collaborate on pilot projects.

LONG TERM

**Expand Enforcement**

Police support for the safety of people bicycling, including encouraging reporting, provides the data for the Town to fully evaluate countermeasures.

**Speed Enforcement for Hot Spots**

Using bicycle crash data and public feedback to identify hot spots and perform targeted enforcement can help prevent future crashes.

**Dedicated Funding**

A dedicated funding stream would allow for more reliable and consistent long term bicycle planning and implementation.

**Allocation of Bicycle Program Tasks**

Dedicate more staff hours to research, implementation and outreach. Ensure coordination and accountability of tasks

**Maintenance**

Ensuring facilities is clear of debris is important to increase ridership and increase safety.



## PROGRAMS

## STRATEGIC PRIORITIES

**Tactical Urbanism**

Provides the ability to test new infrastructure and allows for immediate public feedback and early detection of obstacles before making large investments. The Town's future traffic calming policy includes some specifics for Tactical Urbanism.

**Continue Safe Routes to School Efforts + Partnerships**

Continue work from the adopted 2012 plan in order to increase the number of students who bike to or at school.

**Bicycle Wayfinding**

Wayfinding elements such as signage, pavement markings, and mile markers will help to draw visitors, help users identify the best routes, and enhance their ability to access major destinations.

## LONG TERM

**Regional Map/Mobile App**

Ensure that the Town of Carrboro is represented and supported by the developing DCHC/CAMPO regional app that provides an easily accessible resource to plan bicycle routes, identify maintenance issues, and report safety issues.

**Expand Options for Skills Training + Social Rides in Diverse Neighborhoods**

Making cycling accessible and enjoyable for all who bicycle, including the "interested but concerned" riders, should be a priority (current Town effort ongoing).

**Encouragement Campaign**

Building off of Watch for Me, NC - a targeted encouragement campaign that fits within the culture and brand of Carrboro, would help educate users and encourage more bike trips.

**Advocacy Ambassador Program**

Support and partner with Carrboro's existing bicycle advocates to help with public outreach and bike plan implementation.

**Expand Count Program**

Counts are collected along state-maintained roads; the Town is working to expand counts along local roads and greenways. Accurate count information allows the Town to identify trends and determine where investment should be made.

**Education of People on bikes and People in vehicles on Rules of the Road**

Ensure that educational opportunities about rules of the road are available for youth and adults.





## Policy Spotlight: Shared Mobility Policy

### BACKGROUND

Shared mobility programs are designed to provide cost-effective, environmentally-friendly and convenient travel options for short trips within a city or region. The systems consist of a fleet of user-friendly and durable bicycles, electric power-assisted bicycles or lightweight electric scooters (e-scooters) intended to be driven while standing. Both bike or scooter share programs are relatively inexpensive and quick to launch—compared to highway and transit projects—and can provide an extension to Carrboro’s public transportation system.

As more success has been realized, larger cities are expanding shared mobility into lower density and lower income areas, and mid-size and smaller cities have launched successful bike share and scooter share systems. Bike share and scooter share have been transformative transportation system offerings for many cities in North America. They can provide sustainable transportation options, infill first/last mile connectivity (extend the reach of transit), create jobs, reduce reliance on private automobiles, and improve the health of Carrboro residents.

### POLICY RECOMMENDATIONS

Cities and towns have had some challenges in implementing bike share and/or scooter share systems in recent years. In some cases, private vendors have dropped scooters in a city without any advanced warning. Today, cities are becoming better prepared with their own policies to effectively manage systems that work for them. Some specific policy areas for the Town to consider are:

- » **Fleet Size** - Communities piloting shared mobility for the first time may opt for deploying a limited fleet in the interest of gauging public interest in the service and observing modal interaction between e-scooters, people on bikes, people walking, and motor vehicles. Other communities using static fleet caps may have determined the designated number of units is an appropriate or manageable amount for a community of their size, land-use pattern, or traffic conditions. *The Town of Carrboro should set an initial fixed fleet size with immediate demand-based expansion and reduction procedures within a set pilot period. This approach gradually integrates shared mobility devices into the streetscape.*
- » **Speed Limits** - Shared Mobility devices are most compatible with designated bike lanes and low-to-mid speed travel lanes (under 25 MPH). Most municipalities regulating shared mobility systems require that vendors cap device speed at 15 MPH, a suitable speed for bike lanes, shared use paths and local streets. Some jurisdictions are exploring requirements to cap device speeds in high-traffic areas, such as downtown centers or in public parks. *To start, the Town of Carrboro should clearly state in its permit regulations that all electric devices should be*

*equipped to achieve a speed of no more than 15 MPH throughout the designated service area.*

- » **Sidewalk Use** - Most municipalities strongly discourage, if not outright prohibit the use of shared mobility devices on sidewalks to avoid posing unnecessary danger and discomfort to people walking. On sidewalks, people walking and especially people with disabilities have the clear right of way. Therefore, sidewalk riding by shared scooters should be actively discouraged or prohibited to ensure access, comfort, and safety where people walking have the right of way *The Town may consider prohibiting sidewalk use throughout all service areas, with potential exceptions in discrete areas where traffic speeds are high and pedestrian traffic is low.*
- » **Parking Policy** - Improper parking procedures are another challenge, in that scooters and bikes can create hazards for people traveling on the sidewalk, particularly those people in wheelchairs, with visual impairments or ambulatory disabilities. While systems have long encouraged users to park in the “furnishing zone” of sidewalks (where bike racks, benches, trees and signage are located), some cities have enhanced the formality and enforceability of scooter parking policy. Formalizing the relationship between device parking standards and pedestrian accessibility begins with setting a minimum sidewalk clearance requirement that riders are required to obey when parking. “Drop zones” are an emerging tactic aimed at reducing improper parking procedures. Drop zones are small designated parking areas for dockless bikes or e-scooters within the public right of way, identified with paint and/or signage. *If a bike or scooter share system is established, the Town should mandate shared mobility parking areas/drop zones in busy pedestrian areas and elsewhere, to mitigate blocked sidewalks and clutter. The Town should also include incentives in its scooter or bike share pilot program regulations.*
- » **Accessible Bike Rentals** - While bikeshare and other shared mobility systems have become increasingly popular over the past few years there is still a lack of accessible devices (such as tricycles or handcycles). There are some examples of cities partnering with local bicycle shops or accessibility advocates to provide an accessible bike rental service so that a system is available to people of all abilities.

Examples of accessible rental programs and partnerships include:

**Portland, OR and KerrBikes:**

[www.adaptivebiketown.com](http://www.adaptivebiketown.com)

**Eugene, OR Parks & Rec Dept:**

[www.eugene-or.gov/134/Adaptive](http://www.eugene-or.gov/134/Adaptive)

**Detroit and Adaptive MoGo:**

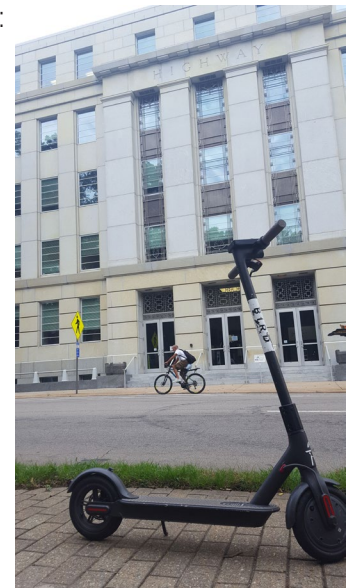
[www.mogodetroit.org/mogo-for-all/adaptive-mogo/](http://www.mogodetroit.org/mogo-for-all/adaptive-mogo/)

**Milwaukee, WI and Bublrbikes:**

<https://bublrbikes.org/adaptive>

**San Francisco and Bay Area Outdoor Recreation Partnership:**

<https://www.lyft.com/bikes/bay-wheels/adaptive-bike-share>





## Policy Spotlight: Bicycle Parking Policy

### TODAY'S EFFORTS

The Town of Carrboro's bicycle parking regulations and guidelines are integrated in the Town's 2009 Bike Plan and Land Use Ordinance (Article XVIII Parking). The Land Use Ordinance outlines the location requirements, recommended design elements, space requirements, trade-offs, and deviations for Carrboro business owners and developers. The Town is currently working towards linking to the APBP bike parking guidance in the Land Use Ordinance.

Creating a document, based on the APBP bike parking guidance, with easy to understand information and visuals tied to the Land Use Ordinance would allow Carrboro business owners, developers, and other interested parties to know what is required of them. Providing more resources and incentives will help support the expansion and enhancement of bicycle parking in Carrboro, which in turn encourages ridership.

### CASE STUDY: CHARLOTTE, NC

Charlotte Department of Transportation created a City of Charlotte Bicycle Parking document, which provides direct guidance and graphics for recommended bike rack styles and the benefits of providing bicycle parking in the city right-of-way. This document's primary purpose is to help businesses apply to the Bicycle Rack Partnership Program. It details the application process and provides inverted "U" Rack specifications and other guidance for Charlotte businesses.

#### GOOD SHORT-TERM BICYCLE PARKING EXAMPLES

*Seattle Department of Transportation (SDOT) has a similar document with helpful graphics.*

*Showing photos of bike racks helps users understand how to meet requirements. Photo Credit: SDOT*



On-street bike corral near an intersection in Ballard (Photo: Alta Planning + Design)



Multiple public racks at a high demand location at the University Stadium Light Rail Station (Photo: MIG|SvR)



Racks are protected under building cover at Swedish First Hill (Photo: Alta Planning + Design)



Rail type rack with space for a cargo bike on Greenwood Ave N (Photo: MIG|SvR)



Racks under a shelter with lighting & repair station at UW (Photo: MIG|SvR)



On-street racks in leftover space from angle parking on Terry Ave (Photo: MIG|SvR)





## Program Spotlight: Wayfinding

### TODAY'S EFFORTS

As of writing, Carrboro is developing a branded wayfinding system, which will include a variety of new signs around town. These include bike parking signs, “bike trailblazer” signs, and bike share signs. Future options can be developed to include a separate sign for other forms of micromobility devices.

### RECOMMENDATIONS

This new wayfinding signage system should be applied to the proposed neighborway network (see Chapter 5) as a low-cost, quick action item. The town’s bike maps should also be updated with this new information so people who bicycle can plan routes both before and during rides.



Photo Credit: Axia Consulting

### CASE STUDY: TRAVELERS REST, SC

The City of Travelers Rest, SC, population 4,600, has transformed itself into a “trail town” with careful planning and incremental implementation. A large part of this transformation has been its wayfinding system. By using branded, clear wayfinding signage, not only was it safer and more enjoyable for people who bicycle to find their way around town and to the surrounding trails, but also promoted a sense of place.

*Signs, such as the ones in these images, create a sense of identify and place within a town for people who bicycle.*





## Program Spotlight: Tactical Urbanism

### TODAY'S EFFORTS

The Town of Carrboro has experience with both pedestrian- and bicycle-focused tactical urbanism projects, such as the painted crosswalk on Weaver Street and a traffic calming pilot project on Cobblestone Drive.

### RECOMMENDATIONS

Due to Carrboro's enthusiastic bicycle community, bicycle-focused tactical urbanism projects would be a great option for the Town. These short, relatively quick interventions using low-cost materials allow the Town to experiment, gather data, and receive immediate feedback on bikeway projects before making large investments in permanent infrastructure. The Town can complement their own programs with creating policies to allow community groups to initiate their own bicycle-focused tactical urbanism projects.

### CASE STUDY: MORGAN HILL, CA

Alta Planning + Design worked with Town of Morgan Hill staff, Morgan Hill's Downtown Association, and Street Plans Collaborative to create a demonstration project utilizing tactical urbanism techniques for a six-month pilot project. Meetings were held with city staff, stakeholders, and residents to determine the two favorite alternatives which would be built in the three-day pop-up event. After the pop-up event, buffered bike lanes were chosen by the public and were installed for six months.



### CASE STUDY: RALEIGH, NC



Raleigh's city government and local advocacy group Oaks & Spokes installed a pop-up, two-way cycle track for three blocks in downtown Raleigh for a weekend. Cones and donated planters were used as temporary protection for the cycle track. Because of its success, a permanent cycle track will be implemented.



## Program Spotlight: Bicycle Count Programs

### TODAY'S EFFORTS

Currently, the Town of Carrboro has bicycle counters on the Libba Cotten Bikeway and on Old NC 86 north of Hillsborough Road.

### RECOMMENDATIONS

Adding more counters in new locations will provide data for evaluation of bicycle facilities and for future bicycle infrastructure decisions. The data collected from counters can also help quantify the benefits of biking and make bicycle projects more competitive for funding opportunities.

### CASE STUDY: SAN DIEGO, CA

The County of San Diego Health and Human Services Agency, San Diego Association of Governments, and San Diego State University collaborated to install automated bicycle counters throughout the region using grant funding. Data is collected every 15 minutes and uploaded daily to the SANDAG website.

### CASE STUDY: SAN FRANCISCO, CA

San Francisco has a multi-pronged approach to bicycle counting. While they have “invisible bike counters” that are installed in the pavement, they also have installed digital bike counters. Digital bike counters were placed on San Francisco’s busiest biking streets to not only gather data on ridership, but also to send a message to people that bicycle and the public that people who bicycle count. The digital signs display the weather, the count of people bicycling that day, and a bar indicating the number of people bicycling that year.



*Digital bicycle counters gather data and are also a form of encouragement for people who bicycle.*

*Photo Credit: SFMTA*



# 5 THE NETWORK



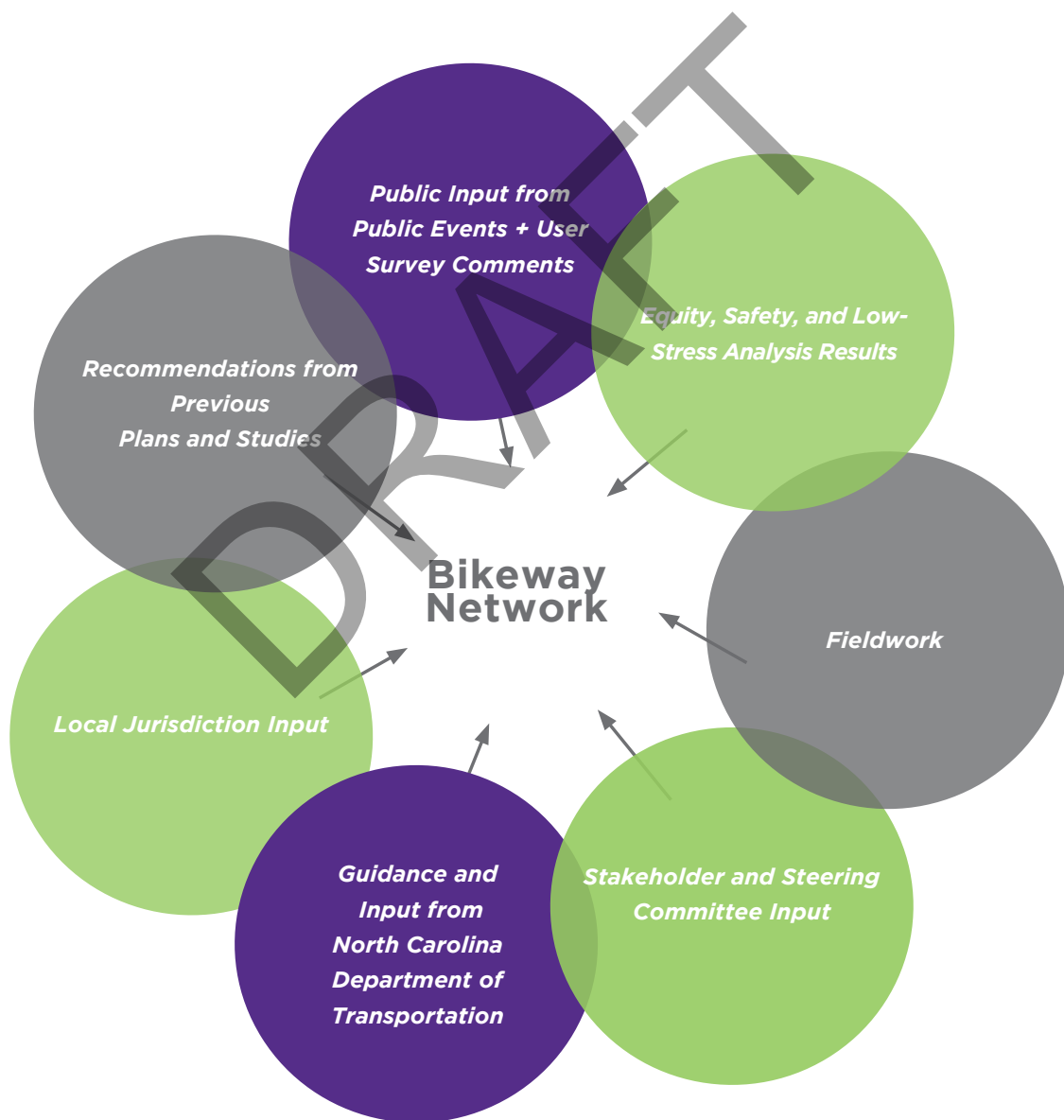
*People on bikes in Carrboro*



## CARRBORO'S APPROACH

The proposed network seeks to:

- » Reflect our vision and goals
- » Address the needs of all ages and abilities in Carrboro
- » Balance the transportation system with safety as the #1 priority for all roadway users
- » Integrate seamlessly with future development and land uses





## TYPES OF BIKEWAYS



### Shared Use Path

Shared Use Paths are completely separated from motorized vehicular traffic and are constructed in their own corridor, often within an open-space area. Shared Use Paths can be paved and should be a minimum of 10' wide. Pavement widths of 12-, 14-, and even 16-feet are appropriate in high-use urban situations.



### Private Connections

A private connection includes the development of a public bike facility on a privately owned street or land. The recommendations found here include shared use paths taking advantage of privately owned open space and shared use neighborways on privately owned residential streets. These facilities are often kept short to minimize impacts on private property but are critical components to a well-connected network.



### Separated Bike Lanes

This updated Plan defines a separated bike lane as a bicycle facility that is physically separated from motor vehicle traffic within a street corridor. For this Plan, this includes cycle tracks and buffered bike lanes, in addition to the City's shared-use path and greenway network. The on-road physical separation can be achieved through parked cars, curbs, medians, bollards/traffic posts, planters, or marked buffered space between the bike lane and adjacent travel lane.



### Bike Lanes

A bike lane is a portion of the roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of people who bicycle. Bike lanes are almost always located on both sides of the road (except one way streets), and carry people who bicycle in the same direction as adjacent motor vehicle traffic. In some cases, climbing bicycle lanes (on uphill side) can be paired with shared-lane markings on the downhill section. The minimum width for a bike lane is 4 feet; five- and six-foot bike lanes are typical for collector and arterial roads.



### Neighborways

In residential neighborhoods, neighborways—also known as bicycle boulevards—improve travel for people who bicycle while calming traffic and greening neighborhoods. Neighborways are shared by automobiles and bicycles, but at speeds that make travel more comfortable for people who bicycle. Typical treatments along neighborways may include mini-circles, chicanes, wayfinding signage, and shared-lane markings.



### Advisory Bike Lane

An advisory bike lane defines a preferred space for people who bicycle and people who drive to operate on narrow streets that would otherwise be a shared roadway environment. Roads with advisory bike lanes accommodate low to moderate volumes of motor vehicle traffic and provide a prioritized space for people who bicycle with little or no widening of the paved roadway surface. A contraflow version allows people who bicycle to move against the flow of motor vehicle traffic on one-way





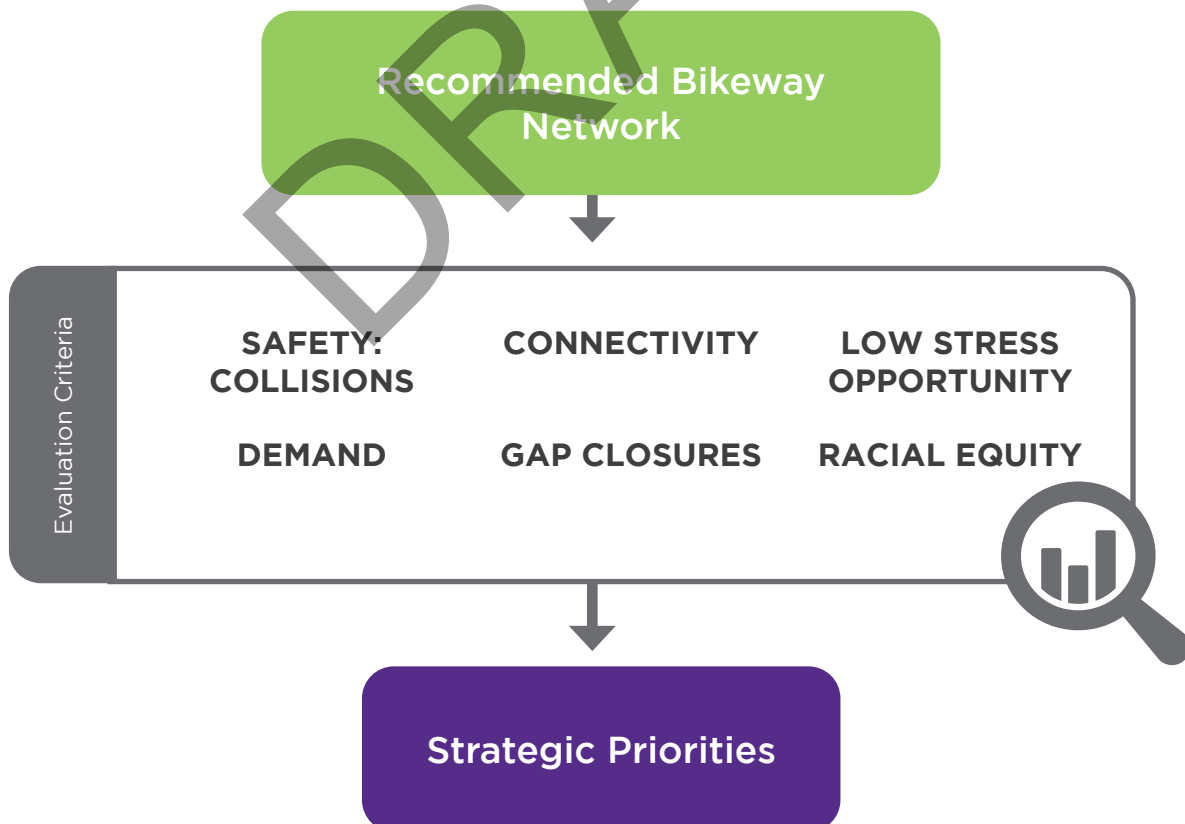
## IDENTIFYING STRATEGIC PRIORITIES

This Plan is designed to serve as a short-term call to action document that identifies projects that provide critical connections yet are feasible and realistic to implement. Full implementation of the long term network will take many years and require a significant amount of investment.

The projects were selected using the evaluation criteria displayed in the graphic below and also through feedback from the public, the steering committee, and town staff.

There are 10 total strategic priorities that are recommended by this Plan. More details for five of the strategic projects start on page 50. These were selected to provide implementation techniques for a variety of facility types. They were also the most highlighted by the Steering Committee and general public. The additional five projects not described on the following pages are:

- » Claremont/Cobblestone Neighborway
- » Parkview Avenue Neighborway
- » Williams Street Neighborway
- » Elm Street/ Laurel Avenue Neighborway
- » West Carr Street Neighborway



# Map 10: Existing, in Development, & Strategic Priorities

Appendix B-50 of 78

## EXISTING BIKE NETWORK

- Bike Lanes
- Bike Lane One Side Only
- Sharrow
- Wide Shoulder
- Shared Use Path

## STRATEGIC PRIORITY NETWORK RECOMMENDATIONS

- Separated Bike Lanes
- Bike Lanes
- Neighborway
- Shared Use Path
- Crossing Improvement

## DEVELOPMENT STATUS

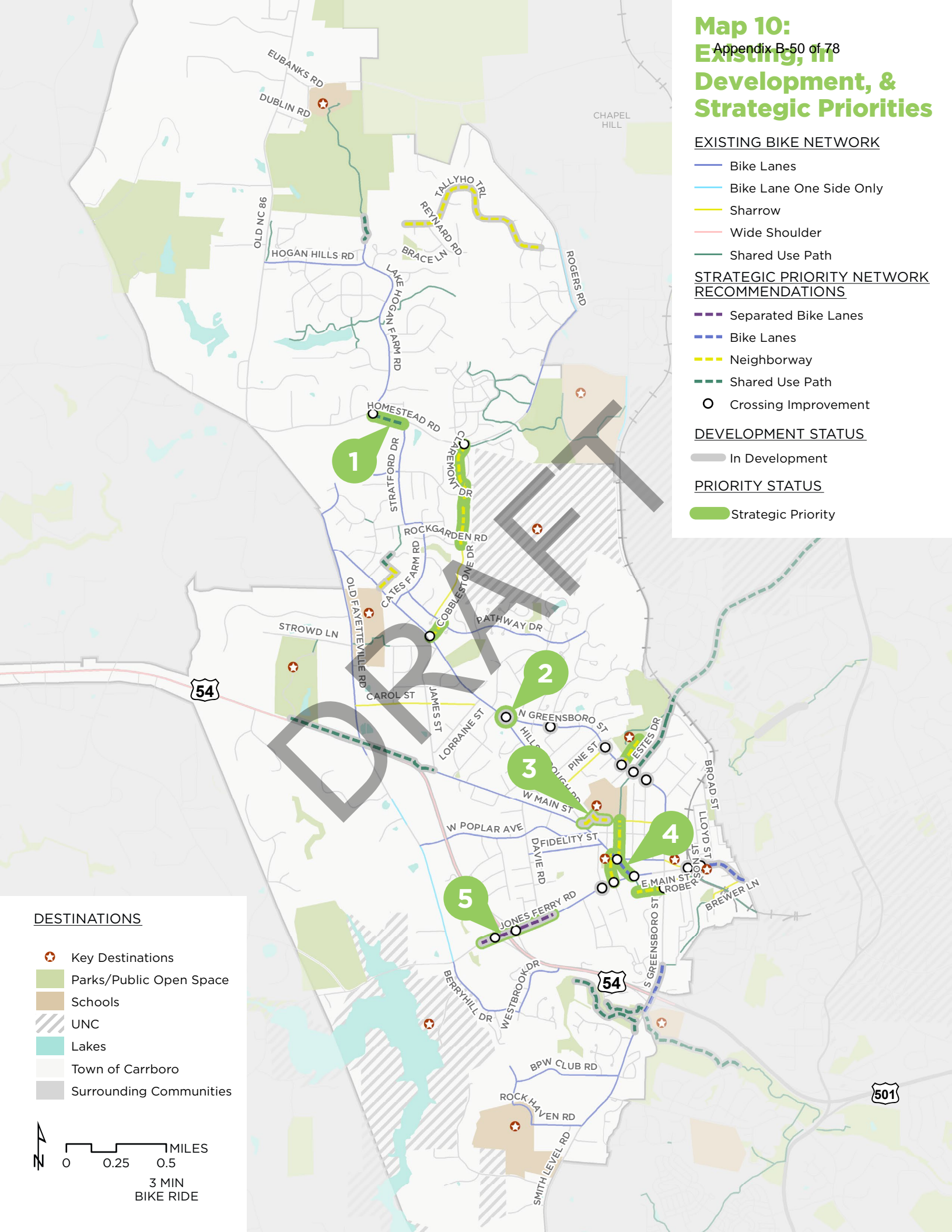
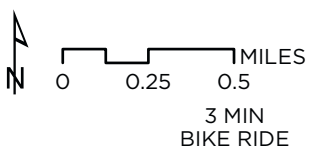
- In Development

## PRIORITY STATUS

- Strategic Priority

## DESTINATIONS

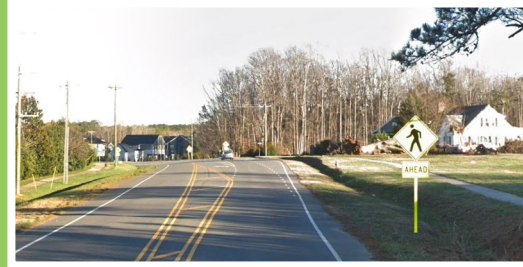
- Key Destinations
- Parks/Public Open Space
- Schools
- UNC
- Lakes
- Town of Carrboro
- Surrounding Communities



## 1 HOMESTEAD RD SIDEPATH LINK

pg. 52

*This project will connect large residential hubs and fill a gap from north Carrboro to downtown by connecting bike lanes along Lake Hogan Farm Rd and Stratford Dr.*



## 2 HILLSBOROUGH ST AND N GREENSBORO ST INTERSECTION IMPROVEMENTS

pg. 54

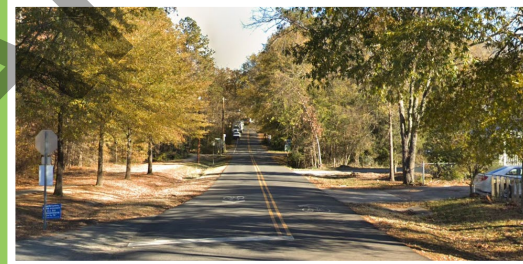
*This is a an unsignalized intersection along a critical bike route. Improving the intersection will increase safety and comfort for all users.*



## 3 SHELTON ST CONTRAFLOW BIKE LANE

pg. 56

*The Shelton St contraflow bike lane will fill an important gap between the Hillsborough St bike lanes and Carrboro Elementary.*



## 4 WEST MAIN ST BIKE LANES & INTERSECTION IMPROVEMENTS

pg. 58

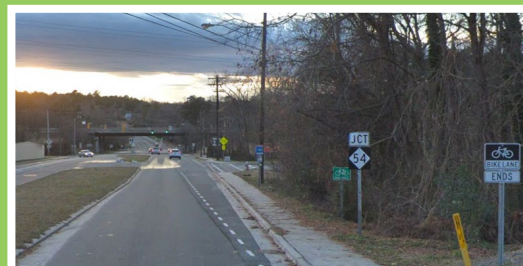
*Intersection improvements and bike lanes on both sides of the street (filling gaps) will improve bike access to downtown along West Main St.*



## 5 JONES FERRY RD SEPARATED BIKE LANES

pg. 62

*Separated bike lanes along Jones Ferry Rd will bring much-desired safety benefits to this heavily used commuter corridor.*





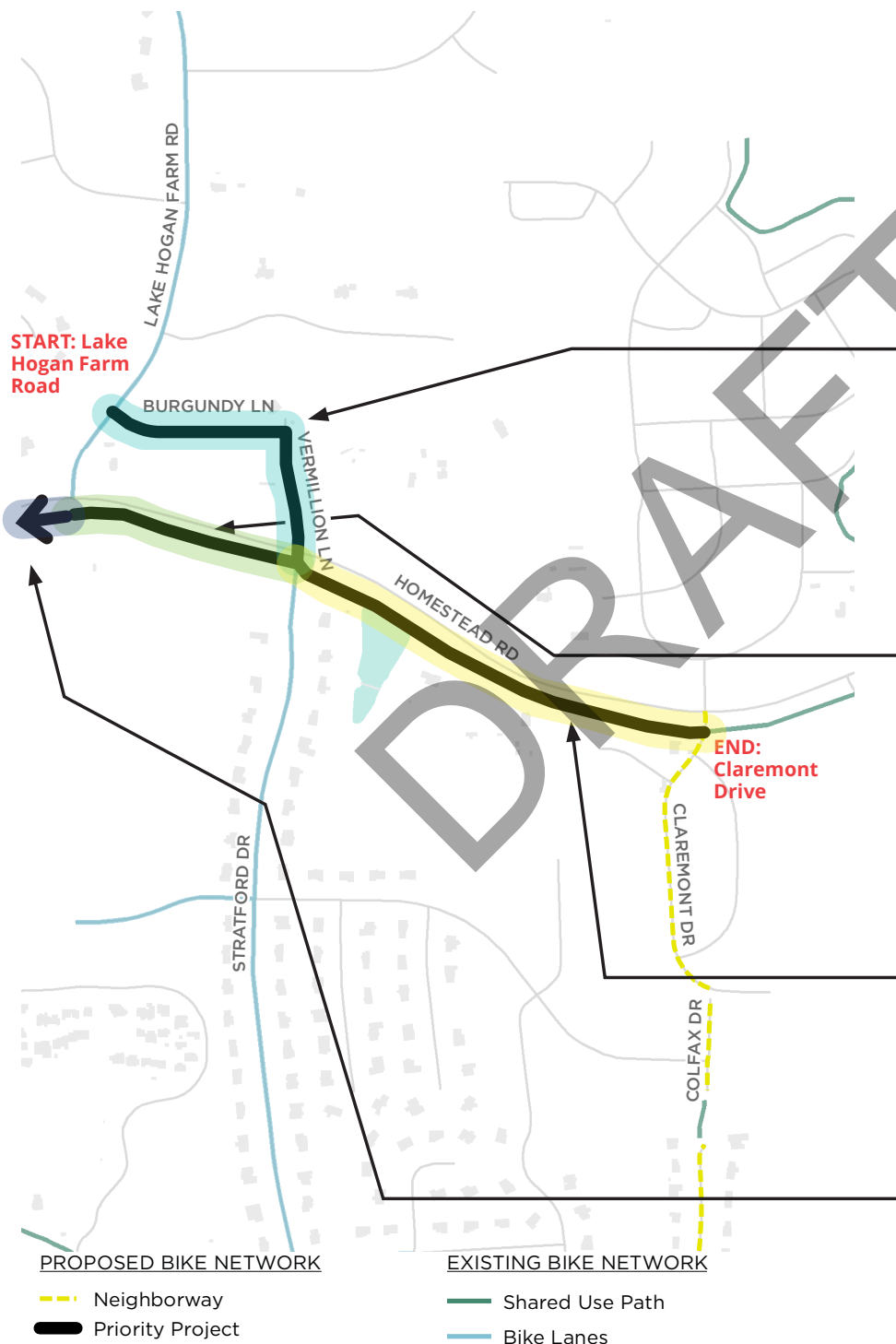
1 - HOMESTEAD RD SIDEPATH LINK



FROM:  
Lake Hogan Farm Road

TO:  
Stratford Drive

LENGTH:  
1,200 Feet



It is recommended that a corridor/alignment study be conducted. The study should consider completing this priority project in three phases:

**PHASE 1:** Implement **neighborway** treatments through Burgundy Ln and the short segment of Vermillion Ln. Construct a short **shared use path** segment from the southern terminus of Vermillion Ln to the Stratford Dr intersection, connecting the existing bike lanes on Lake Hogan Farm Rd to the Stratford Dr bike lanes. Coordination will be needed with the property owners between Vermillion Ln and Homestead Rd.

**PHASE 2:** Construct **sidepath** along south side of Homestead Rd from Lake Hogan Farm Rd to Stratford Dr.

**PHASE 3:** Construct a **sidepath** along the south side of Homestead Rd from the proposed phase 2 sidepath terminus at Stratford Dr to the recently constructed sidepath extending east from Claremont Dr. 1,500' east of Claremont Dr, the existing sidepath connects to the Claremont/Chapel Hill High School greenway.

**LONG-TERM:** Continue **sidepath** west to Old NC 86 and east to High School Road.

The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

#### TRIP GENERATORS:

- Chapel Hill High School
- Smith Middle School
- Seawell Elementary School
- Carolina North Forest
- Claremont Greenway
- Adjacent neighborhoods

#### POTENTIAL PARTNERSHIPS:

- NCDOT
- Town of Carrboro
- Wexford Home Owners Association
- Burgundy Lane property owners
- Other adjacent property owners

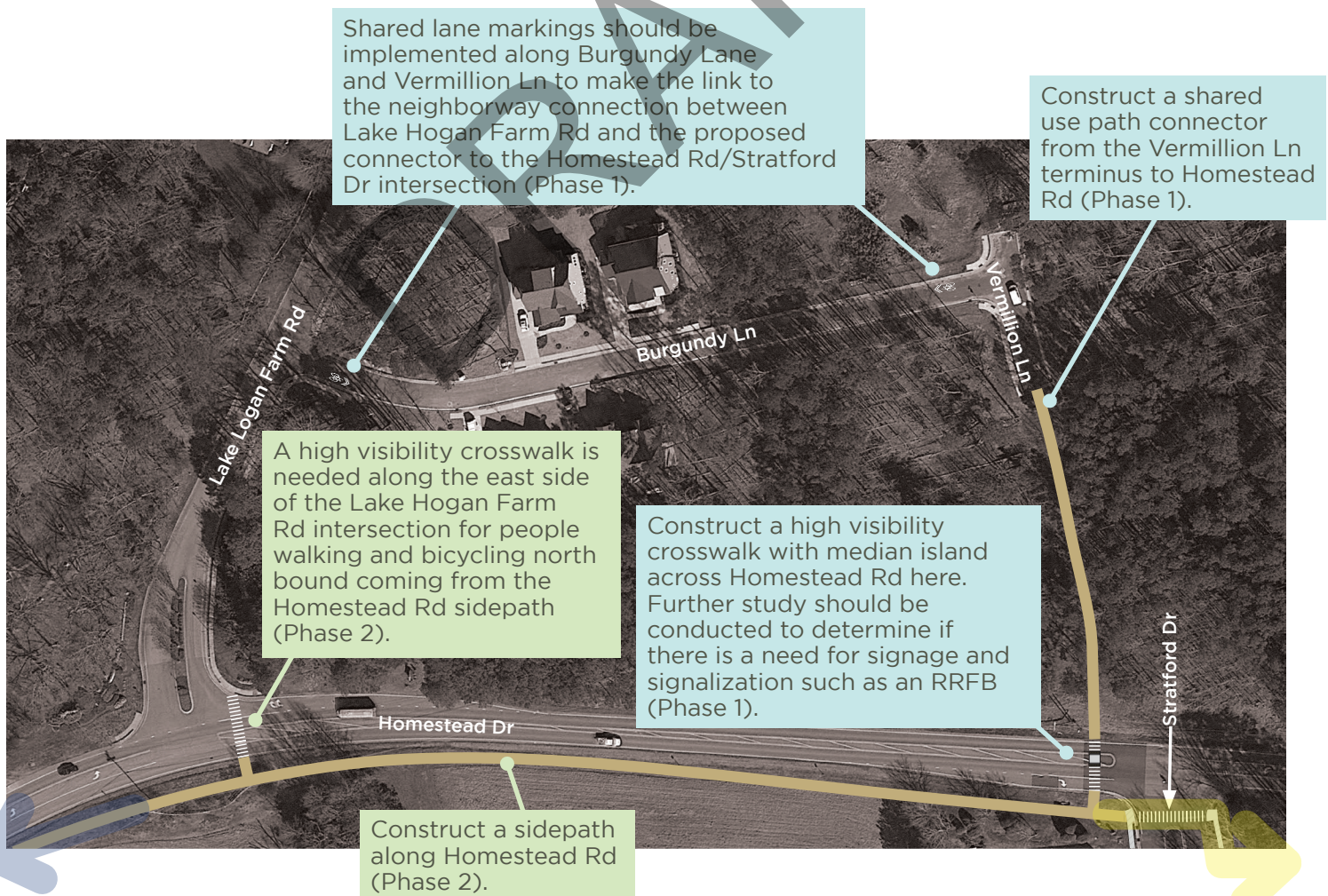
#### POTENTIAL ROW NEEDS:

- Additional ROW needed along Homestead Rd for sidepath construction as well as for the shared use path connector between Homestead Rd and Vermillion Ln.

**OPINION OF TOTAL CONSTRUCTION COST (2019) FOR PHASE 1:** \$168,740

**OPINION OF TOTAL CONSTRUCTION COST (2019) FOR PHASE 2:** \$367,510

#### PHASE 1 & 2: CONNECTING STRATFORD DR BIKE LANES TO LAKE HOGAN FARM RD BIKE LANES





## 2 - HILLSBOROUGH RD & N GREENSBORO ST INTERSECTION IMPROVEMENTS



The intersection at Hillsborough Road and North Greensboro Street is a key link in the network. However, in its current state, the intersection feels uncomfortable for many and lacks clear delineation of movement.

The recommended improvements will increase safety and comfort for all users by defining the space, slowing movement, and reducing confusion.

### OPINION OF TOTAL CONSTRUCTION COST (2019):

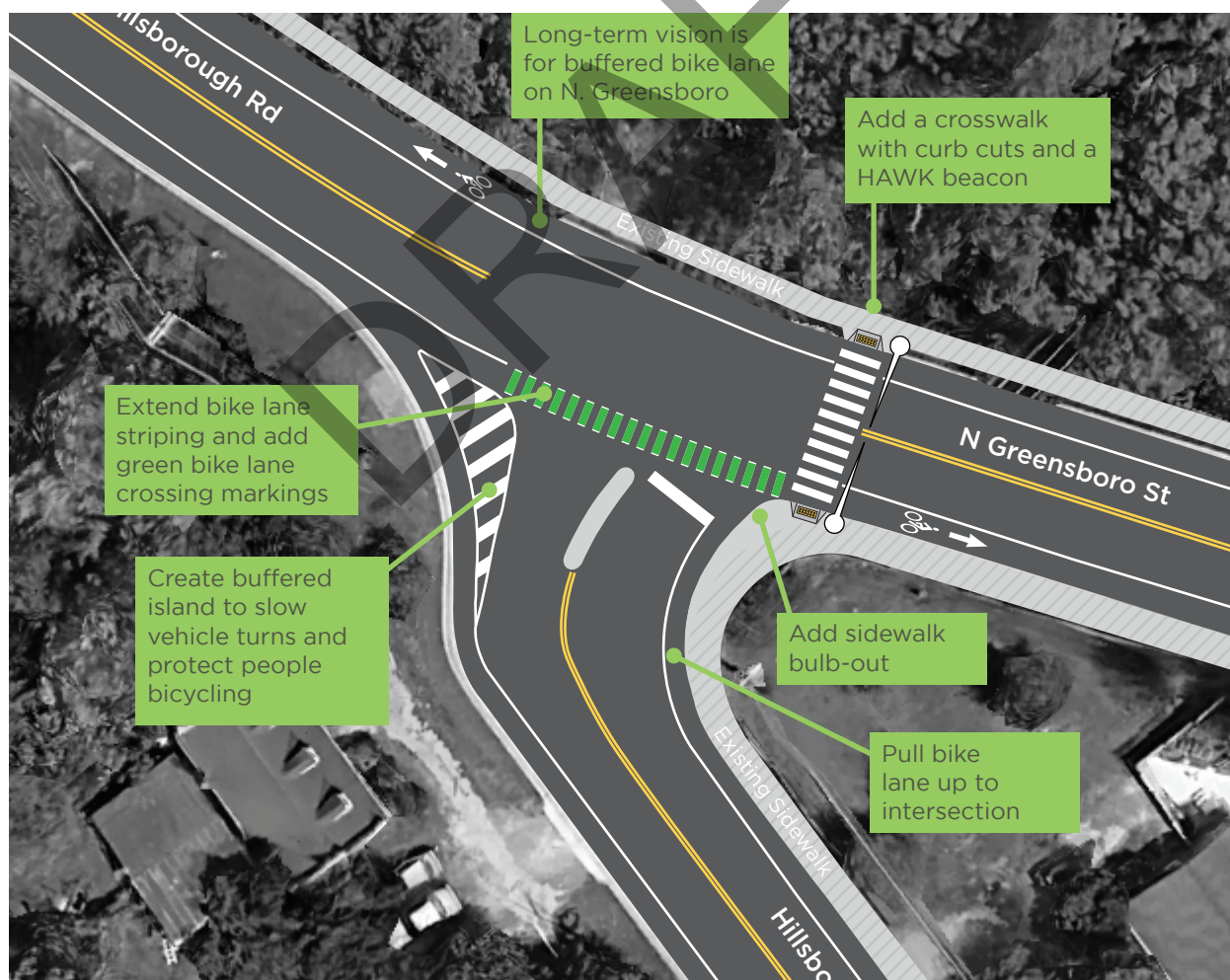
\$253,110\*

### TRIP GENERATORS:

- Carrboro Elementary
- Carrboro United Methodist Church
- Residences adjacent to the corridor
- Charles Herman Wilson Park
- Martin Luther King Jr. Park & Carrboro Community Garden
- Downtown Carrboro
- Adjacent property owners/neighborhood associations

### POTENTIAL PARTNERSHIPS:

- Town of Carrboro
- Adjacent property owners/neighborhood associations



*\*Eliminating the HAWK beacon and the associated utility relocation would substantially reduce the project cost but would also reduce the potential safety impacts.*



The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

### DESIGN GUIDANCE FOR COLORED BIKE LANES:

Colored pavement within a bicycle lane increases the visibility of the facility, identifies potential areas of conflict, and reinforces priority to people who bicycle in conflict areas and in areas with pressure for illegal parking. Color can be applied along the entire corridor or as a spot improvement at intersections.

***Currently, NCDOT does not have Interim Approval for the application of green paint for bicycle lanes - but that likely will change. Carrboro does have this interim approval and can install green paint through encroachment agreements provided the Town include a copy of the approval letter as an exhibit.***

The following required features and maintenance considerations are provided from the *NACTO Urban Bikeway Design Guide*.

### REQUIRED FEATURES:

- The color green shall be used to minimize confusion with other standard traffic control markings.
- Color shall be applied to the road surface to delineate space, increase visibility, and emphasize proper vehicle priority.
- Normal white bike lane lines shall be provided along the edges of the colored lane to provide consistency with other facilities and to enhance nighttime visibility.

### MAINTENANCE:

- Colored pavement requires varying levels of maintenance depending on materials.
- Because the effectiveness of markings depends entirely on their visibility, maintaining markings should be a high priority.
- Colored facilities should be maintained to be free of potholes, broken glass, and other debris.



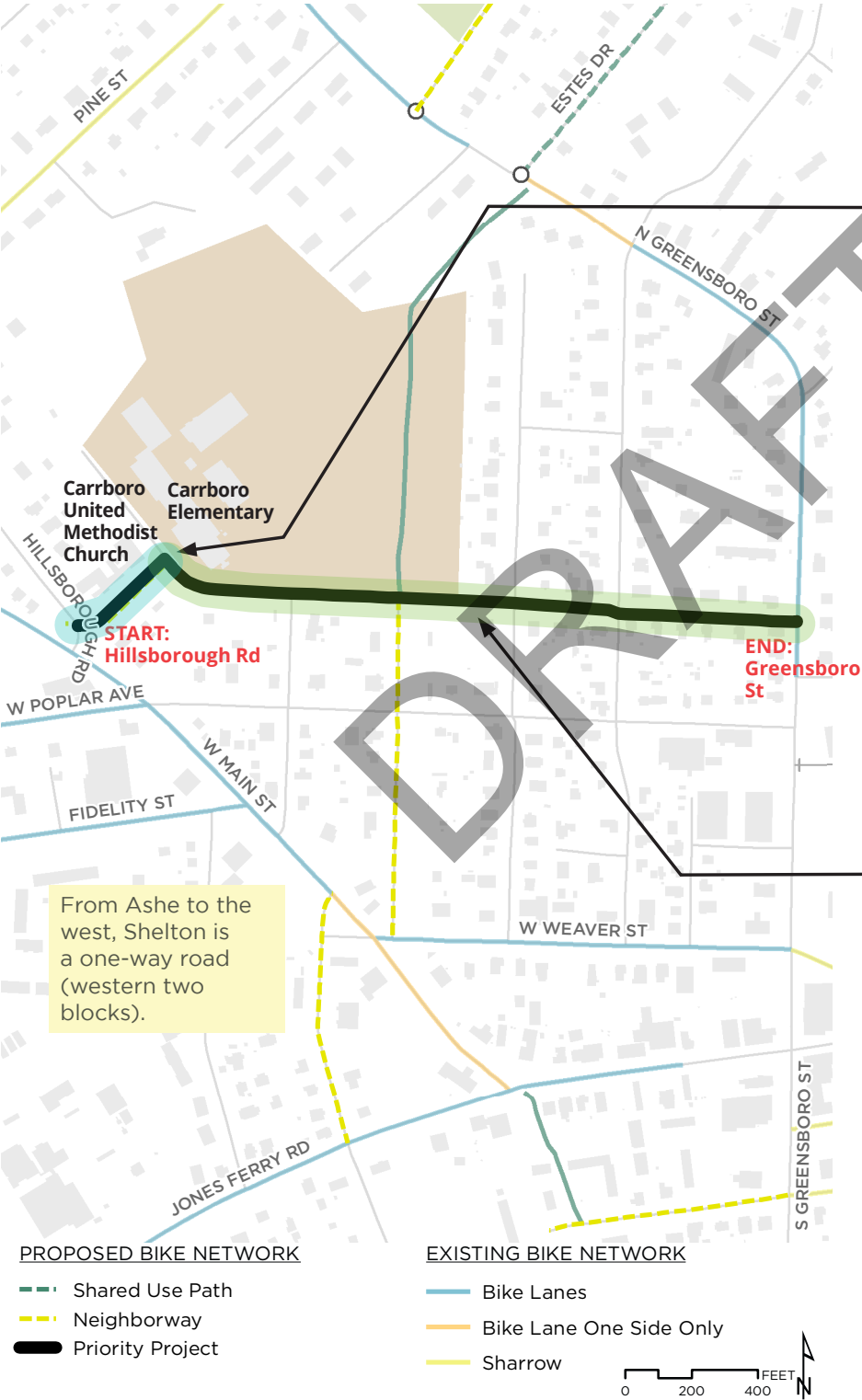
3 - SHELTON ST CONTRAFLOW BIKE LANE



FROM:  
Hillsborough Road

TO:  
N Greensboro Street

LENGTH:  
2,300 Feet



**PHASE 1:** Shelton St from Hillsborough Rd to Carrboro Elementary should be reconfigured to include a **contraflow bike lane**. Ideally, parking would be removed on one side of the street to allow for the greatest separation between people on bikes and in cars. It is possible to keep parking on both sides of the street - see City of Durham example (Watts St) on the following page. Watts St in Durham has nearly the same pavement width as Shelton St and parking on both sides.

**LONG-TERM:** Consider implementing dedicated bicycle facilities along Shelton St from Carrboro Elementary to Greensboro St. Bus circulation, school pick-up/drop-off circulation, and the needs of residents along the corridor will need to be closely examined. Currently, shared lane markings are included along Shelton St from Ashe St to Greensboro St.

The Town of Carrboro, Carrboro Elementary, and residents along the corridor should meet to discuss options that balance all needs.

Options to consider include the following:

- Shared Use Path within existing pavement with one-way conversion
- Advisory Shoulders
- No change - keeping shared lane markings

The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

#### TRIP GENERATORS:

- Carrboro Elementary
- Carrboro United Methodist Church
- Residences adjacent to the corridor
- Businesses along Greensboro St as well as Hillsborough Rd and Main St

#### POTENTIAL PARTNERSHIPS:

- Carrboro Elementary
- Carrboro United Methodist Church
- Town of Carrboro
- Adjacent property owners/neighborhood associations

#### POTENTIAL ROW NEEDS:

- None (unless option to construct shared use path outside of the existing Shelton St pavement width is selected)

#### OPINION OF TOTAL CONSTRUCTION COST (2019) PHASE 1: \$24,310

#### CONTRAFLOW BIKE LANE DESIGN CONSIDERATIONS:

Several requirements and options for contraflow bike lane signage are shown below. See the NACTO Urban Bikeway Design Guide for further design considerations for contraflow bike lanes - <https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/contra-flow-bike-lanes/>.



A "ONE WAY" sign (MUTCD R6-1, R6-2) with "EXCEPT BIKES" plaque shall be posted along the facility and at intersecting streets, alleys, and driveways informing people in cars to expect two-way



A "DO NOT ENTER" sign (MUTCD R5-1) with "EXCEPT BIKES" plaque should be posted along the facility to only permit use by bicycles.



Warning signage, such as a modified "TWO WAY" sign (MUTCD W6-3) may be posted along the facility to inform people in cars to expect two-way traffic.

The short section of Shelton St from Hillsborough Rd to Carrboro Elementary has nearly the same pavement width (slightly more) and parking configuration of an existing contraflow bike lane in Durham, NC (Street view of Watts St pictured to the right and below). See the NACTO Urban Bikeway Design Guide for further design considerations for contraflow bike lanes - <https://nacto.org/publication/urban-bikeway-design-guide/bike-lanes/contra-flow-bike-lanes/>.





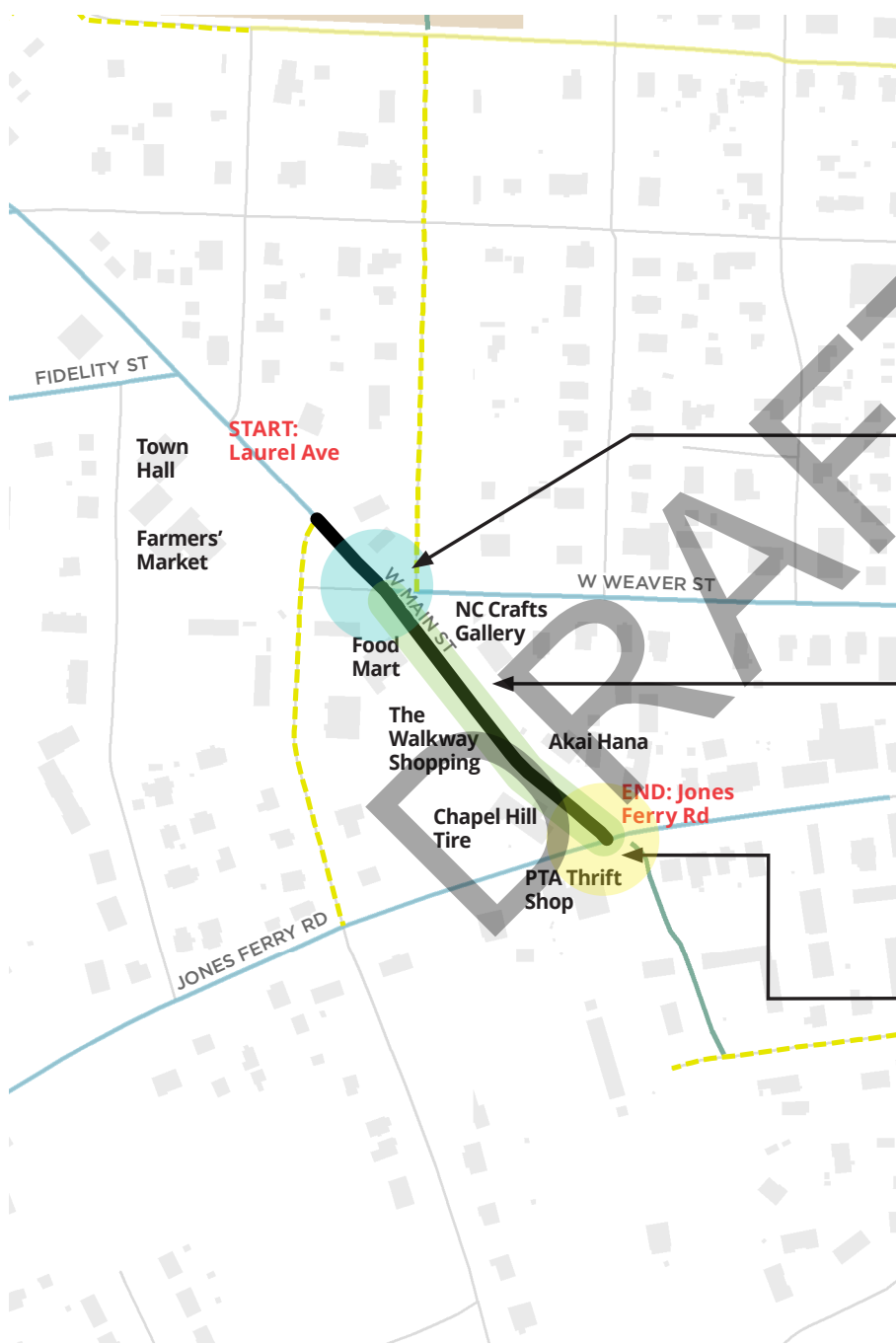
# 4 - W MAIN ST BIKE LANES & INTERSECTION IMPROVEMENTS



**FROM:**  
Laurel Avenue

**TO:**  
Jones Ferry Road

**LENGTH:**  
800 Feet



**PHASE 1:** Fill in bike lane gaps, improve intersections, and develop a consistent southbound bike lane from Laurel Ave to Jones Ferry Rd. With an existing pavement width of 35'-43', this can be accomplished within the existing curbs.

The Weaver St, Laurel Ave, and Main St intersection should be improved to better delineate spaces and create room for a **southbound bike lane** from Laurel Ave to Jones Ferry Rd (detail on following page).

**A LONG-TERM VISION** includes restricting vehicular left turn movements from Main St to Weaver St. The space currently used for a dedicated turn lane could be used for a **separated bike lane** between Laurel Ave and Jones Ferry Rd.

The Jones Ferry Rd and Main St intersection should be improved as a **protected intersection**. This would also require curb modification (helping alleviate current accessibility issues on the south side of the intersection). In the short term, conflict markings should be painted through the intersection).

The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

## PROPOSED BIKE NETWORK

- Neighborhood
- Priority Project

## EXISTING BIKE NETWORK

- Shared Use Path
- Bike Lanes
- Sharrow



### TRIP GENERATORS:

- Town Hall
- Farmers' Market
- Downtown Carrboro
- Businesses and residences along/near the corridor

### POTENTIAL ROW NEEDS:

- None (for short term recommendations) - Long term recommendations may require additional ROW at the intersections

### POTENTIAL PARTNERSHIPS:

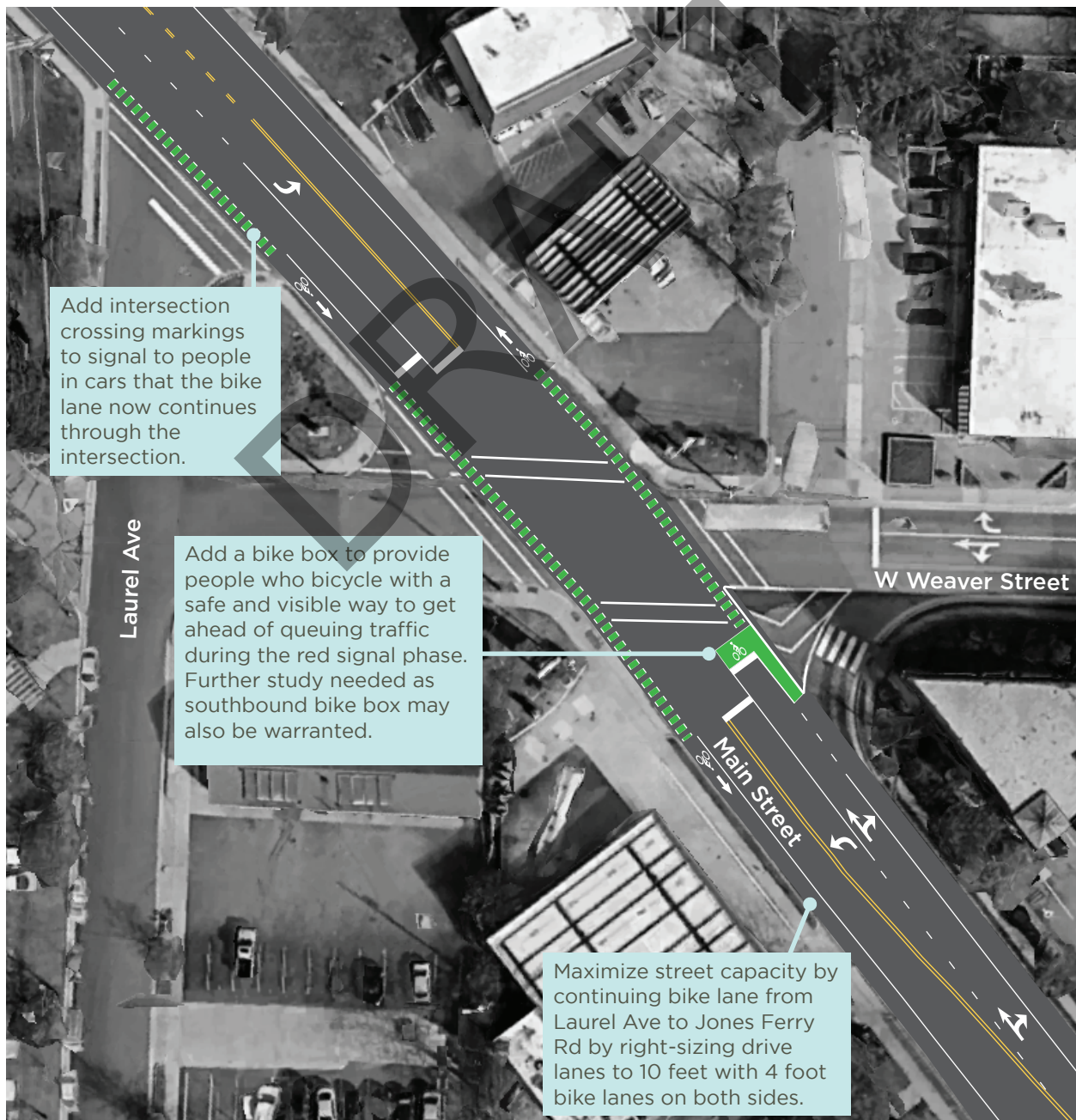
- NCDOT
- Businesses along the corridor
- Town of Carrboro

### OPINION OF TOTAL CONSTRUCTION COST (2019) PHASE I: \$145,860

### ADDITIONAL NOTES

- NCDOT does not have interim approval for application of green paint. The Town of Carrboro does have this interim approval and can install green paint and bike boxes through encroachment with the approval letter as an exhibit.

## PHASE 1 CONCEPT: COMPLETE BIKE LANE AND INTERSECTION IMPROVEMENTS

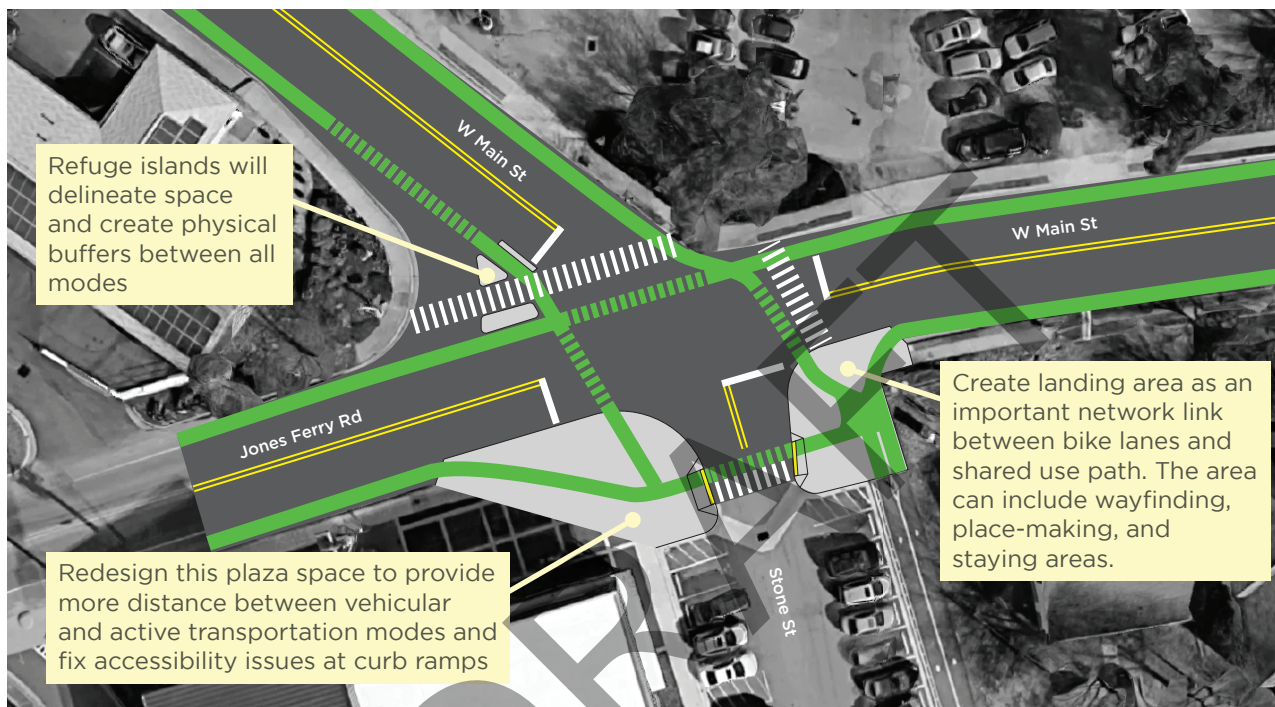




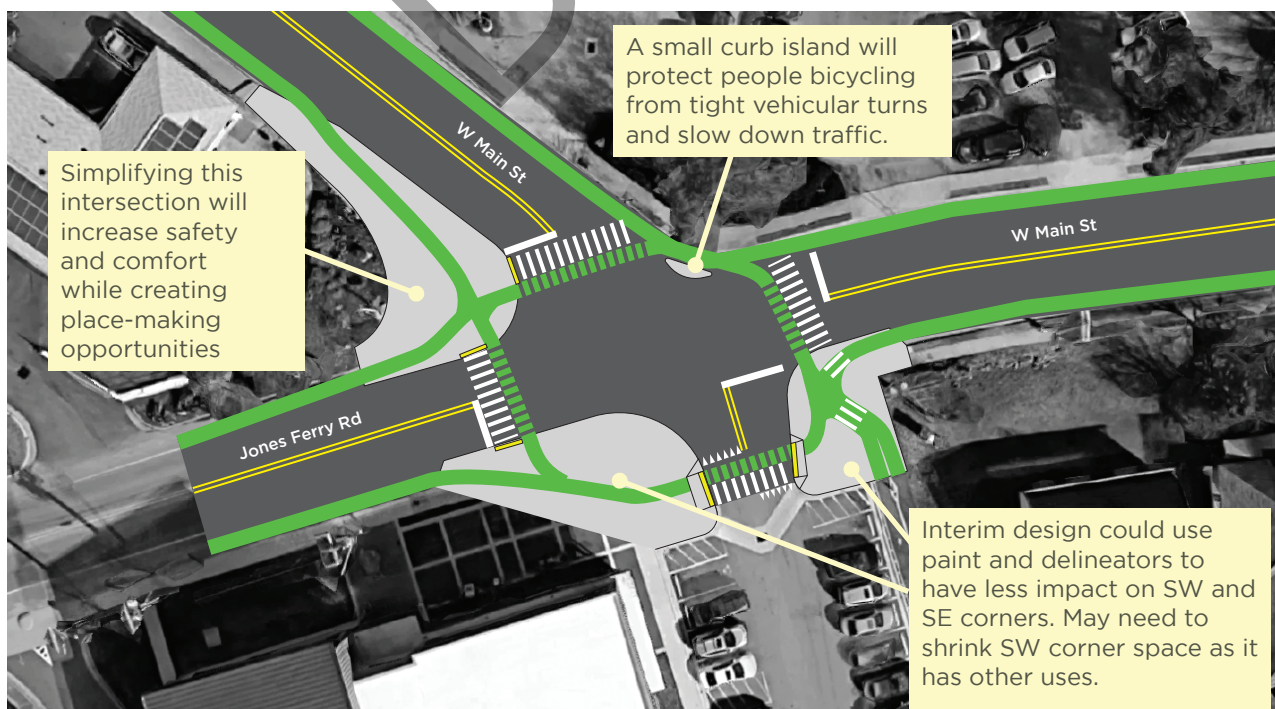
## DESIGN OPTIONS AND CONSIDERATIONS:

The following graphics express long-term concepts for a Main St and Jones Ferry Rd protected intersection. This project would require a heavy reworking of the existing curbs, including the recently completed area in front of the PTA Thrift Store.

### DESIGN ALTERNATIVE 1:

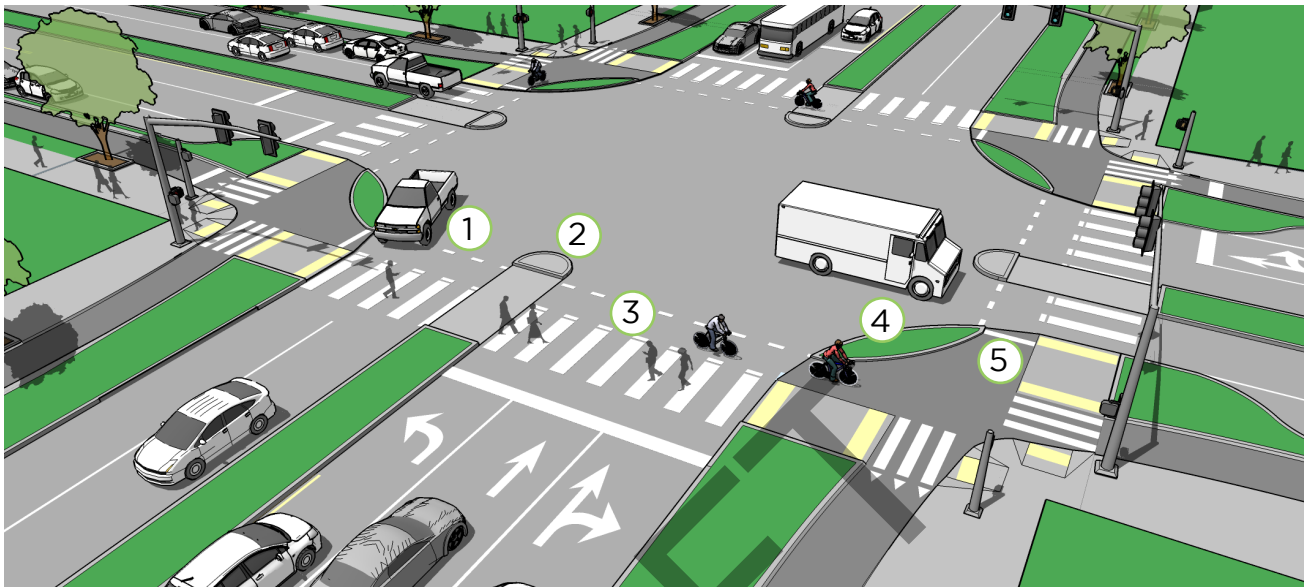


### DESIGN ALTERNATIVE 2:





## PROTECTED INTERSECTION DESIGN GUIDANCE



- 1 Setback bicycle crossing of 20ft allows for one passenger car to queue while yielding. A larger setback is desired in high speed areas (>35 mph). Small setback distance is possible in slow-speed, space constrained conditions.
- 2 If a permissive left turn is allowed, a median island extending into the intersection should be used to channelize and direct left turning motor vehicles.
- 3 Corner safety island with a 15-20ft corner radius slows motor vehicle speeds. Larger radius designs may be possible when paired with a deeper setback or a protected signal phase.
- 4 Intersection crossing markings should be used to identify the bicycle crossing. Consider green pavement to highlight the crossing area.
- 5 A forward stop bar should indicate the area for people bicycling to wait at a red signal.



*Salt Lake City, UT - These protected intersections are used to improve safety and circulation at intersections where two separated bicycle lanes cross.*

## FURTHER CONSIDERATIONS

Colored pavement may be used within the corner refuge area to clarify use by people bicycling and discourage use by people walking or driving.

Intersection approaches with high volumes of right turning vehicles should provide a dedicated right turn only lane paired with a protected signal phase to separate the right turn movements from through bicycle movements (Stanek, 2015).

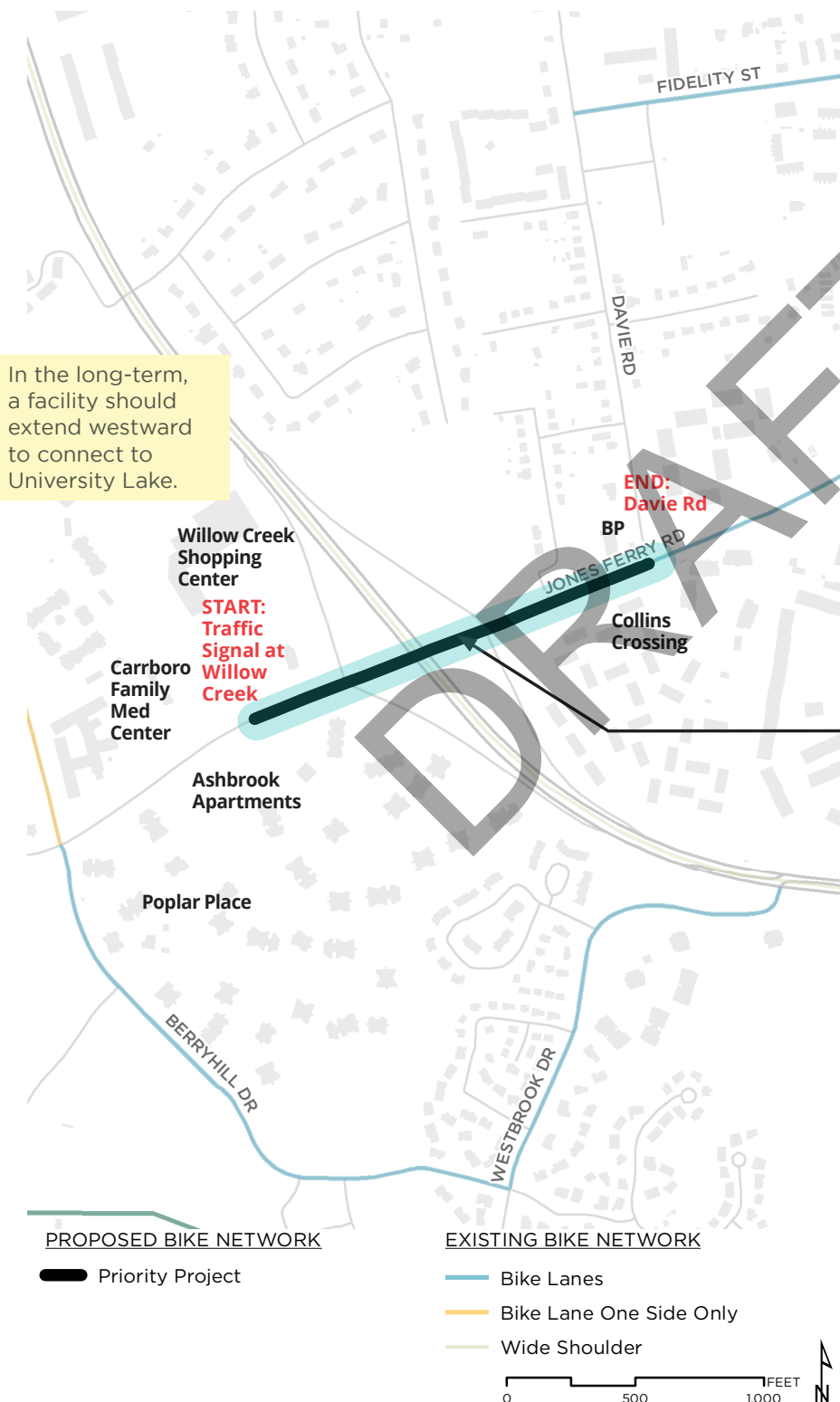
# 5 - JONES FERRY RD SEPARATED BIKE LANES



**FROM:**  
Traffic Signal at Willow Creek

**TO:**  
Davie Road

**LENGTH:**  
1,600 Feet



In the long-term, a facility should extend westward to connect to University Lake.

Jones Ferry Rd, from the traffic light at Willow Creek to Davie Rd, currently has a buffered bike lane along the uphill (eastbound) side (implemented in 2016), and no bicycle facilities along the downhill (westbound) side. The Town is working with NCDOT Division 7 and the IMD Division to develop a pilot project with three test treatments which would create a protected bike lane using the buffer on the eastbound side. The proposed treatments are standard delineator posts, zebra bumps, and thermoplastic rumble strips.

**PHASE 1:** Given the relatively high traffic volumes (8,300-12,000 AADT) and 35 mph speed limit through this section, **separated bike lanes** are recommended along both sides of Jones Ferry Rd.

For the downhill (westbound) portion, this would require eliminating the far right turn lane to create space for a buffered bike lane (and physical barrier such as flexible bollards).

For the uphill section (eastbound), a physical barrier should be constructed in the existing buffer space (such as flexible bollards).

A capacity analysis will be needed for project west of NC 54 ramps.

**LONG-TERM:** Consider constructing a landscaped median to improve safety, green infrastructure, and aesthetics in the separated bike lane buffer space.



The recommendations are conceptual at this stage. While these ideas and design features represent best practices for bicycling, they don't represent actual design. Once a design process begins, input from the community, adjacent property owners, other internal departments, and NCDOT will likely lead to adjustments that will be made based on what is feasible, desirable, and realistic.

#### TRIP GENERATORS:

- Willow Creek Shopping Center (Food Lion)
- Adjacent residential areas
- Downtown Carrboro

#### POTENTIAL PARTNERSHIPS:

- NCDOT
- Town of Carrboro
- Businesses and apartment complex owners along corridor

#### POTENTIAL ROW NEEDS:

- None

#### OPINION OF TOTAL CONSTRUCTION COST (2019) PHASE I: \$111,540

#### EXISTING



#### PHASE 1: FLEXIBLE BOLLARD SEPARATED BIKE LANE



#### PHASE 2: LANDSCAPED MEDIAN PROTECTED BIKE LANE





## THE LONG TERM NETWORK

The proposed long term bike network was developed with the goal of creating a system of well-connected, low-stress facilities for people of all ages and abilities. This network is intended to identify roadways in need of bicycling improvements so that as roadway and development projects occur, these bicycle facilities should be implemented.

In addition, once the strategic priority projects are implemented, projects from the long-term system will be selected as the next to implement.

The visual facility legend to the right highlights each facility type and the total mileage recommended in the proposed network.

The Town should remain flexible to opportunities as well as constraints that may require adjustments to this long-term network. As an example, the community is currently holding conversations to determine the potential alignment and surface type for a greenway trail through Carolina North along Bolin Creek. Additional projects may require refining with further local conversations and coordination with NCDOT and Chapel Hill Transit. These include the N Greensboro St separated (or buffered) bike lanes, E Main St separated bike lanes, and potential, future Rail Trail to Hillsborough, among others potentially.

NCDOT will have corridor studies and roadway projects in the future as well. The Town should remain coordinated with NCDOT to communicate its desires and take advantage of any opportunities to advance bikeways.

### Separated Bike Lanes



### Bike Lanes



### Private Connections



### Neighborhood



### Shared Use Path

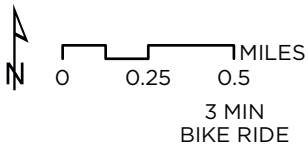


# Map 11: Appendix B-65 of 78 Long-Term Network

- EXISTING BIKE NETWORK
- Bike Lanes
  - Bike Lane One Side Only
  - Sharrow
  - Wide Shoulder
  - Shared Use Path
- LONG-TERM BIKE NETWORK
- Separated Bike Lanes
  - Bike Lanes
  - Neighborway
  - Private Connection
  - Shared Use Path
  - Crossing Improvement
- DEVELOPMENT STATUS
- In Development

## DESTINATIONS

- Key Destinations
- Parks/Public Open Space
- Schools
- UNC
- Lakes
- Town of Carrboro
- Surrounding Communities



As of Oct 2020, Bike lanes are in development but the long-term vision is for separated bike lanes.

As of Oct 2020, Bike lanes are in development but a SUP may be explored at a later timeframe.



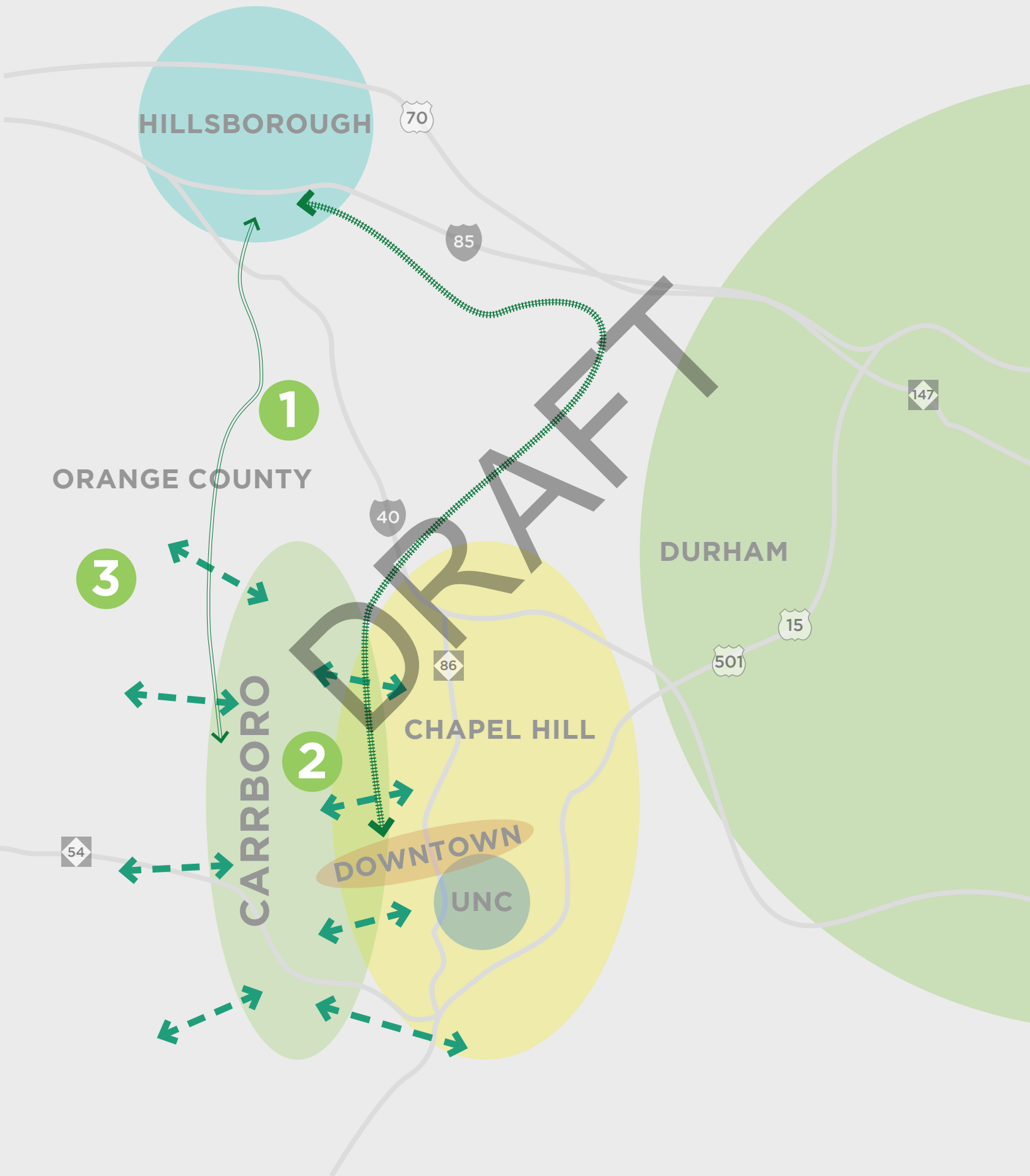
## REGIONAL CONNECTIVITY

There are numerous opportunities for increasing regional bicycle connectivity that would benefit people getting to and from Carrboro. Carrboro has a deep connection to its neighboring communities. Many neighborhoods, commercial areas, attractions, and institutions overlap between multiple

jurisdictions. The projects and categories below highlight areas of opportunity where the Town of Carrboro can leverage its partnerships to develop bicycle facilities that increase livability and economic vitality for not only Carrboro residents, but for the region.

<div>1</div> <div>CHAPEL HILL TO HILLSBOROUGH RAIL TRAIL</div> <div>A 10.2-mile rail corridor from downtown Carrboro northward towards Hillsborough could be a landmark project for the region by linking Carrboro, Chapel Hill, Hillsborough, and Durham. The State University Railroad corridor is currently used infrequently and with very slow-speed trains. A feasibility study managed through the DCHC MPO is recommended to pursue the possibilities.</div>	<div>PARTNERSHIPS</div> <div><ul style="list-style-type: none"><li>• University Railroad (Norfolk Southern)</li><li>• Town of Carrboro</li><li>• Town of Chapel Hill</li><li>• Town of Hillsborough</li><li>• NCDOT</li><li>• UNC - Chapel Hill</li><li>• Orange County</li></ul></div>
<div>2</div> <div>CHAPEL HILL AND UNC CONNECTIONS</div> <div>UNC-Chapel Hill and its institutions are large employers of many Carrboro residents. In addition, Carrboro and Chapel Hill residents commonly utilize services, recreation, and shopping across the “border” given the adjacent proximity. There are numerous key corridors linking Carrboro and Chapel Hill including Main St, Rosemary St, Estes Dr, Homestead Rd, Morgan Creek Greenway, and the Libba Cotton Bikeway. These all represent vital connections between the two communities. Ensuring continuity amongst bicycle facilities is paramount in ensuring a safe and comfortable regional network for regular users.</div>	<div>PARTNERSHIPS</div> <div><ul style="list-style-type: none"><li>• Town of Carrboro</li><li>• Town of Chapel Hill</li><li>• UNC - Chapel Hill</li><li>• NCDOT</li></ul></div>
<div>3</div> <div>ORANGE COUNTY CONNECTIONS</div> <div>Orange County has always been a popular recreational riding region with one of the first state bike routes established for the county. There are currently 206 miles of bicycle routes throughout Orange County, connecting communities and rural landscapes. Today, the communities of Carrboro, Chapel Hill, Hillsborough, and Mebane have expanded their bike networks. Thoughtfully tying these networks together into the future will help reduce future congestion and increase livability in this growing area.</div>	<div>PARTNERSHIPS</div> <div><ul style="list-style-type: none"><li>• Town of Carrboro</li><li>• Town of Chapel Hill</li><li>• Orange County</li><li>• Adjacent property owners</li><li>• NCDOT</li></ul></div>





## LONG TERM NETWORK - OTHER PROJECTS OF INTEREST

In addition to the long-term network shown on page 65, there are other projects of interest, while not shown on that map, warrant additional discussion. These projects are ones that the Town is still interested in finding an appropriate route to implementation, but additional work is needed in clearing administrative hurdles, design review & approval, or identifying community consensus. Showing these as lines on a map fails to acknowledge the underlying complexities and work needed to make these projects a reality.

### **Bolin Creek Greenway**

Carrboro adopted a Greenways Master Plan in 2006, that first identified the Bolin Creek Corridor as a potential alignment for greenway development. This is a multi-phase project of which sections 1A and 1B have been completed. Phase 2 as identified in that plan should still be considered for potential bicycle transportation projects. Consideration of other alignments in that plan were not discussed as part of this planning process, because as of September 2020, direction has yet to be determined by the Carrboro Town Council.

### **Buffered/Separated Bike Lanes**

Throughout the development of this Plan, there was a significant interest in separated bicycle lanes, in particular along N Greensboro Street and Hillsborough Road. These facilities are of utmost important in providing safe routes for people on bikes of all ages and abilities, and the Town is fully supportive of them, but there are implementation hurdles worth acknowledging. There are

currently no separated bicycle lanes on NCDOT maintained facilities. This means that there are no design standards in place to facilitate efficient review and approval of any proposed design for separated bicycle lanes on their facilities. Carrboro is currently working with NCDOT to develop a pilot project for the Jones Ferry Road corridor, which would place physical separation in the buffer space that already exists. The implementation process for future separated bike lanes on NCDOT facilities will be better refined based on the information gathered and lessons learned from that project.

### **Rail Trails**

The current Libba Cotten bikeway is a key piece of bicycle infrastructure in Carrboro. There has been significant interest received in extending that route along the rail corridor to points further north; In particular to use that as part of a route to Hillsborough or the Campus to Campus Connector. The Libba Cotten is a unique section of rail with trail in that it exists through an agreement between the University of North Carolina (who owns the rail spur) & the Town of Carrboro (who built and maintains the trail). The implementation for the Libba Cotten included an extensive discussion of liability, one that would likely need to be held again if another rail trail is to be considered. To extend the trail further would require developing a separate agreement with Norfolk Southern, the owner of the ROW along its alignment north of East Main Street in downtown.



*N. Greensboro Street and Hillsborough Road represent opportunities for enhancing the current bicycle lane to a buffered bike lane or separated bike lane. Given the curb-to-curb constraints, buffered bike lanes may be the only alternative that is the least impactful, in the long-term, and would still provide benefit to people on bikes.*



## DESIGN GUIDE RESOURCES

### Overview

Planners and project designers should refer to these standards and guidelines in developing the infrastructure projects recommended by this Plan. The following resources are from the NCDOT website, for “Bicycle & Pedestrian Project Development & Design Guidance”, located here:

<https://connect.ncdot.gov/projects/BikePed/Pages/Guidance.aspx>

All resources listed below are linked through the web page listed above, retrieved in August 2018.

### National Guidelines

American Association of State Highway and Transportation Officials (AASHTO):

- Guide for the Development of Bicycle Facilities
- Guide for the Planning, Design, and Operation of Pedestrian Facilities

The Federal Highway Administration (FHWA):

- Accessibility Guidance
- Design Guidance
- Facility Design
- Facility Operations

Manual on Uniform Traffic Control Devices (MUTCD):

- 2009 NC Supplement to MUTCD
- Part 4E: Pedestrian Control Features
- Part 7: Traffic Controls for School Areas
- Part 9: Traffic Controls for Bicycle Facilities

National Association of City Transportation Officials (NACTO):

- Urban Bikeway Design Guide
- Urban Street Design Guide

Safe Routes to School (SRTS) Non-Infrastructure:

- National Center for Safe Routes to School
- National Partnership for Safe Routes to School

US Access board:

- ABA Accessibility Standards
- ADA Accessibility Guidelines
- ADA Accessibility Standards
- Public Rights-of-Way, Streets & Sidewalks, and Shared Use Paths

### North Carolina Guidelines

North Carolina Department of Transportation (NCDOT):

- WalkBikeNC: Statewide Pedestrian & Bicycle Plan
- Glossary of North Carolina Terminology for Active Transportation
- NCDOT Complete Streets, including the Complete Streets Planning and Design Guidelines
- Evaluating Temporary Accommodations for Pedestrians
- NC Local Programs Handbook
- Traditional Neighborhood Development Guidelines

Greenway Construction Standards:

- Greenway Standards Summary Memo
- Design Issues Summary
- Greenway Design Guidelines Value Engineering Report
- Summary of Recommendations
- Minimum Pavement Design Recommendations for Greenways
- Steps to Construct a Greenway or Shared-Use Trail

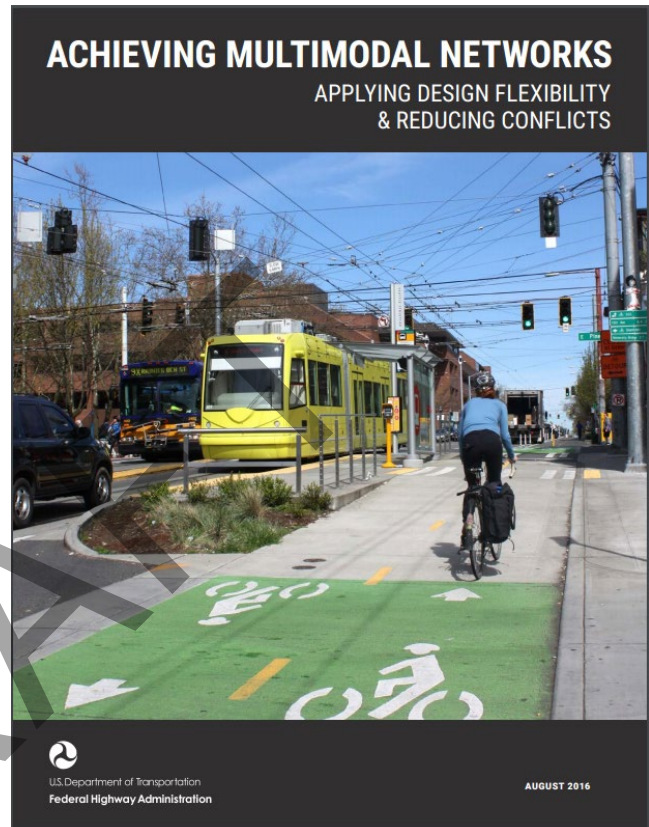
## NCDOT Bicycle and Pedestrian Policies

<https://connect.ncdot.gov/projects/BikePed/Pages/Policies-Guidelines.aspx>

Additional FHWA resources not currently linked through the main NCDOT link above:

- Achieving Multimodal Networks (2016)  
[https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/multimodal\\_networks/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks/)
- Separated Bike Lane Planning and Design Guide (2015)  
[https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/separated\\_bikelane\\_pdg/page00.cfm](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm)
- Incorporating On-Road Bicycle Networks into Resurfacing Projects (2016)  
[https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/resurfacing/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/resurfacing/)
- Small Town and Rural Multimodal Networks Design Guide (2017)  
Main Guide:  
<http://ruralsdesignguide.com/>

Section specific to side paths:  
<http://ruralsdesignguide.com/physically-separated/sidepath>





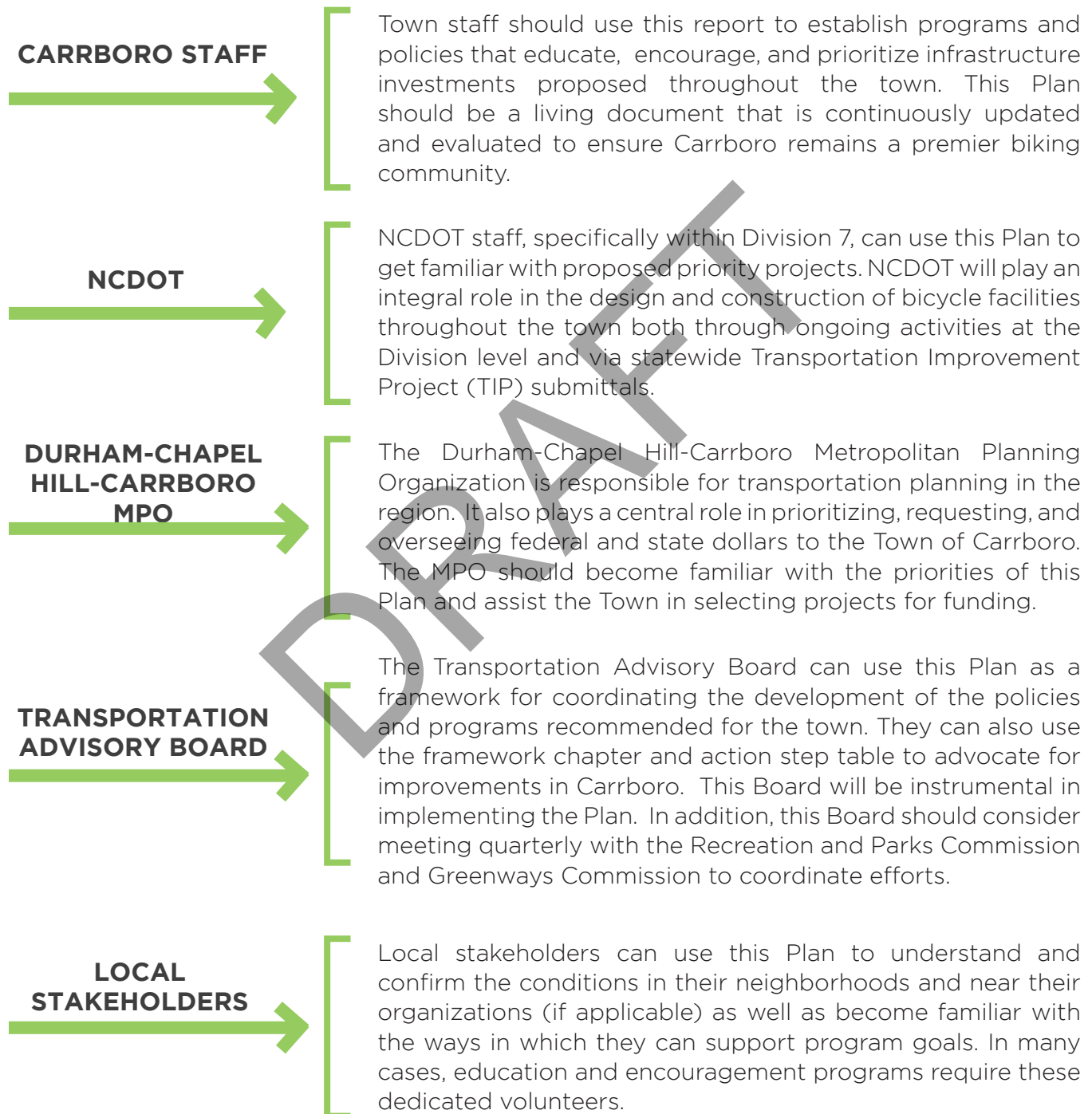
# 6 STRATEGIES





## ROLES + RESPONSIBILITIES

At the heart of every successful plan is a coordinated effort by town staff, stakeholders, and other partners to support safe travel by bike. Everyone has a key role to play in implementing this Plan.



Other stakeholders include Chapel Hill Transit, GoTriangle, Orange County, Town of Chapel Hill, UNC-Chapel Hill, Triangle Trails Initiative, and others.



## PERFORMANCE MEASURES

The performance measures in this Plan are important for assessing whether the Plan is meeting its goals over time. Data on these measures should be collected on a routine basis to help track progress. This information will allow for adjustments to help ensure that this Plan's goals are achieved.

The Plan performance measures are based on the goals of the Plan (see Chapter 1).

The performance measures are generally outcome-based, and the intent is to prioritize investments that do the best job of achieving desired Plan outcomes.

The performance measures were selected based on Carrboro's ability to collect relevant data.

**Table 1 Bicycle Plan Performance Measure Targets**

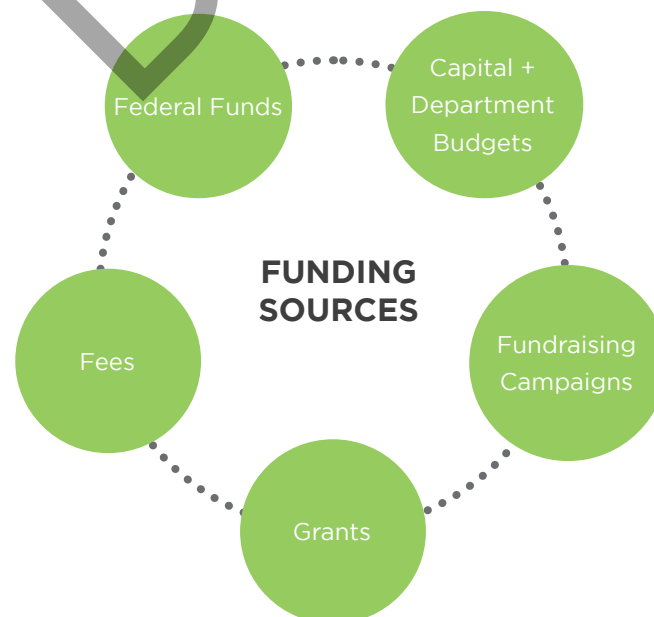
Goal	Example Performance Measure	Performance Target/ Desired Trend
Improve Access	Average travel time by mode	Decrease in average travel time*
	Number of jobs accessible by travel time; mode, and industry	Increase number of jobs accessible
Create a Positive Economic Impact	Retail Sales tax revenue	Increase sales tax revenue
Protect the Environment	Vehicle trips reduced by project	Decrease in the number of vehicle trips
	Bicycle Commute Mode Share	Increase in percentage of commute trips made by bike
Promote Equity	Housing and Transportation Affordability Index	Increase in H+T Index*
Enhance Health	Percentage of children and adults who meet physical activity recommendations	Increase in childhood and adult physical activity level*
Safety	Bicycle collision rate	Reduce bicycle collision rate
	Number of fatalities and serious injuries	Zero fatalities

*\*These data are challenging to obtain and scale to the Town's geography and to the bicycling mode, specifically. The Town can consider surveys to determine progress with equity, average travel time, and physical activity levels due to bicycle facility improvements..*

## FUNDING SOURCES

In order to achieve the goals of this Plan, the Town of Carrboro and its partners will need to fund improvements from a variety of funding sources and partners. Funding sources will need to be opportunistic and consistent in order to implement this plan. Five primary funding sources make up the core funding strategy for this Plan:

- » **Federal Funds.** There are several federal funding programs that can be used for biking projects that are administered by NCDOT to the DCHC MPO or local jurisdictions. Examples include the Transportation Alternatives Programs, Surface Transportation Program, and the Highway Safety Improvement Program. The Strategic Mobility Formula aligns bicycle and pedestrian projects with funds from the Transportation Alternatives Program and Surface Transportation Program.
- » **Grants.** Competitive grants through public agencies or through private or non-profit foundations can generate additional resources for projects and programs.
- » **Capital & Department Budgets.** Carrboro can implement this Plan through regularly scheduled capital projects, such as streetscape projects, street resurfacing, or new public or private property construction.
- » **Fees.** User fees or development impact fees provide an opportunity to generate revenue to fund infrastructure projects, such as sidewalk and trail construction, as well as programs, such as bicycle education classes.
- » **Fundraising Campaigns.** Fundraising through neighborhood groups, advocacy groups, or even crowd-funding can help generate additional resources for projects and programs.







## BIKE-FRIENDLY COMMUNITY RECOGNITION

The Bicycle Friendly Community (BFC) program led by the League of American Bicyclists is intended to assist communities in making bicycling a viable transportation option. The program incorporates assessments in the score card that can help Carrboro gauge where they are excelling and where they are falling short.

The Town has participated in the League of American Bicyclists' Bicycle Friendly Community program since 1999 and its bronze-level designation inspired the Town to frame its first comprehensive bicycle plan around actions that could help lead to higher level designations.

In 2010, the Town was awarded with a silver-level designation – the first to achieve this ranking in North Carolina. The League of American Bicyclists attributed Carrboro's active Transportation Advisory Board, the percentage of arterial streets with bike lanes, and the percentage of people bicycling daily as key contributors to the Town's silver-level designation. The League submitted the guidance below to help Carrboro think about ways to advance to a gold-level recognition.



### *Going for Gold!*

- » Continue to expand on and off street bike network connectivity both within the Town and to surrounding areas. Protected bike lanes are recommended, especially on roads with speed limits above 35 mph.
- » Develop a system of bicycle boulevards on quiet, neighborhood streets.
- » Make intersections safer and more comfortable for people who bicycle.
- » Increase high quality bicycle parking.
- » Expand Safe Routes to School programs.
- » Continue to expand public education and bicycling skills workshops.
- » Promote cycling throughout the year by offering community bike rides.
- » Encourage communication between the Carrboro Police Department and cycling community.
- » Ask police officers to step up enforcement for people driving and bicycling.



## KEY PRIORITIES

# 1

### **KEEP MOMENTUM ON BICYCLE PROJECTS THAT ARE ALREADY IN DEVELOPMENT.**

Map 4 (pg. 19) features existing facilities along with projects that have some level of funding, design, or construction in progress. These “in-development” projects should be fully funded first, as the lowest hanging fruit for new bicycle infrastructure. *Timeline: IMMEDIATE*

# 2

### **USE EQUITY TO PRIORITIZE PROJECTS FOR FUTURE IMPLEMENTATION**

Maps 5 & 6 display the composite and racial equity assessment for the Town. As a condition of Carrboro’s participation in GARE, this information will be used to help prioritize future projects with the goal of ensuring that bicycle ridership is not predictable by race. *Timeline: IMMEDIATE*

# 3

### **STRATEGICALLY AND PROACTIVELY FUND AND BUILD STRATEGIC PRIORITY PROJECTS.**

Map 9 (pg. 44) features a set of priority projects that developed out of the Carrboro Bike Plan process. These are detailed in individual project cut-sheets (starting on page 50) that summarize why the project is a priority, and what the key opportunities and challenges are to its development. *Timeline: 5-10 years*

# 4

### **USE THE LONG TERM NETWORK OF RECOMMENDATIONS TO BUILD OTHER PROJECTS INCREMENTALLY OVER TIME.**

As Carrboro continues to grow, new development and roadway construction projects should incorporate facilities recommended in Map 10 (pg. 59). As progress is made on priority projects, new priorities should be selected from this comprehensive map of recommendations. *Timeline: 10+ years*

# 5

### **LEVERAGE PARTNERSHIPS TO IMPLEMENT NEW POLICY AND PROGRAMS.**

Working with existing partners and reaching out to new organizations with common goals may help implementation of the short-term recommendations outlined in chapter 4. *Timeline: 3-10 years*





Division of  
Bicycle &  
Pedestrian  
Transportation



**Prepared for the Town of Carrboro, North Carolina**

**Prepared by Alta Planning + Design**

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