ADOPTED JANUARY 3, 2019

BIKE APEX

TOWN *of* APEX, NC
BICYCLE PLAN

Apex North Carolina — The Peak of Good Living

State of North Carolina Department of Transportation

Division of Bicycle & Pedestrian Transportation

ACKNOWLEDGEMENTS

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

PROJECT STEERING COMMITTEE

The Steering Committee is made up of local residents, government staff, and community leaders.

Linda Barrett	WakeMed Apex
Paul Black	Capital Area Metropolitan Planning Organization (formerly)
David Cole	Apex resident
Tom Colwell	Apex Parks, Recreation, and Cultural Resources Advisory Commission
Shannon Cox	Apex Planning
Russell Dalton	Apex Public Works & Transportation
Jennifer Delcourt	Active Routes to School
Shannon Flaherty	Apex Chamber of Commerce
Joanna Helms	Apex Economic Development
Bill Jensen	Apex Town Council
David Keilson	NCDOT Division 5
Margot Knepp	Apex resident
Jose Martinez	Apex Public Works & Transportation
Lance Olive	Mayor of Apex
Angela Reincke	Apex Parks, Recreation & Cultural Resources
Jenna Shouse	Apex Planning
Reggie Skinner	Apex Planning Board
Stephen Sposato	Wake County Public Schools
Ann Stephens	Apex Police Department
John Vine-Hodge	NCDOT Division of Bicycle & Pedestrian Transportation

Prepared for the Town of Apex, North Carolina

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Prepared by Alta Planning + Design, in coordination with Kimley-Horn, Inc.

Adopted by the Town of Apex on January 3, 2019

CONTENTS

"Our residents have consistently indicated a strong desire for more on-road and off-road bicycling opportunities for transportation, recreation, health, and economic development purposes."
- Dianne Khin, AICP, Apex Planning Director

WHY SHOULD WE PLAN FOR BICYCLING IN APEX?

The Town of Apex is at the heart of one of the fastest growing regions in the country. With this growth, the Town faces challenges and opportunities for retaining its small town character and quality of life that has attracted so many people here in the first place. One essential aspect of small town living is the freedom and ability to walk out of your front door, and get to where you want to go on foot or by bicycle. This ability of residents to participate in this simple activity is at the root of a remarkable set of positive community benefits related to public health and safety, recreation, transportation, local economy, and tourism.

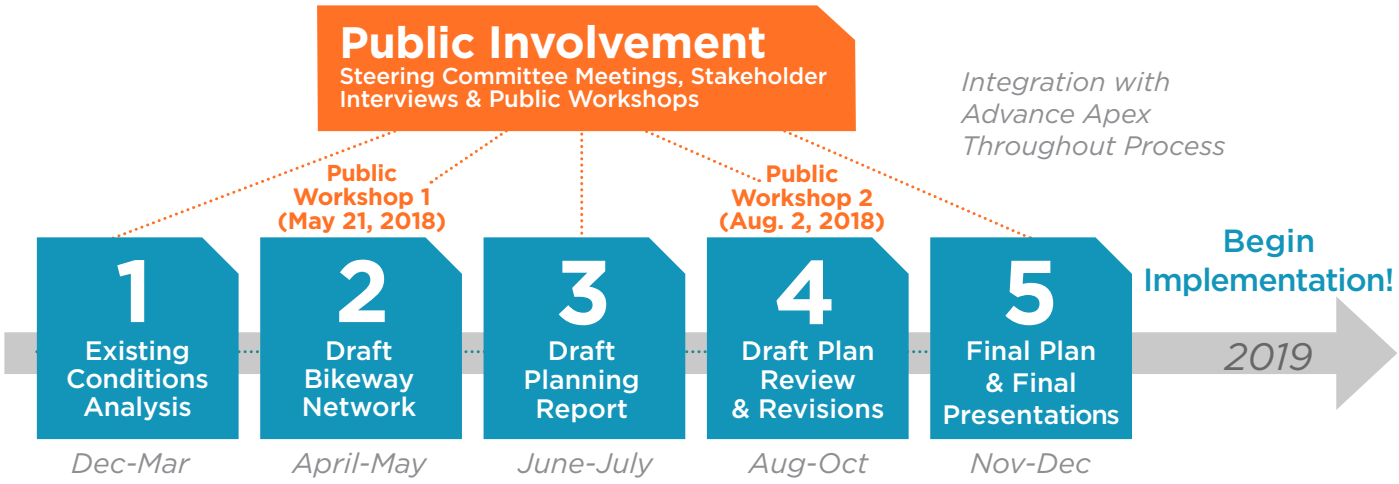
The problem is, as Apex grows, its roads are growing too, and the amount of traffic seems to fill them even as they are built. Town roadways, in their current condition, feel unsafe for many experienced bicyclists, and intimidating for people who would otherwise consider riding. Apex residents have long supported the idea of creating a safe and connected network of bicycle facilities, as is well documented in many of the Town's past and current plans and initiatives. The Town has responded by investing in its initial greenways and side paths. What has been missing, that this plan provides, is a comprehensive analysis of the Town's opportunities for creating such a network, and a strategic set of recommendations to successfully make it happen.

WHAT DOES THIS PLAN RECOMMEND?

This bicycle transportation plan, known as Bike Apex, features policy, program, and infrastructure recommendations that, if adopted, funded, and implemented, will create the bicycle-friendly community that residents have long supported. This plan documents the past and current support for a bicycle-friendly Apex, and highlights some of the current conditions impacting bicycling in Town today (see Chapter 2).

Image in header: Bicyclists at the American Tobacco Trail in Apex.

KEY STEPS IN THE PLANNING PROCESS:



PUBLIC INPUT RESPONSE HIGHLIGHTS:

Would you use greenways more often if you were closer to them, or if there were more of them?

96% YES

4% NO

How important is it to you to improve bicycling conditions in Apex?

85% VERY IMPORTANT

14% SOMEWHAT IMPORTANT

3% NOT IMPORTANT

When I don't ride a bike, it's because...

42% "I DON'T FEEL SAFE"

BASIS OF RECOMMENDATIONS:

Public & Steering Committee Input

Mapping exercises, workshops, group discussions, and comment forms (p.33 and 40)

+

Connections to Key Destinations

Downtown, parks, schools, neighborhoods, commercial areas, and surrounding communities (p. 27)

+

Current Conditions

Opportunities and challenges (p.21) Bicycle Level of Comfort Analysis (p. 31), and past bicycle crash locations (p.29)

+

Existing Plans & Projects

Existing and in-development roadway, greenway, side path, and bicycle lane projects (p.51)

+

Priority Project Analysis

A priority project checklist taking into account nearly 20 unique factors (p.57)

TOP 10 PRIORITY PROJECTS:

1. Beaver Creek Greenway from Downtown Apex to the American Tobacco Trail
2. S Salem St/Old US 1 Sharrows and Bike Lanes, from Downtown Apex to Pleasant Park
3. Olive Chapel Rd Bike Lanes, from NC 55 to New Hill Olive Chapel Rd
4. Hunter St Sharrows, from Apex Peakway to Williams St/NC 55
5. Apex Peakway (North) Side Path, from Center St to Beaver Creek Greenway
6. N Salem St/Davis Dr Side Path & Sharrows from Salem Pond Park at Old Jenks Rd to Downtown Apex
7. Laura Duncan Rd Side Path and Sharrows, from Apex High School at US 64 to Downtown Apex at Center St
8. Apex Peakway (South) Side Path, from Beaver Creek Greenway to Center St
9. Middle Creek Greenway, from Gladsong Rd to Lufkin Rd
10. Reedy Branch Greenway, from Kelly Rd to American Tobacco Trail

BIG PICTURE RECOMMENDATIONS:

1 KEEP MOMENTUM ON BICYCLE PROJECTS THAT ARE ALREADY IN-DEVELOPMENT.

Map 3.1 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.

2 STRATEGICALLY AND PROACTIVELY FUND AND BUILD PRIORITY PROJECTS.

Map 3.2 features a set of priority projects that developed out of the Bike Apex planning process. These are detailed in individual project cut-sheets (starting on page 63) that summarize why the project is a priority, and what the key opportunities and challenges are to its development. See the Project Priority Checklist (p. 57) for how priorities were selected.

3 USE THE COMPREHENSIVE NETWORK OF RECOMMENDATIONS TO BUILD OTHER PROJECTS INCREMENTALLY OVER TIME.

As Apex continues to grow, new development and roadway construction projects should incorporate facilities recommended in **Map 3.3.** As progress is made on priority projects, new priorities should be selected from this comprehensive map of recommendations.

4 IMPLEMENT NEW PROGRAMS THAT SUPPORT AND ENCOURAGE BICYCLING.

As new facilities are built, people will want to know where they are, how to get to them, and how to ride safely on them; new programs can help address these issues, and are outlined starting on page 80. Motorists can also use encouragement to slow down, yield when appropriate, and pass bicyclists safely, and a safety campaign should be launched to do just that.

Together, these recommendations make up the core of this plan, as featured in Chapter 3. They are supplemented by a detailed set of action steps, and a list of resources for the latest information on bicycle facility design and bicycle-related policy in Chapter 4.

"The Town seeks a transportation network that supports mobility, reliability, and safety for all modes of transportation and understands that there is an opportunity to accommodate bicycling as a mode of transportation through our many infrastructure projects." - Russell H. Dalton, PE, Apex Public Works & Transportation

PROJECT BACKGROUND

In 2017, the Town of Apex was awarded a grant from the North Carolina Department of Transportation (NCDOT), Division of Bicycle and Pedestrian Transportation (DBPT), to develop a comprehensive bicycle plan (Bike Apex). The Town of Apex needs this plan to:

- Leverage transportation projects associated with unprecedented development;
- Provide multi-modal transportation choices;
- Improve safety along routes used for bicycling; and
- Address demands for bicycling for recreation and transportation.

The purpose of this plan is to identify opportunities and constraints for bicycling in Apex, and to establish recommendations for improvement. This plan aims to use bicycling as a tool for improvements in mobility, safety, health, economy, environment, and overall quality of life. The goal is to create safe and connected routes for bicycling in Apex, with connections to surrounding communities.

Image in header: Bicyclist in Downtown Apex

Bike Apex will provide a framework for the Town, residents, developers, NCDOT, and other regional planning partners to strategically build better connections for bicycling in Apex. The plan provides detailed bicycle facility recommendations needed to seek project funding, coordinate with future development, and shape policy and program decisions for the Town.

The Town of Apex has long supported the goal of improving bicycle transportation, as evident in formally adopted plans, and in public feedback collected during those planning processes. Specific examples of support for bicycling improvements in adopted plans can be seen in the *Peak Plan 2030*, the *Apex Transportation Plan*, the *Parks, Recreation, Greenways, and Open Space Master Plan*, and in the current development of *Advance Apex*.

See Chapter 2 (page 35) for more on existing plans and how they relate to Bike Apex.

BIKE APEX VISION & GOALS

There is no other single type of investment in Apex that could support this many issues related to quality of life.

ENHANCE MOBILITY

Create a well-connected network of bicycle-friendly streets and paths as part of a diverse network of transportation options in Apex.

CREATE A POSITIVE ECONOMIC IMPACT

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

PROTECT THE ENVIRONMENT

As land in Apex continues to be developed, dedicate areas for future greenways, not only as bike paths, but also as a way to protect waterways, wildlife habitat, and natural areas.

PROMOTE EQUITY

Create a network of bike routes that allow ALL Apex residents to access parks and activity centers by biking.

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 bicyclists; Reduce the number of bicycle crashes, injuries, and fatalities over time.

INCREASE LIVABILITY

Transportation systems have a direct impact on overall quality of life. Implement complete street solutions which will accommodate all modes, including bicycles, to support healthy, safe, and bikeable neighborhoods.

PLANNING PROCESS

The planning process began in late 2017 with data collection and analysis of existing conditions, including public survey and meeting feedback from the Advance Apex planning process. Next, project planners developed a draft proposed bicycle network, based on past plans, existing conditions analysis, and initial public outreach. The proposed network was refined through a process of multiple draft reviews and revisions, with feedback from Town staff, project consultants, a public workshop, and review by the project Steering Committee.

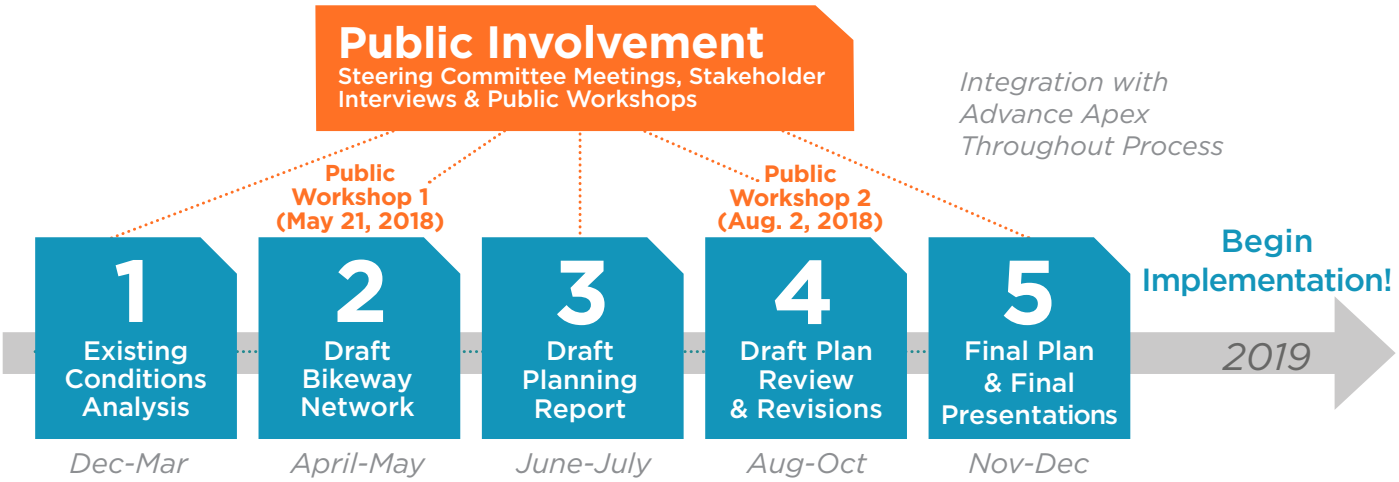
The Steering Committee met at key stages throughout development of the plan, with members representing a range of perspectives. The committee had representation from the following groups (see the acknowledgements section of this Plan for a list of individual members):

- Advance Apex Steering Committee
- Apex Chamber of Commerce
- Apex Economic Development
- Apex Parks, Recreation & Cultural Resources
- Apex Parks, Recreation & Cultural Resources Advisory Commission
- Apex Planning
- Apex Planning Board
- Apex Police
- Apex Public Works & Transportation
- Apex Town Council
- Capital Area Metropolitan Planning Organization
- Local bicycle advocates
- Local residents
- North Carolina Active Routes to School
- North Carolina Department of Transportation
- Wake County Public School System
- Wake Med

The planning process included several other important methods of public outreach and involvement, in addition to the public representation on the Steering Committee and the public workshops. Examples include a project web page where people could learn about Bike Apex and submit questions and comments; project "business cards" to direct people to the web page, a public comment form for the draft plan recommendations, public workshop announcements with the Town water bill, and plan promotion via email and social media. For the results of committee and public feedback, please refer to the public input section of Chapter 2, and Appendix C: Meeting Summaries.

Project "business cards" and public workshop announcement.

Key Steps in the Planning Process



Open comment maps were used to gather public input on bicycling conditions during public workshops.

Meeting participants were also invited to indicate their preferences for a variety of aspects of the plan, including types of bicycle infrastructure and programs.

BENEFITS OF A BICYCLE-FRIENDLY APEX

Potential benefits for the Town of Apex in supporting and implementing this plan include improvements in safety, health, economic impact, mobility, and environmental stewardship.

SAFETY

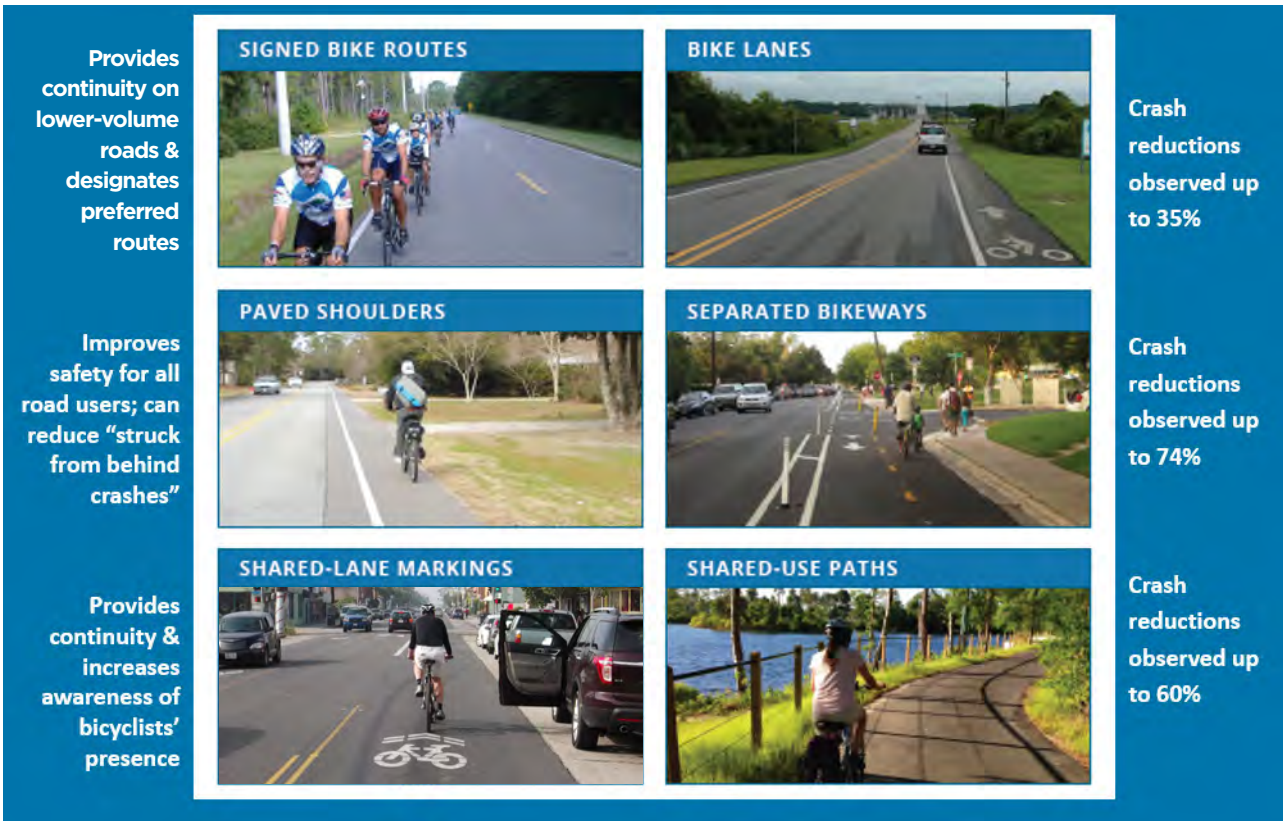
Trends and Challenges

According to a survey of 16,000 North Carolina residents for the 2011 North Carolina Bicycle and Pedestrian Safety Summit, the most commonly reported safety issue for walking and bicycling was inadequate infrastructure (75%).[1] A lack of bicycle facilities, such as bicycle lanes, side paths, greenways, and safe crossings, lead to unsafe conditions for bicyclists.

"The ultimate goal is to increase the safety and mobility of bicyclists and motorists, while encouraging alternate modes of transportation in our continuously growing community."
- John Letteney, Apex Chief of Police

- **From 2007-2015, there were 34 bicycle crashes within the Apex town limits and ETJ, including one fatality** (see Map 2.3).
- On average, in NCDOT's Division 5 (which includes the Town of Apex), **24 pedestrians and 2 bicyclists are killed each year in collisions with motor vehicles, while many more are seriously injured** (combined 5-year average for 2012-2016).[2]
- In 2017, 15% of all traffic fatalities in North Carolina were bicyclists and pedestrians.[2]
- North Carolina is ranked as one of the least safe states for bicycling (44th).[3]

Bicycle Facilities and Safety Benefits



Sources: 1) U.S. Department of Transportation Federal Highway Administration, Crash Modification Factor (CMF) Clearinghouse; CMF ID: 1719 and CMF ID: 4097, and 2) Teschke, Kay. Route Infrastructure and the Risk of Injuries to Bicyclists. American Public Health Association. December 2012.

Improving Safety

When Apex residents don't ride a bike, the number one reason is because, "it doesn't feel safe." (according to the 2017 Advance Apex survey of 1,235 individuals). Separate studies conducted by the Federal Highway Administration and the University of North Carolina Highway Safety Research Center demonstrate that installing pedestrian and bicycle facilities directly improves safety by reducing the risk and severity of pedestrian-automobile and bicycle-automobile crashes (see examples below). Some facilities improve safety for both bicyclists and pedestrians, such as side paths, paved shoulders, bicycle/pedestrian overpasses or underpasses, and intersection crossing improvements (below). The following web addresses link to more comprehensive research on safety.

- http://www.walkbikenc.com/
- http://www.pedbikeinfo.org/data/factsheet_crash.cfm

Bicycle Facilities with Pedestrian Crash Countermeasures

FACILITY TYPE	PEDESTRIAN CRASH REDUCTION FACTOR
Install bicycle & pedestrian overpass/ underpass	90%
Install sidewalk or side path (to avoid walking along roadway)	88%
Provide paved shoulder (of at least 4 feet)	71%
Install raised median at unsignalized intersection	46%
Install crossing refuge island	36%
Install crossing countdown signal heads	25%

Federal Highway Administration. (2008). Toolbox of Countermeasures and Their Potential Effectiveness for Pedestrian Crashes. https://safety.fhwa.dot.gov/ped_bike/tools_solve/ped_tctpepc/

HEALTH

Trends and Challenges

The Town of Apex is located in the number one ranked county in North Carolina for health outcomes (Wake County), which is based on two types of measures: how long people live and how healthy people feel while alive.[4] However, the state of North Carolina ranks 33rd compared to all other states in core determinants of health.[5] Two key measures in that ranking are cardiovascular deaths and obesity, for which North Carolina is ranked 30th and 35th, respectively. Other key trends and challenges related to health and transportation in North Carolina and Apex:

- 66% of adults in North Carolina are either overweight or obese.[6] The state is also ranked 5th worst in the nation for childhood obesity.[7]
- Every dollar invested in pedestrian and bicycle trails can result in a savings of nearly $3 in direct medical expenses.[8]
- 91% of Apex residents surveyed for Advance Apex in 2017 reported bicycling for exercise and recreation.[9]

Better Health through Active Transportation

The Town of Apex can make strides to improve community health by improving streets that are unsafe for bicycling, thereby creating more opportunities for healthy living and active transportation. Using active transportation to and from school, work, parks, restaurants, and other routine destinations is one of the best ways that children and adults can lead measurably healthier lives. Increasing one's level of physical activity through bicycling reduces the risk and impact of cardiovascular disease, diabetes, chronic disease, and some cancers. It also helps to control weight, improves mood, and reduces the risk of premature death.[10]

Active Transportation: Pathway to Health

Source: Alta Planning + Design; WalkBikeNC

- Two 14-year studies of more than 60,000 people investigated if total physical activity, as well as different types of physical activity, were associated with heart failure risk. It found that **walking or bicycling at least 20 minutes per day was associated with the largest risk reduction of heart failure.**[11]
- **Active transportation (i.e., biking and walking) can dramatically improve health by reducing and preventing not only incidences of obesity, but community levels of diabetes, stroke, and heart disease, as noted in the figure above.**
- The 2017 Advance Apex survey indicated that when Apex residents ride a bike, most do so for exercise and recreation (91%); in addition to riding for exercise, some also reported biking for transportation to shops and restaurants (13%), and to work or school (4%). This indicates an opportunity to increase bicycling as a form of active transportation in Apex.[9]

ECONOMIC IMPACTS OF ACTIVE TRANSPORTATION

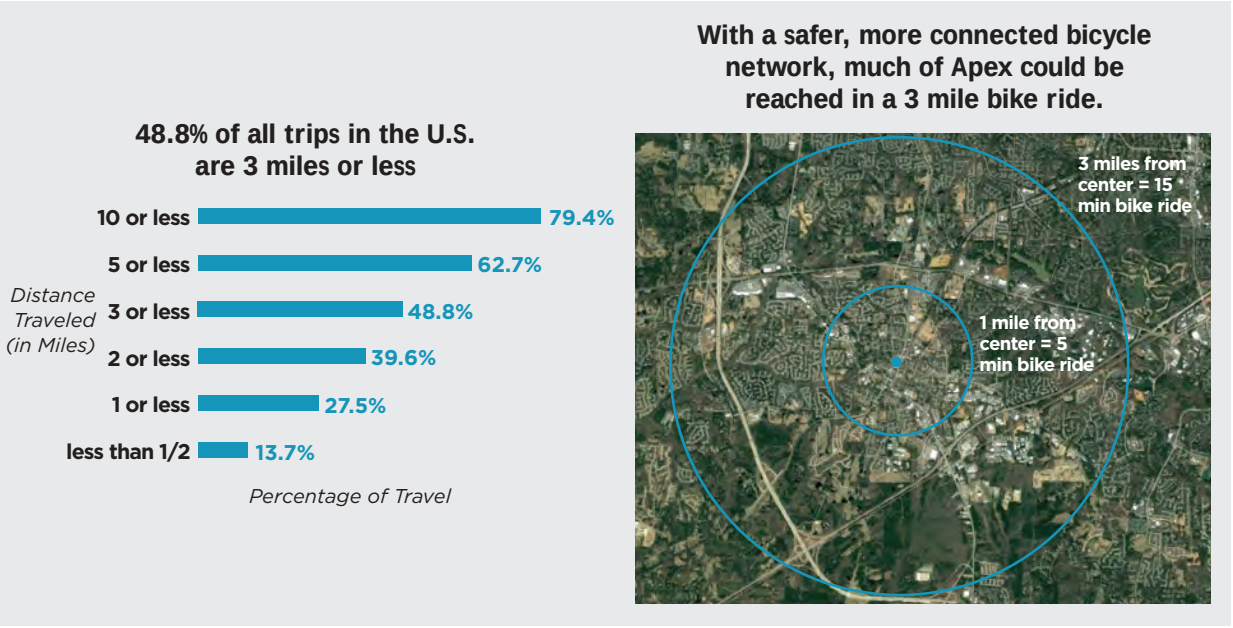
"The presence of dedicated bicycle facilities can infuse a positive economic impact in the local community...Any leverage that we can provide for our communities and our state greatly improves our success in a very competitive process." - Joanna Helms, Director, Apex Economic Development

Economic Trends in North Carolina

Bicycle and pedestrian facilities generate economic returns by raising property values, supporting local businesses and jobs, and attracting visitors. Below are some key economic trends related to bicycling and greenway trails in North Carolina:

- **A combined three-year study of four greenways in North Carolina (including the American Tobacco Trail) found that every $1.00 of initial trail construction supports $1.72 annually from sales revenue, sales tax revenue, and benefits related to health and transportation.**[12]
- 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. The research also portrayed exceptional gains in the amount of physical activity occurring.[13]
- The cost of purchasing and maintaining a bicycle to an individual, and the cost of building and maintaining bicycle facilities to a community, is negligible compared to those same costs for cars and highways.
- 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.

Daily Trip Distances of Americans & Bike Trip Times in Apex



More than half of all driving trips are for a distance of five miles or less. Even for those who are only willing to bike distances of one mile or less, there is potential to replace one-quarter (27.5%) of short driving trips with biking. Source: Bicycle and Pedestrian Information Center website, www.pedbikeinfo.org

MOBILITY AND ACCESSIBILITY BENEFITS OF ACTIVE TRANSPORTATION

Opportunity to Increase Bicycling Rates

According to the 2011 Bicycle and Pedestrian Safety Survey, at least 70 percent of North Carolinians would walk or bike more for daily trips if walking and bicycling conditions were improved. With appropriate accommodations, walking and bicycling can replace driving for commuting to work, running errands, or making other short trips.

Commute rates for walking and bicycling in North Carolina currently fall below the national average, with just 0.2% of North Carolina commuters bicycling to work and 1.8% walking to work, compared to 0.6% bicycling and 2.9% walking nationwide. This places North Carolina 43rd for both walking and bicycling commute rates in nationwide state rankings.[3]

To put these numbers into perspective, 34% of all trips are made by walking or bicycling in Denmark and Germany, and 51% of all trips in the Netherlands are by foot or by bike.[14] Germany, Denmark, and the Netherlands are wealthy countries with high rates of automobile ownership, just like the United States. Yet, long-established land use patterns and an emphasis on providing quality walking and bicycling environments has helped alleviate the reliance on motor vehicles for short trips.

Some cities in the U.S. have made great strides in bicycling and walking commute rates, showing that significant improvements are possible across the U.S. Boston, MA (17%), Washington, DC (17%), and San Francisco (14%) are examples of large cities with the highest rates.[3]

Some participants in this planning process for Apex have mentioned that there are local people who now commute by bike, and the potential for more people to enjoy a safe walking or biking commute could really benefit Apex households.

These mobility benefits go beyond commuting as well. Apex is fortunate in having banks, schools, parks, a library, offices, and agencies within town and close by, and Apex people can benefit from safe facilities that increase the rate of walking and biking for short trips to these destinations. Furthermore, other aspects of mobility and accessibility also apply to children and those who can no longer drive due to advanced age. Moreover, improved walking infrastructure benefits those who use wheelchairs or scooters, as well as people who have visual impairments.

Reduced Vehicle Miles Traveled (VMT) & Congestion

Taking short trips by foot or by bike can help to greatly reduce motor vehicle miles driven and traffic congestion. **Under the Nonmotorized Transportation Pilot Program, walking and bicycling investments contributed to an estimated 23% increase in the number of walking trips and an estimated 48% increase in the number of bicycling trips in four pilot communities between 2007 and 2013.**[15] These individual changes in travel behavior can add up to produce significant societal benefits. Traffic on arterials and other streets can be mitigated as people use sidewalks, bike lanes, paths, and other facilities to get around. Parking lots can also be made less congested by reducing crowding, circling, and waiting for open spots.

The following web addresses link to more comprehensive research on transportation efficiency.

» http://www.walkbikenc.com/
» http://www.pedbikeinfo.org/data/factsheet_general.cfm

STEWARDSHIP BENEFITS OF ACTIVE TRANSPORTATION

Stewardship addresses the impact that transportation decisions (both at the government/policy level and individual level) can have on the land, water and air that Apex residents and visitors enjoy.

Trends and Challenges

Below are some key trends and challenges related to stewardship and transportation in North Carolina:

» Even a modest increase in walking and bicycling trips (in place of motor vehicle trips) can have significant positive impacts for the environment. For example, if a person were to replace two miles of their daily driving trips with walking or bicycling they would prevent about 650 pounds of carbon dioxide from entering the atmosphere in a year.[16]
» According to the National Association of Realtors and Transportation for America, 89% of Americans believe that transportation investments should support the goal of reducing energy use.[17]

Providing safe accommodations for walking and bicycling in Apex can help to reduce automobile dependency, which in turn leads to a reduction in vehicle emissions – a benefit for Apex residents and visitors and the surrounding environment. As of 2016, 28 percent of U.S. greenhouse gas emissions are attributed to the transportation sector, and personal vehicles account for almost two-thirds (60 percent) of all transportation emissions.[18] Primary emissions that pose potential health and environmental risks are carbon dioxide, carbon monoxide, volatile organic compounds, (VOCs), nitrous oxides (NOx), and benzene. Children and senior citizens are particularly sensitive to the harmful affects of air pollution, as are individuals with heart or other respiratory illnesses. Increased health risks such as asthma and heart problems are associated with vehicle emissions.[19]

The following web addresses link to more comprehensive research on active transportation and stewardship.

» http://www.walkbikenc.com/
» http://www.pedbikeinfo.org/data/factsheet_environmental.cfm

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Bicyclists on the American Tobacco Trail, crossing Olive Chapel Rd.

"The Town of Apex is experiencing a development boom. Along with development comes pressure on our transportation network and opportunities for new and improved infrastructure built to the specifications of the Town's transportation plan." - Dianne Khin, AICP, Planning Director, Town of Apex

LOCAL CONTEXT

The Town of Apex is located in the southwest portion of Wake County, North Carolina and is a popular residential community in proximity to the Research Triangle Park and Raleigh-Durham International Airport. The Town has approximately 14,441 acres within its municipal boundaries, with another 9,111 acres of extraterritorial jurisdiction (ETJ). The study area for Bike Apex includes the town proper as well as the entire ETJ, and several thousand acres of Wake County jurisdiction that is included within the town's planning boundary.

Apex is a rapidly growing community (9.37 new residents per day, from July 2017 to January 2018), situated in one of the fastest growing regions of the country. This brings many challenges as the community seeks to respond to new opportunities and development pressures while maintaining its unique character.

"With the rapid growth that is occurring in Apex, it is critical to get a plan in place addressing non-motorized connectivity within our community before the opportunities to make such connections are not available." - John M. Brown, Director, Apex Parks, Recreation, and Cultural Resources

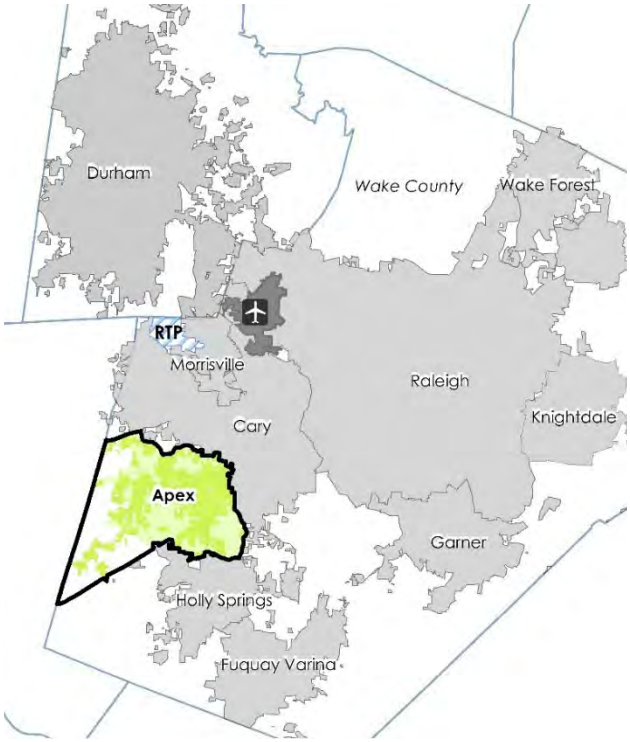


Table 2.1 Population Growth, 2010-2016

Town of Apex	17%
Wake County	16%
Triangle Region	19%
North Carolina	4%
United States	3%

Source: US Census Bureau, 2016 American Community Survey 5-Year Estimates

Image in header: Bike lane on Apex Peakway

Highlights from the Advance Apex planning process are listed below to provide local context.

Housing & Prosperity:

» Single-family residential housing dominates the market in Apex.

» Median household income in Apex was $95,000 in 2016, compared to the Triangle region's median income of $59,000. A high median income suggests a greater tax base and greater ability to fund quality bicycling infrastructure. Higher incomes also suggest more people in Apex are bicycling for recreation than for other purposes (e.g., not out of necessity, or lack of vehicle ownership).

» Apex residents are largely private-sector salary workers, with the largest industries being education, health care and social services.

Transportation:

» The vast majority of households in Apex have at least one vehicle available to them for daily transportation, with approximately 70% of households having two or more. Because of this, public transportation, walking, and bicycling are likely to serve as supplemental transportation choices rather than necessities for the majority of the community. Therefore, these facilities should be attractive and provide distinct recreational and local mobility benefits to all members of the community in order to attract users.

» In 2016, about 82% of Apex residents commuted to work by driving alone, while 8% of residents commuted as part of a carpool. Very few Apex commuters take advantage of transportation options such as walking, biking, or transit, likely reflecting the fact that many Apex residents work outside the local community and that limited transit options exist to serve regional destinations.

» In 2015, the most common work destination for Apex residents was Raleigh, with 24% of Apex commuters traveling there. Cary (18%) and Durham (11%) followed.

» In the five year period of 2013-2017, there were 3,976 vehicular, bicycle, and pedestrian crashes; 10 involved cyclists, and 28 involved pedestrians (Highway Safety Research Center at the University of North Carolina at Chapel Hill).

» 0.2% of Apex residents bike to work (same as NC average), compared to 0.6% nationally. For comparison, one of the highest bike commute rates in NC is in Carrboro, at 4.6% (U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates).

Bicycle & Pedestrian Network:

Today, Apex is home to a generally accessible and interconnected network of sidewalks, greenways, and trails. However, there are substantial gaps in the network—even in developed areas. Maintaining and expanding bicycle and pedestrian facilities to keep up with the town's growth will be critical to continuing Apex's reputation for a high quality of life and family-friendly environment. The opportunities and challenges related to this are outlined in the following table on current conditions.

Bike Apex Steering Committee members providing input on existing conditions for bicycling in Apex.

CURRENT CONDITIONS

Tables 2.2-2.3 and Maps 2.1-2.5 that follow describe key opportunities and challenges in Apex related to current conditions for bicycling, and provide a basic inventory of existing facilities, destinations, and conditions. It is based on input from the Steering Committee, general public, field review, and available data.

Table 2.2 Current Conditions Assessment

Opportunities and Challenges	Assessment
Overall Transportation Network	The majority of streets in Apex see relatively little traffic, with several notable exceptions. US 1, US 64, NC 540, and NC 55 are the main arterial roadways that carry high volumes of traffic through the area. The busiest section of roadway is the section of US 1 east of Center Street on the far east end of the study area that sees over 65,000 vehicles per day. Other heavily-traveled segments include US 1 between Center Street and NC 55 (56,000 vehicles), NC 55 between US 1 and NC 540 (44,000 vehicles) and US 64 between NC 55 and N Salem St (44,000 vehicles).
Designated Bicycle Routes (see **Map 2.1***)*	Three of North Carolina's designated State Bicycle Routes pass through or begin in Apex including NC Bike Route 1: Carolina Connection (which doubles as designated U.S. Bike Route 1), NC Bike Route 2: the Mountains to Sea Route, and NC Bike Route 5: Cape Fear Run. However, these routes are currently designated only through signage.
Existing Bike Lanes (see **Map 2.1***)*	Dedicated bicycle facilities in Apex are currently limited, with less than 1.5 miles of bicycle lanes and wide outside lanes combined within the town limits. The two bicycle facilities in Apex are striped bicycle lanes on the Apex Peakway between Center Street and New Dover Road, and wide lanes on Hunter Street between NC 55 and North Salem Street that can accommodate bicyclists.
Existing Side Paths (see **Map 2.1***)*	The longest sections of existing side paths are along Beaver Creek Commons Dr, Laura Duncan Rd, Ragan Rd, Pine Plaza Dr, Evans Rd, Milano Rd, Horton Ridge Blvd, Jordan Shires Dr, Jordan Point Blvd, and Ambergate Station Dr. Recently completed side path projects include: Apex Barbecue Road (Kelly Road to Scotts Ridge Elementary School) and Humie Olive Road (across from schools between Blazing Trail Dr and Whistling Quail Run). New side paths will be built along sections of Richardson Rd, Laura Duncan Rd, Green Level Church Rd, and Wimberly Rd as part of development.
Existing Greenways (see **Map 2.1***)*	Apex currently has over 10 miles of maintained public greenways. There are currently 23 greenway projects that are either under construction or approved by the Town as part of development plans and Town-funded projects. It is anticipated that 7-10 miles of greenway will be built within the next year. Notable facilities in Apex include Beaver Creek, Haddon Hall, and the Apex Community Park Lake Trail system. The town is also host to a sizeable segment of the American Tobacco Trail (ATT), which spans over 22 miles from Apex to Durham and provides regional connectivity in addition to recreational opportunities. This segment of the ATT doubles as a portion of East Coast Greenway, eventually linking Maine to Florida. The community has funded projects that will expand the local greenway system, including an extension of the White Oak Creek Greenway to the American Trail (in collaboration with the Town of Cary) and completion of portions of the Beaver Creek Greenway and Middle Creek Greenway.
Ownership of Public Road Right-of-Ways *(see* **Map 2.3***)*	The roadway network in Apex is a combination of locally-owned and state-owned roads. The ownership of the public right-of-way is important for determining: 1) the types of facilities that can be constructed in or along a roadway; 2) the agency in charge of maintaining the roadway and implementing bicycle recommendations; and 3) how improvements are scheduled, funded, and constructed. Map 2.3 shows which roadways in Apex are state- versus locally-owned. The town will need to coordinate with NCDOT Division 5 and the Division of Bicycle and Pedestrian Transportation to implement this plan's recommended improvements along these roadways.

Table 2.2 Current Conditions Assessment *(Continued)*

Opportunities and Challenges	Assessment
Varying Needs of Different Types of Bicyclists	Apex's growing greenway system is currently geared towards recreational riders, in a shared space with pedestrians, strollers, dog walkers and other trail users. Some bicycling commuters may be comfortable in this riding environment, but its not ideal for faster-moving bicyclists (recreational touring cyclists, as well as commuters), especially during busier times of the day when trails can become crowded. On-street bicycle facilities need to be expanded to accommodate these needs.
Size & Scale of Apex for Bicycling	If Apex were completely flat with no obstacles, it would be about a 15 minute bicycle ride over about 3 miles from the center of town to the town limits (as the crow flies; based on 12 MPH average). Apex is well suited for bicycling in terms of its size and scale; consider Raleigh, for example, which is 20 miles across at it's longest, end to end.
Climate	North Carolina's climate is very well-suited for bicycling, with cycling possible almost year-round, aside from a few months of the year during the peak extremes of summer and winter The most bike-friendly small town in the U.S. (Davis, CA), has similar annual average temperatures, the key difference being humidity levels.
Topography	In general, in the absence of large rivers or mountainous terrain, Apex is well-suited for bicycling in terms of topography and landscape. Still, the hills of North Carolina's Piedmont Region can be challenging for many people. Additionally, Apex has some substantial wetlands, but not nearly the same challenges for bicycle facility development as seen in coastal regions to the east.
Major Infrastructure/ Physical Barriers to Bicycling	Like most small and suburban towns, the major infrastructure that prohibits bicycle travel in Apex is major highways, and in this case, railroads. These barriers to bicycling cross through Apex, and create "bikeable islands" within residential areas. See map 2.4 Bicycle Level of Comfort, in which these somewhat isolated bikeable areas are visible.
School-aged Children Walking & Biking to School	The first Wednesday of each month has become a Walking Wednesday at Olive Chapel Elementary School in Apex, N.C. Parents walk their children to school from one of 12 gathering points, all within one mile of the school. Since the Walking School Bus Program began in 2003, the number of vehicles dropping off and picking up students has dropped from 200 on a typical day to 77 on a Walking Wednesday. In addition to walking to school, the Wake County Public School System is also supportive of improving conditions for bicyclists in Apex, as expressed through letters of support for this Plan's grant application process from the principals of Apex Middle School, Apex Elementary School, and Salem Elementary School. Each recognized the benefits of such improvements, including for safe bicycling routes to schools.
Potential for Increasing Commuting by Bicycle	According to Advance Apex, most Apex residents (92%) commute out of town for work, and 47% travel between 10 and 24 miles to work each day. Even though these distances are achievable for bicycle commuting by some people, it is also time-consuming, further discouraging it as a commute option. However, with a completed bicycle network, these times and distances are certainly feasible. Furthermore, when bicycle trips are integrated with transit, longer commute distances can become much more feasible. Examples include bicycle racks on buses, high quality bicycle storage and services and park and ride locations, and the availability of bicycle share services near major bus stops and stations. There are current plans to expand transit options through Wake Transit and improving bike connectivity to these services should be further studied.
Opportunity with New Growth and Development	New growth in the coming decades offers an opportunity to design future development and new roadways to accommodate walking and bicycling the first time around, rather than as retrofit projects which tend to be considerably more complicated and expensive to implement.

Table 2.3 Inventory of Select Roadways

Road Name	Predominant Roadway Widths (LF)	Number of Lanes	AADT*	Speed Limit (MPH)	Presense of Curb & Gutter
Apex Barbecue Road	*20-46*	*2*	*4,100-5,500*	*45*	*varies*
Apex Pkwy (NC 55 to Old Raleigh Rd)	*28-40*	*2-3*	*9,700-13,000*	*25*	*yes*
Beaver Creek Commons Drive	*20*	*2*	*N/A*	*35*	*yes*
Center St/Ten Ten Rd (Old Grove Ln to Town Limits)	*20-41*	*2-3*	*19,000-36,000*	*45*	*varies*
Center Street (Salem St to Tunstall Ave)	*33*	*2*	*5,500-7,600*	*35*	*yes*
Center Street (Tunstall Ave to Old Grove Ln)	*22-45*	*2*	*7,600*	*35-55*	*varies*
Davis Drive (N. Salem Street to Apex Town Limits)	*36*	*2-4*	*13,000*	*45*	*varies*
Evans Road	*20*	*2*	*N/A*	*35*	*varies*
Green Level Church Road	*18*	*2*	*4,500*	*45*	*varies*
Green Level W. Road	*20*	*2*	*1,000*	*45*	*varies*
Holland Road	*20*	*2*	*1,100*	*35-55*	*no*
Hughes St (NC 55 to NC 55)	*18-20*	*2*	*4,500-5,000*	*35-55*	*varies*
Humie Olive Road	*18*	*2*	*610*	*45*	*varies*
Hunter Street	*42-60*	*2*	*7,000-11,000*	*35-45*	*yes*
James St (Tingen Rd to Schieffelin Rd)	*18*	*2*	*2,500*	*35*	*varies*
Jenks Road (NC 540 to US 64)	*18-36*	*2*	*3,900*	*55*	*varies*
Jenks Road (Old Jenks Rd to NC 540)	*18-36*	*2*	*3,400-3,900*	*45-55*	*varies*
Kelly Rd (North of Olive Chapel Rd)	*18-74*	*2-3*	*2,600-9,800*	*45-55*	*varies*
Kelly Rd (South of Olive Chapel Rd)	*20*	*2*	*1,200-1,500*	*45*	*varies*
Laura Duncan Road	*20-29*	*2*	*7,500-8,500*	*35-45*	*varies*
Lufkin Road	*20*	*2*	*N/A*	*35-55*	*varies*
Mason St (Chatham St to Laura Duncan Rd)	*20-29*	*2*	*3,500-11,000*	*35*	*yes*
Morris Acres Road	*18-36*	*2*	*3,400-9,800*	*35-55*	*yes*
N. Salem Street (Brittley Way to Davis Drive)	*22*	*2-5*	*13,000*	*35-45*	*varies*
NC 55 through Apex Town Limits	*30-72*	*2-4*	*18,000-43,000*	*35-50*	*varies*
New Hill Olive Chapel Road	*18-19*	*2*	*3,400-4,700*	*45*	*no*
Old Jenks Road	*18*	*2*	*3,400*	*45-55*	*varies*
Old US 1 (NC 540 to Apex Town Limits)	*22-34*	*2*	*2,000-2,300*	*35-55*	*no*
Olive Chapel Rd (Apex Barbecue to Town Limits)	*18*	*2*	*1,700-4,000*	*45*	*varies*

**AADT = Annual average daily traffic*
Source: NCDOT Roadway Data (2014-2018)

Table 2.3 Inventory of Select Roadways *(Continued)*

Road Name	Predominant Roadway Widths (LF)	Number of Lanes	AADT*	Speed Limit (MPH)	Presense of Curb & Gutter
Olive Chapel Road (East of Apex Barbecue Rd)	*18-47*	*2-3*	*6,000-8,000*	*45*	*varies*
Richardson Road	*20*	*2*	*410*	*55*	*varies*
Roberts Road	*20-36*	*2*	*4,000*	*55*	*varies*
S. Salem Street (NC 55 to NC 540)	*19-66*	*2*	*2,000-9,300*	*35-55*	*varies*
Salem Street (Templeton St to Brittley Way)	*22*	*2*	*13,000*	*35-45*	*varies*
Salem Street downtown (Templeton Dr to NC 55)	*22*	*2*	*8,500-13,000*	*25*	*yes*
Schieffelin Road	*20*	*2*	*3,700*	*35-55*	*varies*
Tingen Rd/Veridea Pkwy	*18-51*	*2*	*1,100-3,500*	*35-55*	*varies*
W. Chatham Street	*24-36*	*2*	*4,000*	*35*	*varies*
Wimberly Road	*20*	*2*	*600-860*	*45*	*no*
Zeno Road	*20*	*2*	*N/A*	*35*	*varies*

**AADT = Annual average daily traffic*
Sources: NCDOT Roadway Data (2014-2018) and Google Earth Imagery Data from 1/8/2018.

MAP 2.1 EXISTING BICYCLE FACILITIES

ABOUT THIS MAP

This map features existing bicycle facilities in Apex, consisting of bike lanes, sidepaths, greenways, trails within parks, and signed state bike routes (see example images at left). Additionally, several connections are in various stages of development (funded, under design, or under construction).

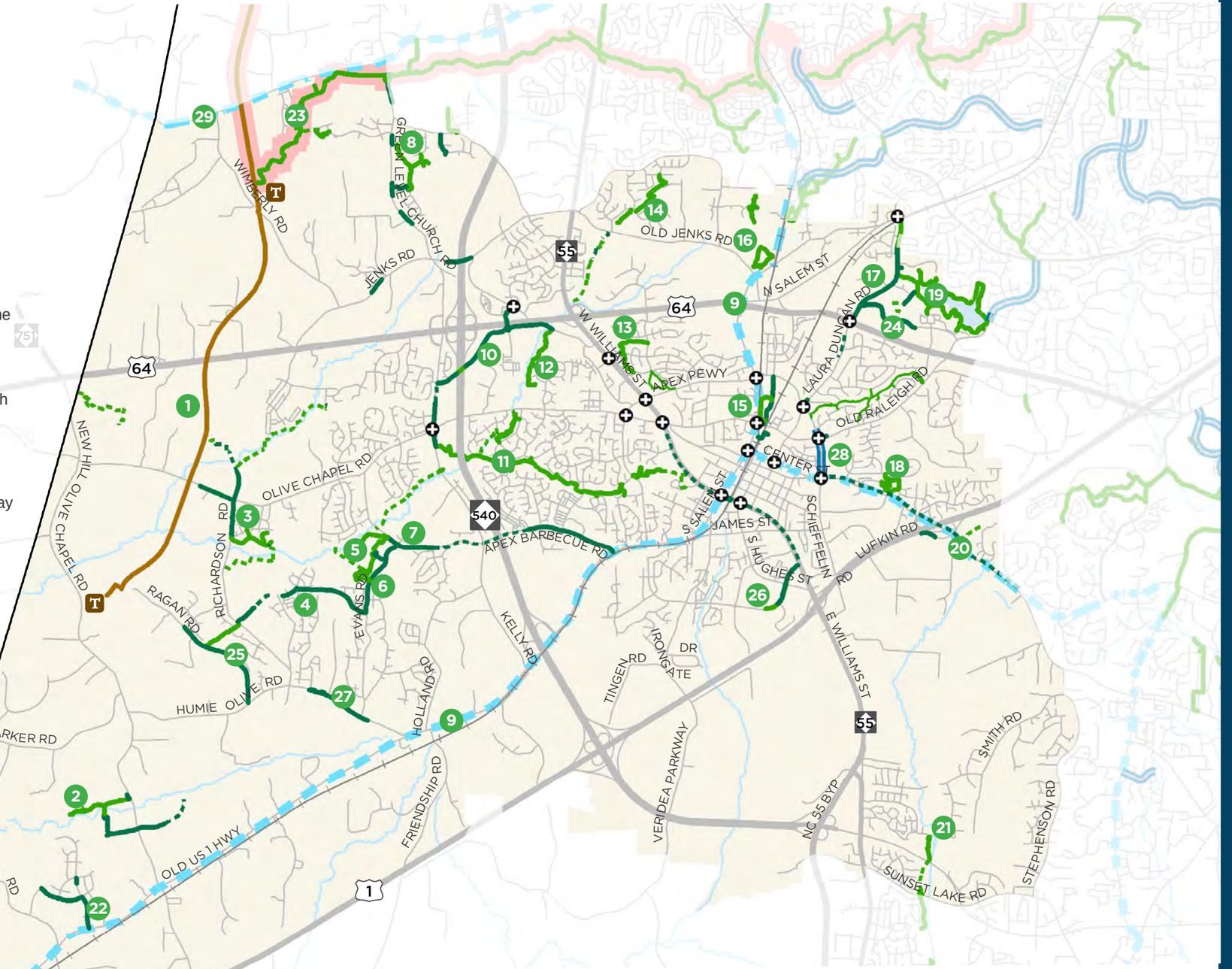
Examples of Existing Bicycle Facilities in Apex:

Bike Lane

Side Path

Greenway

State Bike Route (On-Road, Signed Only)



ATT Trailhead
American Tobacco Trail
East Coast Greenway Corridor
Study Area

Existing Greenway
Greenway In-Development*
Private Greenway

*funded, under design, or under construction

Existing Side Path
Side Path In-Development

Existing Bike Lanes
State Bike Route (On-Road, Signed Only)
Signalized Ped Crossing

0 1 2 3 4 5 MILES
0 5 10 15 20 25 MINUTE BIKE RIDE (Based on 12 MPH average)

EXISTING BICYCLE FACILITIES

1. American Tobacco Trail
2. Little Beaver Creek Greenway (and Side Path Connection)
3. Arcadia West Greenway Connection
4. Milano Avenue Side Path
5. Apex Nature Park Trails
6. Evans Road Side Path
7. Apex Barbecue Side Path
8. Crestmont Greenway
9. US 1 Carolina Connection Bike Route
10. Beaver Creek Commons Drive Side Path
11. Beaver Creek Greenway
12. North Beaver Creek Greenway
13. Haddon Hall Greenway
14. Charleston Village & Sutton Place Greenway
15. Hunter Street Park Trail
16. Salem Park Pond Trail
17. Laura Duncan Road Side Path
18. Seagroves Farm Neighborhood Loop Trail
19. Community Lake Trail
20. State Bike Route 5*/Ten-Ten Road side paths and bike lanes in-development
21. Middle Creek Greenway
22. Jordan Shires Drive Side Path
23. White Oak Creek Greenway
24. Pine Plaza Drive Side Path
25. Ragan Road Side Path
26. Apex Peakway Side Path
27. Humie Olive Road Side Path
28. Apex Peakway Bicycle Lanes
29. State Bike Route 2*

**There are pending re-routes for State Bike Route 2 and 5. There is currently no process to make the transitions official, but the re-routes can be found at: https://www.ncdot.gov/bikeped/walkbikenc/plan-resources/default.aspx#recommendations*

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MAP 2.2 DESTINATIONS & REGIONAL CONNECTIONS

ABOUT THIS MAP

This map highlights numerous community destinations and regional links that include schools, parks, commercial areas, and other local destinations.

DESTINATIONS & REGIONAL CONNECTIONS

1. Jordan Lake/New Hope Gameland
2. American Tobacco Trail
3. Future Park
4. Apex Friendship High School and Middle School
5. Apex Nature Park
6. Green Level High School
7. Olive Chapel Elementary School
8. Publix Pointe Super Market
9. Kelly Road Park
10. Scotts Ridge Elementary School
11. Pleasant Park
12. Beaver Creek Commons & Beaver Creek Crossing
13. Apex Crossing Shopping Center
14. Peak Plaza Shopping Center
15. White Oak Creek Greenway/East Coast Greenway
16. WakeMed Apex/NC 55 Commercial Area
17. Apex Jaycee Park
18. West Street Park
19. Apex Elementary School/Park
20. CC Jones Memorial Park (Private)
21. Baucom Elementary School
22. Salem Elementary and Middle Schools/Salem Pond Park
23. Historic Downtown Apex
24. Apex Town Hall/Apex Community Center
25. Hunter Street Park
26. Apex Middle School
27. Broadstone Station Shopping Center
28. Apex High School
29. Bishop's Gate Greenway
30. Lufkin Middle School
31. Seagrove Farm Neighborhood Park
32. Bond Park
33. Laurel Park Elementary School
34. Apex Community Park
35. Middle Creek/Holly Springs Greenway
36. Black Creek Greenway/East Coast Greenway
37. Pinnacle Plaza Commercial Area
38. Tarbert Gatehouse Trail
39. Penny Road Elementary School/Park
40. Regency Park
41. Beaver Creek Greenway
42. Pinnacle Business Park
43. Apex Industrial Park
44. Future High School
45. Future Park
46. Thales Academy Junior/High School
47. Thales Academy K-5
48. St. Mary Magdalene School
49. Peak Charter Academy
50. Harris Lake
51. Swift Creek Greenway

American Tobacco Trail
East Coast Greenway Corridor
Existing Greenway
Private Greenway
Existing Side Path
State Bike Route (On-Road, Signed Only)

Natural Areas
Parks
Water
Historic Downtown Apex
Schools
Commercial/Business
Multi-Family Homes
Office
Industrial
Potential Rail Station Locations (from the Town of Apex Comprehensive Transportation Plan)
Go Triangle Park & Ride

0 1 2 3 4 5 MILES
0 5 10 15 20
25 MINUTE BIKE RIDE (Based on 12 MPH average)

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MAP 2.3 NCDOT ROADWAYS & REPORTED BICYCLE CRASHES

ABOUT THIS MAP

This map shows which roadways in Apex are state-versus- locally-owned, which is relevant because the Town will need to coordinate with NCDOT to improve conditions for bicycling along state-owned roadways.

This map also shows locations of bicycle crashes reported to NCDOT for the years 2007-2015. There were 34 bicycle crashes within the Apex town limits and ETJ, with the most severe crashes occurring along Old US 1 Hwy. Of these collisions, one bicycle collision was fatal.

A large majority of the crashes occurred along arterial roadways, with the highest number occurring along NC 55 (13). This reflects a need for safety improvements along Apex's arterial roadways, and for alternative routing for bicyclists if possible.

REPORTED BICYCLE CRASHES 2007-2015 (NCDOT)

- Fatality
- Disabling Injury
- Evident Injury
- Possible Injury
- No Injury

REPORTED BICYCLE CRASHES 2015-2017 (APEX POLICE DEPT.)

- Injury-level data unavailable

ROADWAY OWNERSHIP

- NCDOT Owned and Maintained Roadway
- Locally Owned and Maintained Roadway

0 1 2 3 4 5 MILES
0 5 10 15 20 25 MINUTE BIKE RIDE (Based on 12 MPH average)

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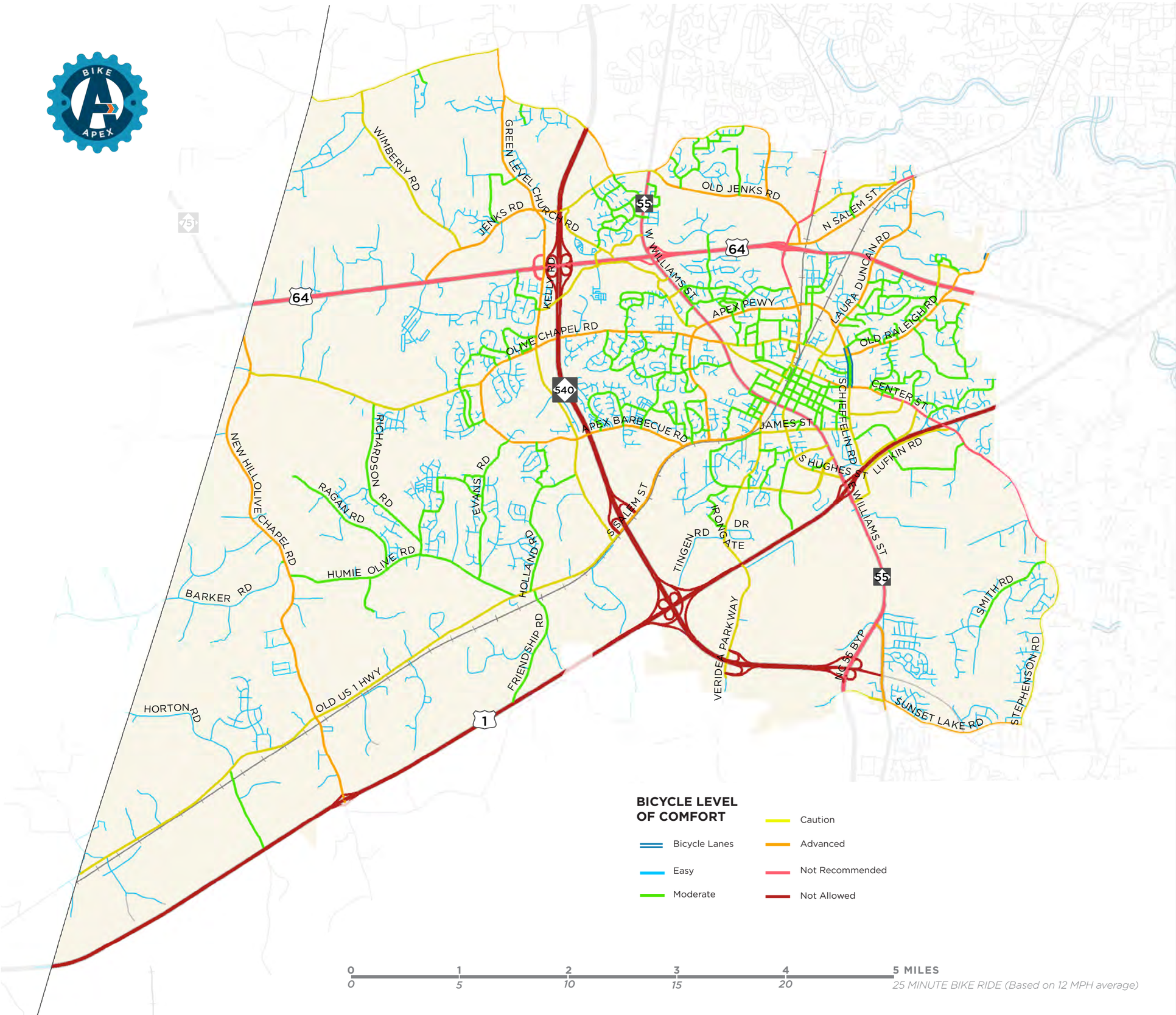
MAP 2.4 BICYCLE LEVEL OF COMFORT (BASED ON EXISTING CONDITIONS)

ABOUT THIS MAP

The project team developed a rating system to evaluate existing conditions on roads across Apex. The data available to classify these roadways includes traffic volumes, speed limits, presence of 4' or wider paved shoulder or bike lane, and designated truck routes. The result is a "bicycle level of comfort" rating, based on a comfort level for moderately experienced cyclists.

Input from the public was solicited at a public workshop to verify the findings of this analysis, and most participants agreed with the findings. One important comment made, was that the ratings may vary by time of day, given that rush hour on some segments may be less comfortable than in other times of the day.

According to the analysis to-date, much of Apex is covered by easy and moderate (blue and green) routes - these are generally relatively lower traffic volume/ speed neighborhood streets that are found throughout the community. The majority of the roadways that provide lower comfort levels are found along Apex's arterial roadways that separate most neighborhoods from one another.



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MAP 2.5 COMMITTEE INPUT ON EXISTING CONDITIONS

ABOUT THIS MAP

This map highlights some of the key takeaways from mapping exercises during the November 2017 and February 2018 Steering Committee meetings.

KEY THEMES

1. Multiple greenway projects are programmed for funding, in design, or under construction. 23 neighborhoods are building greenways as part of residential development - this will more than double existing greenway mileage in Apex.
2. Some roadway projects (such as NC 55 and Ten Ten Road) are programmed in STIP to include bicycle facilities. These roads carry high automobile volumes and speeds, and are currently barriers to bicycling in Apex.
3. Old US 1 and Olive Chapel Road (and US 64 west of NC 751) could be ideal for expansion of the bicycle and pedestrian network since they are pipelines to the west. These corridors also serve areas that have seen large amounts of residential growth in recent years.
4. A linear park and connection to downtown Apex could be created with a shared use path along Old US 1.
5. Some existing greenways, such as Beaver Creek Greenway, are enjoyable for relaxed paced riding with family, but not conducive to riding fast, and may not be ideal for commuting/ transportation needs.
6. Commuting by bicycle from Apex to Cary to Raleigh is possible on a combination of greenways and neighborhood streets but is not direct.
7. Laura Duncan Rd and Lake Pine Dr will have bike/ped facilities at their respective intersections with US 64, as part of STIP project U-5301.

American Tobacco Trail
East Coast Greenway Corridor
Existing Greenway
Greenway In-Development
Private Greenway
Existing Side Path
Side Path In-Development
Existing Bike Lanes
State Bike Route (On-Road, Signed Only)
ATT Trailhead
Signalized Ped Crossing
Study Area

0 1 2 3 4 5 MILES
0 5 10 15 20 25 MINUTE BIKE RIDE (Based on 12 MPH average)

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EXISTING PLANS, PROGRAMS, AND POLICIES

The existing planning documents, programs, and initiatives for the Town of Apex contain a variety of implications for bicycle planning. The plans include references to dedicated bicycle facilities such as bike lanes and shared wide outside lanes, as well as facilities which combine with pedestrian use such as greenways and side paths. The following summary describes these plans and programs with more detail as they relate to bicycle planning for the future of Apex.

APEX TRANSPORTATION PLAN 2011 UPDATE

The Apex Transportation Plan 2011 update provides general and specific strategies for addressing the growing travel demand in Apex through a diverse network of transportation modes, including bicycling. In the development of the plan, one of the top priorities of the residents was to provide bicycle facilities, leading to Objective 8 of the plan: "Support more bike lanes and trails to parks and community activity centers." Objectives 1, 3, and 5 also involve encouraging bicycle use through connectedness and mobility, including improving the greenway system around the town. Objective 6 includes an action to implement complete street solutions which will accommodate all modes, including bicycles. The top 15 priority projects for bicycle and pedestrian improvements are listed in Table 5.1 of the plan; while most of these projects are sidewalks, Priority 3 is a side path accommodating bike travel along Thompson Street. The plan requires that all proposed and improved thoroughfares and proposed collector streets include wide outside lanes with shared road markings to accommodate bicycles, and that all proposed or improved bridges and tunnels include facilities accommodating pedestrians and bicycles. The implementation section of the plan specifies that Hunter Street, Kelly Road, and Lake Pine Drive should facilitate bicycle movements, and recommends a 10-foot-wide side path along the length of Beaver Creek Commons Drive.

Bicycle, Pedestrian, and Equestrian Plan Map

The Bicycle, Pedestrian, and Equestrian Plan map within the Apex Transportation Plan 2011 update shows the existing and proposed facilities which contribute to the bicycle network of the town. These include bike routes, greenways and side paths, wide outside lanes, and intersection improvements. The map includes plans for adding wide outside lanes to accommodate bicyclists on many of the major roadways in Apex. It also includes a large network of proposed greenways and side paths around the town. Additionally, the map depicts the existing bike routes through the town: US Bike Route 1, which runs through Apex on Old US Highway 1/Salem Street, and NC Bike Routes 2 and 5, which run along Green Level West Road and Center Street/Ten Ten Road, respectively.

PARKS, RECREATION, GREENWAYS, AND OPEN SPACE MASTER PLAN

The Apex Parks, Greenways, and Open Space Master Plan created in 2013 is a comprehensive plan for the future of parks, recreation, and cultural resources in the Town of Apex, based on community desires and needs. One of the five Measures of Success for the plan is to "create a park system that residents can access by walking, biking, and driving". The plan focuses on greenways as a top priority for Apex residents. The table and map on pages 5-13 and 5-14 contain proposed greenway and multi-use trails, and the map on page 5-16 contains intersection improvement projects which will impact the connectivity of the bicycling network in Apex. The "Next Steps" recommended by the plan for greenway connectivity include specific greenway projects across the Town of Apex, which will improve bicycle mobility.

US 64 CORRIDOR STUDY

The US 64 Corridor Study Report published in 2011 details the findings of a study of US 64 between the US 64 Business interchange and US 1, which is deemed a Strategic Highway Corridor by the North Carolina Department of

Transportation. The study establishes short-term and long-term master plans which are in accordance with the plans previously in place from the agencies represented along the corridor, including older updates of the Apex plans described previously.

The report proposes a series of long-term projects which impact bicycle connectivity in Apex, including a 12-foot-wide side path along US 64 from Haw River to just east of Jenks Road, and the addition of bicycle lanes on New Hill Road, Jenks Road, Kelly Road, and NC 55. It also proposes wide outside lanes to accommodate bicycles on North Salem Street and Davis Drive.

PEAK PLAN 2030

Peak Plan 2030, the Apex Comprehensive Plan from 2013, provides a vision for the future of the Town of Apex according to community concerns and expectations. Two of the foundational goals of Peak Plan 2030 involve bicycles and pedestrians: "a variety of transportation options to enhance mobility" and "a well-connected pedestrian and bicycle network". One of the recommendations within the plan regarding transportation in Apex is to "build organizational support for bicycle and pedestrian facilities in Apex: establish a bicycle and pedestrian planner within the Apex planning department and establish a bicycle and pedestrian citizen advisory committee." The plan also includes recommendations for prioritizing greenway connections for schools, historic sites, recreational areas, downtown, and other areas.

I-540/SOUTH SALEM STREET SMALL AREA PLAN

The I-540/South Salem Street Small Area Plan was adopted in 2004 and details the plans for the development of the projected activity center located at the interchange of I-540 and South Salem Street. The plan requires South Salem Street to include wide outside lanes for bicycles, and specifies that any collector streets in the area should be wide enough to accommodate bike traffic. The plan also includes greenways connecting to destinations within the area, and safety considerations such as street lighting for pedestrians and bicycles.

SOUTHWEST AREA STUDY 2012

The Southwest Area Study completed in 2012 was initiated to create a comprehensive, sustainable transportation strategy for southwest Wake and Harnett counties, which includes a southern portion of the Town of Apex. The recommendations under this study include the addition of bicycle parking, especially secured parking around transit stops to facilitate connections between the modes. It also recommends traffic calming measures on roadways for the purpose of improving bicycle safety. The 2018 update to the plan is currently underway.

ADVANCE APEX: THE 2045 PLAN

Advance Apex: the 2045 Plan is the 2018 update to the Town of Apex's long-range transportation plan and is currently in progress. The plan focuses on providing a vision for multimodal transportation in Apex. The Bike Apex Plan worked in conjunction with the Advance Apex Plan to ensure seamless recommendations for growth and development.

WAKE TRANSIT PLAN

The Wake Transit Plan is a planning effort spearheaded by GoTriangle that outlines the vision for transit in Wake County over the next ten years. The biggest goals of the plan are to "connect the region; connect all Wake County communities; create frequent, reliable urban mobility; and increase access to transit." The 2016 plan intends to increase bus service across the entire county as well as implement both bus rapid transit and commuter rail transit. Some of the recommendations affecting Apex include:

- An enhanced transfer point in downtown Apex (location TBD)
- All-day bus service on Route 305 (Apex to Raleigh)

- Peak-hour service on existing Route 311 (Apex to RTP)
- New peak-hour service from Holly Springs to downtown Cary with stops in Apex.

WAKE COUNTY GREENWAY SYSTEM PLAN

The 2017 Wake County Greenway System Plan is a comprehensive plan that lays out a vision for a connected network of greenways through all of Wake County. The plan recommends 274 miles of new greenway trails, almost doubling the current existing network. As part of the plan, a greenway is proposed running along Center Street (which will have a side path as part of the U-5825 project) and the northeastern portion of Apex Peakway, as well as what is deemed the Apex West Greenway which connects the American Tobacco Trail to Beaver Creek Greenway. The plan also highlighted the proposed Middle Creek Greenway as a key project, which received significant support from Apex residents who live along that corridor during the draft plan comment period.

NC 55 BYPASS CORRIDOR STUDY (2016)

The NC 55 Bypass Corridor Study is a traffic study that looks at the functional design of the NC 55 Bypass Corridor between Holly Springs and the Town of Apex. The plan recommends widening based on CAMPO's Southwest Area Study and the impacts that widening may cause. The plan does not make any recommendations for bike lanes; however, the large variety of land uses along the corridor provide opportunity for future recommendation.

ACTIVE STIP AND FUNDED TOWN & PARTNER PROJECTS

Below is a summary of active STIP and funded Town & Partner projects that involve bicycle improvements within the Town of Apex.

Active STIP Projects

- **NC 55 (U-2901):** NC 55 will be widened from US 1 to Olive Chapel Road. The project's most recent design (as of September, 2018) includes a side path from Apex Peakway to Olive Chapel Road.
- **US 64 (U-5301):** Several alternatives are being designed to improve flow of traffic and overall safety. Pedestrian and bicyclist needs will be examined as part of the project- particularly when looking at intersection improvements at Laura Duncan Road and lake Pine Drive as these roads carry traffic to US 64.
- **Ten-Ten Road Widening (U-5825):** The road is proposed to be widened from Apex Peakway to Kildaire Farm Road. The widening would convert the two-lane road to a four-lane divided highway. As part of the project, a sidewalk is to be constructed on one side, while a side path would be built on the other. Bike lanes will be included in this project. Estimated date of construction is Spring 2023.
- **Apex Barbecue Bridge Replacement (B-5161):** Apex Barbecue Bridge, which crosses over Beaver Creek, will be replaced to improve overall safety conditions. This project will include greenway, bike lanes, and sidewalk facilities. Construction is scheduled to begin Winter 2018-2019.

Funded Town & Partner Projects

- **Apex Peakway SW Connector (U-5928):** The Apex Peakway SW connector is a project to complete the missing section of the Apex Peakway at South Salem Street. By constructing this portion, the Apex Peakway will be a complete loop around the Town of Apex allowing for enhanced traffic flow. The Apex Peakway will include a side path to provide a safe facility for those wishing to travel by means other than a motorized vehicle.

- **James Street to Downtown Apex Pedestrian Improvements (U-5530 AC):** The James Street to Downtown Apex project is a series of pedestrian improvements that will improve and complete the pedestrian infrastructure along James Street and and a few neighboring streets. The project includes new sidewalks and upgraded ramps, intersection crossing improvements at Center St and Salem Street, installation of Rectangular Rapid Flash Beacons (RRFB) at Saunders St and Salem St, signal improvements and push-button signals at Chatham St and Salem St, and sidewalks along sections of Wrenn St, Moore St, and Salem Street.
- **Kelly and Apex Barbecue Pedestrian Projects:** The Kelly and Apex Barbecue Pedestrian Project will finish the pedestrian route from Olive Chapel Elementary School through Kelly Road Park to Scotts Ridge Elementary School. This project includes the completion of a sidewalk along the east side of Kelly Road as well as a side path along the south side of Apex Barbecue Road. Accessible ramps, cross walks, and push-button pedestrian signal crossings will be installed in various locations along the project.
- **Scotts Ridge Elementary School Side path:** The Scotts Ridge Elementary School Side path is part of the Kelly and Apex Barbecue Pedestrian projects, and will provide safe access to the school. The project is being completed in partnership with Wake County Public School System.
- **Apex Friendship High School Side path:** Apex Friendship High School Side path is a project that provides a side path and a safe route to Apex Friendship High School. The project includes improved crossings on Humie Olive Road.
- **Lake Pine Drive Improvements (U-5537):** Lake Pine Drive is to be converted to a three-lane roadway with bicycle and pedestrian facilities at Apex Community Park.
- **White Oak Creek Greenway extension:** The White Oak Creek Greenway Extension will connect the existing portion of the White Oak Creek Greenway with the American Tobacco Trail. While this project is under the Town of Cary's jurisdiction, the extension of the greenway falls within the Bike Apex study area. It is a joint endeavor with the Town of Cary, NCDOT, Wake County, CAMPO, and Apex. The extension will be maintained by Apex. The project is estimated to cost between $4 and $5 million.
- **Beaver Creek Greenway:** This project is an extension of the Beaver Creek Greenway from Kelly Road Park to the Apex Nature Park and was coordinated with the B-5161 project for crossing under the new bridge. The greenway will complete the 4-mile connection between Apex Nature Park and Apex Jaycee Park. This project will eventually connect to the American Tobacco Trail and was recently identified by Wake County as a priority regional connection.
- **Middle Creek Greenway:** The Middle Creek Greenway will create a regional connection between Apex and Holly Springs. This connection connects 6 neighborhoods, 1 retail center, and 1 employment center while completing a safe route to both Lufkin Road Middle School and the new WCPSS High School. The project is estimated to cost $1.14 million and was recently identified by Wake County as a priority regional connection.

NCDOT NON-MOTORIZED DATA VOLUME PROGRAM

The NCDOT Non-Motorized Data Volume Program is an initiative between the ITRE Bicycle and Pedestrian Group at NC State University and NCDOT which is meant to establish a statewide bicycle and pedestrian count program. Monitors were placed in facilities to collect volume of use, located on Beaver Creek Greenway, Olive Chapel Road (between Kelly Road and Apex Peakway) and Salem Street (between Chatham Street and Hunter Street). This data has helped to evaluate existing facilities to determine trends and potential improvements for the future.

TOWN OF APEX PROGRAMS RELATED TO BICYCLING

The Town of Apex has two municipal education, enforcement, and encouragement programs focused on bicycling.

- **Watch for Me NC:** Apex was a pilot community for the Statewide Watch for Me NC campaign, which is aimed at reducing the number of pedestrians and bicyclists hit and injured in crashes with vehicles. Through the campaign, the Town's Police Department led the effort to reduce violations of safety laws and deliver a consistent safety and educational message to drivers, pedestrians, and bicyclists.
- **Safe Routes to School Program:** The Town has also worked cooperatively with local schools through the Safe Routes to School Program. The Town also collaborated with Olive Chapel Elementary School on a robust Safe Routes to School Program that is now used as an example across the State. The program included construction of facilities around Olive Chapel Elementary School as well as distribution of educational and encouragement materials such as bicycles, helmets, and instructional material regarding walking and biking safely.

The Town has two committees (the Citizens for Apex Parks and the Parks, Recreation, and Cultural Resources Citizen Advisory Committee) that helped supported these programs. Also, while not sponsored by the Town, there are also several bicycle clubs that ride on a regular basis in Town, including guide-led rides accommodating different levels of riders.

TOWN OF APEX UNIFIED DEVELOPMENT ORDINANCE (UDO)

The Town of Apex's UDO Plan Review Checklist and proposed UDO parking amendments were reviewed as part of this planning process. The purpose of the review was to make suggestions and note considerations for future updates related to bicycle infrastructure and transportation. The goal is to maximize bicycle improvements in conjunction with new development, redevelopment, and corridor improvement projects.

The consultant team reviewed UDO draft revision work that was completed by staff in early 2018, and identified model regulatory and policy language from around North Carolina and the United States for elements including land use and transportation integration, transportation system connectivity, Complete Streets, and bicycle parking. If a change was deemed necessary to improve bicycle development requirements, then a modified requirement or a model requirement was suggested as part of this review.

The reviews were submitted to Town staff for consideration in Spring 2018, and can be retrieved by contacting the Town of Apex Planning Department. Since this review, Apex has implemented updated bicycle parking standards.

PUBLIC INPUT

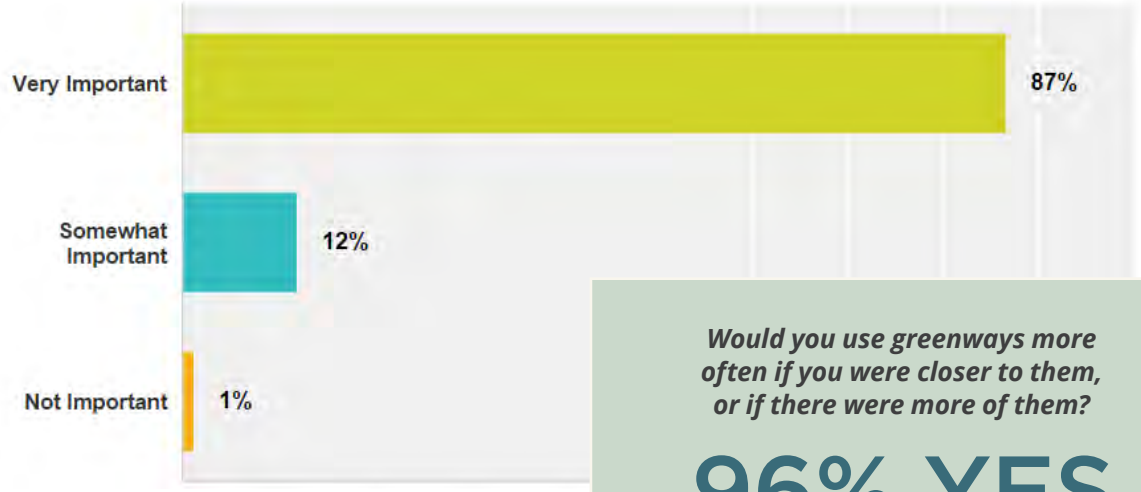
Public input related to bicycling in Apex has been collected through various processes over the past several years, helping to inform this planning process from the outset. Outreach for Bike Apex, in particular, was conducted through the project webpage, public comment form, a project newsletter, project "business cards", and public workshops. Steering committee members and Town staff helped to spread the word about Bike Apex, especially in advance of public meetings.

PUBLIC COMMENTS FROM RECENT & RELATED PLANNING EFFORTS

Wake County Greenway System Plan (2017)

Public outreach for the Wake County Greenway System Plan generated over 2,500 responses, with the highest number of proportional responses coming from nearly 600 Apex residents. Additionally, many Apex residents submitted open comments through the comment form, mostly focused on their overwhelming support for the Middle Creek Greenway project. Other response highlights are shown below.

How important to you is the goal of creating more greenways in Wake County?

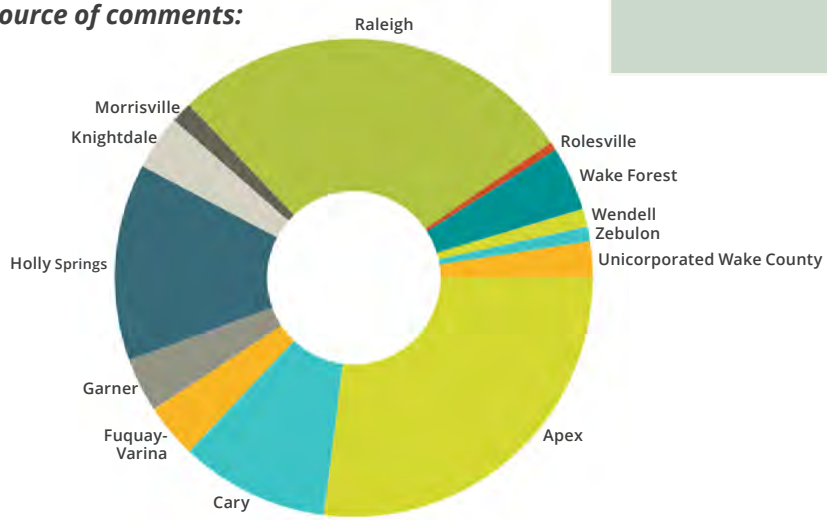


Would you use greenways more often if you were closer to them, or if there were more of them?

96% YES

4% NO

Source of comments:

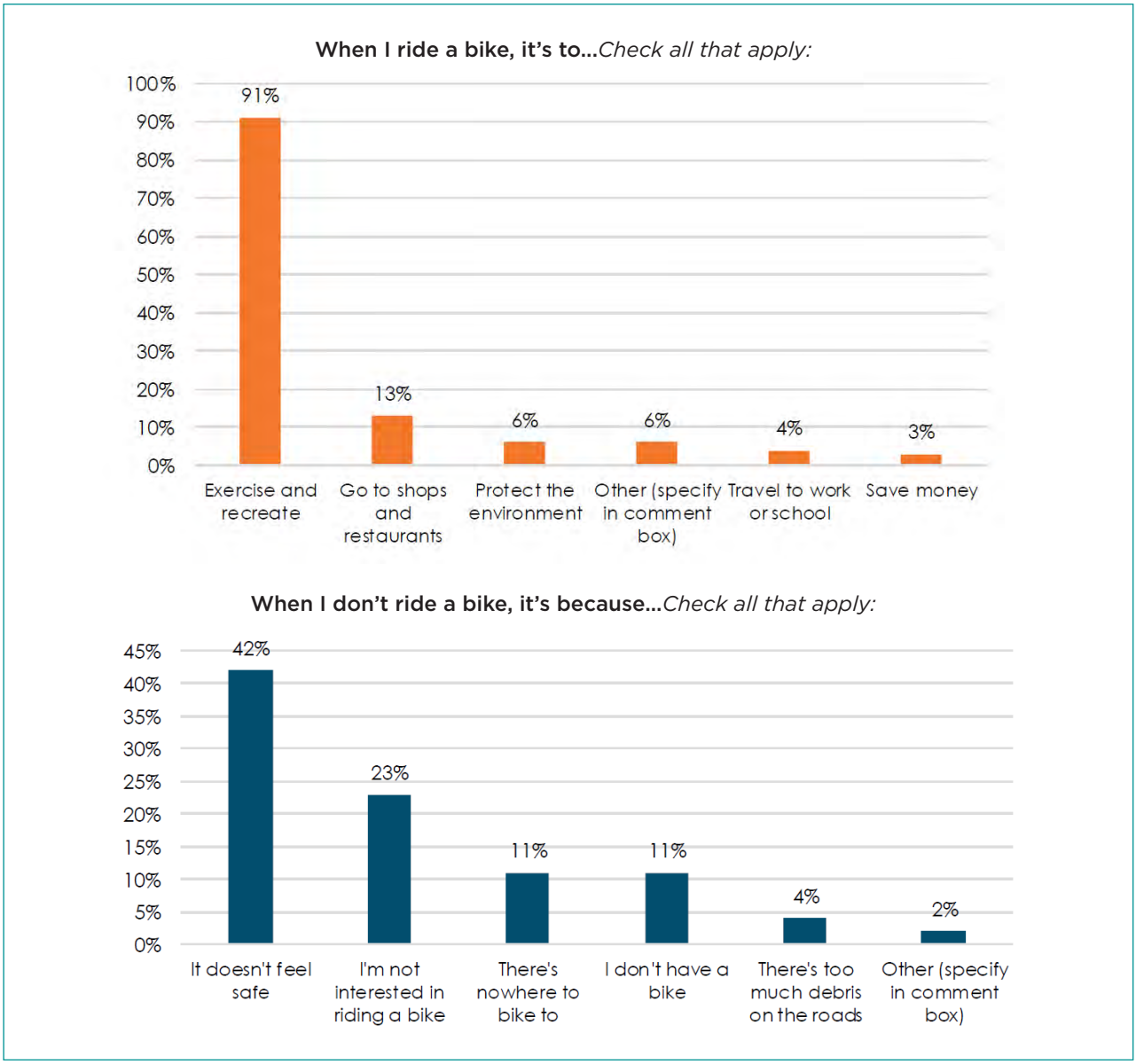


Public response highlights from the Wake County Greenway Plan.

Advance Apex (2017)

As part of Advance Apex, an online survey was used to gain public feedback. 1,235 individuals participated, navigating through a series of 33 questions both online and via a paper version made available at a public workshop. One of the overarching themes was the topic of bicycle and pedestrian issues, which was mentioned 159 times. In summary, Apex residents expressed that:

- Walking and biking would be enhanced if it was safer to cross streets.
- Apex lacks consistent paths.
- If more sidewalks and greenways were available between developments and downtown, more people would bike and walk.
- Many people do not ride bikes because they feel the roads have too much traffic and are therefore unsafe.
- The Town should increase the number of bike lanes; connect existing and future bike lanes to create consistency within the network.
- When asked, "What transportation improvements are most needed?", one of the bicycle-related comments most often mentioned was to install design elements that support safe cycling along S Salem St/Old US 1.



Public response highlights from Advance Apex.

BIKE APEX PUBLIC MEETING #1

The May 2018 open house workshop was focused on introducing the purpose of the plan, existing conditions overview, and gathering input on opportunities and constraints for bicycling in Apex. The room was organized with a rolling Power Point presentation, existing conditions maps, a "StreetMix" station, and information boards detailing the planning process, overall concepts, educational information, and infrastructure/programming ideas.

Thirty-eight people attended the meeting, providing a large volume of feedback regarding opportunities and constraints for bicycling in Apex. Participants provided positive verbal feedback to the project staff, and the overall message was one of support for improving conditions for bicycling in Apex. Input was collected through several means, with key take-aways summarized below:

Dot-Voting Boards: Certain display boards allowed people to vote for their favorite ideas using stickers, with the key topics being programs and bicycle facility types.

- The most popular program ideas noted were bike lane sweeping, increased trail maintenance, and the Watch For Me NC program.
- The most popular bicycle facility types were buffered bicycle lanes, standard bicycle lanes, and shared use paths (greenways).

StreetMix Station: This station allowed participants to learn about the trade-offs involved in street design by moving various street elements within a set right-of-way, both online at https://streetmix.net, and using a hardcopy set of pieces. The most people who participated created designs with bicycle lanes (standard and separated).

Mapping Comments: Large-format maps showing existing conditions were on display on tables for participants to mark up their thoughts, ideas, and concerns regarding opportunities and constraints for bicycling in Apex. Key themes included:

- The general idea of connectivity was a key theme in the mapping comments, with many comments focused on connections from neighborhoods and existing greenways to

Bike Apex Public Workshop, with public input maps in the foreground, and "dot-voting' posters in the background.

Downtown Apex. Other commonly mentioned examples included connectivity to the American Tobacco Trail, the East Coast Greenway, and the Town of Cary.

- Safety was also a key theme. Examples include:
  - Many comments regarding a recent roadway redevelopment south of Apex in Holly Springs, on Woods Creek Rd, where the travel lanes were narrowed and a median was added, creating a pinch-point for bicyclists.
  - Other safety concerns were about key roadway crossings, such as NC 55/ Williams Street at Jaycee Park, Olive Chapel Road at Fairfax Woods Dr, and multiple locations along US 64 (Laura Duncan Road, Lake Pine Drive, N. Salem Street, and Jenks Road).
  - The most noted safety concerns for entire corridors included Old US 1/Salem Street through Apex (also US Bike Route 1), NC 55, and Ten Ten Road.
- Comments about desired bicycle treatments for future roadway projects, such as parts of Ten Ten Road, US 64 and NC 55.
- Additions & corrections to existing and planned facilities (and those currently in different stages of development)

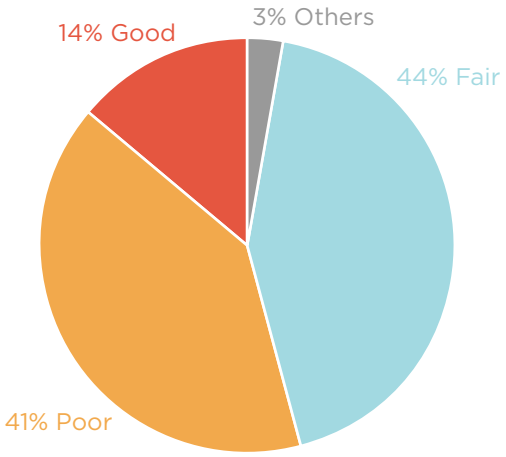
BIKE APEX PUBLIC MEETING #2

The August 2018 open house workshop was focused on the draft bike plan recommendations, and gathering feedback on those recommendations. The meeting was held in conjunction with an Advance Apex meeting, with a dedicated space and station for Bike Apex. The main tools used for input included a public comment form and public input base maps that showed the full draft comprehensive bicycle network.

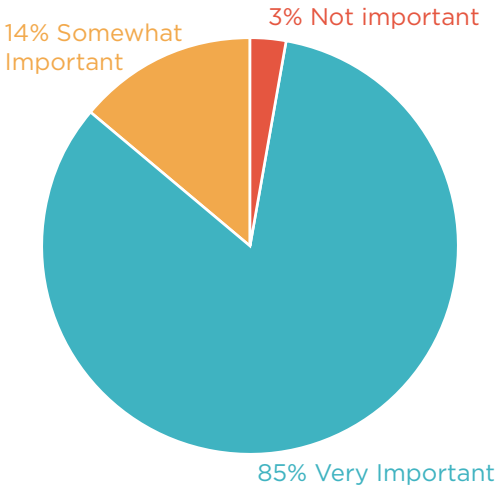
Public Workshop/Public Comment Form

Workshop participants were encouraged to share written comments through the comment form, and those responses were later compiled through the online version of the form, the results of which are summarized below. There were a total of 55 participants with over 404 responses and 144 comments.

How would you rate overall bicycling conditions in Apex?



How important is it to you to improve bicycling conditions in Apex?



Select three types of destinations that are most important to you for bicycling connections:

- 17% **American Tobacco Trail**
- 15% **Downtown Apex**
- 14% **Parks**
- 12% **Jordan Lake**
- 8% **Harris Lake**
- 7% **Shopping centers**
- 6% **Neighborhoods/subdivisions**
- 6% **Town of Cary**
- 4% **Schools**
- 4% **Offices/jobs**
- 4% **Somewhere else (describe in comments)**
- 5% **Others**

Rank these bicycle program ideas from 1 (most important) through 7 (least important).

Increased trail maintenance	Rank: 2.56
Bike lane sweeping (for future bicycle lanes)	Rank: 2.89
Safety campaigns	Rank: 3.98
Map or mobile app with bike routes and greenways	Rank: 4.04
More bike racks and storage	Rank: 4.30
Bicycle wayfinding signs with distances to destinations	Rank: 4.54
Encouragement campaigns and events	Rank: 4.80

Average ranking scores listed at left (lower numbers = more important)

Draft Proposed Bike Network/ Route-Specific Feedback

Workshop participants and online survey participants were invited to view and comment on the full draft comprehensive bicycle network. The most frequently mentioned routes for improving conditions for bicycling were, by far:

1. S Salem St/Old US 1, from Downtown Apex to Pleasant Park, and continuing towards more rural riding roads in western Apex and beyond.
2. Olive Chapel Road, from Hunter St to the American Tobacco Trail and New Hill Olive Chapel Rd.
3. The Beaver Creek Greenway, connecting from Downtown Apex to the American Tobacco Trail.

The following pages feature comments that best represent the majority of the written feedback received (including comments submitted via e-mail).

WHAT WE HEARD

Featured below are comments that best represent the majority of the written feedback received (including comments submitted via e-mail).

Greenway is fine for family short recreation, but it is not acceptable for commuting or exercise. Apex needs to ensure there are wide lanes to permit on road exercise cycling or longer distance commuting via cycling. Western Wake/Apex is growing and with new infrastructure being built both of these user groups would be incorporated.

I would love to see signs giving drivers (and cyclists) some sort of idea what the rules are. The 2 foot and 4 foot spacing signs are a good idea but most people can't judge passing distances that well. Most cyclists I know have been knocked off the road at least once by an SUV mirror or trailer protrusion.

Make connections between town center and community to encourge family biking. Complete connections to Holly Springs in the south and Jordan Lake for serious riders. Ecourage more riders by having street closures on "bicycle event" day for family rides.

When adding signal lights, they need to be able to detect bicycles.

Bike lanes are needed along the entirety of US Bike Route 1. A side path is not a substitute. The same is true of Humie Olive and Friendship.

I've lived here for 32 years and been a recreational cyclist for all of that time....I appreciate and use the marked bike lanes such as those on Apex Peakway, and wish there were more of them. I rarely use greenways but would use them more if all those which are planned are actually built and connected.

For experienced cyclists, connecting to "country roads" toward Jordan Lake is a must. Too often, especially as subdivisions are being built, these roads are becoming busier with little room for bikers.

Need to provide bicycle facilities for both inexperienced riders (greenways) and advanced riders (wide outside lanes or bike lanes). Some of these may parallel each other but provide facilities that meet the needs for all cyclists in the community.

We believe that by adding bicycle infrastructure to the Apex area, it will cause our town to be safer, more efficient and even more active. Having biking lanes on roads can cause both cyclists and automobile drivers to be safer....When there are more recreational biking environments, more people are likely to get outside and bike. - *Submitted by a group of five students at Apex Friendship High School*

We have a great greenway system but it does not connect to downtown. My wife and I would love to jump on bikes and take a leisurely ride into downtown to shop or go out to dinner.

The greenways, parks and schools need to be connected by bike lanes. This should create bike lanes thru out the town.

Sharrows for cyclists with experience

More signs informing the public "Bicycles May Use Full Lane".

As an avid recreational road cyclist, I would like to emphasize the need for better roads for cycling just west of Apex. On my frequent rides from Apex to the west to and around Harris Lake and Jordan Lake, I see many other cyclists in these areas. The primary reason the limited amount of traffic on roads like Friendship, Olive Chapel, Holly Springs New Hill, New Hill Chapel Rd, Old US 1 Hwy, Richardson, Beaver Creek, and Shearon Harris. This area is extremely popular for road cyclists. With the increasing development in the area and the future growth planned, these roads should be prioritized for bike lanes to help keep the roads safe as this area is built out. And hopefully, a complete loop of 20-30 miles of roadway with bike lanes can be added to the plan.

If I was to prioritize things it would be to develop bike-safe paths/routes to connect with Cary and other neighboring towns. For example, Cary has their cross-town greenway that is connecting with the ATT - but it is hard to get up there and connect. Or another example - there are wide sidewalks/paths up Davis headed towards the Triangle, but it is hard to connect to those from Apex.

Fix flooding issue on Beaver Creek Greenway at 540.

"I am convinced that Apex's continuing growth will benefit from planning for bicycling activities. In particular, I believe that street design is important to ensure safety for all users, including pedestrians and cyclists. If you look at almost any promotional materials for "friendly" communities, photographs of cyclists are included. But, making communities safe and encouraging for cyclists doesn't just happen— it takes planning." - David Cole, Apex resident since 1979, active cyclist, and six-time president of the North Carolina Bicycle Club

OVERVIEW

This chapter outlines the recommendations for making Apex safer and more enjoyable for bicycling, with improved connections within town and beyond. A diverse mix of facilities are recommended to create these connections, taking into account the needs of different types of bicyclists. In addition to the infrastructure recommendations that make up the bulk of this chapter, program recommendations are also included to further meet the goals of this plan.

Recommendations were developed based on information from several sources: Public and Steering Committee input, obtained through facilitated meetings, in-person workshops and public comment forms; connectivity to destinations; review of current roadways and bicycle facilities; existing plans and projects, and a prioritization process. These sources form the basis of recommendations in this chapter.

BASIS OF RECOMMENDATIONS

Public & Steering Committee Input
Mapping exercises, workshops, group discussions, and comment forms (p.33 and 40)

+

Connections to Key Destinations
Downtown, parks, schools, neighborhoods, commercial areas, and surrounding communities (p. 27)

+

Current Conditions
Opportunities and challenges (p.21) Bicycle Level of Comfort Analysis (p. 31), and past bicycle crash locations (p.29)

+

Existing Plans & Projects
Existing and in-development roadway, greenway, side path, and bicycle lane projects (p.51)

+

Priority Project Analysis
A priority project checklist taking into account nearly 20 unique factors (p.57)

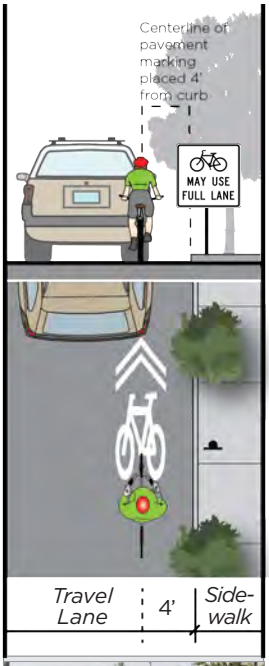
Map 3.1: In-Development Bike Network
Map 3.2 Priority Bike Network & Project Cut-Sheets
Map 3.3 Comprehensive Bike Network

Image in header: Bicyclist on the Beaver Creek Greenway

BICYCLE FACILITY TYPES

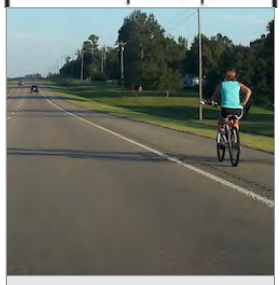
These are the primary facility types recommended in this plan. See the maps (and legends) in Chapter 3 to see where these different types of facilities are recommended in Apex. For more information on facility design, please see the list of design resources on p. 96.

Shared Lane



Shared Lane Markings (SLMs), or "sharrows," are road markings used to indicate a shared lane environment for bicycles and automobiles. Among other benefits, shared lane markings reinforce the legitimacy of bicycle traffic on the street, recommend proper bicyclist positioning, and may be configured to offer directional and wayfinding guidance. Shared lane markings are only recommended in areas where there are constraints.

Paved Shoulder



Paved shoulders on the edge of roadways can be enhanced to serve as a functional space for bicyclists and pedestrians to travel in the absence of other facilities with more separation. Paved shoulders can reduce "bicyclist struck from behind" crashes, which represent a significant portion of rural road crashes. For preferred rumble strip placement see FHWA's Achieving Multimodal Networks (2016).

Bicycle Lane

Bike lanes designate an exclusive space for bicyclists, directly adjacent to motor vehicle travel lanes. The preferred minimum width is 6.5 ft to allow bicyclists to ride side-by-side or pass each other without leaving the bike lane. Absolute minimum bike lane width is 4 ft when no curb and gutter is present or 5 ft when adjacent to a curbface, guardrail, other vertical surface or on-street parking stalls (AASHTO Bike Guide 2012).

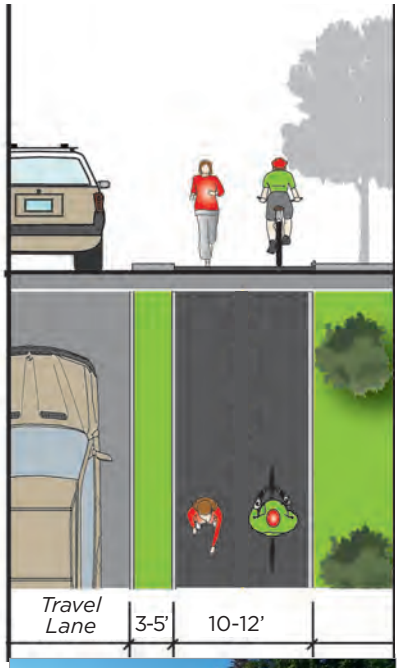
**The optional buffer is 1.5-4 ft, or wider. If 4 ft or wider, mark with diagonal or chevron hatching.*

Separated Bicycle Lane

A separated bike lane is a facility for exclusive use by bicyclists that is located within or directly adjacent to the roadway and is physically separated from motor vehicle traffic with a vertical element. Preferred minimum width of a one-way separated bike lane is 7 ft (2.1 m). This width allows for side-by-side riding or passing. Separated bike lanes should be considered as an option in the design process for the bicycle lanes recommended in this plan, especially for inclusion on projects with new roadway construction.

BICYCLE FACILITY TYPES *(CONTINUED)*

Side Path



A side path is a bidirectional shared use path located immediately adjacent and parallel to a roadway. Side paths can offer a high-quality experience for users of all ages and abilities as compared to on-roadway facilities in heavy traffic environments, allow for reduced roadway crossing distances, and maintain rural and small town community character. Widths and design details of side path elements may vary. Minimum recommended pathway width is 10 ft. In low-volume situations and constrained conditions, the absolute minimum side path width is 8 ft.

Street-Side Greenway

'Street-side greenway' is a term used locally (in the Town of Cary) for side paths with a greater landscaped buffer between the roadway and trail, allowing the trail to meander slightly for increased user comfort and a more rural aesthetic. These street-side trails typically do not fit within the roadway right-of-way, but can usually be constructed with a town greenway easement of 20-30'. The easements can overlay streetscape buffers while not affecting setbacks or buffer widths, so long as required planting density can still be achieved. This design should be considered for the more rural side paths that are recommended in this plan.

Greenway

Greenways offer connectivity opportunities beyond that of the roadway network. These facilities are often located in parks, along rivers, and in utility corridors where there are few conflicts with motorized vehicles. They can provide a low-stress experience for a variety of users, including bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. Faster-moving bicyclists often prefer to use roadways, due to conflicts with other, slower-moving greenway trail users.

KEY RECOMMENDATIONS:

1 KEEP MOMENTUM ON BICYCLE PROJECTS THAT ARE ALREADY IN-DEVELOPMENT.

Map 3.1 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.

2 STRATEGICALLY AND PROACTIVELY FUND AND BUILD PRIORITY PROJECTS.

Map 3.2 features a set of priority projects that developed out of the Bike Apex planning process. These are detailed in individual project cut-sheets (starting on page 63) that summarize why the project is a priority, and what the key opportunities and challenges are to its development. See the Project Priority Checklist (p. 57) for how priorities were selected.

3 USE THE COMPREHENSIVE NETWORK OF RECOMMENDATIONS TO BUILD OTHER PROJECTS INCREMENTALLY OVER TIME.

As Apex continues to grow, new development and roadway construction projects should incorporate facilities recommended in **Map 3.3.** As progress is made on priority projects, new priorities should be selected from this comprehensive map of recommendations.

4 IMPLEMENT NEW PROGRAMS THAT SUPPORT AND ENCOURAGE BICYCLING.

As new facilities are built, people will want to know where they are, how to get to them, and how to ride safely on them; new programs can help address these issues, and are outlined starting on page 80. Motorists can also use encouragement to slow down, yield when appropriate, and pass bicyclists safely, and a safety campaign should be launched to do just that.

Together, these recommendations make up the core of this plan, as featured in Chapter 3. They are supplemented by a detailed set of action steps, and a list of resources for the latest information on bicycle facility design and bicycle-related policy in Chapter 4.

Photo rendering of the proposed side path along Old US 1.

MAP 3.1 IN-DEVELOPMENT BIKE NETWORK

ABOUT THIS MAP

This map 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.

KEY PROJECTS IN-DEVELOPMENT

BICYCLE LANES

1. Ten Ten Rd

SIDE PATHS

2. Jordan Point & Horton Ridge
3. Milano Ave
4. Apex Barbecue Rd
5. NC 55/Williams St
6. Ten Ten Rd
7. Ragan Rd
8. Kelly Rd
9. Laura Duncan Rd

GREENWAYS

10. Little Beaver Creek Greenway
11. Reedy Branch Greenway
12. White Oak Creek Greenway
13. Beaver Creek Greenway
14. Charleston Village Greenway
15. Salem Pond Park Trail Extension
16. Community Park Connector Greenway
17. Middle Creek Greenway
18. Clark Branch Greenway

American Tobacco Trail
East Coast Greenway Corridor
Existing Greenway
Greenway In-Development
Private Greenway
Existing Side Path
Side Path In-Development
Existing Bike Lanes
Bike Lanes In-Development
State Bike Route (On-Road, Signed Only)

0 1 2 3 4 5 MILES
0 5 10 15 20 25 MINUTE BIKE RIDE (Based on 12 MPH average)

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MAP 3.2 PRIORITY BIKE NETWORK

ABOUT THIS MAP

This map features this Plan's priority projects, along with existing projects and projects that are in-development (either funded, in the design phase, or the construction phase). Numbers on this page correspond to the Priority Checklist on pages 57-59,and to the Priority Project Cutsheets (for project 1-8) on pages 63-79.

PRIORITY PROJECT LIST

1. Beaver Creek Greenway from Downtown Apex to the American Tobacco Trail
2. S Salem St/Old US 1 Sharrows and Bike Lanes, from Downtown Apex to Pleasant Park
3. Olive Chapel Rd Bike Lanes, from NC 55 to New Hill Olive Chapel Rd
4. Hunter St Sharrows, from Apex Peakway to Williams St/NC 55
5. Apex Peakway (North) Side Path, from Center St to Beaver Creek Greenway
6. N Salem St/Davis Dr Side Path & Sharrows from Salem Pond Park at Old Jenks Rd to Downtown Apex
7. Laura Duncan Rd Side Path and Sharrows, from Apex High School at US 64 to Downtown Apex at Center St
8. Apex Peakway (South) Side Path, from Beaver Creek Greenway to Center St
9. Middle Creek Greenway, from Gladsong Rd to Lufkin Rd
10. Reedy Branch Greenway, from Kelly Rd to American Tobacco Trail

* *Milano Ave Sidepath is also a priority, but not ranked due to its size.*

American Tobacco Trail
East Coast Greenway Corridor
Existing Greenway
Greenway In-Development
Proposed Greenway
Private Greenway
Existing Side Path
Side Path In-Development
Proposed Side Path
Existing Bike Lanes
Bike Lanes In-Development
Proposed Bike Lanes
Proposed Bicycle Shared Lane Markings, "Bicycle May Use Full Lane" Signage & Speed Limit Reduction

0 1 2 3 4 5 MILES
0 5 10 15 20 25 MINUTE BIKE RIDE (Based on 12 MPH average)

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MAP 3.3 COMPREHENSIVE BIKE NETWORK

ABOUT THIS MAP

This comprehensive network should be built incrementally over time. As Apex continues to grow, new development and roadway construction projects should incorporate these facilities. As progress is made on priority projects, new priorities should be selected from this comprehensive map of recommendations. Numbers on this page correspond to the Priority Checklist on pages 57-59.

FULL PROJECT LIST

1. Beaver Creek Greenway
2. S Salem/Old US 1
3. Olive Chapel Rd
4. Hunter St
5. Apex Peakway (north)
6. N Salem St/Davis Dr
7. Laura Duncan Rd
8. Apex Peakway (south)
9. Middle Creek Greenway
10. Reedy Branch Greenway
11. NC 55/Williams St
12. Apex Barbecue Rd
13. Little Beaver Creek Greenway
14. Old Raleigh Rd/Lake Pine Dr
15. Kelly Rd
16. Humie Olive Rd
17. Hughes St
18. Davis Dr
19. Kelly Rd
20. Jenks Rd/Old Jenks Rd
21. Old US 1
22. Salem Church Rd, N Salem St, Davis Dr
23. Tingen Rd
24. Ragan Rd
25. Community Park Connector Greenway
26. Roberts Rd
27. Evans Rd
28. Green Level West Rd
29. Mt Zion Church Rd & Hammocks Beach Trl
30. Richardson Rd
31. Sunset Lake Rd
32. Morris Acres Rd
33. James St
34. Wimberly Rd
35. New Hill Olive Chapel Rd
36. Pleasant Plains Rd
37. Orchard Villas Ave & Carolina Bell Rd
38. NC 55/Williams St
39. Horton Ridge Rd [future]
40. Holt Rd
41. Jessie Dr
42. Reunion Creek Pkwy (Ext)
43. Stephenson Rd
44. Holland Rd
45. Lufkin Rd/Prince Dead End Rd
46. Goodwin Rd, US 64 & Jenks Rd
47. Richardson Rd
48. Friendship Rd
49. Smith Rd
50. Old Raleigh Rd
51. New Hill Olive Chapel Rd

East Coast Greenway
American Tobacco Trail
ATT Trailhead
Future ATT Trailhead
Proposed Grade Separated Bike/Ped Crossing

US Bike Route 1/NC Bike Route 1: Carolina Connection
NC Bike Route 2: Mountains to Sea
NC Bike Route 5: Cape Fear Run

Existing Greenway
Proposed Greenway
Private Greenway

Existing Side Path
Proposed Side Path
Proposed Street Side Greenway
Proposed Paved Shoulder

Existing Bike Lanes
Proposed Bike Lanes
Proposed Bicycle Shared Lane Markings, "Bicycle May Use Full Lane" Signage & Speed Limit Reduction

Natural Areas
Parks
Schools

0 1 2 3 4 5 MILES
0 5 10 15 20 25 MINUTE BIKE RIDE (Based on 12 MPH average)

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TABLE 3.1 PRIORITY PROJECT CHECKLIST

Projects listed in this table correspond to the Map 3.3 Comprehensive Bike Network. Each project was scored based on the factors listed below. "Maximum" points are listed for some factors, so that no single connectivity factor carries too much weight. This checklist should be considered as a general guide when weighing priorities, rather than a fixed phasing plan. Opportunities to develop any project should be considered as they arise, such as through the development process, or through roadway construction projects, regardless of ranking.

						Project connects to...												Project has...					
	Map 3.3 Label #	Project	From	To	Facility Type*	Existing bike facilities	Existing bike facility on both ends	Parks, trail-heads, or rec. centers	Schools	Sub-division entrances	Offices or shopping centers	State or national bike routes	Multi-family homes	Go Triangle Park & Ride	Historic Down-town Apex	Go Triangle bus stop (route 311 or 305)	Poten-tial rail station location	High job concentra-tion area (see "Work Locations" in Advance Apex)	Area with over 9% poverty (see "Income & Employment" in Advance Apex)	Reported bicyclist crashes along route (2007-2015)	Reported bicyclist fatality along route (2007-2015)	Designa-tion as state or national bike route	Steering Committee input as a top priority	Public input as a top priority	TOTAL
						max 5	1	max 5	max 5	max 5	max 5	max 3	max 5	1	1	1	1	1	1	max 5	1	1	5	5	
Priority Projects/Short-Range	1	Beaver Creek Greenway	Downtown Apex	American Tobacco Trail	GW/SR	5	1	4	1	5			2		1			1					5	5	30
	2	S Salem/ Old US 1	NC 55/Williams St	Pleasant Park	SR/BL	1		1		2	1		1		1		2	1	1	1	1	1	5	5	24
	3	Olive Chapel Rd	NC 55/Williams St	New Hill Olive Chapel Rd	BL	4		1	1	5	3	1	1							3				5	24
	4	Hunter St	NC 55/Williams St	Apex Peakway	SR	2	1	2	1	3	4	1			1	1	1	1	1				5		24
	5	Apex Peakway (north)	Center St	Beaver Creek Greenway	SP	4	1	1	1	5	5	1	1			1			1	1					22
	6	N Salem St/ Davis Dr	Downtown Apex	Town of Cary	SP/SR	1		2	3	2	3	1			1		1	1				1	5		21
	7	Laura Duncan Rd	Center St	US 64	SP/SR	1		1	1	3	3		1		1	1	1	1	1				5		20
	8	Apex Peakway (south)	Beaver Creek Greenway	Center St	SP	3	1	1		5	3	2	2						1	1					19
	9	Middle Creek Greenway	Gladsong Dr	Lufkin Rd	GW/SP	2			1	2	2		1					1					5	5	19
	10	Reedy Branch Greenway	Kelly Rd	American Tobacco Trail	GW/SP	3	1	2	1	5	3		2					1							18
Mid-Range	11	NC 55/ Williams St	Old Jenks Rd	Hunter St	SP					3	5		3			1		1		5					18
	12	Apex Barbecue Rd	Olive Chapel Rd	S Salem St/Old US 1	SP	3		1	1	5		1	1										5		17
	13	Little Beaver Creek Greenway	American Tobacco Trail	Friendship Schools Campus	GW	2	1	2	3	5	1		1												15
	14	Old Raleigh Rd/ Lake Pine Dr	North of Versailles Dr	Apex Peakway	BL	1		1		5	2		1			1			1	3					15
	15	Kelly Rd	Olive Chapel Rd	Old US 1	BL	2	1	3	2	5		1													14
	16	Humie Olive Rd	New Hill Olive Chapel Rd	US 1	SP/SG	2		1	2	3		1											5		14
	17	Hughes St	NC 55/Williams St	NC 55/Williams St	SP	1				3	2		1	1	1	1	1	1	1	1					14
	18	Davis Dr	Farmpond Rd	Old Jenks Rd	SP	1	1		2	1	1									1		1	5		13
	19	Kelly Rd/Green Level Church Rd	Green Level High School Entrance	Olive Chapel Rd	SP	5	1		2	3	1	1													13
	20	Jenks Rd/Old Jenks Rd	Green Level Church Rd	Salem Church Rd	SP			2	2	3	2					1				2					12
	21	Old US 1	Chatham County Line	Pleasant Park	BL/SP	1		1		2									1	1		1		5	12
	22	Salem Church Rd, N Salem St, Davis Dr	Old Jenks Rd	Laura Duncan Rd	BL	1			3	5	2	1													12
	23	Tingen Rd	S Salem St	Apex-Holly Springs limits	BL/SP				1	5	1		3				1		1						12
	24	Ragan Rd	American Tobacco Trail	Humie Olive Rd	SP/SG	2	1	1		2													5		11
	25	Nichols Plaza/ Pine Plaza	Multiple	Multiple	SP	3	1	1			2		1	1		1			1						11

GW = Greenway; SP = Sidepath; SG = Street Side Greenway; BL= Bike Lane; SR = Shared Lane; PS = Paved Shoulder

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TABLE 3.1 PRIORITY PROJECT CHECKLIST (CONTINUED)

Long-Range

					Project connects to...														Project has...					
Map 3.3 Label #	Project	From	To	Facility Type*	Existing bike facilities	Existing bike facility on both ends	Parks, trail-heads, or rec. centers	Schools	Sub-division entrances	Offices or shopping centers	State or national bike routes	Multi-family homes	Go Triangle Park & Ride	Historic Down-town Apex	Go Triangle bus stop (route 311 or 305)	Poten-tial rail station location	High job concentra-tion area (see "Work Locations" in Advance Apex)	Area with over 9% poverty (see "Income & Employment" in Advance Apex)	Reported bicyclist crashes along route (2007-2015)	Reported bicyclist fatality along route (2007-2015)	Designa-tion as state or national bike route	Steering Committee input as a top priority	Public input as a top priority	TOTAL
					max 5	1	max 5	max 5	max 5	max 5	max 3	max 5	1	1	1	1	1	1	max 5	1	1	5	5	
26	Roberts Rd	Green Level High School Entrance	Jenks Rd	SP	3			1	5		1													10
27	Evans Rd	Milano Ave	Humie Olive Rd	SP	2	1	1	2	3										1					10
28	Green Level West Rd	Chatham County line	Green Level Church Rd	BL/SP	2				2		2								2		1			9
29	Mt Zion Church Rd & Ham-mocks Beach Trl	Richardson Rd	Richardson Rd	SP	2		1		5															8
30	Richardson Rd	US 64	Milano Ave	SP/SG	3				5															8
31	Sunset Lake Rd	NC 55 Bypass	Stephenson Rd	BL	1				5			1							1					8
32	Morris Acres Rd	Jenks Rd	Vison Dr	SP	1				3	1		1					1							7
33	James St	Apex Peakway	Short St	SP				1	3	1		1						1						7
34	Wimberly Rd	Green Level West Rd	Jenks Rd	PS/SP	1		1		2		2								1					7
35	New Hill Olive Chapel Rd	Humie Olive Rd	US 1	PS	2				5															7
36	Pleasant Plains Rd	Old US 1	US 1	BL			1	1	2		1							1						6
37	Orchard Villas Ave & Carolina Bell Rd	Proposed green-way near Apex Professional Park	N Salem St	SP				1	2	1	1	1												6
38	NC 55/Williams St	Apex Peakway	Perry Rd	SP	1				2	1									2					6
39	Horton Ridge Rd [future]	Horton Rd	Richardson Rd	SP	1			2	2															5
40	Holt Rd	Old Jenks Rd	Old Jenks Rd	PS					5															5
41	Jessie Dr	Veridea Parkway	Ten Ten Rd	SP					2	2						1								5
42	Reunion Creek Pkwy (Ext)	Middle Creek Greenway	Stephenson Rd	SP	1			1	2			1												5
43	Stephenson Rd	Smith Rd	Sunset Lake Rd	BL					5															5
44	Holland Rd	Kelly Rd	Old US 1	PS					4		1													5
45	Lufkin Rd/ Prince Dead End Rd	Veridea Parkway	Lufkin Road	GW/SP				1	1	1	1						1							5
46	Goodwin Rd, US 64 & Jenks Rd	American Tobacco Trail	Green Level Church Rd	SP	2		1		1															4
47	Richardson Rd	Milano Ave	US 1	SP	1				2		1													4
48	Friendship Rd	Old US 1	US 1	PS					2		1							1						4
49	Smith Rd	Ten Ten Rd	Reunion Creek Pkwy (Ext)	SP				1	2															3
50	Old Raleigh Rd	Lake Pine Dr	Apex-Cary town limits	BL					1						1									2
51	New Hill Olive Chapel Rd	US 64	Humie Olive Rd	PS					1															1

Bicycle Facility Projects In-Development as of 2018 (See Map 3.1)	
Bicycle Lanes	1) Ten Ten Rd
Side Paths	2) Jordan Point & Horton Ridge, 3) Milano Ave, 4) Apex Barbecue Rd, 5) NC 55/Williams St, 6) Ten Ten Rd, 7) Ragan Rd, 8) Kelly Rd, 9) Laura Duncan Rd
Greenways	10) Little Beaver Creek Greenway, 11) Reedy Branch Greenway, 12) White Oak Creek Greenway, 13) Beaver Creek Greenway, 14) Charleston Village Greenway, 15) Salem Pond Park Trail Extension, 16) Community Park Connector Greenway, 17) Middle Creek Greenway, 18) Clark Branch Greenway

**GW = Greenway; SP = Sidepath; SG = Street Side Greenway; BL= Bike Lane; SR = Shared Lane; PS = Paved Shoulder*

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Map-mark up session at the Bike Apex Public Workshop

PRIORITIZATION PROCESS

Projects listed in Table 3.1 correspond to Map 3.3: Comprehensive Bike Network. Each project was scored based on the factors listed below, generally receiving one point per criteria fulfilled. Projects can score multiple points for certain criteria, such as connections to parks and schools. For example, if a project connects to three different parks, it scores three points within that single criteria. "Maximum" points are listed so that no single connectivity factor carries too much weight (for example, some longer segments might capture 8-10 subdivision entrances, but would only receive the maximum of five points).

Project Connects To:

- **Existing bike facilities** (greenways, side paths, and bicycle lanes)
- **Existing bike facility on both ends** (greenways, side paths, and bicycle lanes)
- **Parks, trailheads, or recreation centers**
- **Schools**
- **Sub-division entrances** (generally counts entrances on both sides of the street, unless the recommendation is a side path with limited opportunity for a crosswalk to connect to the other side of the street)
- **Offices or shopping centers** (generally limited to major centers that are named and labeled in Map 2.2)
- **State or national bike routes** (includes US Bike Route 1/NC Bike Route 1, NC Bike Route 2, NC Bike Route 5, and the East Coast Greenway)
- **Multi-family homes** (includes apartments and town homes)
- **Go Triangle Park & Ride** (see Map 2.2)
- **Historic Downtown Apex** (see Map 2.2)
- **Go Triangle bus stop** (route 311 or 305)
- **Potential rail station location** (see Map 2.2)
- **High job concentration area** (see "Work Locations" in Advance Apex)
- **Area with over 9% poverty** (see "Income & Employment" in Advance Apex)

Project Has:

- **Reported bicyclist crashes along route** (2007-2015; see Map 2.3)
- **Reported bicyclist fatality along route** (2007-2015; see Map 2.3)
- **Designation as state or national bike route** (includes US Bike Route 1/NC Bike Route 1, NC Bike Route 2, NC Bike Route 5, and the East Coast Greenway)
- **Steering Committee input as a top priority** (based on feedback collected during Steering Committee Meeting #3, where the focus of the meeting was on the draft proposed network, including discussion of the most important segments from the committee's perspective; see Appendix C: Meeting Summaries)
- **Public input as a top priority** (based on feedback received from public workshop participants and online survey participants, with top responses being for Beaver Creek Greenway, Salem St/Old US 1, and Olive Chapel Rd; additionally, this takes into consideration feedback from the 2017 Wake County Greenway Plan, for which Apex residents identified Middle Creek Greenway as a priority; see public input summary at the end of Chapter 2)

This checklist should be considered as a general guide when weighing priorities, rather than a fixed phasing plan. Opportunities to develop any project should be considered as they arise, such as through the development process, or through roadway construction projects, regardless of ranking.

PRIORITY PROJECT CUT-SHEETS

Projects 1-8 were the highest scoring projects in the Project Priority Checklist. Further detail for each of these projects is provided in the project "cut-sheets" on the following pages. Map 3.2 shows the locations of these projects, using project identification numbers 1-8.

Estimated Construction Costs

Most of the project cut-sheets show a planning level cost estimate. The total is featured on the cut-sheet, whereas a more in-depth estimate for each sheet is included in Appendix B. Portions of certain projects, like some of the proposed bike lanes on Olive Chapel Rd, are not included in the cost estimate, since those sections of bike lanes would be added during the reconstruction and widening of the roadway. Other key considerations for these costs are noted below:

- The estimates are not based on engineering design, and are for planning purposes only. Costs will likely change as more information becomes available in the design phase.
- Costs are based on 2017/2018 unit prices; inflation not included.
- Each project estimate includes a built-in 30% construction contingency.
- Engineering design costs are included as 30% of total construction costs. Higher ranges will be encountered on projects utilizing federal funds that require a high level of regulatory compliance and on projects that impact FEMA regulated floodways that require detailed flood modeling and permitting. Small projects will also see higher percentages for design cost.
- Costs exclude special landscaping, lighting, and green infrastructure.

Interim and Ultimate Cross-Sections for Bicycle Lanes

Several of the priority projects with bicycle lane recommendations are on roadways that are expanding over time with future development, from two-lane roads to much wider cross sections with bicycle lanes (such as Olive Chapel Rd and Old US 1). Since the new cross sections are being built intermittently with new development, the bicycle lanes would also be constructed in separate, sometimes disconnected segments over time. Instead, it is recommended that the Town and NCDOT acquire the necessary right-of-way for the full future cross sections with bicycle lanes, but that the future bicycle lane areas be paved as wide shoulders in the interim, to be striped as full bicycle lanes when there is a substantial portion of the project corridor completed, allowing for contiguous bicycle lanes. The length of what is considered a "substantial" segment is subjective, and may depend more on the context of the segment in question. For example, it may make sense to stripe as an official bicycle lane once there are destinations at both ends of the completed segments (such as entrances between different neighborhoods, schools, parks, etc.).

PRIORITY PROJECT #1:
BEAVER CREEK GREENWAY FROM DOWNTOWN APEX TO THE AMERICAN TOBACCO TRAIL (ATT)

This project was one of the most frequently discussed connections during the planning process, during Steering Committee meetings and public meetings alike. With large portions of the connection already well established, this project focuses on the remaining gaps that would connect bicyclists of all ages and abilities from Downtown Apex to the ATT. Town residents would have direct access to the largest network of contiguous greenway trails in North Carolina (including the combined greenway systems of Durham, Cary, and Raleigh, mainly connected by the East Coast Greenway through the Triangle). This connection would also link trail users from throughout the Triangle to the heart of Apex, generating a positive economic impact for the Town.

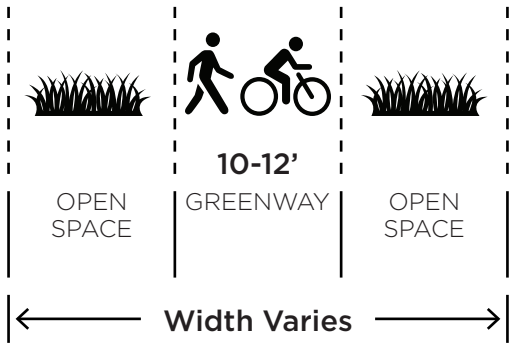
PROPOSED FACILITY TYPES:

- Greenway trail, side path, sharrows & signage

PROJECT LENGTH & ESTIMATED COST:

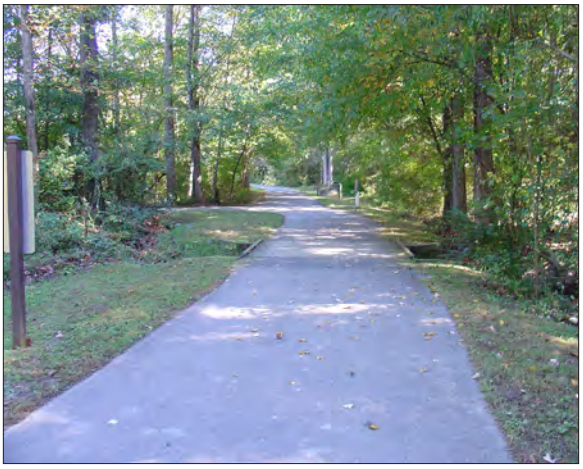
- 1.5 miles / $3,230,000
- *The Wake County Greenway Plan (pp. 74-75) estimated costs for the greenway section from Apex Barbecue Rd to the ATT in the range of $3.4 million to $4.1 million, in 2016 dollars. This assumed boardwalk would be used for most of the section.*

Beaver Creek Greenway cross-section



PRIORITIZATION FACTORS

- Connects to the ATT, and existing trails in Arcadia West, Apex Nature Park, Kelly Road Park, and Apex Jaycee Park
- Connects to existing bicycle facilities on both ends (ATT & Apex Jaycee Park)
- Connects to four parks and trailheads (ATT, Apex Nature Park, Kelly Road Park, and Apex Jaycee Park)
- Connects to Olive Chapel Elementary
- Connects to multiple residential areas
- Connects to multi-family homes
- Connects to Historic Downtown Apex
- Connects to a high job concentration area (see "Work Locations" in Advance Apex)
- Top priority corridor from the Steering Committee
- Top priority corridor from public input



Existing portions of the Beaver Creek Greenway.

Opportunities & Constraints for Priority Project #1

A combination of bicycle shared-lane markings (sharrows) and directional signage would guide bicyclists to the side path on the south side of NC 55 and the greenway trail extension at Apex Jaycee Park, both of which are currently in-development.

Consider a future crossing and connection at Bryan Dr if a signal becomes warranted (to be studied by NC 55 project).

This gap between the Beckett Crossing Greenway and the Beaver Creek Greenway is not essential to the Downtown-American Tobacco Trail connection, but it would connect more trail users to both destinations if completed, while also tying into major shopping areas. In the interim, a neighborhood route with wayfinding could connect these two greenways until permanent infrastructure is constructed.

This section of the Beaver Creek Greenway is being realigned to address flooding issues east of NC 540.

This short section of proposed trail (appx. 800') would connect the existing greenway in Kelly Rd Park to a proposed Kelly Rd trail underpass.

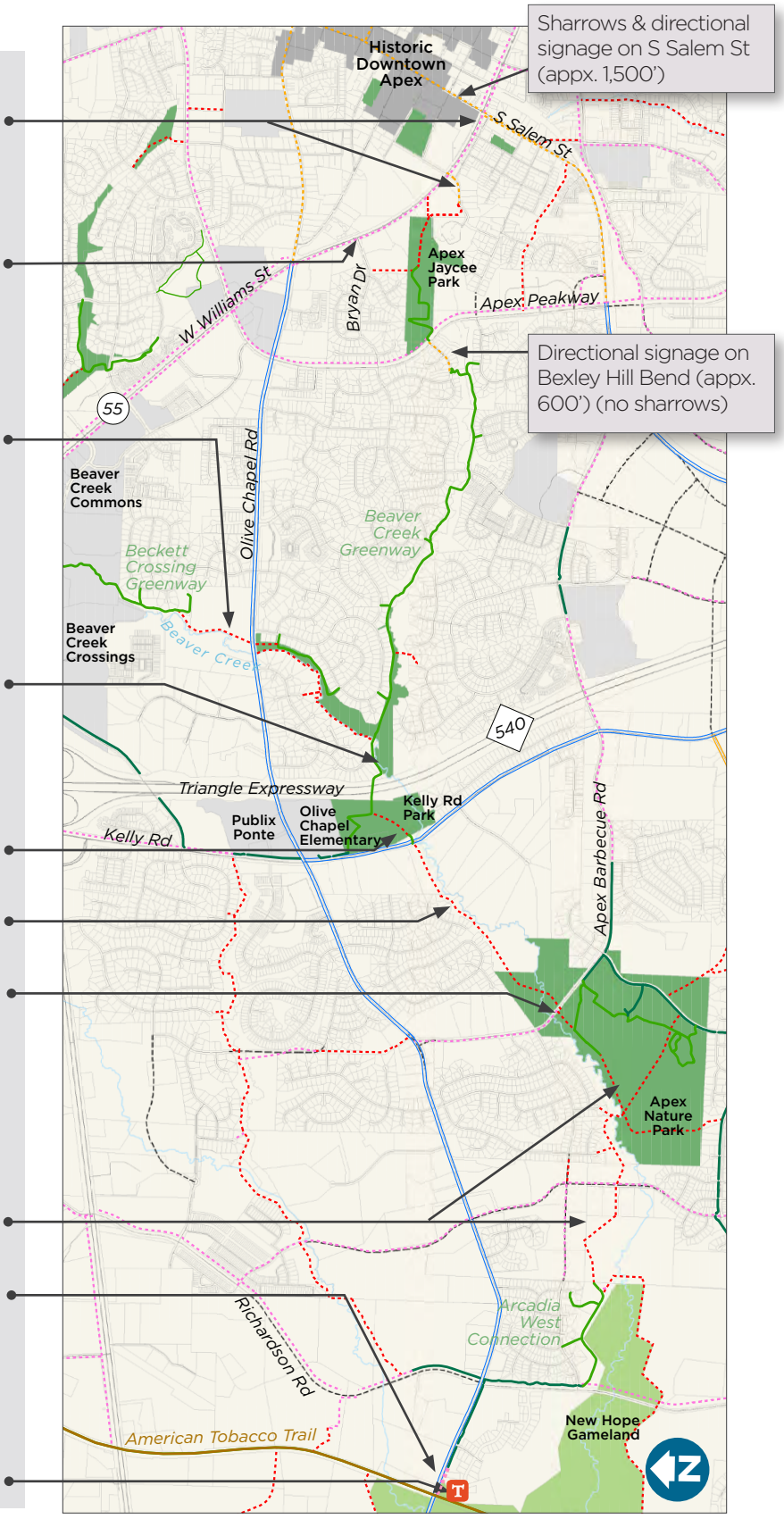
This section of trail is in-development, connecting Kelly Rd Park to Apex Nature Park.

There are plans to construct the greenway under the new Apex Barbecue Bridge (B-5161).

This section of proposed trail within Apex Nature Park (appx. 1,200') and connecting to Arcadia West (appx. 3,000'), is the last major section needed to connect to the American Tobacco Trail. Some portions would require trail easements and/or land acquisition to complete. Boardwalk is recommended for this section to reduce wetland impacts. The trail's location in the floodplain will increase permitting requirements.

500' of side path along Olive Chapel Rd is needed to complete the final connection to the American Tobacco Trail.

This future trailhead is located on Wake County property and in the interim, access to the ATT would be available via an off-road connection south of Olive Chapel Road due to constraints adjacent to the road.



Existing Greenway
Proposed Greenway
Private Greenway
American Tobacco Trail
Future ATT Trailhead
Existing Side Path
Proposed Side Path
Proposed Bike Lanes
Proposed Bicycle Shared Lane Markings, "Bicycle May Use Full Lane" Signage, and/or directional signage. May include speed limit reduction.
Railroad
Future Roadway

PRIORITY PROJECT #2:
Salem St/Old US 1 Bike Lanes and Shared Lanes, From Downtown Apex to Pleasant Park

This project features a combination of bicycle lanes and shared lanes. Public input from Apex's more experienced on-road bicyclists indicated a need for this corridor (which serves as US Bike Route 1/NC Bike Route 1) to accommodate bicyclists on-road. A side path is envisioned as a future extension of this project, and would start at Pleasant Park, heading south to Richardson Rd Ext./Bosco Rd, and connecting to the area identified on the 2045 Future Land Use Map for a future linear park. Ideally, this priority project would be completed in coordination with the opening of Pleasant Park.

Proposed Facility Types:

» Bicycle Lanes, sharrows & signage

Project Length & Estimated Cost:

» 1.2 miles / $70,000

» Excludes most of the bicycle lanes that would be added during roadway widening - see Appendix for details.

Prioritization Factors

» Connects to the NC 55 side paths (in-development)

» Connects to Pleasant Park and West St Park

» Connects to multiple residential areas

» Connects to Apex Professional Center

» Part of designated US Bike Route 1/NC Bike Route 1: Carolina Connection

» Connects to multi-family homes

» Connects to Historic Downtown Apex

» Connects to a high job concentration area (see "Work Locations" in Advance Apex)

» Serves area with over 9% poverty (see "Income & Employment" in Advance Apex)

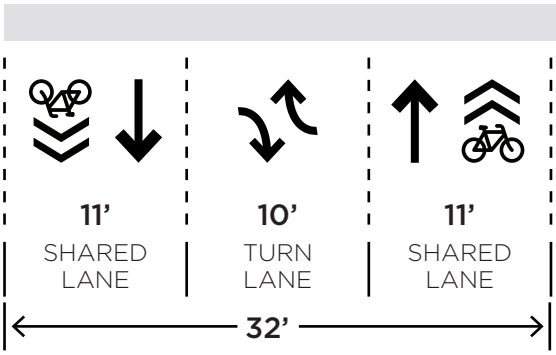
» Reported bicycle crash along route (2007-2015)

» Reported bicyclist fatality along route (2007-2015)

» Connects to potential future rail station location

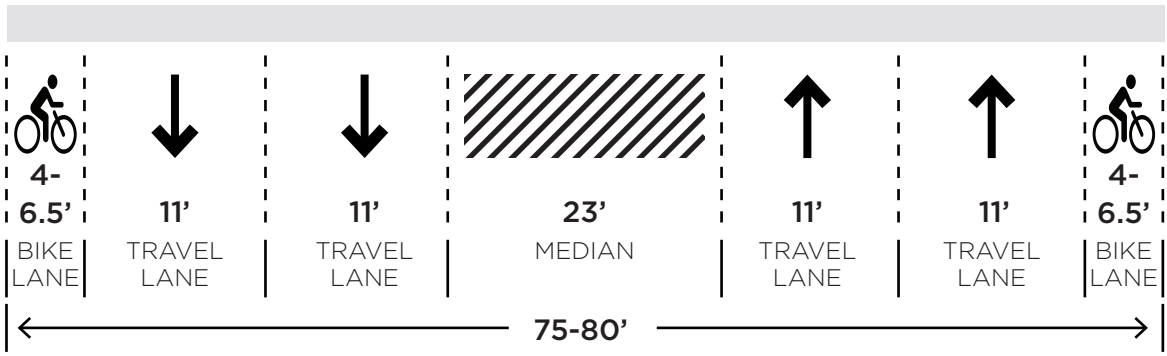
» Top priority corridor from the Steering Committee

» Top priority corridor from public input



S Salem St shared lane markings, from Downtown Apex to Apex Peakway

(conceptual; right-of-way may vary)



Bike lane cross-section on Old US 1, from Apex Peakway to Pleasant Park (and continuing south in future phases with an accompanying side path)

(conceptual; right-of-way may vary)

Opportunities & Constraints for Priority Project #2

The cross section from Downtown Apex to Apex Peakway is too constrained to add bicycle lanes. Shared lane markings could be used in this section; note that the AASHTO Bicycle Guide specifically states that sharrows should not be applied to roads above 35 mph, meaning that a speed limit reduction would be required for any part of this section that is currently posted above 35 MPH (near Apex Peakway). If *"[Bicyclists] May Use Full Lane"* signage is used, it is recommended to be 25 MPH or lower.

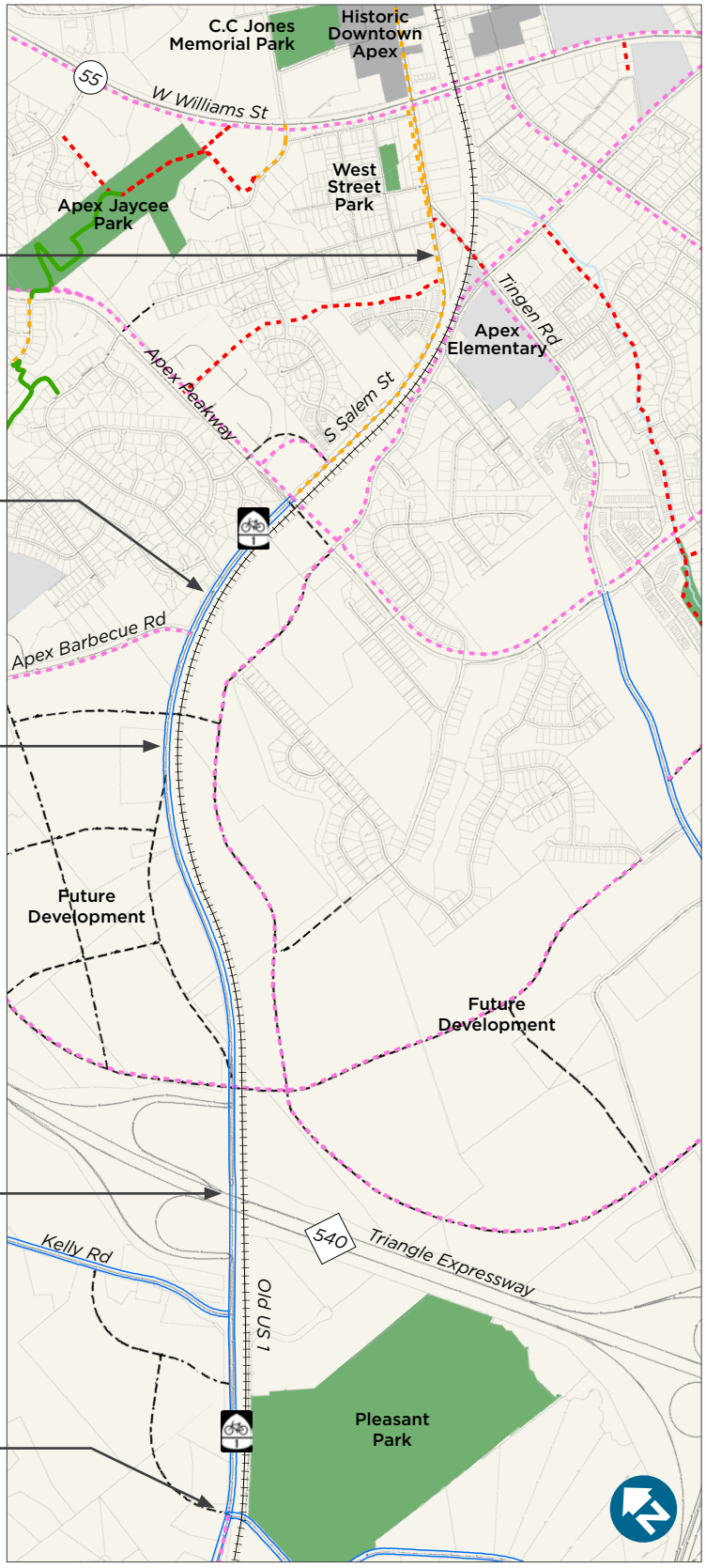
The bicycle lanes from Apex Peakway southwest to the Chatham County Line (not shown on map), will be included during the construction of the planned future cross section for this roadway, which will be four-lanes, with a divided median and bicycle lanes.

In the section between Apex Peakway and Pleasant Park, the amount of space between S Salem St and the railroad right-of-way varies, and is often too constrained for a side path, hence the recommendations for bike lanes only in this section. Sidewalk is proposed on the north side of the road to accommodate pedestrians.

One challenge for this project will be accommodating bicyclists and pedestrians across the Salem St/Old US 1 bridge over I-540, which has a bridge deck that is approximately 55' wide. The current plan is to have bike lanes, with a sidewalk on the north side.

Looking south on the bridge over 540.

The connection from Downtown to Pleasant Park was identified by the Steering Committee as a priority. Bike lanes would then continue to at least to the Chatham County Line, with an accompanying side path for the section between Pleasant Park and Richardson Rd Ext./Bosco Rd, connecting to the area identified on the 2045 Future Land Use Map for a future linear park.



Existing Greenway
Proposed Greenway
Existing Side Path
Proposed Side Path
Proposed Bike Lanes
Proposed Bicycle Shared Lane Markings, "Bicycle May Use Full Lane" Signage, and/or directional signage. May include speed limit reduction.
1 MILE
Railroad
Future Roadway

PRIORITY PROJECT #3:
Olive Chapel Rd Bike Lanes, from NC 55 to New Hill Olive Chapel Rd

Bicycle lanes for the majority of this project (from Apex Peakway to Richardson Rd) will be included during the construction of the planned future cross section for this roadway (below), which will be four-lanes, with a divided median and bicycle lanes. Given the fast-paced growth along this corridor, much of this new cross section with bicycle lanes could be provided with new development, as it occurs.

Other parts of this project corridor could be implemented more proactively. East of Apex Peakway, to NC 55, is already built curb to curb, varying from four to five lanes. This section would have to be restriped to accommodate bicycle lanes independent of the new cross section work for the rest of the corridor. Similarly, the proposed bicycle lanes west of Richardson Rd, to New Hill Olive Chapel Rd, would also need to be developed separate from the new cross section construction.

Proposed Facility Type:

» Bicycle lanes

Project Length & Estimated Cost:

» 0.3 miles / $64,000

» 1,600 LF bike lanes, including restriping of full roadway, along Olive Chapel Rd from W. Williams St to Apex Peakway.

» Excludes bike lane segment from Apex Peakway to Richardson Rd that would be added during roadway widening - see Appendix for details.

Prioritization Factors

» Connects to NC 55 side path (in-development), Beaver Creek Greenway, Kelly Rd side path, Richardson Rd side path, and the American Tobacco Trail (ATT)

» Connects to ATT access point at Olive Chapel Rd

» Connects to Olive Chapel Elementary

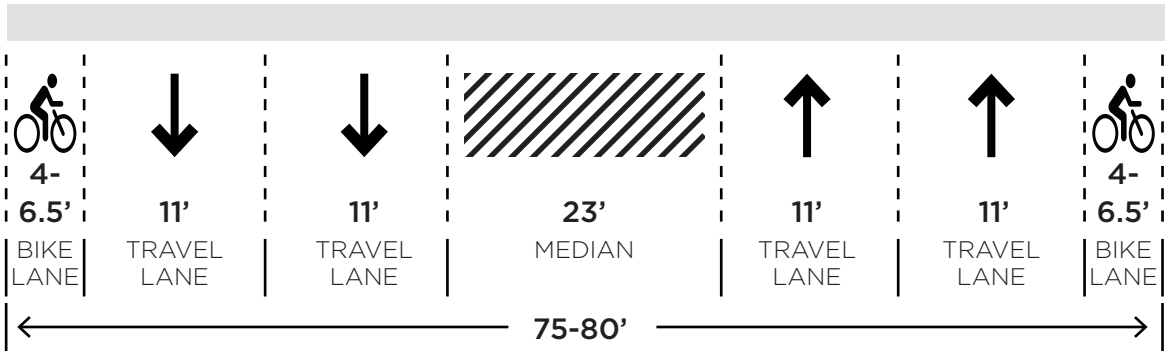
» Connects to multiple residential areas

» Connects to multiple shopping centers

» Connects to multi-family homes

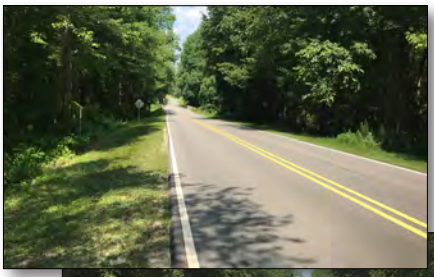
» Three reported bicycle crashes along route (2007-2015)

» Top priority corridor from public input



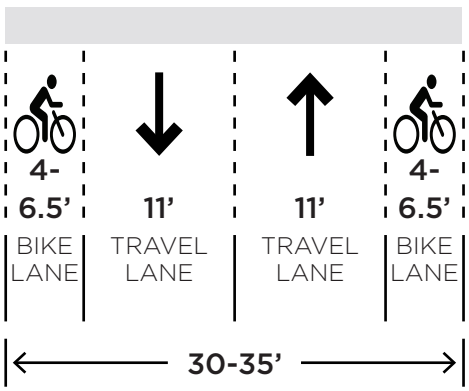
Olive Chapel Rd bike lanes cross section, from NC 55 to Richardson Rd

(conceptual; right-of-way may vary)



Left: Existing conditions looking west along Olive Chapel Rd near the American Tobacco Trail.

Below: Proposed conceptual improvements including road widening for standard bicycle lanes and bicycle lane signage.

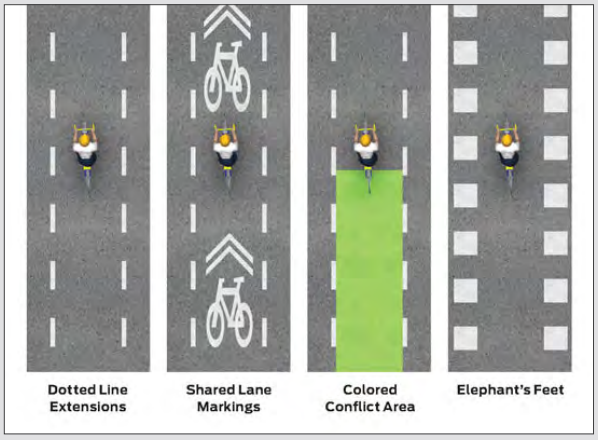


Olive Chapel Rd bike lanes cross section, from Richardson Rd to New Hill Olive Chapel Rd

(conceptual; right-of-way may vary)

Opportunities & Constraints for Priority Project #3

Project starts at the intersection of W Williams St/NC 55 and Olive Chapel Rd. This intersection should include intersection crossing markings for bicyclists (leading to proposed sharrows on Hunter St). This applies to all intersections along this corridor that have bicycle facilities on both sides of the intersection, and will require NCDOT approval.

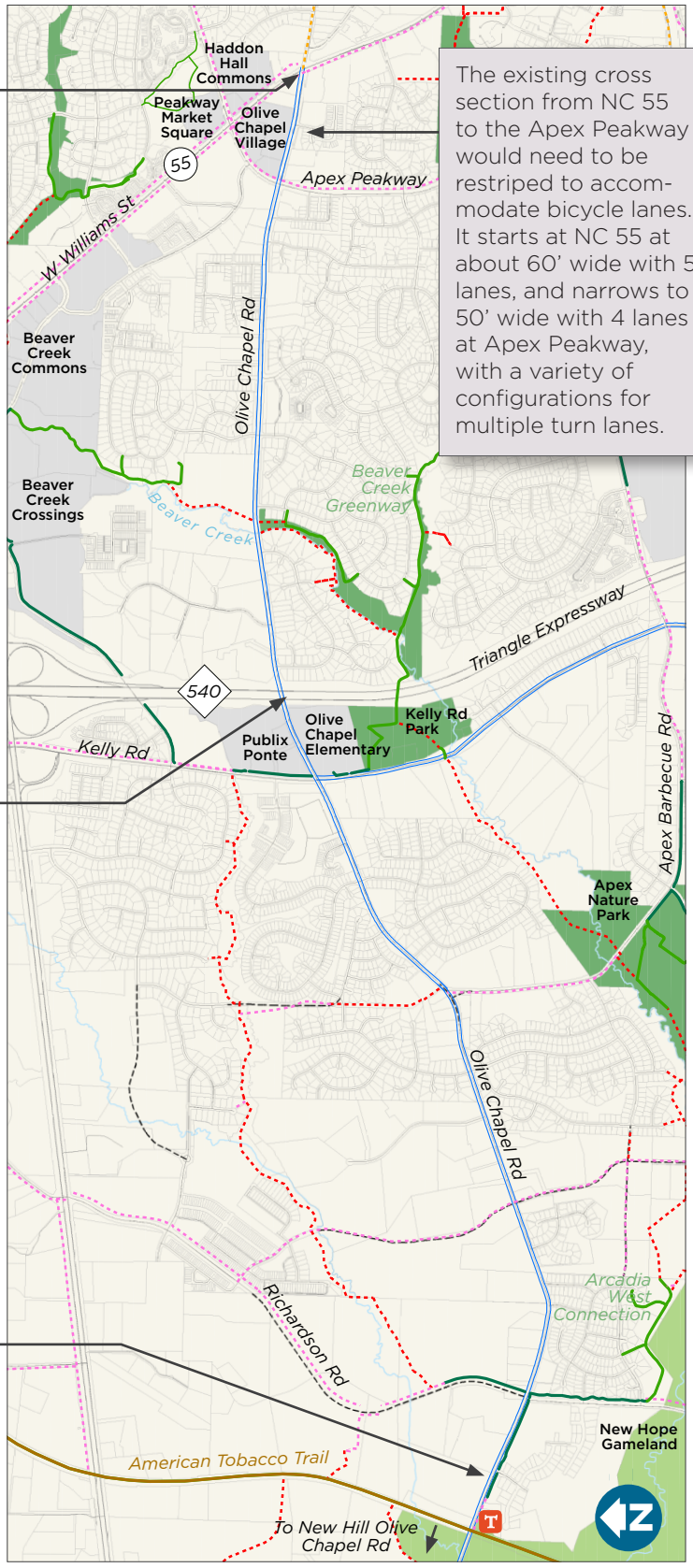


The Olive Chapel Rd bridge over I-540 has a bridge deck that is approximately 40' wide. If the current bridge deck is planned to be used with the new cross section (with four 10' lanes), then the most likely scenario is sharrows, signage, and speed limit reduction over the bridge, connecting the bicycle lanes on each side. An alternative is a separate bicycle and pedestrian bridge; the key drawback being the large expense. However, if and when the bridge is upgraded, it should be designed to accommodate bicycle lanes.

Looking east on the Olive Chapel Rd bridge over 540.

The planned future cross section for Olive Chapel Rd ends at Richardson Rd. Bicycle lanes are recommended from Richardson Rd, west for 1.3 miles to New Hill Olive Chapel Rd (not shown on map). This could be achieved by adding additional pavement width to accommodate the bike lanes (see rendering on previous page).

General note: A concern expressed by local bicyclists in this planning process is that bicycle lanes will not be regularly swept and kept free of debris. The town should make a commitment to sweep the bike lanes that it installs.



The existing cross section from NC 55 to the Apex Peakway would need to be restriped to accommodate bicycle lanes. It starts at NC 55 at about 60' wide with 5 lanes, and narrows to 50' wide with 4 lanes at Apex Peakway, with a variety of configurations for multiple turn lanes.

Existing Greenway
Proposed Greenway
Private Greenway
American Tobacco Trail
Future ATT Trailhead
Existing Side Path
Proposed Side Path
Existing Bike Lanes
Proposed Bike Lanes
Proposed Bicycle Shared Lane Markings, "Bicycle May Use Full Lane" Signage, and/or directional signage. May include speed limit reduction.
Railroad
Future Roadway

PRIORITY PROJECT #4:
Hunter St Sharrows, from Apex Peakway to Williams St/NC 55

This project runs through the heart of Apex, just north of the Historic Downtown, connecting Town Hall, parks, schools, and multiple shopping areas. Shared lane markings are recommended as opposed to bicycle lanes due to right-of-way constraints at railroad crossings, along certain turn lane locations, and for car pool areas.

Proposed Facility Types:

» Sharrows & signage

Project Length & Estimated Cost:

» 1.2 miles / $51,000

» 6,320 LF shared lane markings along Hunter St from Apex Peakway to Williams St/NC 55, with 1,440 LF restriping of angle parking stalls for back-in only from Laura Duncan Rd to Grove St.

Prioritization Factors

» Connects to NC 55 side path (in-development) and Apex Peakway bike lanes

» Connects to a bicycle facility on both ends

» Connects to Apex Community Center and Hunter St Park

» Connects to Baucom Elementary

» Connects to multiple residential areas

» Connects to multiple offices and shopping centers

» Connects to a designated US Bike Route 1/ NC Bike Route 1: Carolina Connection

» Connects to Historic Downtown Apex

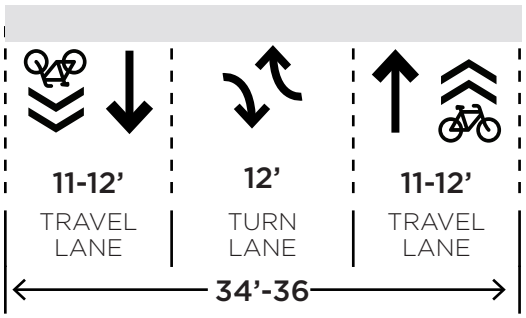
» Connects to a GoTriangle Bus Route

» Connects to a high job concentration area (see "Work Locations" in Advance Apex)

» Serves area with over 9% poverty (see "Income & Employment" in Advance Apex)

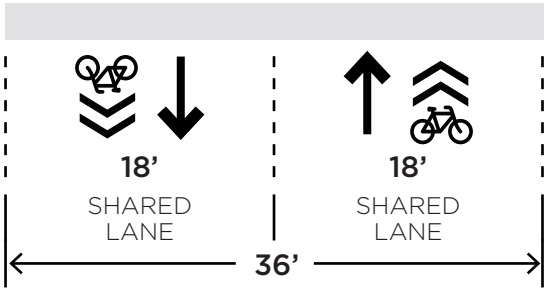
» Connects to potential rail station location

» Top priority corridor from the Steering Committee



Hunter St shared lane markings cross-section, between Laura Duncan Rd and Grove St

(conceptual; right-of-way may vary)



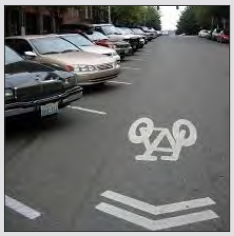
Hunter St shared lane markings cross-section, between Grove St and NC 55

(conceptual; right-of-way may vary)

Opportunities & Constraints for Priority Project #4

Project starts at the intersection of Apex Peakway and Hunter St, with Vineyard Station Shopping Center as an eastern anchor for the route.

The intersection of Hunter St and Laura Duncan Rd is a potential roundabout location. Single-lane roundabouts can provide significant crash reduction benefits for bicyclists when they are designed with their needs in mind. At round-abouts, some bicyclists will choose to travel on the roadway, while others will choose to travel on the sidewalk. Roundabouts can be designed to simplify this choice for bicyclists. See AASHTO Guide for the Development of Bicycle Facilities Section 4.12.11 for design details.

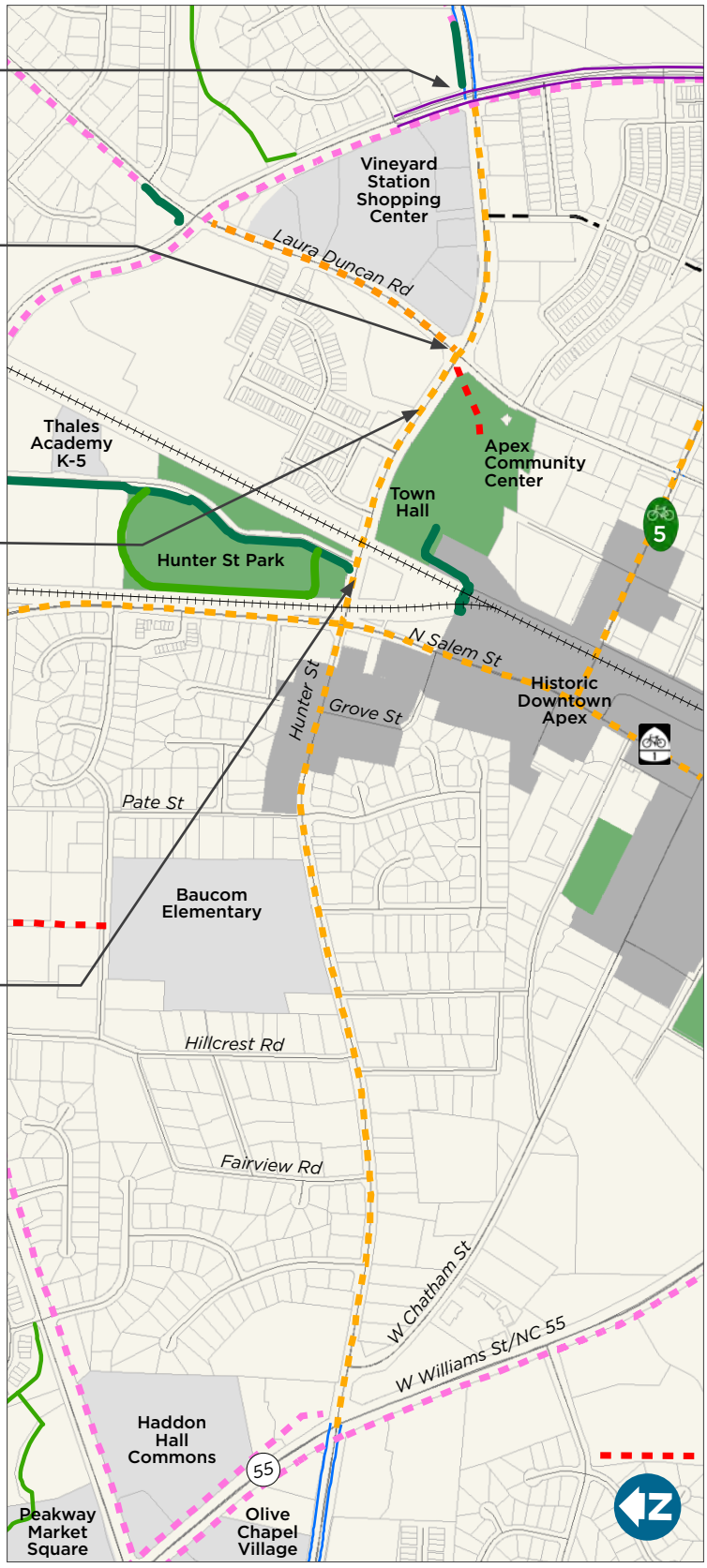


Example back-in angle parking with sharrow.

This part of Hunter St has front-in angle parking. Back-in angle parking is preferred along roadways expecting frequent bicycle travel. This can be challeng-ing to implement due to public perception of difficulty backing-in, but is common enough.

Right of way is especially constrained from Laura Duncan Rd to Grove St. Constraints include two railroad crossings, curb and gutter, concrete medians, angle parking, and turn lanes. Consider using *"[Bicyclist] May Use Full Lane"* signage in this area.

If *"[Bicyclists] May Use Full Lane"* signage is used, it is recom-mended to have speed posted at 25 MPH or lower.



Existing Greenway
Proposed Greenway
Private Greenway
Existing Side Path
Proposed Side Path
Existing Bike Lanes
Proposed Bike Lanes
Proposed Bicycle Shared Lane Markings, "Bicycle May Use Full Lane" Signage, and/or directional signage. May include speed limit reduction.
Railroad
Future Roadway

PRIORITY PROJECT #5:
APEX PEAKWAY (NORTH) SIDE PATH, FROM CENTER ST TO BEAVER CREEK GREENWAY

The long-term future cross section of the Apex Peakway is a four-lane median-divided thoroughfare with a side path. It is anticipated that the side path will be built incrementally, as the future cross section is developed. However, the project is still considered a priority because of its strong role in potentially connecting so many places. Cost estimates are provided below in case the Town decides to proactively build the path, independently and ahead of the full future cross section. Costs would be lower if built in conjunction with the new sections.

PROPOSED FACILITY TYPES:

» Side path

PROJECT LENGTH & ESTIMATED COST:

» 2.8 miles / $2,600,000

» 14,780 LF 10' wide asphalt side path along Apex Peakway from Old Ten Ten Rd to Apex Jaycee Park (curb and drainage already installed)

PRIORITIZATION FACTORS

» Connects to Apex Peakway bicycle lanes, the Beaver Creek Greenway, the Shepherds Vineyard Greenway (private), the Ambergate Station side path, and the Ten Ten Rd bicycle facilities in-development

» Connects to an existing bicycle facility on both ends

» Connects to Apex Jaycee Park

» Connects to Thales Academy K-5

» Connects to multiple residential areas

» Connects to multiple office and shopping centers

» Connects to designated US Bike Route 1/NC Bike Route 1: Carolina Connection and NC Bike Route 5: Cape Fear Run

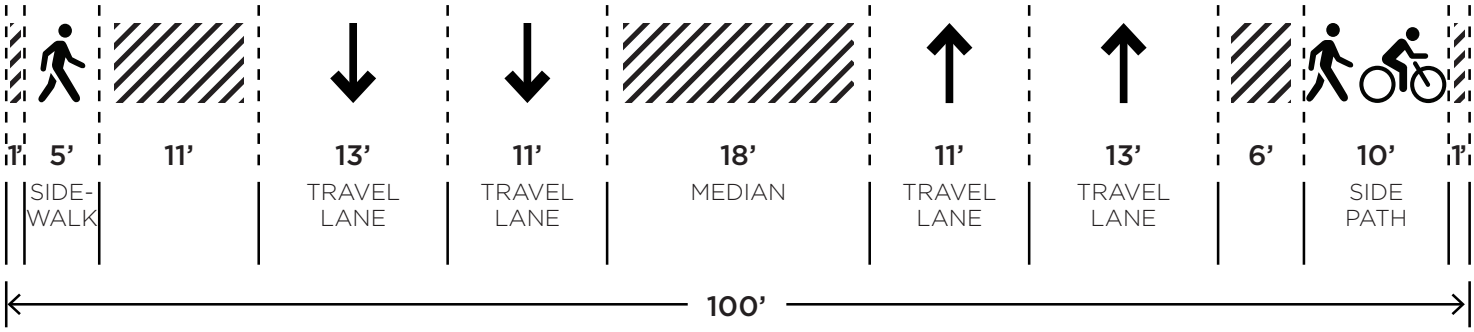
» Connects to multi-family homes

» Connects to a GoTriangle Bus Route

» Serves area with over 9% poverty (see "Income & Employment" in Advance Apex)

» One reported bicycle crash along route (2007-2015)

Apex Peakway cross-section



View of the existing right-of-way for the future expansion of the Apex Peakway (looking east near N Salem St).

Opportunities & Constraints for Priority Project #5

This project would connect to the side path and bike lanes in-development along Ten Ten Rd, heading east (which is NC Statewide Bike Route 5: Cape Fear Run). The project would also continue along the Apex Peakway, south of Ten Ten Rd, as part of Priority Project #8.

If a new bridge is constructed as part of the Apex Peakway widening, then a side path should be accommodated on the south side of it. If not, the side path would require an independent bicycle and pedestrian bridge over the railroad. Alternatively, the side path would have to be routed on the north side of the Apex Peakway through this section, using the existing sidewalk along the existing bridge.

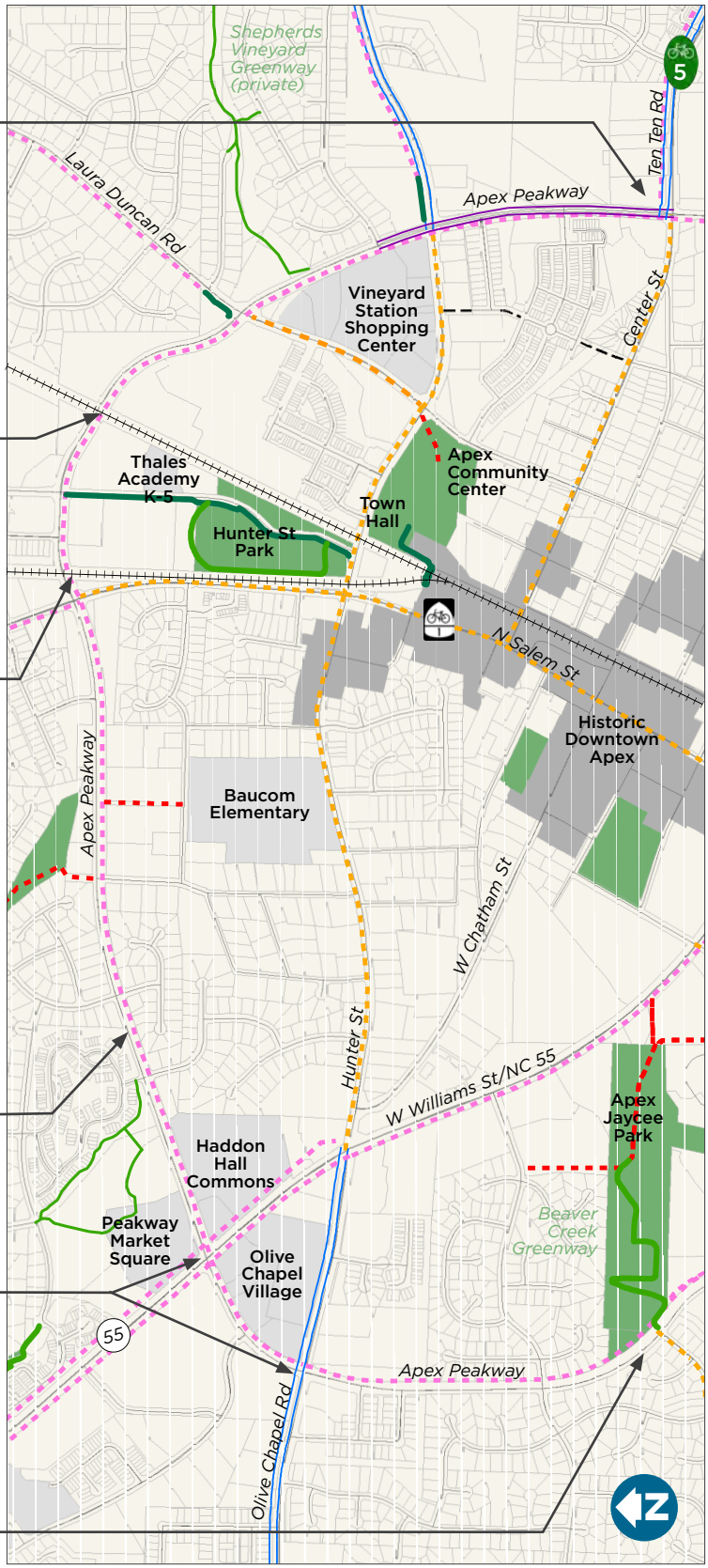
The at-grade crossing of the railroad tracks for the Apex Peakway currently accommodates sidewalk on the north side. The proposed side path would require a similar treatment.

The concrete railroad treatment that closes the flange gap would need to be extended to accommodate the south side side path (in circled area above).

The majority of the side path in this project would be constructed in conjunction with the future widening of the Apex Peakway.

All intersections and driveways along Apex Peakway, but especially major ones, like at NC 55 and Olive Chapel Rd, will need to be designed for safe side path crossings. See the Design Guideline resources in this Plan for more on this topic, specifically, the Small Town and Rural Multimodal Networks Design Guide and section 5.2.2 of the 2012 AASHTO Bike Guide.

This project would connect to Apex Jaycee Park and the Beaver Creek Greenway on the west side. The project would also continue along the Apex Peakway, south of the park, as part of Priority Project #8.



Existing Greenway
Proposed Greenway
Private Greenway
Existing Side Path
Proposed Side Path
Existing Bike Lanes
Proposed Bike Lanes
Proposed Bicycle Shared Lane Markings, "Bicycle May Use Full Lane" Signage, and/or directional signage. May include speed limit reduction.
Railroad
Future Roadway

PRIORITY PROJECT #6:
DAVIS DR/N SALEM ST GREENWAY, SIDE PATH & SHARROWS FROM APEX/CARY LIMITS TO DOWNTOWN APEX

This project will provide a critical connection to regional destinations north of Apex, including the Town of Cary, the East Coast Greenway, and subsequent destinations connected by the East Coast Greenway, such as Umstead State Park, the City of Durham, and the City of Raleigh.

PROPOSED FACILITY TYPES:

» Greenway trail, side path, sharrows & signage

PROJECT LENGTH & ESTIMATED COST:

» 1.9 miles / $1,600,000

» See Appendix for details.

PRIORITIZATION FACTORS

» Connects to trails at Salem Pond Park

» Connects to Salem Pond Park and Hunter St Park

» Connects to Salem Elementary, Salem Middle, and Thales Academy JH/HS

» Connects to multiple residential areas

» Connects to multiple shopping areas

» Part of designated US Bike Route 1/NC Bike Route 1: Carolina Connection

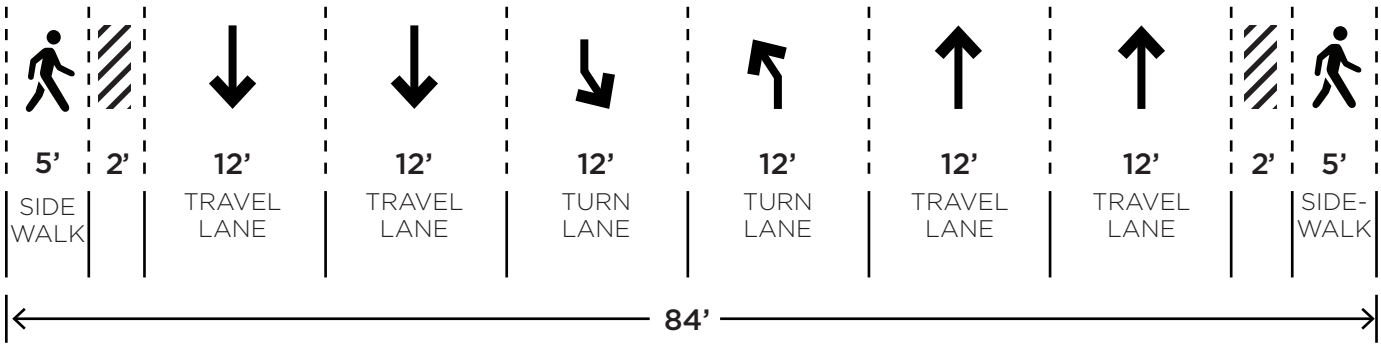
» Connects to Historic Downtown Apex

» Connects to a high job concentration area (see "Work Locations" in Advance Apex)

» Connects to potential rail station location

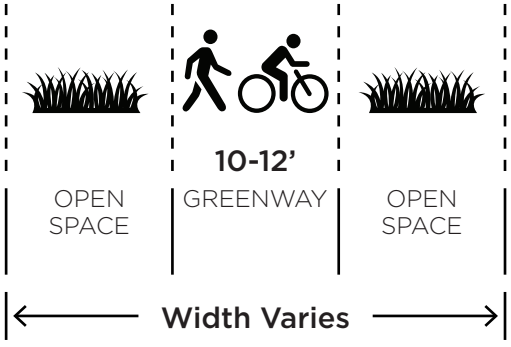
» Top priority corridor from the Steering Committee

Davis Dr Under US 64 bridge: Sidewalk-only cross-section

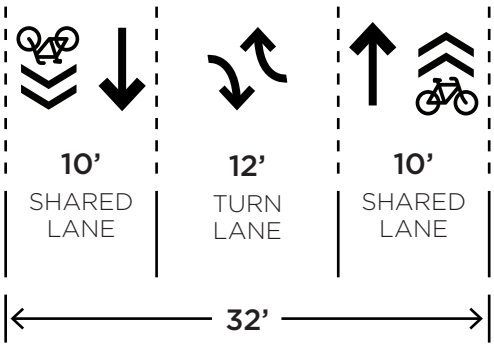


(conceptual; right-of-way may vary)

Salem Middle School Greenway cross-section



N Salem St shared lane markings cross-section



(conceptual; right-of-way may vary)

Opportunities & Constraints for Priority Project #6

The project starts at the Apex/Cary town limits. A combination of greenways and sidepaths is proposed north of Salem Pond Park, connecting to the Town of Cary's proposed side paths and greenways (which, in turn, will connect to the White Oak Creek Greenway/East Coast Greenway, and subsequently a large portion of the Triangle).

The Town of Apex's roadway plan shows a future realignment of Davis Drive at Salem Church Rd.

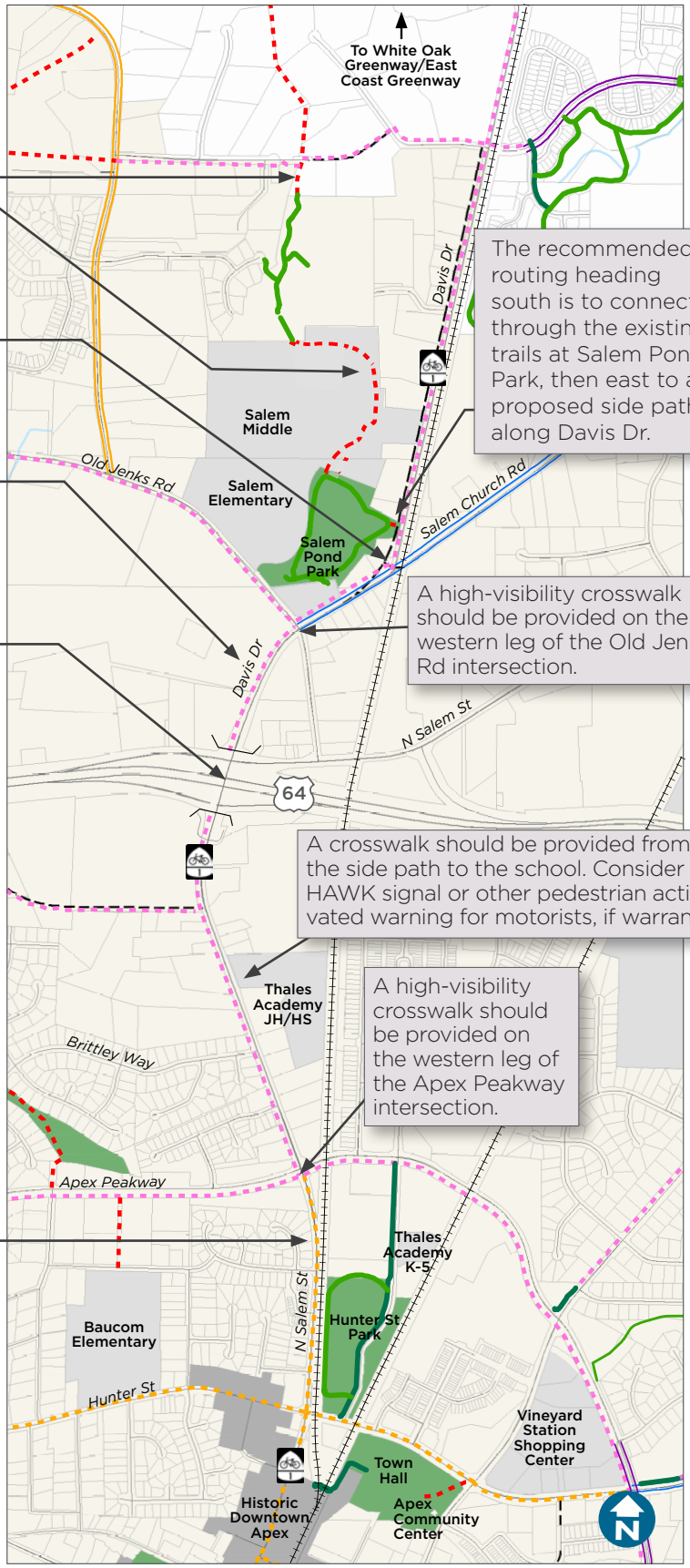
The proposed route continues as a side path west of Davis Drive to Apex Peakway. Several constrained areas with existing sidewalk and landscaping will present design challenges (such as just north of Old Jenks Rd, and just south of Brittley Way).

The side path would transition to a 5' sidewalk to cross under US 64 on the west side of Davis Dr, along with a 5' sidewalk on the east side (see the Town's recommended cross-section on previous page).

Signage examples for side path-to-sidewalk transitions.

Looking north along Davis Dr under US 64. Sidewalk installation may also involve potential adjustments to the height of the jersey barriers and guardrails at this location.

South of Apex Peakway, there is a 32' roadway width for two travel lanes and a center turn lane. Options for on-street bicycle facilities are limited due to lane configuration, the total curb-to-curb width, and adjacent rail road. Given these constraints, it is recommended to transition to bicycle shared lane markings on N Salem St, from Apex Peakway through downtown, with *"[Bicyclist] May Use Full Lane"* signage and a speed limit reduction to 25 MPH (N Salem is already 25 MPH for the school zone, but goes back to 35 MPH before reaching downtown).



Existing Greenway
Proposed Greenway
Existing Side Path
Proposed Side Path
Proposed Paved Shoulder
Proposed Bike Lanes
Proposed Bicycle Shared Lane Markings, "Bicycle May Use Full Lane" Signage, and/or directional signage. May include speed limit reduction.
Railroad
Future Roadway

PRIORITY PROJECT #7:
Laura Duncan Rd Side Path and Sharrows, from Apex High School at US 64 to Downtown Apex at Center St

This side path project is unique, as it is proposed in a location where there is already sidewalk. The benefit of upgrading to a side path is that it would create a bicycle facility that is separated from motor vehicle traffic, in a corridor serving children at Apex High School. Additionally, there is already side path to the north of US 64, and this would provide a continuous facility connecting Apex Community Park, Laurel Park Elementary, shopping areas, and Downtown Apex. The Town of Cary also has proposed trails that would connect this side path to Bond Park and the East Coast Greenway.

Proposed Facility Types:

» Side path and sharrows

Project Length & Estimated Cost:

» 1.2 miles / $910,000

» 5,050 LF 10' wide asphalt side path, including 1,600 LF of new curb and drainage, along Laura Duncan Rd from US 64 to Apex Peakway.

» 1,450 LF shared lane markings along Laura Duncan Rd from Apex Peakway to Hunter Street.

Prioritization Factors

» Connects to the Laura Duncan side path north of US 64

» Connects to Apex Community Center

» Connects to Apex High School

» Connects to multiple residential areas

» Connects to multiple office and shopping centers

» Connects to multi-family homes

» Connects close to a GoTriangle Park & Ride location

» Connects to Historic Downtown Apex

» Connects to a GoTriangle Bus Route

» Connects to a high job concentration area (see "Work Locations" in Advance Apex)

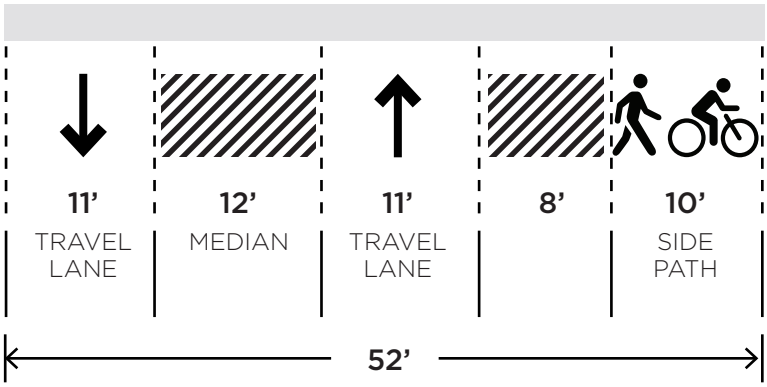
» Serves area with over 9% poverty (see "Income & Employment" in Advance Apex)

» Connects to potential rail station location

» Top priority corridor from the Steering Committee

Laura Duncan Rd sidepath cross-section

(conceptual; right-of-way may vary)



Above: Existing conditions looking south along Laura Duncan Rd, near Apex High School.

Right: Proposed conceptual improvements, including upgrading the existing sidewalk to a side path.

Opportunities & Constraints for Priority Project #7

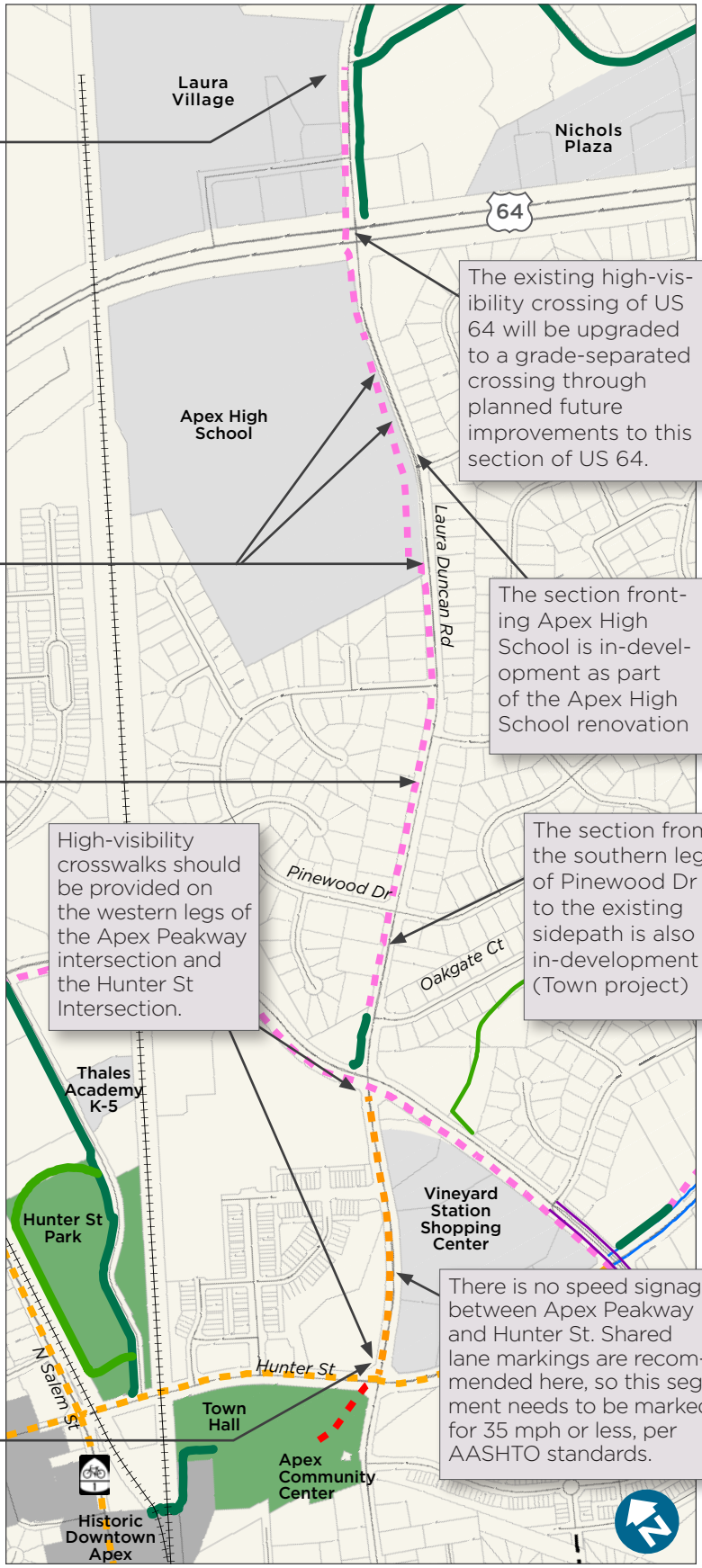
The side path should begin on the west side of Laura Duncan Rd, at Pine Plaza Dr, including crossing treatments that connect to the existing side path on Pine Plaza Dr. This Laura Duncan Rd/Pine Plaza Dr crossing should be implemented as part of the US 64 project, if possible.

The section in front of the school is already in-development. The three existing driveway entrances to the school should be upgraded with high visibility crosswalks, with signage on the path that alerts bicyclists and pedestrians to stop at driveway crossings. Similarly, signage should be directed at motorists approaching the crosswalks to yield to bicyclists and pedestrians in the crosswalks. Consider also raising these driveway crosswalks to be level with the side path, thereby prioritizing the more vulnerable bicyclists and pedestrians over motorists at these conflict areas.

The existing sidewalk along the west side of Laura Duncan Rd, from US 64 to the southern end of Pinewood Dr, would be upgraded to a 10' wide side path. An alternative would be to construct the side path on the east side of Laura Duncan Rd (where there is no sidewalk currently). The drawback for this alternative is that it would necessitate crossing Laura Duncan Rd twice, to access Apex High School and Apex Community Center, which are both on the west side. Additionally, the east side has overhead utilities that further constrain the right-of-way.

Looking south along Laura Duncan Rd, with overhead utilities on the east side.

On the south end, the side path could serve as a connection to Hunter St Park, Town Hall, Apex Community Center, Vineyard Station Shopping Center, and Historic Downtown Apex.



Existing Greenway
Proposed Greenway
Private Greenway
Existing Side Path
Proposed Side Path
Existing Bike Lanes
Proposed Bike Lanes
Proposed Bicycle Shared Lane Markings, "Bicycle May Use Full Lane" Signage, and/or directional signage. May include speed limit reduction.
Railroad
Future Roadway

PRIORITY PROJECT #8:
APEX PEAKWAY (SOUTH) SIDE PATH, FROM BEAVER CREEK GREENWAY TO CENTER ST

The long-term future cross section of the

Apex Peakway is a four-lane median-divided thoroughfare with a side path (see diagram below). It is anticipated that the side path will be built incrementally, as the future cross section is developed. However, the project is still considered a priority because of its strong role in potentially connecting so many places. Cost estimates are provided below in case the Town decides to proactively build the path, independently and ahead of the full future cross section. Costs would be lower if built in conjunction with the new sections.

PROPOSED FACILITY TYPE:

» Side path

PROJECT LENGTH & ESTIMATED COST:

» 3.0 miles / $2,900,000

» See Appendix for details.

PRIORITIZATION FACTORS

» Connects to Apex Peakway bicycle lanes, existing portions of the Apex Peakway side path, the Beaver Creek Greenway, the Ten Ten Rd bicycle facilities in-development, and the NC 55 side path in-development.

» Connects to an existing bicycle facility on both ends

» Connects to Apex Jaycee Park

» Connects to multiple residential areas

» Connects to multiple office and shopping centers

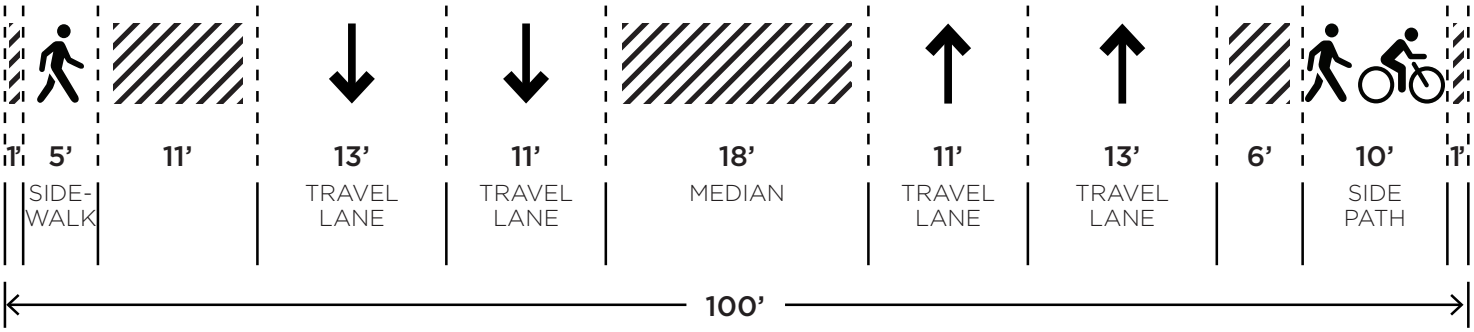
» Connects to designated US Bike Route 1/NC Bike Route 1: Carolina Connection and NC Bike Route 5: Cape Fear Run

» Connects to multi-family homes

» Serves area with over 9% poverty (see "Income & Employment" in Advance Apex)

» One reported bicycle crash along route (2007-2015)

Apex Peakway cross-section



View of the existing right-of-way for the future expansion of the Apex Peakway (looking north, just south of Apex Jaycee Park).

Opportunities & Constraints for Priority Project #8

This project would connect to the side path and bike lanes in-development along Ten Ten Rd, heading east (which is NC Statewide Bike Route 5: Cape Fear Run). The project would also continue along Apex Peakway, north of Ten Ten Rd, as part of Priority Project #5.

This portion of side path could be constructed when this portion of the future Apex Peakway is built.

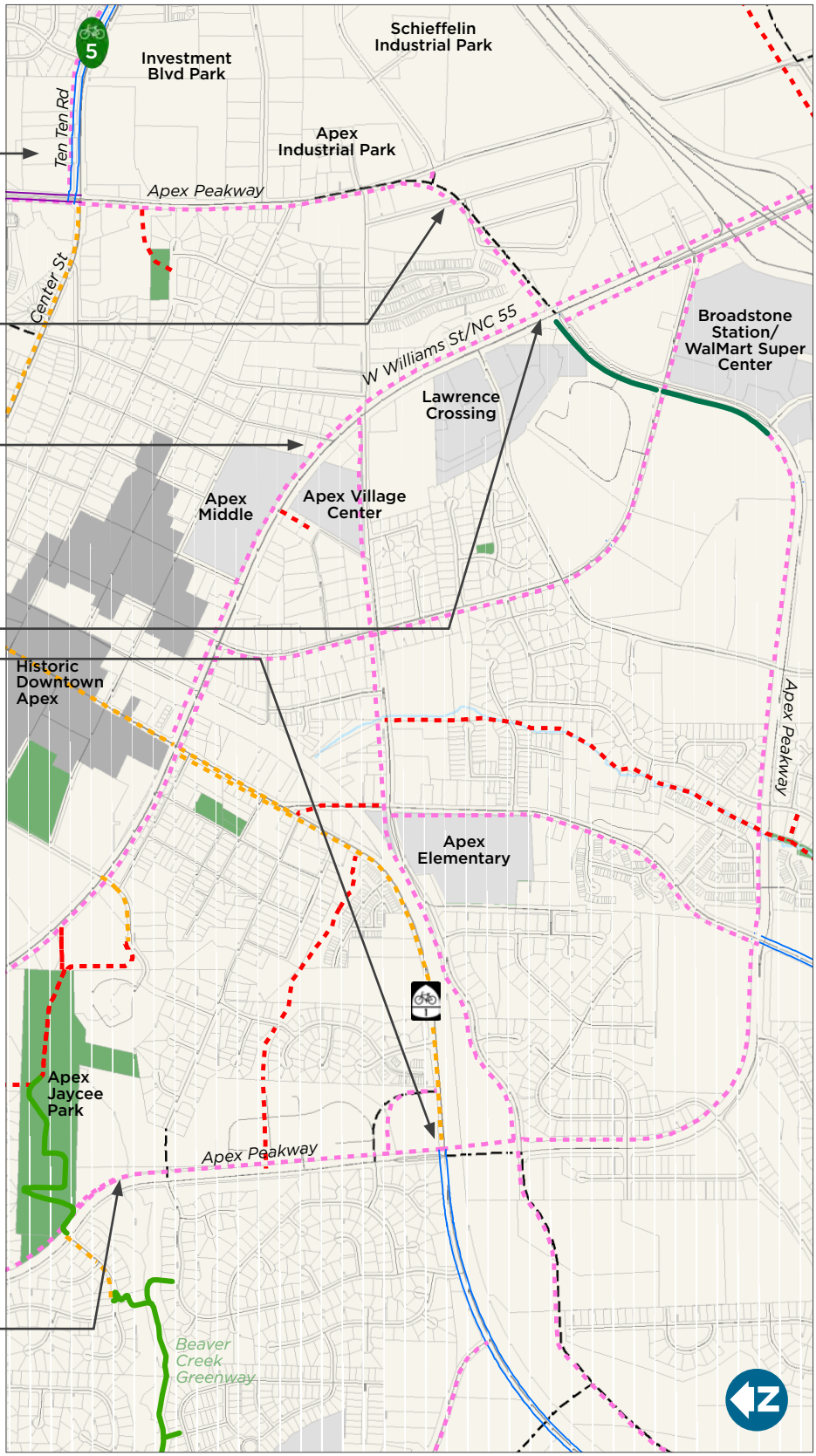
This project would also connect to the side paths currently in-development along NC 55/W Williams St.

Operational and safety concerns exist where side paths cross driveways and intersections, especially at major ones, such as Apex Peakway/NC 55 and Apex Peakway/Old US 1. Refer to the Small Town and Rural Multimodal Networks Design Guide and section 5.2.2 of the 2012 AASHTO Bike Guide. section 5.2.2 of the 2012 AASHTO Bike Guide for an identification of potential design issues. Design crossings to promote awareness of conflict points, and facilitate proper yielding of motorists to bicyclists and pedestrians. A variety of design strategies for enhancing side path crossings should be considered:

- Reduce the frequency of driveways.
- Design intersections to reduce driver speeds and heighten awareness of path users.
- Encourage low speeds on pathway approaches.
- Maintain visibility for all users.
- Provide clear assignment of right-of-way with signs and markings and elevation change.

See the design guide resources listed on page 96 for more information.

This project would connect to Apex Jaycee Park and the Beaver Creek Greenway on the west side. The project would also continue along the Apex Peakway, north of the park, as part of Priority Project #5.



PROGRAM RECOMMENDATIONS

These program recommendations are essential and complementary to the recommended infrastructure projects. Each of the following program ideas (among others) were presented at committee meetings, public meetings, and through a public comment form, to gauge interest among Apex residents. **The program ideas that follow were the highest rated by the public.**

Bicycle Facility Maintenance

Bicycle facilities require regular maintenance in order to keep them free of debris and structural deterioration. Bikeways are especially vulnerable to the accumulation of leaves and gravel as they are blown off the travel lane by automobile traffic. Such accumulation, as well as potholes, cracks, and joints, create serious obstacles and hazards to bicyclists. A good maintenance program is necessary to protect the public investment in bikeways and keep them safe for their users.

Currently, Apex only has one section of bike lanes (on Apex Peakway), but as this plan is implemented, the Town should commit to a maintenance program that sweeps its growing number of bicycle lanes on a regular basis. The American Association of State Highway and Transportation Officials (AASHTO) has provided some model maintenance policy language in its Guide for the Development of Bicycle Facilities. At right are some examples of recommended maintenance policies regarding roadway sweeping, specifically. The AASHTO Guide also has policy recommendations for the following areas: surface repairs, pavement overlays, vegetation, traffic signal detectors, signs and markings, drainage improvements, chip sealing, patching activities, utility cuts, snow clearance, and operating bikeways in work zones.

According to bicyclists in Apex's largest neighboring jurisdiction (the City of Raleigh, which has a growing bicycle lane network), local bicyclists commonly report parked cars and other obstacles in bicycle lanes. The Town of Apex should be prepared for this issue as its bicycle lanes are built, and target offenders with education/enforcement strategies. Apex could use an online tool for public reporting of issues, like SeeClickFix used in Raleigh: https://en.seeclickfix.com/raleigh.

Example Maintenance Policies from the AASHTO Guide for the Development of Bicycle Facilities

- Establish a regular sweeping schedule for roadways and pathways that anticipates both routine and special sweeping needs. This may involve more frequent sweeping seasonally, and also should include periodic inspection, particularly in areas that experience frequent flooding, or in areas that have frequent vandalism. The sweeping program should be designed to respond to user requests for sweeping activities.
- Remove debris in curbed sections with maintenance vehicles that pick up the debris; on roads with flush shoulders, debris can be swept off the pavement.
- Reduce the presence of loose gravel on roadway shoulders by paving gravel driveway approaches, prioritized on corridors that receive heavy bicyclist use. Also require parties responsible for debris to contain it; for example, require tarps on trucks loaded with gravel. Local ordinances often require tow-vehicle operators to remove glass after crashes, and contractors are usually required to clean up daily after construction operations that leave gravel and dirt on the roadway.

From 2014 Advocacy Advance report ("How Communities are Paying to Maintain Trails, Bike Lanes, and Sidewalks")

- In case study communities, the report notes that bicycle lanes are treated like other road facilities and contracted out to private firms for regular sweeping. Sweeping costs were reported between $55-62 per curb mile of bicycle lanes for sweeping once a month, plus additional monthly sweeps during peak months for bicycle traffic. Some cities use stormwater management funds to cover the cost of street sweeping.

Safety Campaign to Educate Motorists, Bicyclists, and Pedestrians

The public comment form for Advance Apex indicated that when people choose not to ride their bike in Apex, it is because they do not feel safe (see page 38). Watch for Me NC is an ongoing comprehensive grant program and campaign administered by the NCDOT Division of Bicycle and Pedestrian Transportation (NCDOT DBPT) that helps address this issue. It is aimed at increasing safety and reducing the number of bicyclists and pedestrians hit and injured in crashes with vehicles. The campaign consists of educational messages on traffic laws and safety, and an enforcement effort by area police.

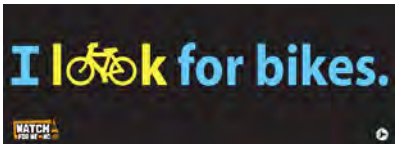
Apex was a pilot community for the Statewide Watch for Me NC campaign, and the Town should continue its efforts with the program going forward. Through the campaign, the Town's Police Department led the effort to reduce violations of safety laws and delivers a consistent safety and educational message to drivers, pedestrians, and bicyclists. The Town's Chief of Police will be the best resource for evaluating future enhancements and possible expansion of the program going forward. There may be opportunities for the Town to continue receiving the grant; see the website for contact information and notice of the annual program opening: https://www.watchformenc.org/.

A recommended first step would be to publish a foldable paper map, as described on the following page, with the entire opposite side of the map dedicated to bicycle safety education. The City of Durham, for example, has done this for nearly a decade, distributing tens of thousands of maps featuring bicycle education information at festivals, events, and their visitors bureau.

Consider also implementing a rail safety program, such as **NC's BeRailSafe**, especially as proposed projects are constructed in close proximity to railroads. NCDOT has resources available for this topic:

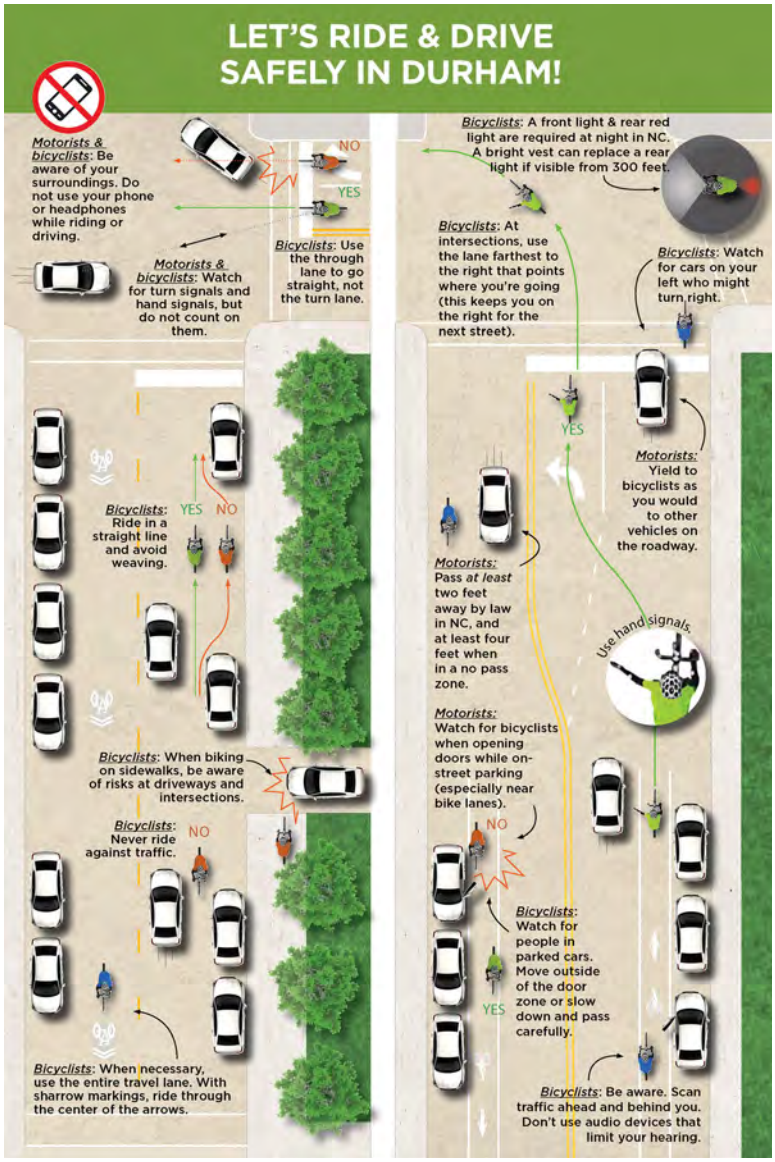
www.ncdot.gov/divisions/rail/Pages/be-rail-safe.aspx

www.ncdot.gov/divisions/rail/Pages/safety-education.aspx



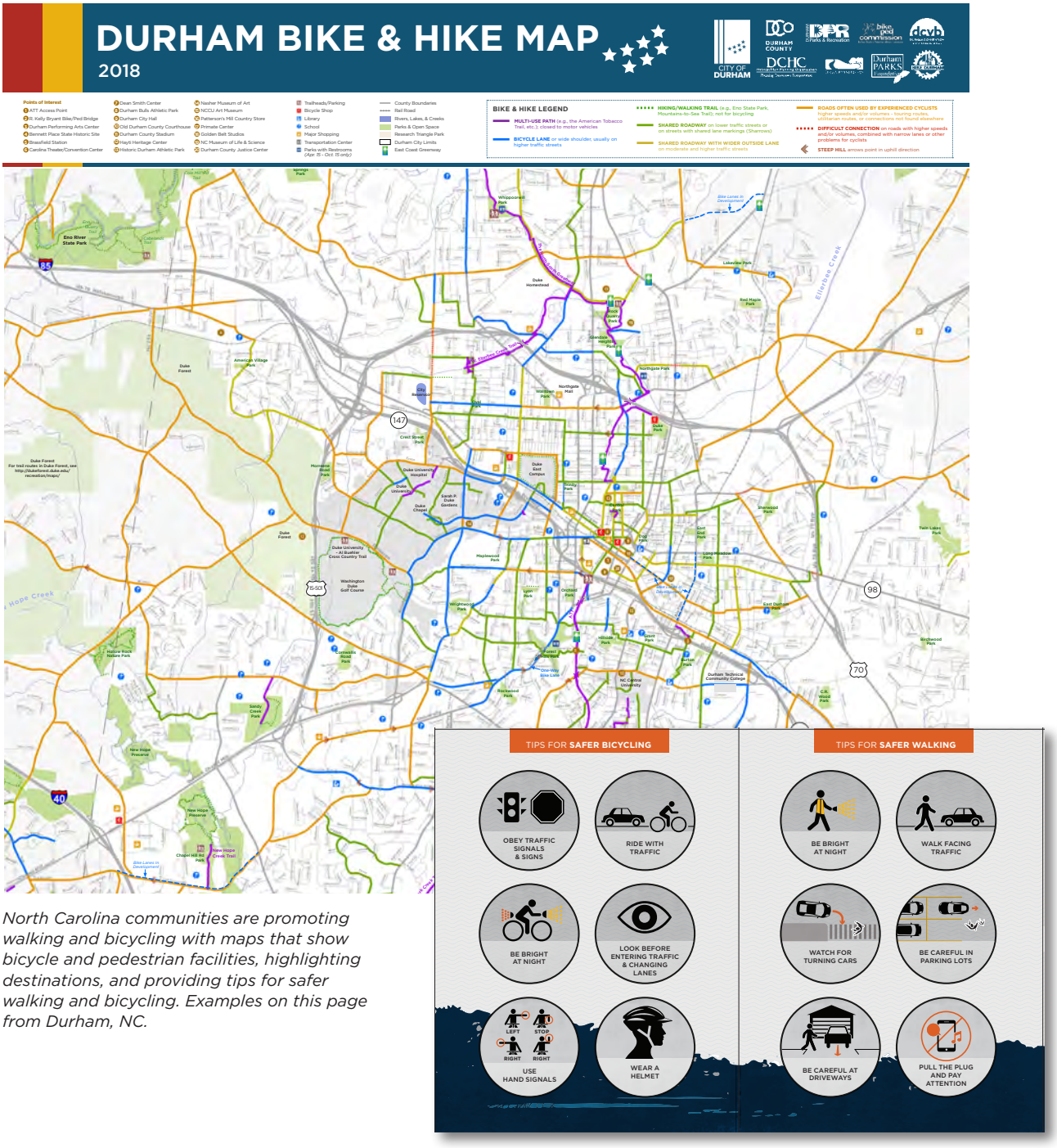
Left: Watch for Me NC campaign bumper stickers.

Below: An example education resource featured in the Durham Bike & Hike Map that outlines how motorists and bicyclists can ride and drive safely. Full map available here: https://durhamnc.gov/1031/Durham-Bike-Hike-Map



Map or Mobile App with Bike Routes and Greenways

One of the most effective ways of encouraging people to walk more often or to ride a bicycle is through the use of maps and guides to show where you can walk and bike, and to guide people to enjoyable routes and destinations. These maps can also be designed so that a portion of the map is devoted to bicycle and pedestrian safety education, such as informational graphics that demonstrate bicycle hand signals and how to share the road and the trail safely. The map should be made available online and printed as needed to be actively distributed to residents and visitors. A town map could be created following completion of this plan.



North Carolina communities are promoting walking and bicycling with maps that show bicycle and pedestrian facilities, highlighting destinations, and providing tips for safer walking and bicycling. Examples on this page from Durham, NC.

Open Streets Events

Open Streets Events are periodic street closures (usually on Sundays) that create a temporary park that is open to the public for walking, bicycling, dancing, hula hooping, roller skating, and other forms of human-powered activity. These programs are known by many names: Ciclovias, Open Streets, Sunday Parkways, Summer Streets, and Sunday Streets. They promote health by creating a safe and attractive space for physical activity and social interaction.

For this type of program, organizers should consider lessons learned and best practices from other communities. Some recommendations include:

- These events lend themselves to innovative partnerships and public/private funding. Health care providers whose mission includes facilitating physical activity are often major sponsors. Businesses may also support the event if it brings customers to their location. Since they often take place on Sundays, partnerships with local churches in Apex could also be pursued.
- Informing residents and businesses along the route about what it means for them is essential. They should be informed numerous times (3-6 times is not too much), including a reminder the day before the event. Expectations about vehicle access to and from residences should be managed clearly.
- Closing Salem Street in Apex may be challenging due to through traffic needs - however, it would be most visible and potentially impactful.
- For a local event example, refer to Durham's Bull City Play Streets event: https://www.facebook.com/BullCityOpenStreets/.
- Smaller NC communities, like Boone, Marion, and Salisbury have each held at least one ciclovia as well.
- Videos of Sunday Parkways events: http://www.streetfilms.org/tag/ciclovias/

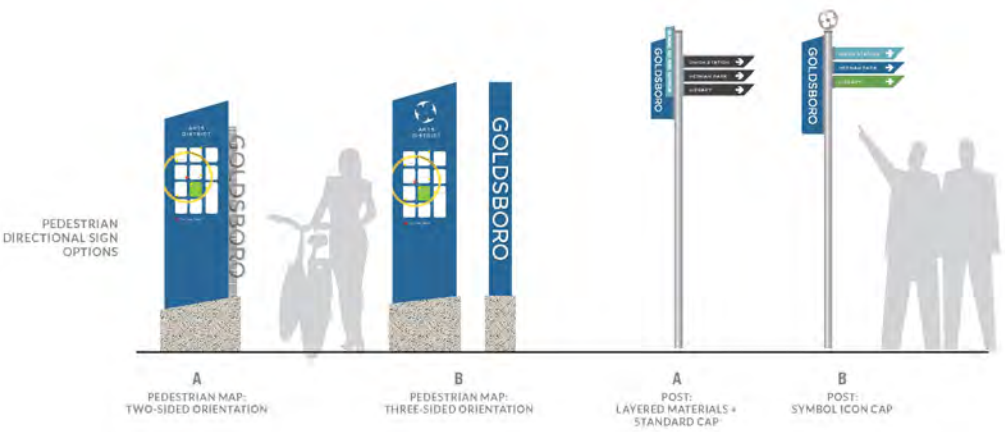
Examples of Open Street events in Durham and Boone, NC

Signage and Wayfinding

A relatively low-cost program that the Town of Apex can pursue is to make and post simple wayfinding signs, to make it easier for people to find destinations, and to point how short it is to walk to various places in Town. The Walk [Your City] program is designed to do just that. See below and visit **http://walkyourcity.org/** for more information. BlueCross BlueShield of North Carolina has partnered on these efforts in the past. For a step-by-step guide to help non-professionals participate in the process of developing and designing a signage system, as well as information on the range of signage types, visit the Project for Public Places website: **www.pps.org/reference/signage_guide**

For a longer-term, more comprehensive approach to wayfinding, the Town should conduct a full wayfinding plan. The plan would establish an agreed-up signage "brand" (a.k.a., look and feel of the signs), a hierarchy of signage types (route confirmation, directional, and kiosk signage, for example), and a signage placement plan that shows exactly where each sign and sign type will be placed.

Road signage has traditionally been expensive and car-centered, leaving walkers and bikers by the wayside. Walk [Your City] lets anyone from citizens to corporations quickly and affordably promote healthy lifestyles, public safety, and human-centered transit. Visit http://walkyourcity.org/ for more information.



A full wayfinding plan would establish an signage "brand" and hierarchy of signage types (example here from Goldsboro, NC).

Greenway Trail Maintenance

Greenway maintenance is essential to the long-term viability and sustainability of the Town's greenway trails. Construction of greenway trails should not take place without a maintenance plan and priority in place. This Plan recommends a strong, collaborative approach to maintenance.

Maintenance Principles

The greenway trail system should be viewed and maintained as a public resource, serving generations to come. The following guiding principles will help assure the preservation of a first class system:

- Good maintenance begins with sound planning and design.
- Foremost, protect life, property and the environment.
- Promote and maintain a quality outdoor recreation and transportation experience.
- Develop a management plan that is reviewed and updated annually with tasks, operational policies, standards, and routine and remedial maintenance goals.
- Maintain quality control and conduct regular inspections.
- Include field crews, police and fire/rescue personnel in both the design review and on-going management process.
- Maintain an effective, responsive public feedback system and promote public participation.
- Be a good neighbor to adjacent properties.
- Operate a cost-effective program with sustainable funding sources.

Greenway Trail Flooding

The most frequently mentioned maintenance issue during this planning process was trail flooding along the Beaver Creek Greenway, near I-540. A solution for flooding on Beaver Creek Greenway is in development as of late 2018.

In general, trail flooding can sometimes be addressed by elevating sections of trail as a boardwalk, but that option may be constrained by floodplain regulations in some areas. Another potential solution is to reroute trail alignments further from floodways. At a minimum, when trails are designed to flood, then quarterly inspections should be made to ensure its integrity, and signage should be used to both caution trail users of flooding potential, and to inform them that the trail is designed to flood periodically.

Longevity of Facilities

Mulch	2-3 years
Granular Stone	7-10 years
Boardwalk	7-10 years
Asphalt	7-15 years
Concrete	20+ years
Bridge/Underpass	100+ years

Range of Trail Maintenance Costs

Reported annual maintenance costs from cities and regions for shared-use trails range widely, from just $500/mile to over $15,000/mile. As a local example, the Town of Cary uses $6,000/mile for annual mowing and trash pick up, and minor repairs like replacing a fence rail; they budget asphalt and drainage repairs separately on case by case basis. Some key factors affecting these wide ranges include:

- Quality of materials used, and frequency of sealing and reconstruction of the path
- Amount of leaf drop affecting the trail that requires concentrated sweeping
- Amount of flooding of the trail that has to be cleaned up
- Amount of snow removal/grooming needed
- Whether or not mowing, irrigation, and other care of adjacent open space is calculated in the cost
- Presence of waste receptacles

The largest factor affecting the annual maintenance figures of different cities is whether or not the eventual trail reconstruction is accounted for in annual maintenance budgets, as opposed to being considered as separate capital item.

Signal Detection and Actuation for Bicyclists

Bicyclists in Apex who submitted written comments for this Plan's public comment form indicated a desire for bicycles to be detected at signals. A pilot project could be pursued to install these at intersections along US Bike Route 1/NC Bike Route 1: Carolina Connection (Old US 1/Salem St). These could also be installed as opportunities arise, such as during traffic signal replacement, and/or during major intersection and roadway improvements along the route.

Bicycle detection is used at actuated signals to alert the signal controller of bicycle crossing demand on a particular approach. Bicycle detection occurs either through the use of push-buttons or by automated means (e.g., in-pavement loops, video, microwave, etc). Inductive loop vehicle detection at many signalized intersections is calibrated to the size or metallic mass of a vehicle. For bicycles to be detected, the loop must be adjusted for bicycle metallic mass. Otherwise, undetected bicyclists must either wait for a vehicle to arrive, dismount and push the pedestrian button (if available), or cross illegally.

Proper bicycle detection meets two primary criteria: 1) accurately detects bicyclists; and 2) provides clear guidance to bicyclists on how to actuate detection (e.g., what button to push, where to stand). See the NACTO Urban Bikeway Design Guide (https://nacto.org/publication/urban-bikeway-design-guide/bicycle-signals/signal-detection-and-actuation/) for more on these four primary types of bicycle signal detection:

- **Loop detection (preferred) –** Induction loop embedded in the pavement; sensitivity settings need to be monitored and adjusted over time for best results
- **Video –** Video detection aimed at bicyclist approaches and calibrated to detect bicyclists
- **Push-button –** User-activated button mounted on a pole facing the street (If provided, shall be located so bicyclists can activate the signal without dismounting. If used, push buttons should have a supplemental sign facing the bicyclist's approach to increase visibility.)
- **Microwave –** Miniature microwave radar that picks up non-background targets

As a pilot project, the Town could consider adding signal detection and actuation for bicyclists as a recommendation for the Ten Ten Rd widening project (U-5825) (Bike Route 5).

"As a new resident of Apex, I am very excited by these plans. My wife and I frequently take our three boys for the 2 mile walk from our house to Kelly Road Park on the Beaver Creek Greenway....It would be great to have them all connected together into one system, I know my family would be frequent users both for walking and bicycling." - Public Comment

IMPLEMENTATION OVERVIEW

This chapter defines a structure for managing the implementation of this Plan. Implementing its recommendations will require leadership and dedication to bicycle facility development on the part of a variety of agencies. Equally critical, will be meeting the need for a recurring source of revenue. Even small amounts of local funding are essential for matching and leveraging outside sources. Most importantly, the town need not accomplish the recommendations of this plan by acting alone; success will be realized through collaboration with regional and state agencies, the private sector, and non-profit organizations. Funding resources that may be available to Apex are presented in the appendix of this plan.

Other important actions can be taken in advance of major investments, including potentially forming a Bicycle and Pedestrian Advisory Committee (BPAC), the initiation of education and safety programs, and incorporating Bike Apex recommendations into other Town documents, policies, and procedures. Even just getting a project "shovel-ready" can be a huge step towards implementation, as many outside funding sources look more favorably upon projects that are already in public right-of-way, planned, and designed. Following through on these priorities will allow the key stakeholders to prepare for the development of larger bicycle and trail projects over time, while taking advantage of strategic opportunities as they arise.

Members of the Bike Apex Steering Committee and/or the Advance Apex Steering Committee could be good candidates for a future standing Bicycle and Pedestrian Advisory Committee (BPAC) during plan implementation.

Image in header:
Bicyclist on Salem St

KEY PARTNERS & ROLES IN IMPLEMENTATION

Apex Town Council

Recognize the value of bikeways & greenways by adopting this plan, thereby supporting quality of life in Apex.

NCDOT-DBPT

Guidance on bicycle policy & project funding; Support in coordinating with local division & district offices

Town of Apex Interdepartmental Partners and/or BPAC

- Lead on funding, as part of CIP and public-private partnerships
- Coordinate implementation of this Plan's Action Steps
- Coordinate with CAMPO to leverage local funding on specific projects
- Coordinate with NCDOT Division 5 for bicycle and pedestrian facilities as incidental projects during roadway reconstruction and resurfacing
- Continue to enforce development regulations to support bicycle facility and greenway development
- Coordinate with NCDOT, CAMPO, and other project partners through the bikeway and greenway development process (see typical process on page 95)

Private Sector

Potential partners in developing bicycle facilities and potential program sponsorship

NCDOT Division 5

- Become familiar with the recommendations in this plan
- Communicate with CAMPO on potential projects that could incorporate bicycle and greenway facilities, especially where recommendations cross or align with NCDOT maintained ROW
- Coordinate with CAMPO on the STI process for bicycle facility and greenway projects

Local Residents, Business Owners, and Civic Organizations

- Help build public support for bicycle projects and programs
- Reach out to elected officials and other decision-makers to express support for greenways & bikeways

CAMPO

Coordinate with Apex on leveraging funding opportunities through the LAPP and STI processes; Incorporate this Plan's projects into long-range transportation plans

Consultants

Assist Apex by providing guidance on project development, and by providing design and construction services

Regional Partners

Continued coordination and partnerships with:

- Wake County Parks, Recreation and Open Space
- Wake County Schools
- Towns of Cary and Holly Springs
- The East Coast Greenway Alliance
- Private Developers

Acronym Legend:
BPAC: Bicycle & Pedestrian Advisory Committee
NCDOT: North Carolina Department of Transportation
DBPT: Division of Bicycle and Pedestrian Transportation
CAMPO: Capital Area Metropolitan Planning Organization
STI: Strategic Transportation Investments

Table 4.1 Implementation Action Steps

#	TASK	LEAD	SUPPORT	DETAILS	PHASE
	ADMINISTRATIVE ACTION STEPS				
1	Adopt Bike Apex as the Town's Bicycle Transportation Plan.	Town Council	Town Staff, Project Consultants, Steering Committee	Through adoption, the Plan becomes an official planning document of the Town. Adoption does not commit the town to dedication of funding, but rather shows intention to support plan implementation over time. It also signals to outside funding groups that Apex has undergone a successful, supported planning process, which is key to securing outside funding.	2018
2	Designate staff to lead implementation of Bike Apex, including a "Bike Plan Coordinator".	Town Council & Town Manager	Multiple departmental directors	The Town Manager and Town directors of Planning, GIS, Development Services, Public Works & Transportation, and Parks, Recreation, and Cultural Resources should each identify their respective departmental staff leads for implementing this bicycle plan. A staff organizational chart for plan implementation should be shared among departments, so there is a known point person for each. A single point person among the designated staff should be designated as the "Bike Plan Coordinator".	2019
3	Designate a Bicycle and Pedestrian Advisory Committee (BPAC) for plan implementation.	Town Council	Town Manager and designated staff from step above	The Town of Apex should form a bicycle and pedestrian advisory committee (BPAC) out of the plan's steering committee to assist in the implementation of this plan. The BPAC should have representation from active pedestrians and commuting and recreational cyclists and should champion the recommendations of this plan. The formation of this group would be a significant step in becoming designated as a Bicycle Friendly Community (see section that follows). The committee would provide a communications link between the residents of the community and local government. They should also continue to meet periodically, and be tasked with assisting Town staff in community outreach, marketing, and educational activities recommended by this plan.	2019
4	Communicate this plan's priority projects to potential implementation partners.	Bike Plan Coordinator	BPAC & NCDOT-Division of Bicycle and Pedestrian Transportation (DBPT)	The purpose of this step is to network with potential project partners, and to build support for implementing the top projects. Possible groups to receive a presentation/coordination meeting include: CAMPO, NCDOT Division 5, Wake County Parks, Recreation and Open Space, neighboring jurisdictions. Consider a presentation at the annual Triangle Bicycle & Pedestrian Workshop.	2019

Table 4.1 Implementation Action Steps (Continued)

#	TASK	LEAD	SUPPORT	DETAILS	PHASE
	ADMINISTRATIVE ACTION STEPS (CONTINUED)				
5	Begin Annual Bike Apex meeting.	Bike Plan Coordinator	Departmental leads, stakeholders, NCDOT Division 5 highway staff and planning engineer	Coordination between key project partners will provide a level of accountability, and ensure that recommendations are implemented. Key project partners (see task 4 above & organizational chart) should meet on an annual basis to discuss and evaluate the implementation of this Plan. A brief progress benchmark memo should be a product of these meetings, and participants should reconfirm the plan's goals each year. The meetings could also occasionally feature special training sessions, or include on-site tours of recently completed projects and upcoming priority project corridors.	Ongoing (Beginning Winter 2019-2020)
6	Update Bike Apex.	Town Council & Bike Plan Coordinator	BPAC	This plan should be updated by 2023 (about five years from adoption). If many projects and programs have been completed by then, a new set of priorities should be established. If not, a new implementation strategy should be established, potentially reassigning project priorities.	2023
	INFRASTRUCTURE, POLICY, AND FUNDING ACTION STEPS				
7	Ensure that Bike Apex recommendations are implemented as part of new development.	Bike Plan Coordinator	Designated staff from Planning, GIS, and Development Services departments	Other Town documents and maps should be updated with recommendations from Bike Apex, to ensure bicycle facilities are implemented with new development. Consider updates to the UDO to better support bicycling and bicycle parking standards (Bike Apex consultants submitted suggestions to Town staff in 2018).	2019
8	Ensure that projects are incorporated in NCDOT's prioritization process and in the future planning of the NCDOT Planning Branch	Bike Plan Coordinator	CAMPO, NCDOT Division 5, and NCDOT Planning Branch	The Town of Apex, CAMPO, and NCDOT Division 5 should coordinate to fund recommendations from this plan over time. Use the plan cut-sheets and recommendation maps to communicate project details and to submit projects for funding. The Town will need to be prepared to match at least 20% of their submitted project totals. Projects that have secured public right-of-way and design completed (or at least underway) will be more competitive.	2019 onward
9	Seek multiple funding sources and facility development options.	Bike Plan Coordinator	BPAC (for potential grant writing assistance, funding research, letters of support, etc.)	It will be necessary to consider many different sources of funding that together will support plan implementation. Funding sources can be used for a variety of activities, including: programs, planning, design, implementation, and maintenance. The appendix outlines the most likely sources of funding from the federal, state, and local government levels as well as from the private and non-profit sectors.	2019 onward
10	Adopt guidelines for greenway trail accessiblity	Town Council	Apex Parks, Recreation & Cultural Resources	Adopt the the Outdoor Area Guidelines from the US Access Board. The guidelines are available for download and review here: https://www.access-board.gov/attachments/article/1637/outdoor-guide.pdf	2019

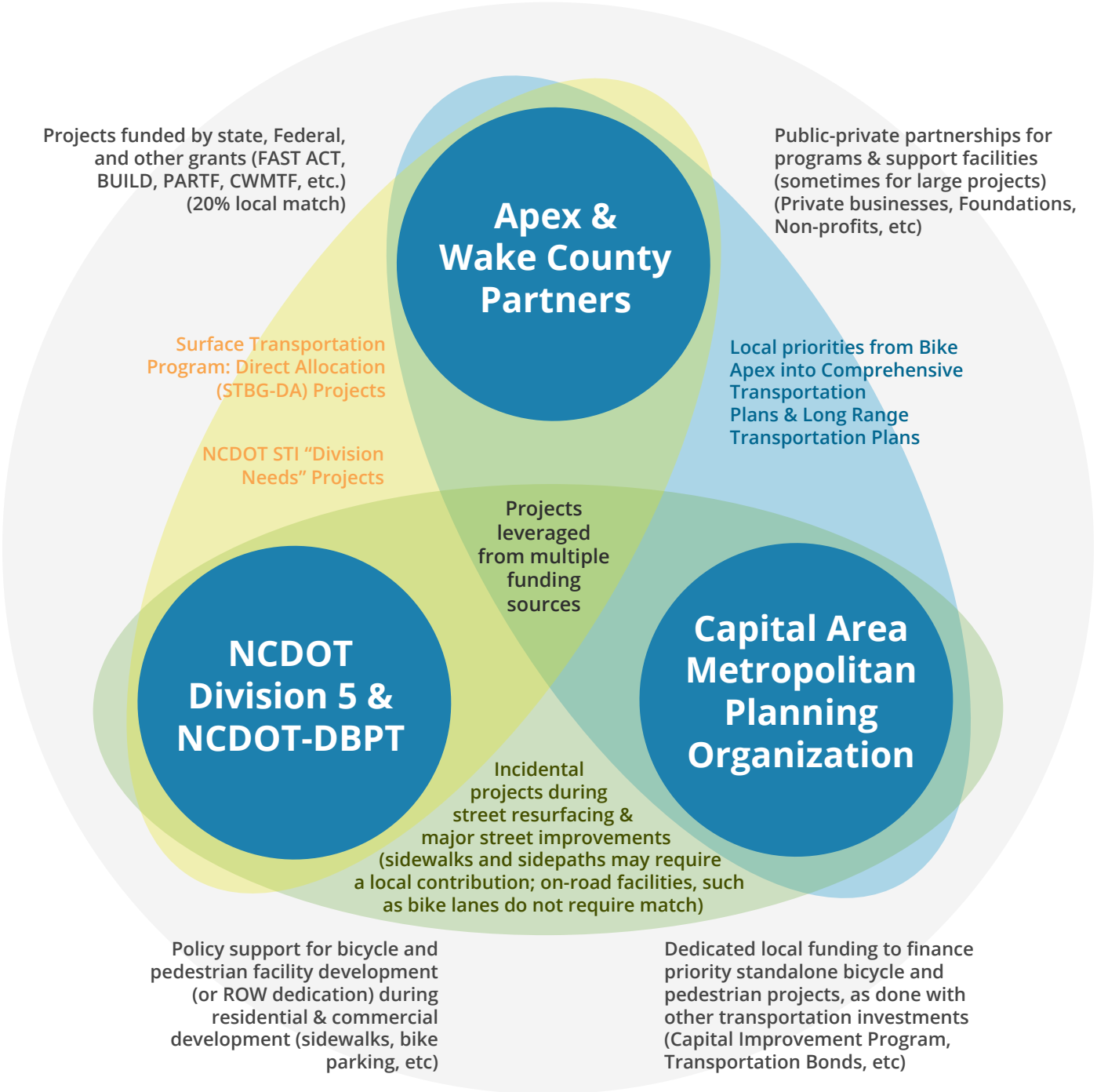
Table 4.1 Implementation Action Steps (Continued)

#	TASK	LEAD	SUPPORT	DETAILS	PHASE
	INFRASTRUCTURE, POLICY, AND FUNDING ACTION STEPS (CONTINUED)				
11	Develop a long-term funding strategy.	Bike Plan Coordinator & departmental leads	Town Council	To allow continued development of the project recommendations, capital funds for bicycle and trail facility construction should be set aside every year. Funding for an ongoing maintenance program should also be included in the Town's operating budget. Consider incorporating Bike Apex recommendations into a multi-year bond package for the Town of Apex, along with other initiatives, such as with projects related to parks, recreation, and transportation improvements.	2019 onward
12	Begin Priority Projects	Bike Plan Coordinator	Town Council, departmental leads, private contractors	Dedicate funding, seek proposals, and hire a contractor for a site survey, construction documents, and permitting. Confirm that the project can be designed completely within existing public right-of-way, and secure easements if needed. When design is complete, select a phase of the project to be constructed first, based on costs and funding available at that stage. Send the project out to bid, select a contractor, and begin work. See typical project development cycle later in this chapter.	2019 onward
13	Invest in staff training opportunities related to bicycle infrastructure.	Town Council	Bike Plan Coordinator & departmental leads	Consider trainings from the National Association of City Transportation Officials (NACTO) on the Urban Bikeway Design Guide. These trainings can be customized for Apex staff, helping to ensure that as new facilities are designed and constructed, they are up to world-class standards for safety and functionality. If Apex hosts the workshop, they could strategically invite NCDOT division staff, CAMPO staff, and others who would be partners in implementation. Cost sharing for the training could come from participation of staff from neighboring municipalities. More info: https://nacto.org/training-and-workshops/	Training would be most beneficial before design phase of major projects
14	Maintain bicycle & greenway trail facilities.	Designated staff from Public Works & Transportation and Parks, Recreation, and Cultural Resources	BPAC & General Public (for reporting maintenance needs); NCDOT	Apex should define a maintenance plan, budget, and schedule for existing and future bicycle and trail facilities, pavement markings, and sidewalks, working with NCDOT where necessary. See maintenance program recommendations in Chapter 3 for more on this topic.	2019 onward
15	Continue participating in NCDOT and ITRE's Non-Motorized Traffic Monitoring Program (Pedestrian & Bicycle Counts)	Public Works & Transportation and Parks, Recreation, and Cultural Resources	NCDOT & ITRE https://www.ncdot.gov/divisions/bike-ped/Pages/research-data.aspx	Since late 2014, NCDOT and local governments have installed equipment that uses electromagnetic bicycle detectors and infrared technology to count bicycle and pedestrian traffic. Over time, Apex can expand this program as more bike facilities are constructed, and use this data to justify investment, prioritize projects, and understand preferred bicycling routes and behavior.	2019 onward

Table 4.1 Implementation Action Steps (Continued)

#	TASK	LEAD	SUPPORT	DETAILS	PHASE
INFRASTRUCTURE, POLICY, AND FUNDING ACTION STEPS (CONTINUED)					
16	Coordinate with NCDOT Division 5 on their 3-year road resurfacing schedule (and any short term changes to it) to accomplish projects that require pavement markings.	Bike Plan Coordinator & Designated staff from Public Works & Transportation	NCDOT Division 5	Resurfacing is a very important opportunity for implementing bike facilities, especially ones that are primarily pavement markings. It is essential for implementation that the Town stay in close touch with NCDOT Division 5 Operations and Maintenance staff to stay on top of the resurfacing schedule and keep closely abreast of any updates or changes to the schedule. Checking in with the Division at least once every quarter is not too often. Additionally, a BPAC representative could be assigned to reviewing the three-year resurfacing/restriping schedule from Division 5 on a regular basis to ensure there are no missed opportunities.	2019 onward
PROGRAM ACTION STEPS					
17	Continue current efforts to provide safe routes to school	Town of Apex	Wake County Schools, NCDOT Bike/Ped Division	As a separate effort from Bike Apex, the Town of Apex has an internal analysis underway to identify safe routes to school needs across all schools in Apex. The analysis will result in a map and prioritization of projects. This analysis should be regularly revisited and progress on implementing projects should be tracked over time. This effort will complement the objectives and priorities of Bike Apex. Additionally, NCDOT is looking to ways to continue some Safe Routes to School (SRTS) funding; coordinate w/ NCDOT-DBPT regarding any future opportunities for SRTS funding.	2019 onward
18	Launch new programs.	Bike Plan Coordinator & BPAC	NCDOT Bike/Ped Division, Apex Police Dept., Wake County Schools & Wake County Human Services, WakeMed, public health advocates	These groups should coordinate to launch new programs, as described in Chapter 3, such as launching a safety campaign, developing a map or mobile app with bike routes, hosting an "open streets" event, and pursuing some form of greenways signage and wayfinding program. Bike Apex committee members could also be called upon for program involvement.	Most feasible to begin programs after a BPAC is formed
19	Distribute bicycle and pedestrian safety information.	BPAC	NCDOT Bike/Ped Division, Police Department	NCDOT has print material with safety tips for motorists, bicyclists and pedestrians available for download at https://www.watchformenc.org/program-materials/. Other methods of distribution could include web sites, social media, and 'on-the-ground' in park kiosks. The Watch for Me NC program is another resource for this task (with more information at https://www.watchformenc.org/).	2020
20	Conduct communication & outreach campaigns related to walking and bicycling.	BPAC	Local newspapers, Town website & social media mangers	BPAC should publicly announce their successes as progress is made. This could be achieved partly through social media, and by establishing a page on the town website dedicated to bike/ped education and project updates. Also, BPAC should provide regular (annual) reports to the Town Council on implementation progress.	2020
21	Seek designation as a Bicycle-Friendly Community	Bike Plan Coordinator	BPAC (members could be assigned tasks to complete individual portions of the application process)	The development and implementation of this plan is an essential first step toward becoming a designated Bicycle-Friendly Community. With progress on program, policy, and infrastructure recommendations, the Town should be in a position to apply for and receive recognition by 2022. See https://bikeleague.org/community for more information on the application process.	2022

TYPICAL PROJECT FUNDING PARTNERS AND METHODS



FACILITY DEVELOPMENT METHODS

NCDOT STRATEGIC TRANSPORTATION INVESTMENTS (STI)

The NCDOT's State Transportation Improvement Program is based on the Strategic Transportation Investments Bill, signed into law in 2013. The Strategic Transportation Investments (STI) Initiative introduces the Strategic Mobility Formula, a new way to fund and prioritize transportation projects. See the appendix for more information.

RESIDENTIAL AND COMMERCIAL DEVELOPMENT

The construction of sidewalks, bicycle facilities, trails, greenways, and safe crosswalks should be required during development. Construction of facilities that corresponds with site construction is more cost-effective than retrofitting. In commercial development, emphasis should also be focused on safe pedestrian and bicyclist access into, within, and through large parking lots. This ensures the future growth of the pedestrian and bicycle networks and the development of safe communities.

ROADWAY CONSTRUCTION

Pedestrians and bicyclists should be accommodated any time a new road is constructed or an existing road is reconstructed. In the longer-term, all new roads with moderate to heavy motor vehicle traffic should have sidewalks, bicycle facilities, and safe intersections. Also, case law surrounding the Americans with Disabilities Act (ADA) has found that roadway resurfacing constitutes an alteration, which requires the addition of curb ramps at intersections where they do not yet exist.

REPAVING

Repaving projects provide a clean slate for revising pavement markings. When a road is repaved, the roadway should be restriped to provide space for bike lanes and shoulders, where feasible. In addition, if the spaces on the sides of non-curb and gutter streets have relatively level grades and few obstructions, the total pavement width can be widened to include paved shoulders, though this will likely require a local contribution. NCDOT provides three-year plans that include resurfacing schedules. Please see the following website: https://connect.ncdot.gov/resources/Asset-Management/HMIP-Plans/Pages/HMIP.aspx.

BRIDGE CONSTRUCTION OR REPLACEMENT

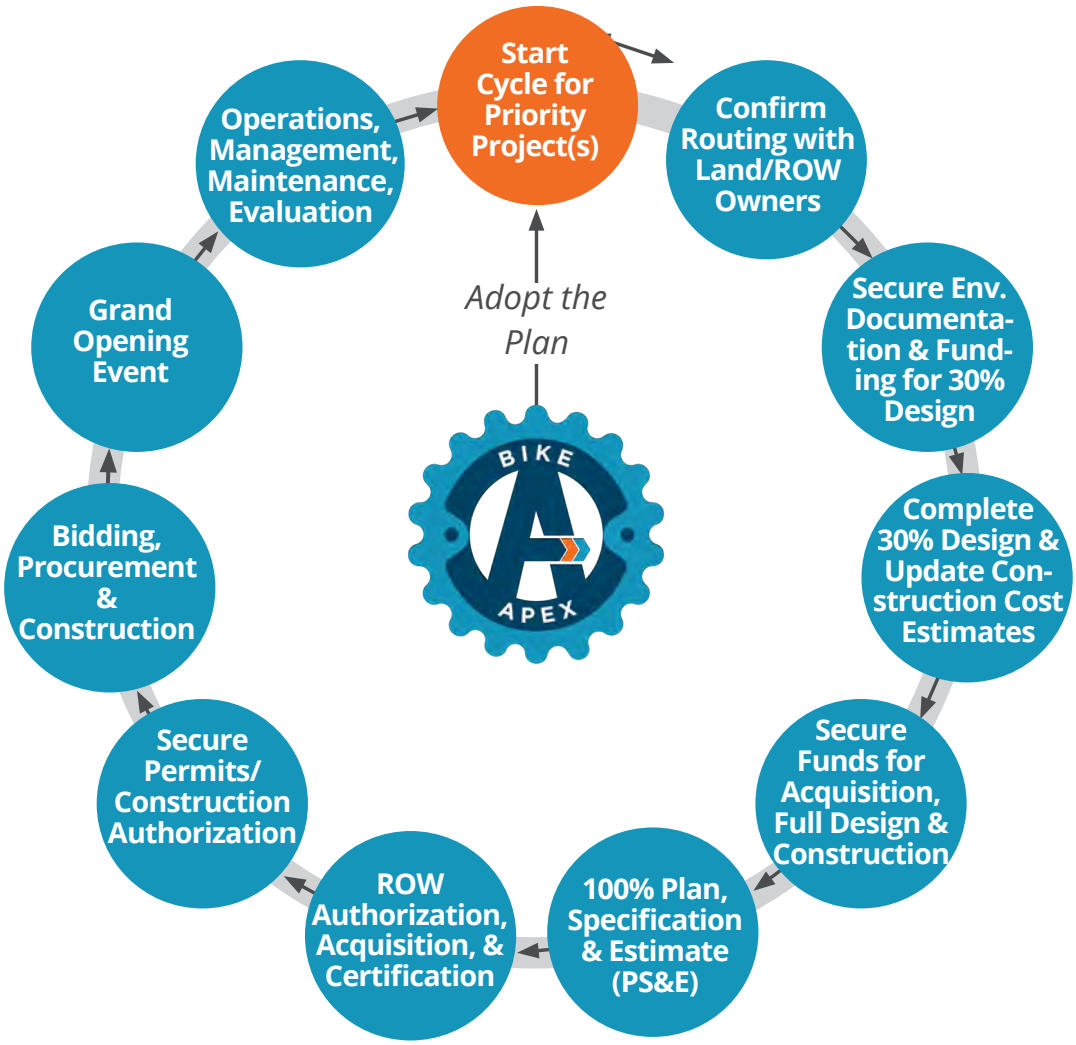
Provisions should always be made to include walking and bicycling facilities as a part of vehicular bridges. See NCDOT's "List of Bridges and Current Status": https://www.ncdot.gov/initiatives-policies/Transportation/bridges/Pages/default.aspx. Even though bridge construction and replacement does not occur regularly, it is important to consider these policies for long-term bicycle planning.

TOWN EASEMENTS

Apex should continue to revise existing utility easements to accommodate public access greenway trail facilities. Adopting policy language to allow for public access for trail users, as a matter of right, on all new sewer and utility easements would greatly enhance the development of greenways. Sewer easements are very commonly used for this purpose, offering cleared and graded corridors that easily accommodate trails. This approach avoids the difficulties associated with acquiring land, and it better utilizes the Town's resources.

TYPICAL PROJECT DEVELOPMENT PROCESS

These are the steps typically involved in bicycle facility development, when the project is being built independent of other major development or roadway projects. Certain funding sources may have additional requirements, and some steps may occur simultaneously or in a different order.



DESIGN GUIDELINE RESOURCES

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: The Statewide Pedestrian and 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/
- Separated Bike Lane Planning and Design Guide (2015) 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/
- Small Town and Rural Multimodal Networks Design Guide (2017)

  Main Guide:
  http://ruraldesignguide.com/

  Section specific to side paths:
  http://ruraldesignguide.com/physically-separated/sidepath

RECOMMENDATIONS FOR THE TOWN OF APEX ENGINEERING SPECIFICATIONS

The Town of Apex Standard Specifications and Standard Details are to be utilized as minimum standards for all roadway and utility construction within the jurisdiction of the Town of Apex. The following review of these standards provides some considerations for modifying and updating these standards to improve safety and comfort for bicyclists.

GREENWAY SECTION 200.02

» Change asphalt paved path width from 10' to 10' minimum. Higher volume and/or higher encounter of pedestrians and cyclists trails may justify wider widths, such as 12' or 14'. (See ASSHTO Guide for the Development of Bicycle Facilities Section 5.2.1)
» Consider adding a note that "path width of 8 ft may be used for a short distance due to physical constraints with approval of Town of Apex Department of Public Works and Transportation." (See ASSHTO Guide for the Development of Bicycle Facilities Section 5.2.1)
» Consider adding a section for road side path scenarios.

STANDARD BOARDWALK 200.05

» Change railing to railing clear width from 10'-0" clear to 10'-0" minimum clear. Additional 1'-2' shy distance from the standard 10' trail width to the confined railing may be justified on higher volume trails. Since this can add significant additional cost, widening can be reserved for specific high use trails on a case by case basis.

STREET TYPICAL SECTIONS (RESIDENTIAL) 300.01

» For the Major residential street, it is recommended to include the bike lane option as noted on the Major Collector street, with additional suggested notation made on the 300.01 comments. While not all residential streets will require a bike lane, it is important to include as an option for when a residential road is determined to be a useful part of a bicycle network.

STREET TYPICAL SECTIONS (COLLECTORS) 300.01

» For the Major Collector Street, it is assumed that the "May include 4' bike lanes and center line striping" would utilize the 30' pavement width as (2) 11' travel lanes and (2) 4' bike lanes and exclude the gutter. Recommend noting this or showing graphically on the typical section to ensure that the 4' bike lane is measured outside of the gutter pan.
» For the Rural Collector street, recommend noting that the 4' shoulder may be used/marked as a bike lane.

STREET TYPICAL SECTIONS (3/5-LANE THOROUGHFARES) 300.01

» Recommend including additional options with bicycle facilities for both 3-lane and 5-lane scenarios, similar to the divided thoroughfare. Due to the higher volume/speed of vehicles expected on thoroughfares, recommend at a minimum 5' bike lanes when provided. Preferably, consider buffered bike lanes or a side path. Lane widths should be reduced to 11' for the bike lane options.
» For the 5-lane thoroughfare, recommend against the wide 13' outside travel lane, as this encourages speeding.

STREET TYPICAL SECTIONS (DIVIDED THOROUGHFARES) 300.01

» For the 4-lane median-divided thoroughfare, recommend a wider separation than 3.5' between the curb and multi-use path to accommodate street trees and provide additional buffer between cars and trail users. The 13' outside travel lane should be reduced as this encourages excessive speeding.
» For the 4-lane median divided thoroughfare, recommend at minimum a 5' bike lane outside of gutter, or buffered bike lanes, since a higher level of traffic

MEDIAN ISLAND TRAFFIC CALMING DEVICE 300.21 & NECKDOWN TRAFFIC CALMING DEVICE 300.22

» Consider adding a note that says application of these devices should be context-sensitive, mainly to be used on lower-speed roadways. These devices should not be used without consideration for how they may negatively affect bicycle safety, as they may cause "pinch points" for bicyclists and motor vehicles traveling side-by-side. If used, they should be accompanied by signage indicating that bicyclists may use full lane.

NEW SECTION: ROUNDABOUTS

» Consider creating a typical standard for roundabouts. Single-lane roundabouts can provide significant crash reduction benefits for bicyclists when they are designed with their needs in mind. At roundabouts, some bicyclists will choose to travel on the roadway, while others will choose to travel on the sidewalk. Roundabouts can be designed to simplify this choice for bicyclists. (See ASSHTO Guide for the Development of Bicycle Facilities Section 4.12.11 for design details).

PERFORMANCE MEASURES

Measuring performance over time is essential to implementation. Tracking performance measures will allow departments and partners to understand progress, communicate successes and challenges, and motivate leaders to take further actions. The following performance measures were selected to track progress toward the goals of this plan. Implementation progress updates at inter-department meetings could be used as an opportunity to evaluate progress against these measures.

INCREASE THE QUALITY OF BICYCLING THROUGHOUT THE REGION

OBJECTIVES

- Encourage and support local bicycle advocacy groups
- Increase connections between neighborhoods, schools, and businesses
- Increase bicycle facilities

PERFORMANCE MEASURES

- Number of advocacy groups promoting bicycling
- Measure of connectivity: Percentage of new projects built as Complete Streets with connectivity to surrounding destinations
- Percentage of roadways that have designated or separated bicycle facilities
- Percentage of signalized intersections that have bike and pedestrian friendly accommodations
- Percentage of bridges with bicycle facilities
- Total funding devoted to the construction of bicycle facilities

IMPROVE HEALTH OUTCOMES IN THE REGION

OBJECTIVES

- Increase access to recreational bicycle facilities
- Increase bicycle exercise and activity rates among all age groups

PERFORMANCE MEASURES

- Mileage of greenways per person (residents and visitors)
- Number of residents living within a half-mail of a greenway, park, and/or bike lane.
- Physical inactivity rates & obesity rates
- Reduction in transportation-related emissions from increase in bicycling trips

IMPROVE SAFETY FOR ALL CYCLISTS

OBJECTIVES

- Reduce cyclist crashes
- Engage law enforcement in bicycle safety
- Improve cyclist and driver adherence to traffic laws

PERFORMANCE MEASURES

- Bicyclist crash and fatality rates per capita
- Number of bicycle education courses offered through Town departments and Town-sponsored events
- Number of citations related to bicycle safety violations to bicyclists and motorists
- Distribute 'Ride Guide: North Carolina Bicycle Laws' - https://www.bikelaw.com/wp-content/uploads/2014/11/BIKELAW_RG_NC_Web.pdf

INCREASE BICYCLING TRIPS BY RESIDENTS AND VISITORS

OBJECTIVES

- Increase education on the social, economic, and health benefits of bicycling
- Increase bicycle mode share for commuting
- Improve resources for bicycle tourists

PERFORMANCE MEASURES

- Percentage of schools participating in bicycle safety education/ encouragement programs
- Bicyclist mode share
- Bicyclist counts
- Availability of bicycle brochures or guides (printed and online)
- Designation as Bicycle Friendly by the League of American Bicyclists

PROMOTE AND ENCOURAGE GROWTH OF TOURISM ECONOMY

OBJECTIVES

- Increase economic growth, job creation, and tourism revenue through bicycling

PERFORMANCE MEASURES

- Return on investment measures such as job creation, small business development, tourism, home prices
- Number of groups promoting bicycling
- Number of bike events in region and corresponding economic impact
- Number of visitors coming to region partially due to bicycling amenities

OVERVIEW

When considering possible funding sources for bicycle and pedestrian projects, it is important to remember that not all construction activities or programs will be accomplished with a single funding source. It will be necessary to consider several sources of funding that together will support full project completion. Funding sources can be used for a variety of activities, including: programs, planning, design, implementation, and maintenance. This appendix outlines the most likely sources of funding from the federal, state, and local government levels as well as from the private and non-profit sectors. Note that this reflects the funding available at the time of writing. Funding amounts, cycles, and the programs themselves may change over time.

FEDERAL FUNDING SOURCES

Federal funding is typically directed through state agencies to local governments either in the form of grants or direct appropriations. Federal funding typically requires a local match of five percent to 50 percent, but there are sometimes exceptions. The following is a list of possible Federal funding sources that could be used to support construction of pedestrian and bicycle improvements.

FIXING AMERICA'S SURFACE TRANSPORTATION (FAST ACT)

In December 2015, President Obama signed the FAST Act into law, which replaces the previous Moving Ahead for Progress in the Twenty-First Century (MAP-21). The Act provides a long-term funding source of $305 billion for surface transportation and planning for FY 2016-2020. Overall, the FAST Act retains eligibility for big programs - Transportation Investments Generating Economic Recovery (TIGER), Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ), and Highway Safety Improvement Program (HSIP) - and funding levels between highways and transit.

In North Carolina, federal monies are administered through the North Carolina Department of Transportation (NCDOT) and Metropolitan Planning Organizations (MPOs). Most, but not all, of these programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system. For more information, visit: https://www.transportation.gov/fastact.

Transportation Alternatives

Transportation Alternatives (TA) is a funding source under the FAST Act that consolidates three formerly separate programs under SAFETEA-LU: Transportation Enhancements (TE), Safe Routes to School (SRTS), and the Recreational Trails Program (RTP). These funds may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, side paths, and rail-trails. TA funds may also be used for selected education and encouragement programming such as Safe Routes to School, despite the fact that TA does not provide a guaranteed set-aside for this activity as SAFETEA-LU did.

Funding for the Surface Transportation Block Grant Program (STPBG) will grow from the current level of $819 million per year to $835 million in 2016 and 2017 and to $850 million in 2018 through 2020.

The FAST Act provides $84 million for the Recreational Trails Program. Funding is prorated among the 50 states and Washington D.C. in proportion to the relative amount of off-highway recreational fuel tax that its residents paid. To administer the funding, states hold a statewide competitive process. The legislation stipulates that funds must conform to the distribution formula of 30% for motorized projects, 30% for non-motorized projects, and 40% for mixed used projects. Each state governor is given the opportunity to "opt out" of the RTP.
For the complete list of eligible activities, visit: http://www.fhwa.dot.gov/fastact/factsheets/stbgfs.cfm.
For funding levels, visit: http://trade.railstotrails.org/index.

Surface Transportation Program

The Surface Transportation Program (STP) provides states with flexible funds which may be used for a variety of highway, road, bridge, and transit projects. A wide variety of pedestrian improvements are eligible, including trails, sidewalks, crosswalks, pedestrian signals, and other ancillary facilities. Modification of sidewalks to comply with the requirements of the Americans with Disabilities Act (ADA) is also an eligible activity. Unlike most highway projects, STP-funded pedestrian facilities may be located on local and collector roads which are not part of the Federal-aid Highway System. 50 percent of each state's STP funds are allocated by population to the MPOs; the remaining 50 percent may be spent in any area of the state. For more information, visit http://www.fhwa.dot.gov/specialfunding/stp/.

Highway Safety Improvement Program

HSIP provides $2.4 billion for projects and programs that help communities achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways, and walkways. Bicycle and pedestrian safety improvements, enforcement activities, traffic calming projects, and crossing treatments for non-motorized users in school zones are eligible for these funds. For more information: http://www.fhwa.dot.gov/fastact/factsheets/hsipfs.cfm.

Congestion Mitigation/Air Quality Program

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions. States with no non-attainment areas may use their CMAQ funds for any CMAQ or STP eligible project. These federal dollars can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Purely recreational facilities generally are not eligible. Communities located in attainment areas who do not receive CMAQ funding apportionments may apply for CMAQ funding to implement projects that will reduce travel by automobile. For more information: http://www.fhwa.dot.gov/fastact/factsheets/cmaqfs.cfm.

Federal Transit Administration Enhanced Mobility of Seniors and Individuals with Disabilities

This program can be used for capital expenses that support transportation to meet the special needs of older adults and persons with disabilities, including providing access to an eligible public transportation facility when the transportation service provided is unavailable, insufficient, or inappropriate to meeting these needs. For more information: https://www.transit.dot.gov/funding/grants/enhanced-mobility-seniors-individuals-disabilities-section-5310.

Safe Routes to School (SRTS) Program

SRTS enables and encourages children to walk and bike to school. The program helps make walking and bicycling to school a safe and more appealing method of transportation for children. SRTS facilitates the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. Most of the types of eligible SRTS projects include sidewalks or a shared-use path. However, intersection improvements (i.e. signalization, marking/upgrading crosswalks, etc.), on street bicycle facilities (bike lanes, wide paved shoulders, etc.) or off-street shared-use paths are also eligible for SRTS funds.

For more information: http://saferoutespartnership.org/healthy-communities/policy-change/federal/FAST-act-background-resources

OTHER FEDERAL FUNDING SOURCES

Federal Land and Water Conservation Fund

The Land and Water Conservation Fund (LWCF) provides grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction. The program is administered by the Department of Environment and Natural Resources as a grant program for states and local governments. Maximum annual grant awards for county governments, incorporated municipalities, public authorities, and federally recognized Indian tribes are $250,000. The local match may be provided with in-kind services or cash. For more information: http://www.ncparks.gov/About/grants/lwcf_main.php

Rivers, Trails, and Conservation Assistance Program

The Rivers, Trails, and Conservation Assistance Program (RTCA) is a National Parks Service (NPS) program providing technical assistance via direct NPS staff involvement to establish and restore greenways, rivers, trails, watersheds and open space. The RTCA program provides only for planning assistance—there are no implementation funds available. Projects are prioritized for assistance based on criteria including conserving significant community resources, fostering cooperation between agencies, serving a large number of users, encouraging public involvement in planning and implementation, and focusing on lasting accomplishments. This program may benefit trail development in North Carolina locales indirectly through technical assistance, particularly for community organizations, but is not a capital funding source. Annual application deadline is August 1st. For more information: http://www.nps.gov/ncrc/programs/rtca/ or contact the Southeast Region RTCA Program Manager Deirdre “Dee” Hewitt at (404) 507- 5691

Federal Lands Transportation Program (FLTP)

The FLTP funds projects that improve access within federal lands (including national forests, national parks, national wildlife refuges, national recreation areas, and other Federal public lands) on federally owned and maintained transportation facilities. More than $300 million per fiscal year has been allocated to the program for 2017 and 2018. For more information: https://flh.fhwa.dot.gov/programs/fltp/

Energy Efficiency and Conservation Block Grants

The Department of Energy’s Energy Efficiency and Conservation Block Grants (EECBG) may be used to reduce energy consumptions and fossil fuel emissions and for improvements in energy efficiency. Section 7 of the funding announcement states that these grants provide opportunities for the development and implementation of transportation programs to conserve energy used in transportation including development of infrastructure such as bike lanes and pathways

and pedestrian walkways. Although the current grant period has passed, more opportunities may arise in the future. For more information: https://www.energy.gov/eere/wipo/weatherization-and-intergovernmental-programs-office

TIGER Discretionary Grants

The U.S. Department of Transportation's (DOT) Transportation Investment Generating Economic Recovery (TIGER) discretionary grants are intended to fund capital investments in surface transportation infrastructure. The grant program focuses on "capital projects that generate economic development and improve access to reliable, safe, and affordable transportation for disconnected both urban and rural, while emphasizing improved connection to employment, education, services and other opportunities, workforce development, or community revitalization." Infrastructure improvement projects such as recreational trails and greenways with an emphasis on multi-modal transit qualify for this grant. Pre-Application deadlines are typically in May, with final application deadlines in June. For more information: https://www.transportation.gov/BUILDgrants

Economic Development Administration

Under Economic Development Administration's (EDA) Public Works and Economic Adjustment Assistance programs, grant applications are accepted for construction, non-construction, technical assistance, and revolving loan fund projects. "Grants and cooperative agreements made under these programs are designed to leverage existing regional assets and support the implementation of economic development strategies that advance new ideas and creative approaches to advance economic prosperity in distressed communities." Application deadlines are typically in March and June. For more information: https://www.eda.gov/funding-opportunities/

Environmental Solutions for Communities Grant Program

The National Fish and Wildlife Foundation (NFWF) and Wells Fargo seek to promote sustainable communities through Environmental Solutions for Communities by supporting highly-visible projects that link economic development and community well-being to the stewardship and health of the environment. Priority for grants to projects that successfully address one or more of the following:

- Support innovative, cost-effective programs that enhance stewardship on private agricultural lands to enhance water quality and quantity and/or improve wildlife habitat for species of concern, while maintaining or increasing agricultural productivity.
- Support community-based conservation projects that protect and restore local habitats and natural areas, enhance water quality, promote urban forestry, educate and train community leaders on sustainable practices, promote related job creation and training, and engage diverse partners and volunteers.
- Support visible and accessible demonstration projects that showcase innovative, cost-effective and environmentally-friendly approaches to improve environmental conditions within urban communities by 'greening' traditional infrastructure and public projects such as storm water management and flood control, public park enhancements, and renovations to public facilities.
- Support projects that increase the resiliency of the Nation's coastal communities and ecosystems by restoring coastal habitats, living resources, and water quality to enhance livelihoods and quality of life in these communities.
- In North Carolina, strong preference will be given to projects located in the regions of Charlotte, Raleigh, or Winston Salem.

For more information: https://www.nfwf.org/environmentalsolutions/Pages/home.aspx

STATE FUNDING SOURCES

There are multiple sources for state funding of bicycle and pedestrian transportation projects. However, beginning July 1, 2015, state transportation funds cannot be used to match federally-funded transportation projects, according to a law passed by the North Carolina Legislature.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) STRATEGIC TRANSPORTATION INVESTMENTS (STI)

Passed in 2013, the Strategic Transportation Investments law (STI) allows NCDOT to use its funding more efficiently and effectively to enhance the state's infrastructure, while supporting economic growth, job creation and a higher quality of life. This process encourages thinking from a statewide and regional perspective while also providing flexibility to address local needs.

STI also establishes the Strategic Mobility Formula, a new way of allocating available revenues based on data-driven scoring and local input. It was used for the first time to develop NCDOT's current construction schedule, the 2016-2025 State Transportation Improvement Program (STIP).

The STIP, which identifies the transportation projects that will receive funding during a 10-year period, is a state and federal requirement. Federal law requires it to be updated at least every four years. NCDOT, however, updates it every two years. Work is currently underway to update the STIPfor 2018-2027.

The new Strategic Mobility Formula funds projects in three categories: Division Needs, Regional Impact, and Statewide Mobility.All independent bicycle and pedestrian projects are placed in the "Division Needs" category, and are currently ranked based on 50% data (safety, access, demand, connectivity, and cost effectiveness) and 50% local input, with a breakdown as follows:

STI Revenue Distribution (Source: www.ncdot.gov/strategic-transportationinvestments)

Safety 15%

- Definition: Projects or improvements where bicycle or pedestrian accommodations are non-existent or inadequate for safety of users
- How it's measured: Crash history, posted speed limits, and estimated safety benefit
- Calculation:
  - Bicycle/pedestrian crashes along the corridor within last five years: 40% weight
  - Posted speed limits, with higher points for higher limits: 40% weight
  - Project safety benefit, measured by each specific improvement: 20% weight

Access 10%

- Definition: Destinations that draw or generate high volumes of bikes/pedestrians
- How it's measured: Type of and distance to destination

Demand 10%

- Definition: Projects serving large resident or employee user groups
- How its measured: # of households and employees per square mile within 1 ½ mile bicycle or ½ mile pedestrian facility + factor for unoccupied housing units (second homes)

Connectivity 10%

» Definition: Measure impact of project on reliability and quality of network
» How it's measured: Creates score per each Strategic Transportation Investments based on degree of bike/ped separation from roadway and connectivity to similar or better project type

Cost Effectiveness 5%

» Definition: Ratio of calculated user benefit divided by NCDOT project cost
» How it's measured: Safety + Demand + Access + Connectivity)/Estimated Project Cost to NCDOT

Local Input 50%

» Definition: Input from MPO/RPOs and NCDOT Divisions, which comes in the form points assigned to projects.
» How it is measured: Base points + points for population size. A given project is more likely to get funded if it is assigned base points from both the MPO/RPO and the Division, making the need for communicating the importance of projects to these groups critical. Further, projects that have a local match will score higher.

Additional bicycle and pedestrian project requirements:

» Federal funding typically requires a 20% non-federal match
» **State law prohibits state match for bicycle and pedestrian projects (except for Powell Bill). Since state law prohibits state monies from being the match for bicycle and pedestrian projects, the Town will need to supply the 20% match from other sources, such as the Town's own funds, matching grants, etc.**
» Limited number of project submittals per MPO/RPO/Division
» Minimum project cost requirement is $100,000
» Bike/Ped projects typically include: bicycle lanes, side path/greenway, paved shoulders, sidewalks, pedestrian signals, SRTS infrastructure projects, and other streetscape/multi-site improvements (such as median refuge, signage, etc.)

These rankings largely determine which projects will be included in NCDOT's State Transportation Improvement Program (STIP). The STIP is a federally mandated transportation planning document that details transportation planning improvements prioritized by the stakeholders for inclusion in NCDOT's Work Program over the next 10 years. "More than 900 non-highway construction projects were prioritized for years 2015-2020, totaling an estimated $9 billion. NCDOT will only have an estimated $1.5 billion to spend during this time period." The STIP is updated every 2 years. The STIP contains funding information for various transportation divisions of NCDOT, including, highways, rail, bicycle and pedestrian, public transportation and aviation.

For more information on STIP: https://www.ncdot.gov/initiatives-policies/Transportation/stip/Pages/default.aspx

To access the STIP: https://connect.ncdot.gov/projects/planning/Pages/State-Transportation-Improvement-Program.aspx

For more about the STI process: https://www.ncdot.gov/initiatives-policies/Transportation/stip/Pages/strategic-transportation-investments.aspx

INCIDENTAL PROJECTS

Bicycle and Pedestrian accommodations such as; bike lanes, wide paved shoulders, sidewalks, intersection improvements, bicycle and pedestrian safe bridge design, etc. are frequently included as "incidental" features of larger highway/roadway projects. This is increasingly common with the adoption of NCDOT's "Complete Streets" Policy.

In addition, bicycle safe drainage grates and handicapped accessible sidewalk ramps are now a standard feature of all NCDOT highway construction. Most pedestrian safety accommodations built by NCDOT are included as part of scheduled highway improvement projects funded with a combination of federal and state roadway construction funds, and usually with a local match. On-road bicycle accommodations, if warranted, typically do not require a local match.

"Incidental Projects" are often constructed as part of a larger transportation project, when they are justified by local plans that show these improvements as part of a larger, multi-modal transportation system. Having a local bicycle or pedestrian plan is important, because it allows NCDOT to identify where bike and pedestrian improvements are needed, and can be included as part of highway or street improvement project. It also helps local government identify what their priorities are and how they might be able to pay for these projects. Under "Complete Streets" local governments may be responsible for a portion of the costs for bicycle and pedestrian projects.

DUKE ENERGY WATER RESOURCES FUND

Duke Energy is investing $10 million in a fund for projects that benefit waterways in the Carolinas. The fund supports science-based, research-supported projects and programs that provide direct benefit to at least one of the following focus areas:

- Improve water quality, quantity and conservation;
- Enhance fish and wildlife habitats;
- Expand public use and access to waterways; and
- Increase citizens' awareness about their roles in protecting these resources.

Apex could consider this resource for its proposed creekside greenways. For more information: http://www.duke-energy.com/community/foundation/water-resources-fund.asp

CLEAN WATER MANAGEMENT TRUST FUND

The Clean Water Management Trust Fund is available to any state agency, local government, or non-profit whose primary purpose is the conservation, preservation, and restoration of North Carolina's environmental and natural resources. Grant assistance is provided to conservation projects that:

- enhance or restore degraded waters;
- protect unpolluted waters, and/or
- contribute toward a network of riparian buffers and greenways for environmental, educational, and recreational benefits;
- provide buffers around military bases to protect the military mission;
- acquire land that represents the ecological diversity of North Carolina; and
- acquire land that contributes to the development of a balanced State program of historic properties.

The application deadline is typically in February. For more information: http://www.cwmtf.net/#appmain.htm

SPOT SAFETY PROGRAM

The Spot Safety Program is a state funded public safety investment and improvement program that provides highly effective low cost safety improvements for intersections, and sections of North Carolina's 79,000 miles of state maintained roads in all 100 counties of North Carolina. The Spot Safety Program is used to develop smaller improvement projects to address safety, potential safety, and operational issues. The program is funded with state funds and currently receives approximately $9 million per state fiscal year. Other monetary sources (such as Small Construction or Contingency funds) can assist in funding Spot Safety projects, however, the maximum allowable contribution of Spot Safety funds per project is $250,000.

The Spot Safety Program targets hazardous locations for expedited low cost safety improvements such as traffic signals, turn lanes, improved shoulders, intersection upgrades, positive guidance enhancements (rumble strips, improved channelization, raised pavement markers, long life highly visible pavement markings), improved warning and regulatory signing, roadside safety improvements, school safety improvements, and safety appurtenances (like guardrail and crash attenuators).

A Safety Oversight Committee (SOC) reviews and recommends Spot Safety projects to the Board of Transportation (BOT) for approval and funding. Criteria used by the SOC to select projects for recommendation to the BOT include, but are not limited to, the frequency of correctable crashes, severity of crashes, delay, congestion, number of signal warrants met, effect on pedestrians and schools, division and region priorities, and public interest. For more information: https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx

POWELL BILL FUNDS

Annually, State street-aid allocations (Powell Bill Funds) are made to incorporated municipalities which establish their eligibility and qualify as provided by G.S. 136-41.1 through 136-41.4. Powell Bill funds shall be expended only for the purposes of maintaining, repairing, constructing, reconstructing or widening of local streets that are the responsibility of the municipalities or for planning, construction, and maintenance of bikeways or sidewalks along public streets and highways. Beginning July 1, 2015 under the Strategic Transportation Investments initiative, Powell Bill funds may no longer be used to provide a match for federal transportation funds such as Transportation Alternatives. Certified Statement, street listing, add/delete sheet and certified map from all municipalities are due between July 1st and July 21st of each year. Additional documentation is due shortly after. More information: https://connect.ncdot.gov/municipalities/State-Street-Aid/Pages/default.aspx

HIGHWAY HAZARD ELIMINATION PROGRAM

The Hazard Elimination Program is used to develop larger improvement projects to address safety and potential safety issues. The program is funded with 90 percent federal funds and 10 percent state funds. The cost of Hazard Elimination Program projects typically ranges between $400,000 and $1 million. A Safety Oversight Committee (SOC) reviews and recommends Hazard Elimination projects to the Board of Transportation (BOT) for approval and funding. These projects are prioritized for funding according to a safety benefit to cost (B/C) ratio, with the safety benefit being based on crash reduction. Once approved and funded by the BOT, these projects become part of the department's State Transportation Improvement Program (STIP). For more information: https://connect.ncdot.gov/resources/safety/Pages/NC-Highway-Safety-Program-and-Projects.aspx

GOVERNOR'S HIGHWAY SAFETY PROGRAM

The Governor's Highway Safety Program (GHSP) funds safety improvement projects on state highways throughout North Carolina. All funding is performance-based. Substantial progress in reducing crashes, injuries, and fatalities is required as a condition of continued funding. This funding source is considered to be "seed money" to get programs started. The grantee is expected to provide a portion of the project costs and is expected to continue the program after GHSP funding ends. State Highway Applicants must use the web-based grant system to submit applications. For more information: http://www.ncdot.org/programs/ghsp/

EAT SMART, MOVE MORE NORTH CAROLINA COMMUNITY GRANTS

The Eat Smart, Move More (ESMM) NC Community Grants program provides funding to local communities to support their efforts to develop community-based interventions that encourage, promote, and facilitate physical activity. The current focus of the funds is for projects addressing youth physical activity. Funds have been used to construct trails and conduct educational programs. For more information: http://www.eatsmartmovemorenc.com/Funding/Funding.html

THE NORTH CAROLINA DIVISION OF PARKS AND RECREATION – RECREATIONAL TRAILS AND ADOPT-A-TRAIL GRANTS

The North Carolina Division of Parks and Recreation and the State Trails Program offer funds to help citizens, organizations and agencies plan, develop and manage all types of trails ranging from greenways and trails for hiking, biking, and horseback riding to river trails and off-highway vehicle trails. "The Adopt-a-Trail Grant Program (AAT) awards $108,000 annually to government agencies, nonprofit organizations and private trail groups for trail projects. The Recreational Trails Program (RTP) is a $1.3 million grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. Grant applicants must be able to contribute 20% of the project cost or in-kind contributions. Both grant applications are typically due in January or February. For more information: https://www.ncparks.gov/more-about-us/grants/trail-grants

NC PARKS AND RECREATION TRUST FUND (PARTF)

The Parks and Recreation Trust Fund (PARTF) provide dollar-for-dollar matching grants to local governments for parks and recreational projects to serve the general public. Counties, incorporated municipalities, and public authorities, as defined by G.S. 159-7, are eligible applicants. A local government can request a maximum of $500,000 with each application. An applicant must match the grant dollar-for-dollar, 50 percent of the total cost of the project, and may contribute more than 50 percent. The appraised value of land to be donated to the applicant can be used as part of the match. The value of in-kind services, such as volunteer work, cannot be used as part of the match. Grant applications are typically due in February. For more information: https://www.ncparks.gov/more-about-us/parks-recreation-trust-fund/parks-and-recreation-trust-fund

The Town of Apex has received two PARTF grants in the past, one for land acquisition in 2003, and another for the Beaver Creek Greenway in 2007.

COMMUNITY DEVELOPMENT BLOCK GRANT FUNDS

Community Development Block Grant (CDBG) funds are available to local municipal or county governments that qualify for projects to enhance the viability of communities by providing decent housing and suitable living environments and by expanding economic opportunities, principally for persons of low and moderate income. State CDBG funds are provided by the U.S. Department of Housing and Urban Development (HUD) to the state of North Carolina. All North Carolina small cities are eligible to apply for funds except for 23 entitlement cities that receive funds directly from the U.S. Department of Housing and Urban Development (HUD) (Apex does not receive direct funds, so it is eligible to apply). Each year, CDBG provides funding to local governments for hundreds of critically-needed community improvement projects throughout the state. More information: https://www.nccommerce.com/ruraldevelopment/state-cdbg/grant-categories

CLEAN WATER MANAGEMENT TRUST FUND (CWMTF)

This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection, eligible for application by a state agency, local government, or non-profit. At the end of each year, a minimum of $30 million is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies, and conservation non-profits to help finance projects that specifically address water pollution problems. Funds may be used for planning and land acquisition to establish a network of riparian buffers and greenways for environmental, educational, and recreational benefits. Deadlines are typically in February. For more information: http://www.cwmtf.net/#appmain.htm

SAFE ROUTES TO SCHOOL (SRTS)

SRTS is managed by NCDOT, but is federally funded; See Federal Funding Sources above for more information.

URBAN AND COMMUNITY FORESTRY GRANT

The North Carolina Division of Forest Resources Urban and Community Forestry grant can provide funding for a variety of projects that will help toward planning and establishing street trees as well as trees for urban open space. The goal is to improve public understanding of the benefits of preserving existing tree cover in communities and assist local governments with projects which will lead to a more effective and efficient management of urban and community forests. Grant requests should range between $1,000 and $15,000 and must be matched equally with non-federal funds. Grant funds may be awarded to any unit of local or state government, public educational institutions, approved non-profit 501(c)(3) organizations, and other tax-exempt organizations. First time municipal applicant and municipalities seeking Tree City USA status are given priority for funding. Grant applications are due by March 31 at 5:00 pm and recipients are notified by mid-July each year.

For more about Tree City USA status, including application instructions, visit: https://www.ncforestservice.gov/Urban/urban_grant_program.htm

LOCAL GOVERNMENT FUNDING SOURCES

Municipalities often plan for the funding of pedestrian and bicycle facilities or improvements through development of Capital Improvement Program (CIP) or occasionally, through their annual Operating Budgets. In Raleigh, for example, the greenways system has been developed over many years through a dedicated source of annual funding that has ranged from $100,000 to $500,000, administered through the Recreation and Parks Department. CIPs should include all types of capital improvements (water, sewer, buildings, streets, etc.) versus programs for single purposes. This allows municipal decision-makers to balance all capital needs. Typical capital funding mechanisms include the capital reserve fund, capital protection ordinances, municipal service district, tax increment financing, taxes, fees, and bonds. Each category is described below. A variety of possible funding options available to North Carolina jurisdictions for implementing pedestrian and bicycle projects are also described below. However, many will require specific local action as a means of establishing a program, if not already in place.

CAPITAL RESERVE FUND

Municipalities have statutory authority to create capital reserve funds for any capital purpose, including pedestrian facilities. The reserve fund must be created through ordinance or resolution that states the purpose of the fund, the duration of the fund, the approximate amount of the fund, and the source of revenue for the fund. Sources of revenue can include general fund allocations, fund balance allocations, grants, and donations for the specified use.

CAPITAL PROJECT ORDINANCES

Municipalities can pass Capital Project Ordinances that are project specific. The ordinance identifies and makes appropriations for the project.

LOCAL IMPROVEMENT DISTRICT (LID)

Local Improvement Districts (LIDs) are most often used by cities to construct localized projects such as streets, sidewalks, or bikeways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as traffic trip generation.

MUNICIPAL SERVICE DISTRICT

Municipalities have statutory authority to establish municipal service districts, to levy a property tax in the district additional to the town-wide property tax, and to use the proceeds to provide services in the district. Downtown revitalization projects are one of the eligible uses of service districts, and can include projects such as street, sidewalk, or bikeway improvements within the downtown taxing district.

TAX INCREMENT FINANCING

Project Development Financing bonds, also known as Tax Increment Financing (TIF) is a relatively new tool in North Carolina, allowing localities to use future gains in taxes to finance the current improvements that will create those gains. When a public project (e.g., sidewalk improvements) is constructed, surrounding property values generally increase and encourage surrounding development or redevelopment. The increased tax revenues are then dedicated to finance the debt created by the original public improvement project. Streets, streetscapes, and sidewalk improvements are specifically authorized for TIF funding in North Carolina. Tax Increment Financing typically occurs within designated development financing districts that meet certain economic criteria that are approved by a local governing body. TIF funds are generally spent inside the boundaries of the TIF district, but they can also be spent outside the district if necessary to encourage development within it. Although larger cities use this type of financing more often, Woodfin, NC is an example of another small town that has used this type of financing.

OTHER LOCAL FUNDING OPTIONS

- Bonds/Loans
- Taxes
- Impact fees
- Exactions
- Installment purchase financing
- In-lieu fees
- Partnerships

PRIVATE AND NON-PROFIT FUNDING SOURCES

Many communities have solicited funding assistance from private foundations and other conservation-minded benefactors. Below are several examples of private funding opportunities available.

UNION BANK

Union Bank is a community bank serving the north central North Carolina region with a location in Apex. Union Bank strives to make the communities it serves better by providing strong financial and customer service. With its strong commitment to the communities it serves, Union Bank is involved in a variety of different local projects.

LAND FOR TOMORROW CAMPAIGN

Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals, and community groups committed to securing support from the public and General Assembly for protecting land, water, and historic places. The campaign was successful in 2013 in asking the North Carolina General Assembly to continue to support conservation efforts in the state. The state budget bill includes about $50 million in funds for key conservation efforts in North Carolina. Land for Tomorrow works to enable North Carolina to reach a goal of ensuring that working farms and forests, sanctuaries for wildlife, land bordering streams, parks, and greenways, land that helps strengthen communities and promotes job growth, and historic downtowns and neighborhoods will be there to enhance the quality of life for generations to come. For more information: http://www.land4tomorrow.org/

THE ROBERT WOOD JOHNSON FOUNDATION

The Robert Wood Johnson Foundation was established as a national philanthropy in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans.

Grant making is concentrated in four areas:

- To ensure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

Projects considered for funding typically are innovative and aim to create meaningful, transformative change. Project examples include: service demonstrations; gathering and monitoring of health-related statistics; public education; training and fellowship programs; policy analysis; health services research; technical assistance; communications activities; and evaluations. For more specific information about what types of projects are funded and how to apply, visit http://www.rwjf.org/en/how-we-work/grants/what-we-fund.html

NORTH CAROLINA COMMUNITY FOUNDATION

The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for non-profit organizations and institutions throughout the state. Based in Raleigh, the foundation also manages a number of community affiliates throughout North Carolina, that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. The foundation also manages various scholarship programs statewide. For more information: http://nccommunityfoundation.org/

RITE AID FOUNDATION GRANTS

The Rite Aid Foundation is a foundation that supports projects that promote health and wellness in the communities that Rite Aid serves. Award amounts vary and grants are awarded on a one year basis to communities in which Rite Aid operates. The Rite Aid Foundation focuses on three core areas for charitable giving: children's health and well-being; special community health and wellness needs; and Ride Aid's own community of associates during times of special need. Online resource: https://www.riteaid.com/about-us/rite-aid-foundation

Z. SMITH REYNOLDS FOUNDATION

This Winston-Salem-based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. The Foundation focuses its grant making on five focus areas: Community Economic Development; Environment; Public Education; Social Justice and Equity; and Strengthening Democracy. Deadline to apply is typically in August. For more information: www.zsr.org

BANK OF AMERICA CHARITABLE FOUNDATION, INC.

The Bank of America Charitable Foundation is one of the largest in the nation. There are numerous different initiatives and grant programs, yet the ones most relevant to increased recreational opportunities and trails are the Revitalizing Neighborhoods and Environment Programs. Starting in 2013, a new 10-year, $50 billion goal to be a catalyst for climate change was launched. This initiative aims to spark the "innovation economy and advance a transition to a low-carbon future." For more information: www.bankofamerica.com/foundation

DUKE ENERGY FOUNDATION

Funded by Duke Energy shareholders, this non-profit organization makes charitable grants to selected non-profits or governmental subdivisions. Each annual grant must have:

- An internal Duke Energy business "sponsor"
- A clear business reason for making the contribution

The grant program has several investment priorities: Education; Environment; Economic and Workforce Development; and Community Impact and Cultural Enrichment. Related to this project, the Foundation would support programs that support conservation, training, and research around environmental and energy efficiency initiatives. For more information: http://www.duke-energy.com/community/foundation.asp

AMERICAN GREENWAYS EASTMAN KODAK AWARDS

The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants ($250 to $2,000) to stimulate the planning, design, and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying land,

holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, and building trails. Grants cannot be used for academic research, institutional support, lobbying, or political activities. For more information: http://www.rlch.org/funding/kodak-american-greenways-grants

NATIONAL TRAILS FUND

American Hiking Society created the National Trails Fund in 1998, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. 73 million people enjoy foot trails annually, yet many of our favorite trails need major repairs due to a $200 million backlog of badly needed maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. To date, American Hiking has granted more than $588,000 to 192 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project.

Projects the American Hiking Society will consider include:

- Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements.
- Building and maintaining trails which will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage.
- Constituency building surrounding specific trail projects - including volunteer recruitment and support.

For more information: http://www.americanhiking.org/national-trails-fund/

THE CONSERVATION ALLIANCE

The Conservation Alliance is a non-profit organization of outdoor businesses whose collective annual membership dues support grassroots citizen-action groups and their efforts to protect wild and natural areas. Grants are typically about $35,000 each. Since its inception in 1989, The Conservation Alliance has contributed $4,775,059 to environmental groups across the nation, saving over 34 million acres of wild lands.

The Conservation Alliance Funding Criteria:

- The Project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation.
- The Alliance does not look for mainstream education or scientific research projects, but rather for active campaigns.
- All projects should be quantifiable, with specific goals, objectives, and action plans and should include a measure for evaluating success.
- The project should have a good chance for closure or significant measurable results over a fairly short term (within four years).

For more information: http://www.conservation-alliance.com/grants

THE JOHN REX ENDOWMENT

The John Rex Endowment sees environmental, policy, and systems approaches as necessary to achieve long-term, sustainable changes that support healthy weight in children. Learn about their goal to improve policies and implement changes to the built environment that increase children's access to healthy foods and active living opportunities in Wake County municipalities: http://www.rexendowment.org/what-we-fund/funding-areas/healthy-weight

NATIONAL FISH AND WILDLIFE FOUNDATION (NFWF)

The National Fish and Wildlife Foundation (NFWF) is a private, non-profit, tax exempt organization chartered by Congress in 1984. The National Fish and Wildlife Foundation sustains, restores, and enhances the Nation's fish, wildlife, plants, and habitats. Through leadership conservation investments with public and private partners, the Foundation is dedicated to achieving maximum conservation impact by developing and applying best practices and innovative methods for measurable outcomes.

The Foundation provides grants through more than 70 diverse conservation grant programs. A few of the most relevant programs for bicycle and pedestrian projects include Acres for America, Conservation Partners Program, and Environmental Solutions for Communities. Funding priorities include bird, fish, marine/coastal, and wildlife and habitat conservation. Other projects that are considered include controlling invasive species, enhancing delivery of ecosystem services in agricultural systems, minimizing the impact on wildlife of emerging energy sources, and developing future conservation leaders and professionals.

For more information: http://www.nfwf.org/whatwedo/grants/Pages/home.aspx

THE TRUST FOR PUBLIC LAND

Land conservation is central to the mission of the Trust for Public Land (TPL). Founded in 1972, the TPL is the only national non-profit working exclusively to protect land for human enjoyment and well-being. TPL helps acquire land and transfer it to public agencies, land trusts, or other groups that have intentions to conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities.

For more information: http://www.tpl.org

BLUE CROSS BLUE SHIELD OF NORTH CAROLINA FOUNDATION (BCBS)

Blue Cross Blue Shield (BCBS) focuses on programs that use an outcome approach to improve the health and well-being of residents. Healthy Places grant concentrates on increased physical activity and active play through support of improved build environment such as sidewalks, and safe places to bike. Eligible grant applicants must be located in North Carolina, be able to provide recent tax forms and, depending on the size of the non-profit, provide an audit. For more information: http://www.bcbsncfoundation.org/

ALLIANCE FOR BIKING & WALKING: ADVOCACY ADVANCE GRANTS

Bicycle and pedestrian advocacy organizations play the most important role in improving and increasing biking and walking in local communities. Rapid Response Grants enable state and local bicycle and pedestrian advocacy organizations to develop, transform, and provide innovative strategies in their communities. Since 2011, Rapid Response grant recipients have won $100 million in public funding for biking and walking. The Advocacy Advance Partnership with the League of American Bicyclists also provides necessary technical assistance, coaching, and training to supplement the grants. For more information, visit www.peoplepoweredmovement.org

LOCAL TRAIL SPONSORS

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Types of gifts other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

CORPORATE DONATIONS

Corporate donations are often received in the form of liquid investments (i.e. cash, stock, bonds) and in the form of land. Municipalities typically create funds to facilitate and simplify a transaction from a corporation's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented.

PRIVATE INDIVIDUAL DONATIONS

Private individual donations can come in the form of liquid investments (i.e. cash, stock, bonds) or land. Municipalities typically create funds to facilitate and simplify a transaction from an individual's donation to the given municipality. Donations are mainly received when a widely supported capital improvement program is implemented.

FUNDRAISING/CAMPAIGN DRIVES

Organizations and individuals can participate in a fundraiser or a campaign drive. It is essential to market the purpose of a fundraiser to rally support and financial backing. Often times fundraising satisfies the need for public awareness, public education, and financial support.

VOLUNTEER WORK

It is expected that many citizens will be excited about the development of a greenway corridor. Individual volunteers from the community can be brought together with groups of volunteers form church groups, civic groups, scout troops and environmental groups to work on greenway development on special community workdays. Volunteers can also be used for fund-raising, maintenance, and programming needs.

INNOVATIVE FUNDING OPTIONS

Crowdsourcing "is the process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional employees or suppliers." For some success stories and ideas for innovative fundraising techniques: http://www.americantrails.org/resources/funding/TipsFund.html

An example crowdsourcing tool used locally with some success is "ioby", which offers the ability to organize different forms of capital—cash, social networks, in-kind donations, volunteers, advocacy: https://www.ioby.org/about

BICYCLE/TRAIL PARTNERSHIP CASE STUDIES IN THE CAROLINAS

Apex may be able to partner with the private sector for funding or sponsorship for some aspects of this plan. Some examples of trail partnerships in the Carolinas are provided below.

WILMINGTON/NEW HANOVER COUNTY & BLUE CROSS BLUE SHIELD (BCBS)

BCBSNC and their GO NC! program donated funds to complete the final phase of the 15-mile Gary Shell CrossCity Trail from Wade Park to the drawbridge at Wrightsville Beach. In addition to completing the trail, other enhancements include mile markers along the 15-mile trail and five bicycle fix-it stations along the trail. This partnership came about during development of the WMPO's Wilmington/New Hanover County Comprehensive Greenway Plan in 2012. http://www.bcbsnc.com/content/campaigns/gonc/index.htm

SPARTANBURG, SC & THE MARY BLACK FOUNDATION

The Mary Black Foundation Rail Trail was a collaboration between the Mary Black Foundation, Palmetto Conservation Foundation, City of Spartanburg, Partners for Active Living, SPATS, and local citizens. It extends from downtown Spartanburg at Henry Street, between Union and Pine Streets, and continues 2 miles to Country Club Road. Since its inception there has been buzz about redeveloping the Rail Trail corridor. The commuter and recreational trail brings together all walks of life, and connects neighborhoods, businesses, restaurants, a school, a bike shop, the YMCA, a grocery store, and a skate park. As the Hub City Connector segment of

the Palmetto Trail through Spartanburg County, the Rail Trail is an outdoor transportation spine for Spartanburg from which other projects are expected to spin off. One great example is the first phase of B-cycle bicycle-sharing program located at the Henry Street trailhead. Project contact: Lisa Bollinger, Spartanburg Area Transportation Study, Spartanburg, SC.

SWAMP RABBIT TRAIL AND GREENVILLE HEALTH SYSTEM, GREENVILLE, SC

The Greenville Health System Swamp Rabbit Trail is a shared-use-path that runs along the Reedy River through Greenville County, connecting parks, schools, and local businesses. The GHS Swamp Rabbit has become very popular among residents and visitors for recreational and transportation purposes. The Greenville Heath System has become a private sponsor because of the health benefits offered by the trail as well as the branding opportunity achieved by having its name and logo on the trail's signs. The GHS Swamp Rabbit Trail continues to increase in size and popularity, with communities in neighboring counties making plans to extend the trail into their towns. Project contact: Ty Houck, Greenville County Parks, Recreation and Tourism, Taylors, SC.

COST ESTIMATES

Most of the project cut-sheets show a planning level cost estimate. The total is featured on the cut-sheet, whereas a more in-depth estimate for each sheet is included in this appendix. Portions of certain projects, like some of the proposed bike lanes on Olive Chapel Rd, are not included in the cost estimate, since those sections of bike lanes would be added during the reconstruction and widening of the roadway. Other key considerations for these costs are noted below:

- The estimates are not based on engineering design, and are for planning purposes only. Costs will likely change as more information becomes available in the design phase.
- Costs are based on 2017/2018 unit prices; inflation not included.
- Each project estimate includes a built-in 30% construction contingency.
- Engineering design costs are included as 30% of total construction costs. Higher ranges will be encountered on projects utilizing federal funds that require a high level of regulatory compliance and on projects that impact FEMA regulated floodways that require detailed flood modeling and permitting. Small projects will also see higher percentages for design cost.
- Costs exclude special landscaping, lighting, and green infrastructure.

alta ENGINEERING
NC License #P-1301

PLANNING ESTIMATE

APEX BICYCLE PLAN

LOCATION: **PROJECT #1: BEAVER CREEK GREENWAY FROM DOWNTOWN APEX TO THE AMERICAN TOBACCO TRAIL (ATT)**

DESCRIPTION: **800 LF 10' ASPHALT TRAIL (KELLY RD PARK CONNECTION). INCLUDES (1) PEDESTRIAN BRIDGE CROSSING.**

4,200 LF TRAIL FOR APEX NATURE PARK CONNECTION. ASSUMES 50% LENGTH AS BOARDWALK, 50% LENGTH AS ASPHALT. INCLUDES (4) PEDESTRIAN BRIDGES.

CURB)

2,400 LF SHARED LANE MARKINGS (ALONG S SALEM ST FROM W CHATHAM ST TO E WILLIAMS ST, UPCHURCH ST FROM W WILLIAMS ST TO CORRENNA ST), and 600 LF OF WAYFINDING SIGNAGE FROM BEXLEY HILLS BEND FROM APEX PEAKWAY TO BEAVER CREEK GREENWAY).

TOTAL LENGTH:	**1.5 MILES**
EST. PROJECT COST:*	**$3,230,000**

*INCLUDING DESIGN FEES AND RIGHT-OF-WAY ACQUISITION

COUNTY: WAKE DIVISION: 5

ITEM NO. LINE. NO.	ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
			ROADWAY ITEMS				
0001	0000100000-N	800	MOBILIZATION	1	LS	$187,000.00	$187,000.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	1	LS	$18,700.00	$18,700.00
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	1	LS	$42,000.00	$42,000.00
0004	0022000000-E	225	UNCLASSIFIED EXCAVATION	2,430	CY	$50.00	$121,500.00
0005	1011000000-N	500	FINE GRADING	1	LS	$35,000.00	$35,000.00
0006	1121000000-E	520	AGGREGATE BASE COURSE	1,480	TON	$55.00	$81,400.00
0007	1275000000-E	600	PRIME COAT	1,320	GAL	$6.00	$7,920.00
0008	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	440	TON	$95.00	$41,800.00
0009	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	30	TON	$650.00	$19,500.00
0010	4025000000-E		CONTR FURN, ***SIGN (E)	54	SF	$20.00	$1,080.00
0011	4102000000-N	904	SIGN ERECTION, TYPE E	6	EA	$100.00	$600.00
0012	4399000000-N	1105	TEMPORARY TRAFFIC CONTROL	1	LS	$35,600.00	$35,600.00
0013	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	24	EA	$150.00	$3,600.00
0014	4915000000-E	1264	7' U-CHANNEL POSTS	6	EA	$100.00	$600.00
0015	6084000000-E	1660	SEEDING & MULCHING	1.5	ACR	$2,500.00	$3,750.00
0016			RECTANGULAR RAPID FLASHING BEACON (PER CROSSING)	0	EA	$10,000.00	$0.00
0017			10' BOARDWALK	2,100	LF	$500.00	$1,050,000.00
0018			PEDESTRIAN BRIDGE	150	LF	$2,000.00	$300,000.00
0019			DRAINAGE ALLOWANCE	1	LS	$32,000.00	$32,000.00
0020			EROSION CONTROL ALLOWANCE	1	LS	$38,000.00	$38,000.00
0021			MINOR ITEMS (5%)	1	LS	$91,000.00	$91,000.00

CONSTRUCTION COST SUBTOTAL	$2,111,000.00
CONSTRUCTION CONTINGENCY (30%)	$633,300.00
OPINION OF PROBABLE CONSTRUCTION COST	$2,744,300.00
ENGINEERING DESIGN (15%)	$412,000.00
RIGHT-OF-WAY ACQUISITION (@ APPROX. 60K PER ACRES)	$65,000.00
OPINION OF TOTAL PROJECT COST	**$3,221,300.00**

NOTE: ESTIMATE IS NOT BASED ON AN ENGINEERING DESIGN, AND IS FOR PLANNING PURPOSES ONLY.
BASED ON 2017/2018 UNIT PRICES, INFLATION NOT INCLUDED.
EXCLUDES SPECIAL LANDSCAPING, LIGHTING, AND GREEN INFRASTRUCTURE.

COMPUTED BY CJA
DATE 11/8/2018

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PLANNING ESTIMATE

APEX BICYCLE PLAN

LOCATION: **PROJECT #2: SALEM ST/OLD US 1 BIKE LANES AND SHARED LANES, FROM DOWNTOWN APEX TO PLEASANT PARK**

DESCRIPTION: **5,650 LF SHARED LANE MARKINGS AND SPEED LIMIT REDUCTION ALONG SALEM STREET FROM DOWNTOWN APEX TO APEX PEAKWAY.**
800 LF RESTRIPING OVER 540 OVERPASS FOR BIKE LANES, AND INSTALLATION OF 275 LF SIDEWALK ON ONE SIDE.
(EXCLUDES PORTION OF S SALEM ST PLANNED FOR ROADWAY WIDENING)

TOTAL LENGTH:	**1.2 MILES**
EST. PROJECT COST:*	**$70,000**

*INCLUDING DESIGN FEES AND RIGHT-OF-WAY ACQUISITION

COUNTY: WAKE

DIVISION: 5

ITEM NO.			ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
LINE. NO.	DESC. NO.	SECT. NO.					
			ROADWAY ITEMS				
0001	0000100000-N	800	MOBILIZATION	1	LS	$2,800.00	$2,800.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	1	LS	$2,500.00	$2,500.00
0001	2591000000-E	848	4" CONCRETE SIDEWALK	153	SY	$35.00	$5,347.22
0013	4025000000-E		CONTR FURN, ***SIGN (E)	198	SF	$20.00	$3,960.00
0014	4102000000-N	904	SIGN ERECTION, TYPE E	22	EA	$100.00	$2,200.00
0012	4399000000-N	1105	TEMPORARY TRAFFIC CONTROL	1	LS	$10,000.00	$10,000.00
0005	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	1,600	LF	$0.50	$800.00
0001	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	3,200	LF	$0.60	$1,920.00
0016	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	46	EA	$150.00	$6,900.00
0017	4915000000-E	1264	7' U-CHANNEL POSTS	22	EA	$100.00	$2,200.00
0014			DRAINAGE ALLOWANCE	1	LS	$0.00	$0.00
0015			EROSION CONTROL ALLOWANCE	1	LS	$2,000.00	$2,000.00
0016			MINOR ITEMS (5%)	1	LS	$2,000.00	$2,000.00

CONSTRUCTION COST SUBTOTAL	$43,000.00
CONSTRUCTION CONTINGENCY (30%)	$12,900.00
OPINION OF PROBABLE CONSTRUCTION COST	$55,900.00
ENGINEERING DESIGN (20%)	$11,000.00
RIGHT-OF-WAY ACQUISITION (@ APPROX. 75K PER ACRES)	$0.00
OPINION OF TOTAL PROJECT COST	**$66,900.00**

NOTE: ESTIMATE IS NOT BASED ON AN ENGINEERING DESIGN, AND IS FOR PLANNING PURPOSES ONLY.
BASED ON 2017/2018 UNIT PRICES, INFLATION NOT INCLUDED.
EXCLUDES SPECIAL LANDSCAPING, LIGHTING, AND GREEN INFRASTRUCTURE.
ASSUMES BIKE LANES, CURB AND DRAINAGE FROM APEX PEAKWAY TO PLEASANT PARK CONSTRUCTED WITH PLANNED SALEM ST ROADWAY WIDENING UNDER SEPARATE PROJECT (COST EXCLUDED FROM THIS ESTIMATE)

COMPUTED BY CJA
DATE 11/8/2018

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PLANNING ESTIMATE

APEX BICYCLE PLAN

LOCATION: **PROJECT #3: OLIVE CHAPEL RD BIKE LANES, FROM NC 55 TO NEW HILLL OLIVE CHAPEL RD**

DESCRIPTION: **1,600 LF BIKE LANES, INCLUDING RESTRIPING OF FULL ROADWAY, ALONG OLIVE CHAPEL RD FROM W. WILLIAMS ST TO APEX PEAKWAY.**
(EXCLUDES BIKE LANE SEGMENT FROM APEX PEAKWAY TO RICHARDSON RD PLANNED WITH FUTURE ROADWAY WIDENING).

TOTAL LENGTH:	**0.3 MILES**
EST. PROJECT COST:*	**$64,000**

*INCLUDING DESIGN FEES AND RIGHT-OF-WAY ACQUISITION

COUNTY: WAKE

DIVISION: 5

ITEM NO.			ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
LINE. NO.	DESC. NO.	SECT. NO.					
			ROADWAY ITEMS				
0001	0000100000-N	800	MOBILIZATION	1	LS	$3,100.00	$3,100.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	1	LS	$2,500.00	$2,500.00
0003	4025000000-E		CONTR FURN, ***SIGN (E)	18	SF	$20.00	$360.00
0004	4102000000-N	904	SIGN ERECTION, TYPE E	2	EA	$100.00	$200.00
0005	4399000000-N	1105	TEMPORARY TRAFFIC CONTROL	1	LS	$3,100.00	$3,100.00
0006	4686000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)	6,950	LF	$1.30	$9,035.00
0007	4688000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (6", 90 MILS)	3,200	LF	$2.30	$7,360.00
0008	4710000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)	80	LF	$11.00	$880.00
0009	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	27	EA	$150.00	$4,050.00
0010	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	6,950	LF	$1.00	$6,950.00
0011	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	21	EA	$50.00	$1,050.00
0012	4915000000-E	1264	7' U-CHANNEL POSTS	2	EA	$100.00	$200.00

CONSTRUCTION COST SUBTOTAL	$39,000.00
CONSTRUCTION CONTINGENCY (30%)	$11,700.00
OPINION OF PROBABLE CONSTRUCTION COST	$50,700.00
ENGINEERING DESIGN (25%)	$13,000.00
RIGHT-OF-WAY ACQUISITION (@ APPROX. 60K PER ACRES)	$0.00
OPINION OF TOTAL PROJECT COST	**$63,700.00**

NOTE: ESTIMATE IS NOT BASED ON AN ENGINEERING DESIGN, AND IS FOR PLANNING PURPOSES ONLY.
BASED ON 2017/2018 UNIT PRICES, INFLATION NOT INCLUDED.

COMPUTED BY CJA
DATE 11/8/2018

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PLANNING ESTIMATE

APEX BICYCLE PLAN

LOCATION: **PROJECT #4: HUNTER ST SHARROWS, FROM APEX PEAKWAY TO WILLIAMS ST/NC 55**

DESCRIPTION: **6,320 LF SHARED LANE MARKINGS) ALONG HUNTER ST FROM APEX PEAKWAY TO WILLIAMS ST / NC 55, WITH 1,440 LF RESTRIPING OF ANGLE PARKING STALLS FOR BACK-IN ONLY FROM LAURA DUNCAN RD TO GROVE ST.**

TOTAL LENGTH:	**1.2 MILES**
EST. PROJECT COST:*	**$51,000**

*INCLUDING DESIGN FEES AND RIGHT-OF-WAY ACQUISITION

COUNTY: WAKE

DIVISION: 5

ITEM NO.			ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
LINE. NO.	DESC. NO.	SECT. NO.					
			ROADWAY ITEMS				
0001	0000100000-N	800	MOBILIZATION	1	LS	$2,400.00	$2,400.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	1	LS	$2,500.00	$2,500.00
0003	4025000000-E		CONTR FURN, ***SIGN (E)	342	SF	$20.00	$6,840.00
0004	4102000000-N	904	SIGN ERECTION, TYPE E	38	EA	$100.00	$3,800.00
0005	4399000000-N	1105	TEMPORARY TRAFFIC CONTROL	1	LS	$2,400.00	$2,400.00
0006	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	1,680	LF	$1.20	$2,016.00
0009	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	39	EA	$150.00	$5,850.00
0010	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	1,680	LF	$1.00	$1,680.00
0012	4915000000-E	1264	7' U-CHANNEL POSTS	38	EA	$100.00	$3,800.00

CONSTRUCTION COST SUBTOTAL	$31,000.00
CONSTRUCTION CONTINGENCY (30%)	$9,300.00
OPINION OF PROBABLE CONSTRUCTION COST	$40,300.00
ENGINEERING DESIGN (25%)	$10,000.00
RIGHT-OF-WAY ACQUISITION (@ APPROX. 60K PER ACRES)	$0.00
OPINION OF TOTAL PROJECT COST	**$50,300.00**

NOTE: ESTIMATE IS NOT BASED ON AN ENGINEERING DESIGN, AND IS FOR PLANNING PURPOSES ONLY.
BASED ON 2017/2018 UNIT PRICES, INFLATION NOT INCLUDED.

COMPUTED BY CJA
DATE 11/8/2018

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NC License #P-1301

PLANNING ESTIMATE

APEX BICYCLE PLAN

PROJECT #5: APEX PEAKWAY (NORTH) SIDEPATH, FROM CENTER ST TO BEAVER CREEK GREENWAY

LOCATION:

DESCRIPTION: **14,780 LF 10' WIDE ASPHALT SIDE PATH ALONG APEX PEAKWAY FROM OLD TEN TEN RD TO APEX JAYCEE PARK. CURB AND DRAINAGE ALREADY INSTALLED**

TOTAL LENGTH:	**2.8 MILES**
EST. PROJECT COST:*	**$2,600,000**

*INCLUDING DESIGN FEES AND RIGHT-OF-WAY ACQUISITION

COUNTY: WAKE

DIVISION: 5

ITEM NO.			ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
LINE. NO.	DESC. NO.	SECT. NO.					
			ROADWAY ITEMS				
0001	0000100000-N	800	MOBILIZATION	1	LS	$152,300.00	$152,300.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	1	LS	$15,300.00	$15,300.00
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	1	LS	$95,200.00	$95,200.00
0004	0022000000-E	225	UNCLASSIFIED EXCAVATION	8,220	CY	$50.00	$411,000.00
0005	1011000000-N	500	FINE GRADING	1	LS	$82,150.00	$82,150.00
0006	1121000000-E	520	AGGREGATE BASE COURSE	6,100	TON	$55.00	$335,500.00
0007	1275000000-E	600	PRIME COAT	5,750	GAL	$6.00	$34,500.00
0008	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	1,870	TON	$95.00	$177,650.00
0009	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	115	TON	$650.00	$74,750.00
0010	2605000000-N	848	CONCRETE CURB RAMP	70	EA	$2,000.00	$140,000.00
0011	4399000000-N	1105	TEMPORARY TRAFFIC CONTROL	1	LS	$29,000.00	$29,000.00
0012	6084000000-E	1660	SEEDING & MULCHING	3.4	ACR	$2,500.00	$8,500.00
0013			EROSION CONTROL ALLOWANCE	1	LS	$89,000.00	$89,000.00
0014			MINOR ITEMS (5%)	1	LS	$74,000.00	$74,000.00

CONSTRUCTION COST SUBTOTAL	$1,719,000.00
CONSTRUCTION CONTINGENCY (30%)	$515,700.00
OPINION OF PROBABLE CONSTRUCTION COST	$2,234,700.00
ENGINEERING DESIGN (15%)	$335,000.00
RIGHT-OF-WAY ACQUISITION (@ APPROX. 60K PER ACRES)	$0.00
OPINION OF TOTAL PROJECT COST	**$2,569,700.00**

NOTE: ESTIMATE IS NOT BASED ON AN ENGINEERING DESIGN, AND IS FOR PLANNING PURPOSES ONLY.
BASED ON 2017/2018 UNIT PRICES, INFLATION NOT INCLUDED.
EXCLUDES SPECIAL LANDSCAPING, LIGHTING, AND GREEN INFRASTRUCTURE.
FOR SIDE PATH CONSTRUCTION ONLY. ASSUMES ROAD OVERPASS WILL UTILIZE SHARED LANE MARKINGS, AND NO WIDENING WILL BE PROPOSED.

COMPUTED BY CJA

DATE 11/8/2018

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PLANNING ESTIMATE

APEX BICYCLE PLAN

LOCATION: **PROJECT #6: DAVIS DR/N SALEM ST SIDEPATH & SHARROWS FROM APEX/CARY LIMITS TO DOWNTOWN APEX**

DESCRIPTION:

1,800 LF 10' WIDE ASPHALT PATH FROM HOWELL RD TO EXISTING GREENWAY, AND THROUGH THE SALEM MIDDLE SCHOOL PROPERTY.

4,700 LF 10' WIDE ASPHALT SIDE PATH ALONG DAVIS DR FROM SALEM POND PARK TO APEX PEAKWAY. INCLUDES 3,140 LF REQUIRING NEW CURB AND DRAINAGE.

3,700 LF SHARED LANE MARKING ALONG DAVIS DR FROM APEX PEAKWAY TO DOWNTOWN APEX.

EXCLUDES PEDESTRIAN HAWK OR OTHER SIGNAL CROSSING AT THALES ACADEMY (REQUIRES FURTHER EVALUATION OF NEED)

TOTAL LENGTH:	**1.9 MILES**
EST. PROJECT COST:*	**$1,600,000**

*INCLUDING DESIGN FEES AND RIGHT-OF-WAY ACQUISITION

COUNTY: WAKE

DIVISION: 5

ITEM NO.			ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
LINE. NO.	DESC. NO.	SECT. NO.					
			ROADWAY ITEMS				
0001	0000100000-N	800	MOBILIZATION	1	LS	$91,000.00	$91,000.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	1	LS	$9,100.00	$9,100.00
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	1	LS	$47,600.00	$47,600.00
0004	0022000000-E	225	UNCLASSIFIED EXCAVATION	3,950	CY	$50.00	$197,500.00
0005	1011000000-N	500	FINE GRADING	1	LS	$46,150.00	$46,150.00
0006	1121000000-E	520	AGGREGATE BASE COURSE	2,820	TON	$55.00	$155,100.00
0007	1275000000-E	600	PRIME COAT	2,530	GAL	$6.00	$15,180.00
0008	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	830	TON	$95.00	$78,850.00
0009	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	50	TON	$650.00	$32,500.00
0010	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	3,140	LF	$25.00	$78,500.00
0011	2605000000-N	848	CONCRETE CURB RAMP	18	EA	$2,000.00	$36,000.00
0012	4025000000-E		CONTR FURN, ***SIGN (E)	126	SF	$20.00	$2,520.00
0013	4102000000-N	904	SIGN ERECTION, TYPE E	14	EA	$100.00	$1,400.00
0014	4399000000-N	1105	TEMPORARY TRAFFIC CONTROL	1	LS	$17,400.00	$17,400.00
0013	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	30	EA	$150.00	$4,500.00
0014	4915000000-E	1264	7' U-CHANNEL POSTS	14	EA	$100.00	$1,400.00
0015	6084000000-E	1660	SEEDING & MULCHING	2.0	ACR	$2,500.00	$5,000.00
0016			DRAINAGE ALLOWANCE	1	LS	$113,000.00	$113,000.00
0017			EROSION CONTROL ALLOWANCE	1	LS	$50,000.00	$50,000.00
0018			MINOR ITEMS (5%)	1	LS	$44,000.00	$44,000.00

CONSTRUCTION COST SUBTOTAL	$1,027,000.00
CONSTRUCTION CONTINGENCY (30%)	$308,100.00
OPINION OF PROBABLE CONSTRUCTION COST	$1,335,100.00
ENGINEERING DESIGN (15%)	$200,000.00
RIGHT-OF-WAY ACQUISITION (@ APPROX. 60K PER ACRES)	$63,000.00
OPINION OF TOTAL PROJECT COST	**$1,598,100.00**

NOTE: ESTIMATE IS NOT BASED ON AN ENGINEERING DESIGN, AND IS FOR PLANNING PURPOSES ONLY.
BASED ON 2017/2018 UNIT PRICES, INFLATION NOT INCLUDED.
EXCLUDES SPECIAL LANDSCAPING, LIGHTING, AND GREEN INFRASTRUCTURE.

COMPUTED BY CJA
DATE 11/8/2018

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PLANNING ESTIMATE

APEX BICYCLE PLAN

LOCATION: **PROJECT #7: LAURA DUNCAN RD SIDEPATH, FROM APEX HIGH SCHOOL AT US 64 TO DOWNTOWN APEX AT CENTER ST**

DESCRIPTION: **5,050 LF 10' WIDE ASPHALT SIDE PATH, INCLUDING 1,600 LF OF NEW CURB AND DRAINAGE, ALONG LAURA DUNCAN RD FROM US 64 TO APEX PEAKWAY.**

1,450 LF SHARED LANE MARKINGS ALONG LAURA DUNCAN RD FROM APEX PEAKWAY TO HUNTER STREET.

TOTAL LENGTH:	**1.2 MILES**
EST. PROJECT COST:*	**$910,000**

*INCLUDING DESIGN FEES AND RIGHT-OF-WAY ACQUISITION

COUNTY: WAKE

DIVISION: 5

ITEM NO.			ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
LINE. NO.	DESC. NO.	SECT. NO.					
			ROADWAY ITEMS				
0001	0000100000-N	800	MOBILIZATION	1	LS	$53,200.00	$53,200.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	1	LS	$5,400.00	$5,400.00
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	1	LS	$23,800.00	$23,800.00
0004	0022000000-E	225	UNCLASSIFIED EXCAVATION	1,880	CY	$50.00	$94,000.00
0005	1011000000-N	500	FINE GRADING	1	LS	$11,250.00	$11,250.00
0006	1121000000-E	520	AGGREGATE BASE COURSE	2,190	TON	$55.00	$120,450.00
0007	1275000000-E	600	PRIME COAT	1,960	GAL	$6.00	$11,760.00
0008	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	640	TON	$95.00	$60,800.00
0009	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	40	TON	$650.00	$26,000.00
0010	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	1,600	LF	$25.00	$40,000.00
0011	2605000000-N	848	CONCRETE CURB RAMP	16	EA	$2,000.00	$32,000.00
0012	4025000000-E		CONTR FURN, ***SIGN (E)	72	SF	$20.00	$1,440.00
0013	4102000000-N	904	SIGN ERECTION, TYPE E	8	EA	$100.00	$800.00
0014	4399000000-N	1105	TEMPORARY TRAFFIC CONTROL	1	LS	$10,200.00	$10,200.00
0015	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	12	EA	$150.00	$1,800.00
0016	4915000000-E	1264	7' U-CHANNEL POSTS	8	EA	$100.00	$800.00
0017	6084000000-E	1660	SEEDING & MULCHING	0.5	ACR	$2,500.00	$1,250.00
0018			DRAINAGE ALLOWANCE	1	LS	$48,000.00	$48,000.00
0019			EROSION CONTROL ALLOWANCE	1	LS	$31,000.00	$31,000.00
0020			MINOR ITEMS (5%)	1	LS	$26,000.00	$26,000.00

CONSTRUCTION COST SUBTOTAL	$600,000.00
CONSTRUCTION CONTINGENCY (30%)	$180,000.00
OPINION OF PROBABLE CONSTRUCTION COST	$780,000.00
ENGINEERING DESIGN (15%)	$117,000.00
RIGHT-OF-WAY ACQUISITION (@ APPROX. 60K PER ACRES)	$8,000.00
OPINION OF TOTAL PROJECT COST	**$905,000.00**

NOTE: ESTIMATE IS NOT BASED ON AN ENGINEERING DESIGN, AND IS FOR PLANNING PURPOSES ONLY.
BASED ON 2017/2018 UNIT PRICES, INFLATION NOT INCLUDED.
EXCLUDES SPECIAL LANDSCAPING, LIGHTING, AND GREEN INFRASTRUCTURE.

COMPUTED BY CJA
DATE 11/8/2018

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NC License #P-1301

PLANNING ESTIMATE

APEX BICYCLE PLAN

LOCATION: **PROJECT #8: APEX PEAKWAY (SOUTH) SIDEPATH, FROM BEAVER CREEK GREENWAY TO CENTER ST**

DESCRIPTION: **16,000 LF OF SIDE PATH ALONG APEX PEAKWAY FROM APEX JAYCEE PARK TO E WILLIAMS ST, CONNECT TO AND ALONG SEAGRAM ST, ALONG MARKHAM ST, ALONG JAMES ST, AND ALONG SCHIEFFELIN RD TO CENTER ST INCLUDES 3,200 LF OF NEW CURB AND DRAINAGE.**

TOTAL LENGTH:	**3.0 MILES**
EST. PROJECT COST:*	**$2,900,000**

*INCLUDING DESIGN FEES AND RIGHT-OF-WAY ACQUISITION

COUNTY: WAKE DIVISION: 5

ITEM NO. LINE. NO.	ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
			ROADWAY ITEMS				
0001	0000100000-N	800	MOBILIZATION	1	LS	$167,300.00	$167,300.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	1	LS	$16,800.00	$16,800.00
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	1	LS	$75,600.00	$75,600.00
0004	0022000000-E	225	UNCLASSIFIED EXCAVATION	6,140	CY	$50.00	$307,000.00
0005	1011000000-N	500	FINE GRADING	1	LS	$39,300.00	$39,300.00
0006	1121000000-E	520	AGGREGATE BASE COURSE	6,700	TON	$55.00	$368,500.00
0007	1275000000-E	600	PRIME COAT	6,230	GAL	$6.00	$37,380.00
0008	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	2,030	TON	$95.00	$192,850.00
0009	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	125	TON	$650.00	$81,250.00
0010	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	3,225	LF	$25.00	$80,625.00
0011	2605000000-N	848	CONCRETE CURB RAMP	56	EA	$2,000.00	$112,000.00
0012	4399000000-N	1105	TEMPORARY TRAFFIC CONTROL	1	LS	$31,900.00	$31,900.00
0013	6084000000-E	1660	SEEDING & MULCHING	1.7	ACR	$2,500.00	$4,250.00
0014			UTILITY POLE RELOCATION	4	EA	$10,000.00	$40,000.00
0015			PEDESTRIAN BRIDGE	30	LF	$2,000.00	$60,000.00
0016			DRAINAGE ALLOWANCE	1	LS	$96,000.00	$96,000.00
0017			EROSION CONTROL ALLOWANCE	1	LS	$97,000.00	$97,000.00
0018			MINOR ITEMS (5%)	1	LS	$81,000.00	$81,000.00

CONSTRUCTION COST SUBTOTAL	$1,889,000.00
CONSTRUCTION CONTINGENCY (30%)	$566,700.00
OPINION OF PROBABLE CONSTRUCTION COST	$2,455,700.00
ENGINEERING DESIGN (15%)	$368,000.00
RIGHT-OF-WAY ACQUISITION (@ APPROX. 60K PER ACRES)	$29,000.00
OPINION OF TOTAL PROJECT COST	**$2,852,700.00**

NOTE: ESTIMATE IS NOT BASED ON AN ENGINEERING DESIGN, AND IS FOR PLANNING PURPOSES ONLY.
BASED ON 2017/2018 UNIT PRICES, INFLATION NOT INCLUDED.
EXCLUDES SPECIAL LANDSCAPING, LIGHTING, AND GREEN INFRASTRUCTURE.
ASSUMES FUTURE ROADWAY NOT CONSTRUCTED/EXPANDED. FOR SIDE PATH CONSTRUCTION ONLY.

COMPUTED BY CJA
DATE 11/8/2018

MEETING SUMMARIES

This appendix includes summaries of the main meetings that took place as part of this planing process, including:

- **November 2017:** Advance Apex Bicycle & Pedestrian Focus Group Meeting (Committee Meeting #1)
- **February 2018:** Committee Meeting #2
- **May 2018:** Public Workshop #1
- **June 2018:** Committee Meeting #3
- **August 2018:** Public Workshop #2
- **October 2018:** Committee Meeting #4

MEETING SUMMARIES
AVAILABLE UPON REQUEST

BIKE APEX

Prepared for the Town of Apex & NCDOT
Prepared by Alta Planning + Design

2019