TOWN OF CHAPEL HILL
MOBILITY AND CONNECTIVITY PLAN

OCTOBER 2017
Updated October 2020

STEWART

TOWN OF CHAPEL HILL

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Special thanks to those involved in the making of the Mobility and Connectivity Plan for the Town of Chapel Hill, North Carolina. These individuals and organizations include but are not limited to:

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Chapel Hill Transit
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Executive Summary

The Chapel Hill Mobility and Connectivity Plan expands the vision for the transportation and recreation system in Chapel Hill, NC as it relates to transit and non-motorized travel. It identifies the next phase of priorities for making bicycle and pedestrian connections within Chapel Hill and to key destinations in Orange County and the greater Triangle area. This effort combines existing planning efforts, resident input, and a fresh look at issues and opportunities. It focuses on leveraging the Town's growing greenway system with an updated design toolkit for on-street networks to create safe and comfortable corridors that link neighborhoods, parks, employment centers, business districts, transit stops, and other destinations.

This plan presents a toolbox of pedestrian, shared-use, and bicycle facility types and their consideration for use in Chapel Hill's transportation network. It examines the feasibility of these facilities, incorporates them into a comprehensive network and develops an implementation strategy for the future. The resulting network is aimed at increasing the combined bicycle, pedestrian, and transit modeshare. It serves as a guide for town staff, stakeholders, and the public interested in the pursuit of creating (1) an integrated transportation system with (2) improved comfort and (3) convenient choices for all citizens and visitors of Chapel Hill, NC. For simplification, the Chapel Hill Mobility and Connectivity Plan is hereinafter referred to as the Mobility Plan.

goal

The goal of the Mobility Plan is to achieve a 35% bicycling, walking, and transit commute combined modeshare in Chapel Hill by 2025.

This plan builds on the vision and previous planning efforts with a fresh look at safely getting pedestrians and cyclists to key places in town.

The Mobility Plan extends existing planning work by building on outcomes and recommendations from the 2013 Chapel Hill Greenways Master Plan, the 2014 Chapel Hill Bike Plan, and the 2020 Comprehensive Plan (2012). It integrates bicycle and pedestrian access to transit and considers how to build on recommendations from recent planning efforts. In addition, this plan gives a fresh look at pedestrian-specific mobility, identifying ways to get people of all ages and abilities to key destinations in the town.

23% → 27%

Meeting the 35% goal by 2025 is in line with 4% increase in bike/ped/transit modeshare from 2011 to 2015.

Mobility on Major Street Corridors

The Chapel Hill 2020 Plan calls for "a comprehensive transportation system that provides everyone safe and reasonable access to all that the community offers." Five street corridors—Martin Luther King Jr. Boulevard, E Franklin Street, US 15-501/Fordham Boulevard, US 15/501 South, and Raleigh Road—facilitate most of the Town's existing auto travel, but none of those corridors are "Complete Streets" that provide better accommodations for pedestrians, cyclists, and transit users.

The five main street corridors all have four lanes or more of traffic and typically lack continuous pedestrian and bike facilities. Each corridor has gaps in the existing network that must be filled in order to achieve Complete Streets. The Mobility Plan recommends short-term improvements to help fill those gaps, to establish bike facilities with some separation from traffic, and to create safe crossing options at major intersections. Long-term recommendations include major road widenings in conjunction with the implementation of bus rapid transit on Martin Luther King Jr. Blvd and US 15-501 South, US 15-501/Fordham Blvd.

Bicycle improvements in the corridors include multi-use paths, buffered bicycle lanes, bike boxes, two-stage left-turn queue boxes, green pavement markings, marked bike lanes through intersections, and improved detection at signals.


Bus Rapid Transit
Multi-Use Paths
Lane Reallocation
Buffered Bike Lanes/
Bike Lanes
MARTIN LUTHER KING JR DR
US 15-501
E FRANKLIN ST
FORDHAM BLVD
US 15-501
RALEIGH RD
HWY 54
FORDHAM BLVD
US 15-501 - NC HWY 54
Multi-Use Path /CycleTrack
Intersection Improvements
Regional Greenway Connection

Developing Priority Non-Motorized Corridors

Presently, the Town of Chapel Hill lacks a comprehensive network for non-motorized transportation. Now is the opportune time to knit together the Town's numerous greenways, multi-use paths, neighborhood sidewalks, and bikeways to create a network of priority pedestrian and bicycle corridors that serve as a parallel system to on-street facilities. The six priority bike/ped corridors shown below link the key focus areas of the town and will aim to attract users of all ages and abilities who seek alternatives to driving but want to stay away from major street corridors and their traffic. By connecting neighborhoods to destinations, residents will be able to use local street and trail connections to access these priority corridors and travel to the places they live, shop, work, and play.

Other Major Recommendations

New Facilities and Types

- Utilize **on-street greenway connectors** to link greenway trails through priority corridors.
- Construct new **grade-separated crossings** at key locations to facilitate connectivity across busy roadways.
- Require and identify opportunities for **paved connectors/paths** to neighborhoods.
- Develop greenway and multiuse **connections to the regional greenway system** to link Chapel Hill to the extensive network across Triangle.

Programs and Policies

- **Update Sidewalk Priority Ranking criteria** to account for priority corridors, focus areas, and constructability.
- Implement and fund a **sidewalk microgap program** in Town annual capital budget.
- Develop and fund a **bike parking program** to encourage installation of bike racks at existing developments where demand is high.
- Increase **bike parking requirements for transit** stations and stops.
- Investigate regional coordination opportunities with potential implementation of a Town bike share program.

Culture and Mindset

- Develop **mobility performance measures & annual reporting** to track progress on bike/ped mobility and connectivity.
- Establish a **continuous bike/ped count program** to track cycling and pedestrian usage of facilities.
- Become an **affiliate community of National Association of City Transportation Officials (NACTO)** to help with the development of urban street, bike, and transit design standards.
- Employ a **mobility coordinator** to focus on the coordination between bicycle, pedestrian, greenway, and transit accessibility issues.
- Create a **wayfinding and signage** package to raise awareness of routes and orient people to destinations
- **Support and expand 'Active Routes to School' programming** to make walking and biking to schools safer and increase the number of children who do.

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The four objectives established for Chapel Hill's Mobility Plan are to integrate the system, remove barriers, reduce stress, and offer attractive transportation choices.

Introduction

Vision, Objectives and Goal

The vision and objectives of the plan guided the technical planning and selection of recommendations. These objectives were set based on the recognition that to achieve overall mobility goals, Chapel Hill needs to grow and integrate the multi-modal infrastructure that it has with an eye toward the future using the best tools available.

Through policies, prioritization and implementation, the Mobility Plan lays the groundwork for building out Chapel Hill's non-motorized transportation system in a way that achieves the plan's vision and objectives.

The plan uses the current 27% combined ped/bike/transit mode share as a starting point to track progress over time through a set of defined performance measures.

Integrate System

Expand and link walking, bicycling, and shared-use networks, and enhance connections to transit.

Reduce Stress

Create an environment where people of all ages and abilities feel safe and independently mobile.

Remove Barriers

Improve crossings between networks and to destinations, and integrate land use development.

Offer Attractive Choices

Foster options that are comfortable, affordable and efficient for residents and visitors.

Vision and Objectives for Chapel Hill Mobility Plan based on Public Input

Comprehensive Inputs to the 2017 Chapel Hill Mobility Plan

Biking and Walking Benefits

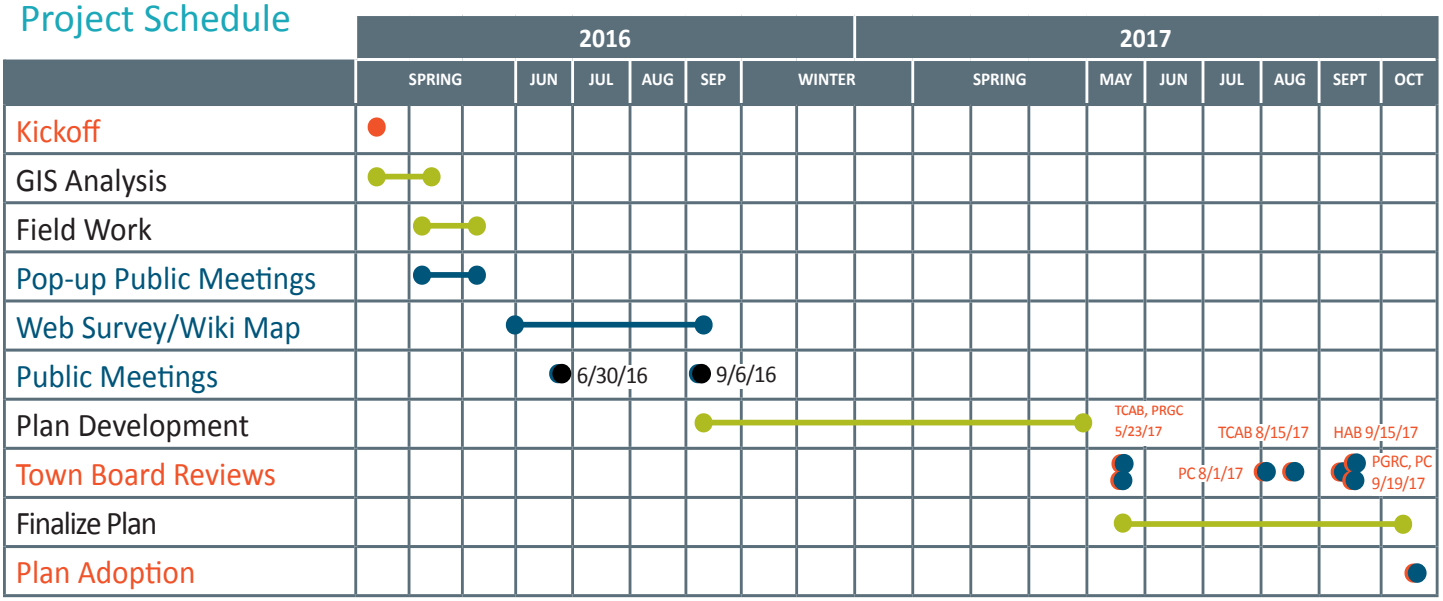
Biking and walking interest is growing because these modes provide distinct economic, health, and environmental benefits to people and communities. Active transportation options and facilities can:

- Attract and retain residents, including families who want accessible, fun, friendly activities, and Millennials who are increasingly choosing not to drive.
- Save people money by providing less expensive options to driving
- Offer people flexibility and consistency, since walking and bicycling often have more reliable travel time than driving.
- Lure businesses who are interested in attracting a skilled workforce that is drawn to bikeable, walkable, and amenity rich areas. Many major businesses are choosing areas with more transportation choices than suburban office parks.
- Provide physical activity opportunities for North Carolinians, where more than 65% of the population is overweight or obese.
- Give people access to places where they can be active near their homes.
- Ensure youth have a wide range of options for physical activity so that they may perform better on tasks that demand concentration and avoid childhood obesity.
- Decrease the amount of emissions in urban areas, especially for short trips.

Developing the Mobility Plan

The Town of Chapel Hill maintains an ongoing goal to improve infrastructure for bicyclists and pedestrians. Development of the Mobility Plan focused on this goal through the 18-month plan process. The team evaluated the existing plans, policies, and programs to develop an overarching and binding set of recommendations that are not specific to any one mode, but a comprehensive approach to promoting improved mobility throughout the community.

Project Schedule



Plan Process

The Mobility Plan builds on the existing Town Bike and Greenway Plans to develop a true multimodal network and increase the use of alternate transportation modes. The initial phases of the project involved data collection through both researching existing plans and budgets as well as field work. Those efforts, highlighted in the Existing Conditions chapter, were supplemented by public involvement efforts where residents were able to help identify mobility needs and issues they experience in the everyday lives. Planners then used the facility data and public input to evaluate the existing ped/bike network to identify key corridors and network gaps.

That analysis led to a series of recommendations for both physical improvements and policy changes throughout Chapel Hill and a plan of action to implement those recommendations in the near- and long-term future. With successful implementation, the Town should continue to see increases in non-motorized and transit trips as its neighborhoods, businesses, and institutions become better connected for pedestrians and cyclists.

Public Outreach Methods

The Mobility Plan process offered many opportunities for citizens to provide input and to inform the recommendations. Activities conducted during the study creatively connected with the community and attempted to help gain input from a broader cross-section of the residents.

Steering Committee - Initially, the Town convened a Steering Committee with representatives from UNC, various Town departments, NCDOT, GoTriangle, Town of Carrboro, City of Durham, & DCHC MPO to help inform and review the findings on the plan. After an initial kick-off meeting, the group's duties were transitioned to the Town's Transportation and Connectivity Advisory Board. The TCAB reviewed the project's progress and recommendation throughout the process.

Pop-Up Outreach - The project team developed three pop-up public involvement opportunities to go Chapel Hill residents to get survey input in locations where they typically travel.

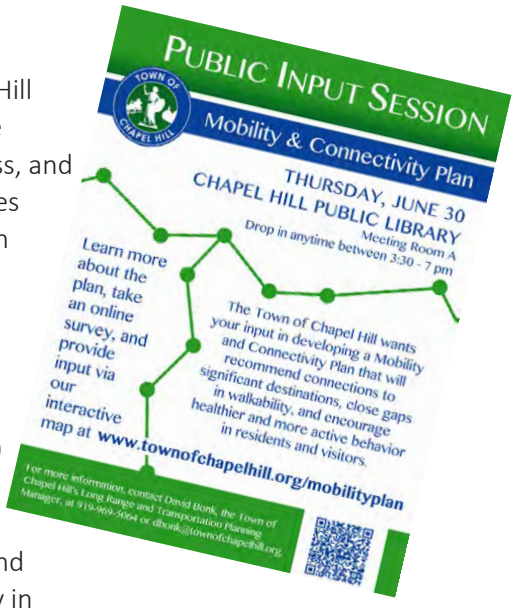
- Tuesday, June 21, 2016- Active outreach at Plaza 140 to collect survey input
- Wednesday, June 22, 2016 - Team rides various transit routes throughout the day in Chapel Hill to collect survey input; followed by event at Performance Bike
- Thursday, June 23, 2016- Active outreach at East Gate Shopping Center and Chapel Hill Main Library to collect survey input
- Friday August 26th, 2016- Active outreach at Cyclicious event at UNC-Chapel Hill

Public Outreach Methods

Bicycling enthusiasts at the Cyclicious event at UNC-Chapel Hill

In-Person Surveys and Pop Up Events

These outreach activities expanded the reach of the Mobility Plan to get input from people where they were.



Public Open Houses - Two public open houses were held at the Chapel Hill Public Library. The drop-in style open houses had a variety of interactive boards and a presentation to introduce residents to the planning process, and get feedback on the following: vision and goals of the plan; current issues with bicycling, walking, and access to transit; and voting on prioritization of projects. Both open houses also took open-ended feedback for consideration in the plan.

- Thursday, June 30, 2016- Drop-in session between 3:30 and 7:00 PM at the Chapel Hill Public Library: **39 attendees**
- Tuesday, September 6, 2016- Drop-in session between 4 and 7:00 PM at the Chapel Hill Public Library: **43 attendees**

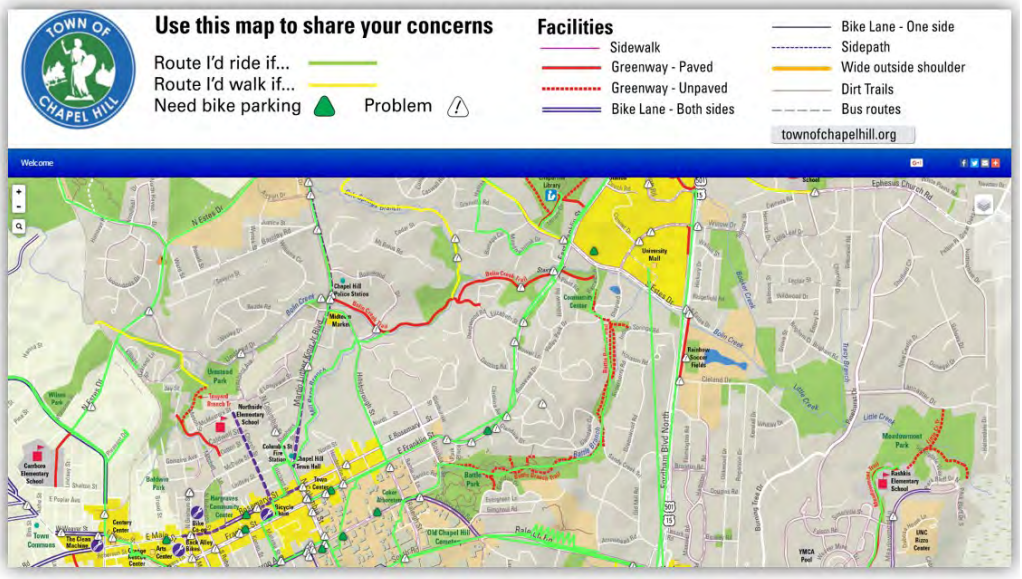
Comments and inputs based on existing conditions and opportunities and project prioritization were worked into the public involvement summary in Chapter 4 and **Appendix A**.

Survey - With guidance from Town staff, the project team developed a survey intended to gain insights from a variety of users about current pedestrian, cycling, and transit destinations; connectivity issues; and suggestions for improvements. The survey was open from mid-June until mid-September 2016.

Commute Modeshare

Setting Goals for Future Modeshift to Bicycling, Walking and Taking Transit.

Map-Based Online Input - The Town of Chapel Hill used an online tool called WikiMaps to complement to the survey. This tool allowed community members to provide visual, map-based input about desired walking and bicycling corridors and network problem areas, as well as comments about various subjects such as transit stops, intersections, maintenance, and destinations currently difficult or impossible to access using alternative modes of transportation.



Wiki-Mapping
Citizens input concerns, identified locations and indicated desired routes using an online map tool.

Map-based reporting for bicycle and pedestrian issues in the Town was available to citizens online throughout the public input period for the Mobility Plan

Summary of Public Involvement Activities

Pop-Up Outreach

Three targeted pop-up events to get survey input in locations where residents travel – Chapel Hill Transit, Eastgate Shopping Center, and UNC Chapel Hill

Public Open Houses

Two public open houses at Chapel Hill Public Library with opportunities to evaluate existing conditions and prioritize projects.

Survey

Question emphasis on pedestrian mobility, walkability, and accessibility to address pedestrian planning inputs. Questions also targeted specifically at Ephesus Fordham District.

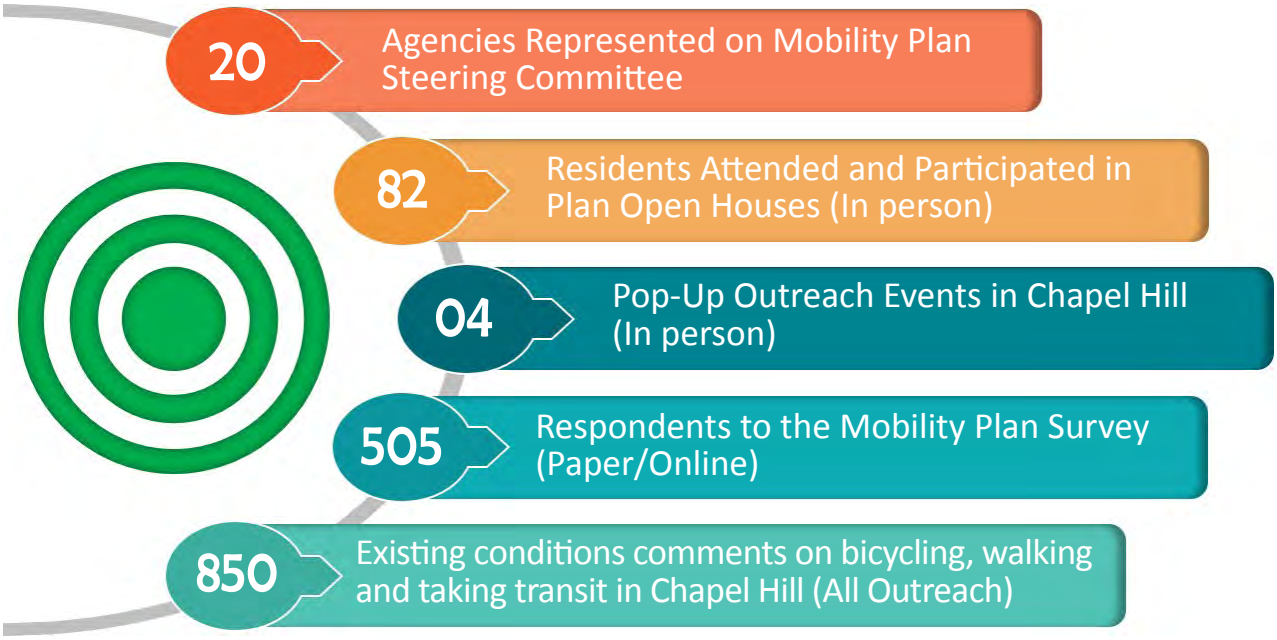
Steering Committee

Kick off meeting and updates given to steering committee throughout the project. Committee assisted with outreach on Public Input.

Wiki-Mapping

Visual online map-based input on town-wide bicycle, pedestrian, and transit mobility issues.

Opportunities for stakeholder and public input to provide guidance to Chapel Hill Mobility Plan



Breakdown of the key inputs to the Mobility Plan

Evaluating Existing Conditions

Demographics

Community Growth

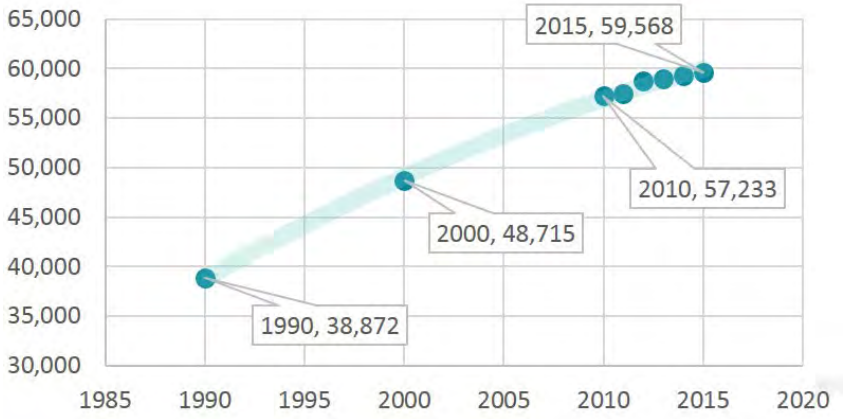
The Town of Chapel Hill's population, like that of the entire Triangle region, continues to grow, increasing by more than 50% over the 25-year period from 1990 to 2015. Orange County's population is expected to increase by 13% between the 2010 and 2020 Censuses, while its neighboring counties to the east are all expected to grow by 20% in the same period.

While its population is growing, the Town limits are not. Chapel Hill's "Urban Services Boundary" is comprised of 20.9 square miles where water, sewer, and other municipal services are provided. A Rural Buffer exists on the edges of Chapel Hill and Carrboro to maintain rural character and low-density uses without urban services outside of the towns. Most of the land in Chapel Hill is already developed or spoken for so community growth in Chapel Hill will occur primarily in the redevelopment of existing areas.

Preparing for Community Growth

Planning for and managing growth will be prominent issues for our community, and region. In order to adapt to and embrace these changes and the growth that is predicted, the Town needs to plan for transportation now and into the future.

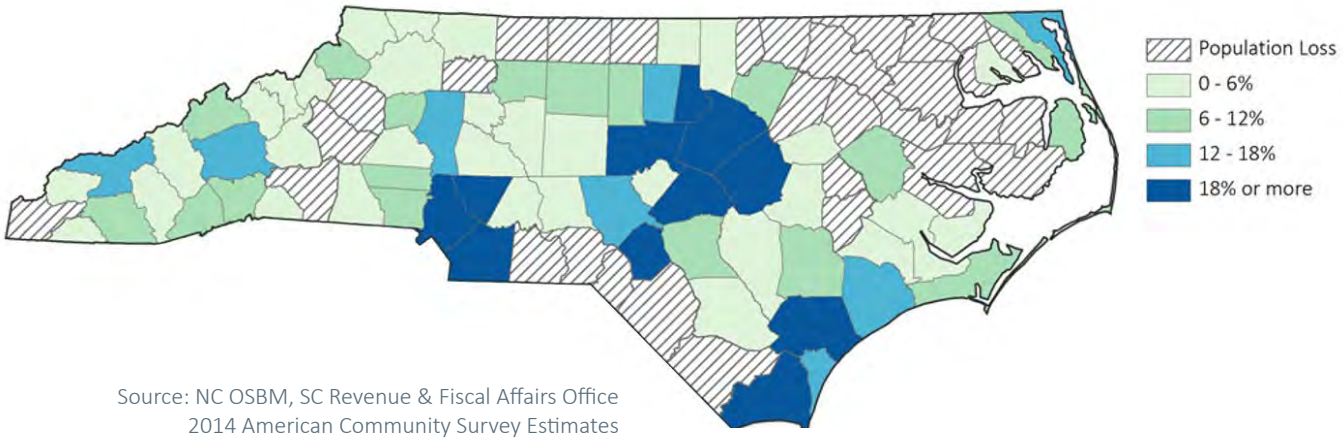
Population Growth - Chapel Hill, NC



Source: US Census Bureau, Census Data

Population Growth Areas in North Carolina

Projected growth and losses in population, 2010-2020



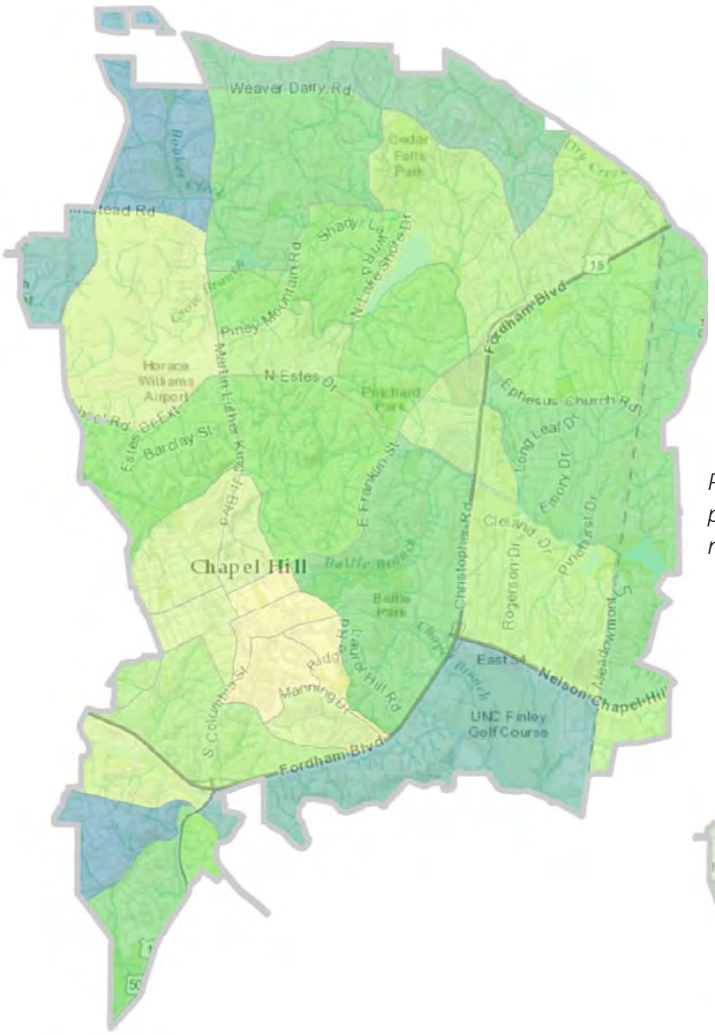
Source: NC OSBM, SC Revenue & Fiscal Affairs Office
2014 American Community Survey Estimates

Populations with Needs or Preferences for Bicycling and Walking

Census data can help planners identify areas where there may be a need or desire for transportation alternatives. Areas where a large number of households have low rates of vehicle ownership and lower incomes may need more transit service to link residents to jobs and services, as well as bike and pedestrian connections to transit.

2014 American Community survey data shows the following trends in Chapel Hill and may predict where some residents will most benefit from improvements to bicycling and walking mobility.

- A greater percentage of households with lower incomes, zero vehicle ownership, and non-family status are found in the central part of Chapel Hill adjacent to UNC. This pattern is typical for areas with both multifamily residential uses and large university student population.
- A greater percentage of zero-vehicle households occurs in areas to the northeast of downtown.
- Non-family households have an significantly lower average income than that of family households, and make up 48% of the total households in Chapel Hill. Much of this population is located along the MLK Jr Blvd. corridor and may be helped with frequent transit service.

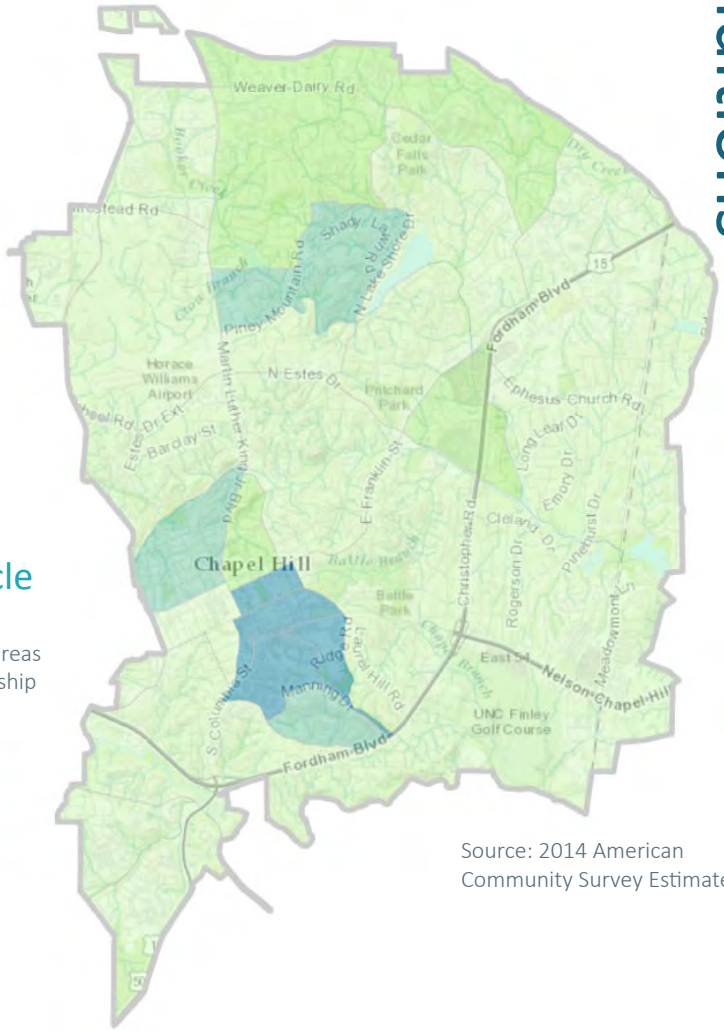


Lower Household Incomes

The lighter shaded areas indicate areas of the Town with lower median household incomes.

1 - 20,000	80,001 - 100,000
20,001 - 40,000	100,001 - 120,000
40,001 - 60,000	120,001 - 140,000
60,001 - 80,000	140,001 - 160,000

Populations in Chapel Hill with greater needs or preferences for bicycling and walking, including "last mile" trips to access transit.



Lower Rates of Vehicle Ownership

The darker shaded areas indicate areas that have lower rates of car ownership in the Town.

Percent of Occupied Units with Zero Vehicles	
	0-10%
	10-20%
	20-30%
	30-40%
	40% +

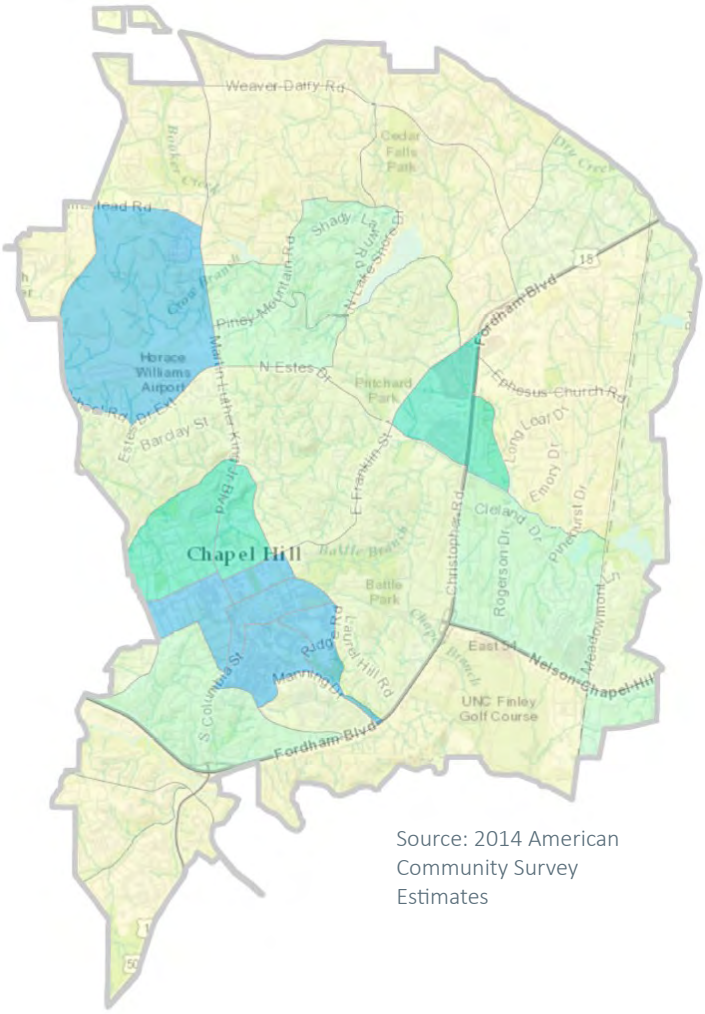
Source: 2014 American Community Survey Estimates

Demographics

Percent of Non-Family Households

A household includes all the persons who occupy a housing unit, whether living alone or with others. The average household size in Chapel Hill is 2.35 persons.

The darker shaded areas indicate places in the Town that have higher percentages of Non-Family Households.



Source: 2014 American Community Survey Estimates

Household Income in Chapel Hill

Transportation Demand Management (TDM)

The Town's TDM Employee and Citizen Outreach includes year round campaigns, programming and special events to promote commute alternatives to and from work as well as getting out and about in the Chapel Hill community.

Outreach includes:

- Go Chapel Hill Transportation Management Plan (TMP) Program:
  - Outreach to local businesses
  - Commute Club
  - Annual TMP Champion Conference, trainings & workshops
- Bicycle Month special events
- Partnership & Collaboration with UNC-CH, Town of Carrboro, regional transit agencies, organizations, local businesses, bicycle stores and advocacy groups
- Social media including Instagram, Facebook, Twitter, Newsletter, E-Blasts and Go Chapel Hill website

Go Chapel Hill .org
Bike
Bus
Walk

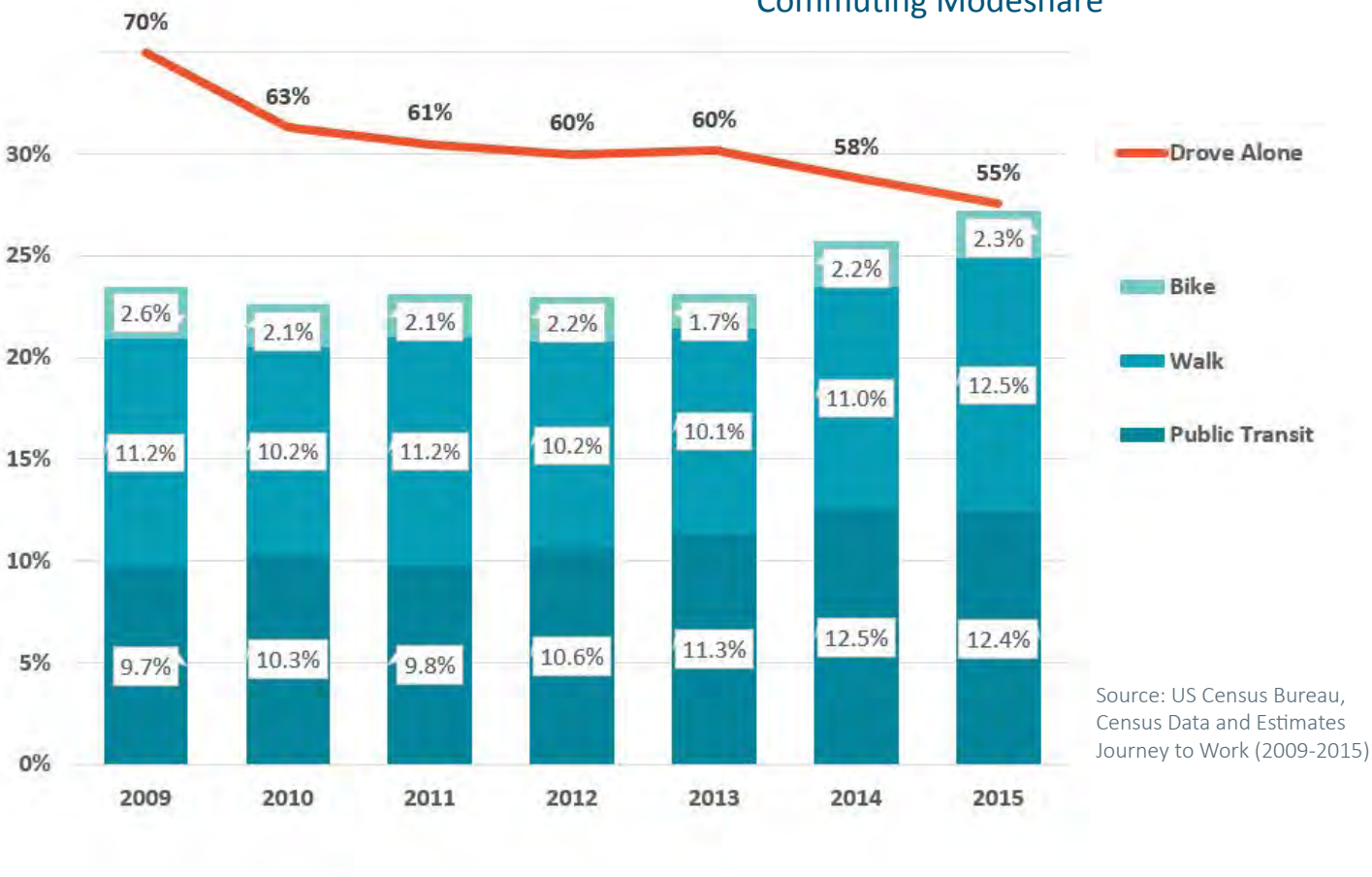
Statistics

Changing Behaviors

There is already a culture of taking transit, walking, and bicycling to work in Chapel Hill. Journey to work data from 2015 shows residents commuting by alternative modes rose to over 27% of total trips while single occupancy vehicles decreased to 55%.

However, commuting does not represent the majority of transportation usage. It does not include travel such as running errands, trips to school, or business meetings. Nationally, commuting only accounts for 16% of trips.

Commuting Modeshare



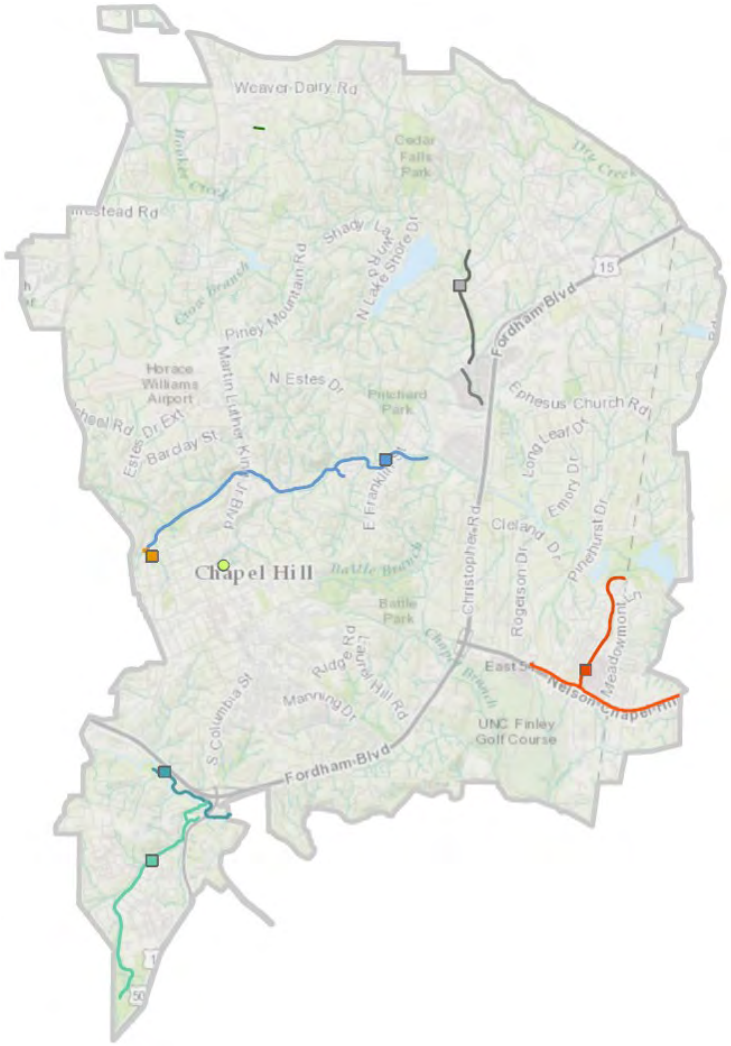
Source: US Census Bureau, Census Data and Estimates Journey to Work (2009-2015)

On the right trajectory! Trends indicate a decrease in the number of individuals commuting to work in a single occupancy vehicle. Enhancing "last mile" connections is key to increasing numbers of individuals using other modes.

User Counts

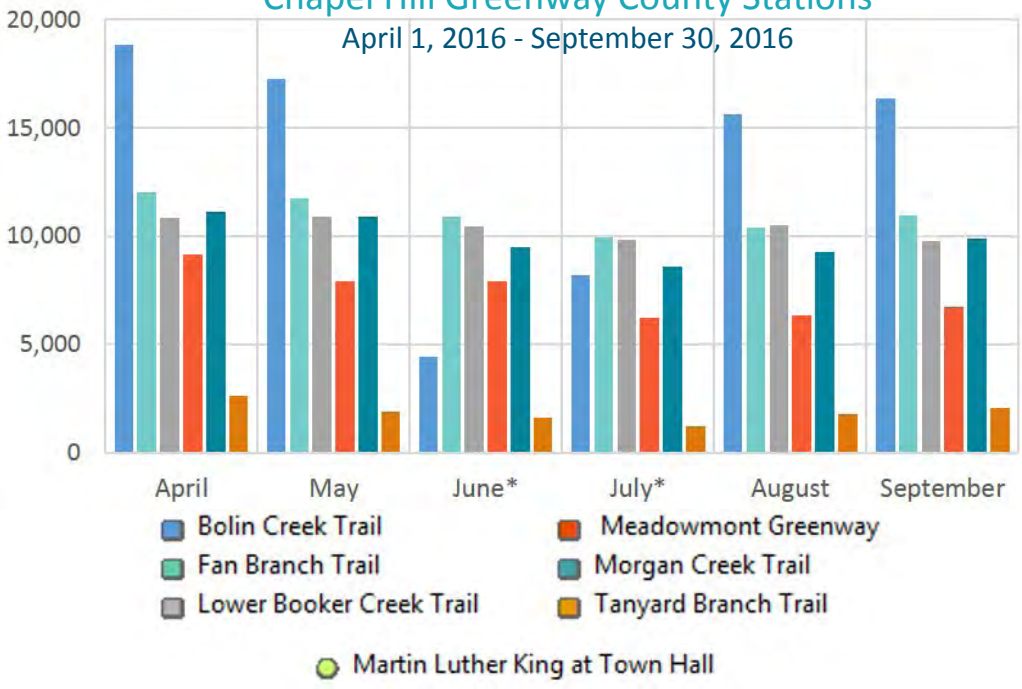
The Town of Chapel Hill used to publish bicyclist and pedestrian counts through its Mobility Report Cards. The reports detailed user counts for as many as 117 locations but were discontinued in 2005. In 2015, the Mobility Report Card was reinstated by the DCHC-MPO.

In 2014, the Town partnered with NCDOT to install a permanent bicycle and pedestrian count location on Martin Luther King Jr Blvd. near Town Hall. This station is part of a bike/ped count program by NCDOT to analyze bicycling and walking in the state and institutionalize a non-motorized volume data program. The Town expanded the number of permanent count stations in 2016, focusing stations on longer segments of greenways in the town. Three more stations were installed in various locations by the end of 2017.



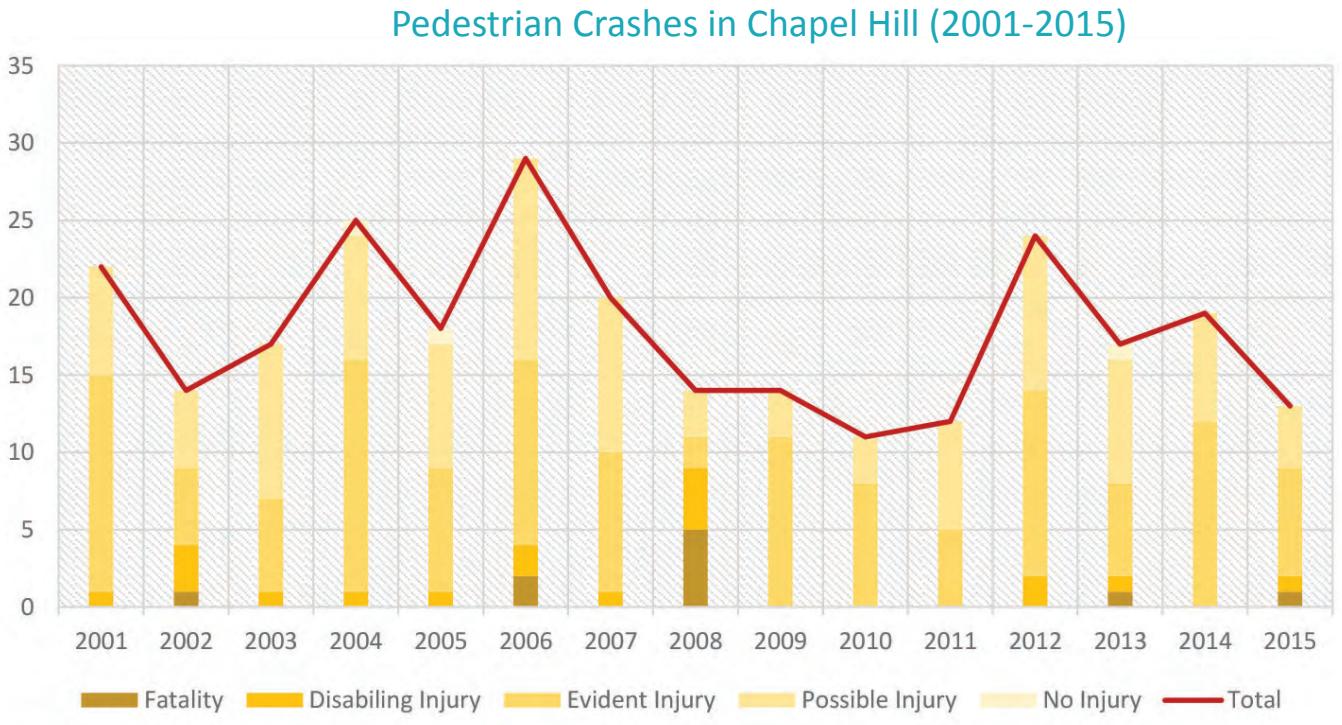
Chapel Hill has seven stations continuously collecting bicycle and pedestrian counts. User counts on most town greenways regularly meet or exceed 10,000 per month.

Count of Bicyclists and Pedestrians
Chapel Hill Greenway County Stations
April 1, 2016 - September 30, 2016



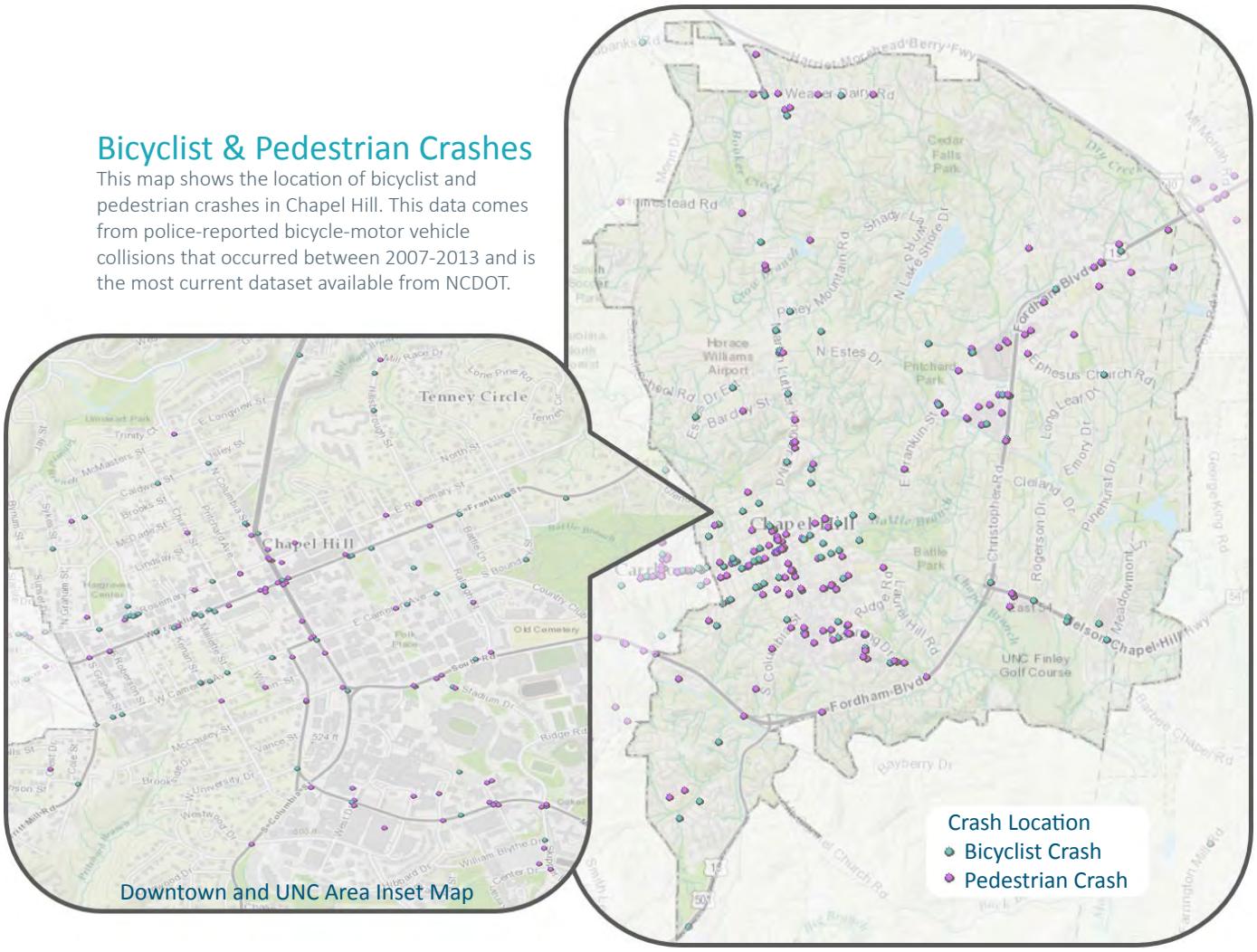
Crashes

Pedestrians and cyclists are at an inherent disadvantage when involved in traffic crashes. Between 2001 and 2015, there were 269 pedestrian crashes reported in the Town, an average of approximately 18 crashes per year, including a small number of fatal or disabling injuries occurring nearly every year. A 2005 survey by NHTSA found that nearly half of all crashes resulting in pedestrian injury go unreported. While there is no discernible pattern to suggest if pedestrian crashes are on the decline permanently, since 2012 there has been a steady decrease in the overall number of crashes reported. Fewer bicycle crashes were reported during the same period, making it difficult to look at trends.



Bicyclist & Pedestrian Crashes

This map shows the location of bicyclist and pedestrian crashes in Chapel Hill. This data comes from police-reported bicycle-motor vehicle collisions that occurred between 2007-2013 and is the most current dataset available from NCDOT.



Source: NCDOT Bicyclist and Pedestrian Crash Data 2007-2013

Areas of Concern for Bike/Ped Crashes

Crash Frequency

Downtown/UNC Campus
- Franklin Street
- Columbia Street
- Cameron Avenue
- South Road
- Manning Drive

Ephesus-Fordham District
Martin Luther King Jr. Boulevard
Weaver Dairy Road
NC 54 Raleigh Road

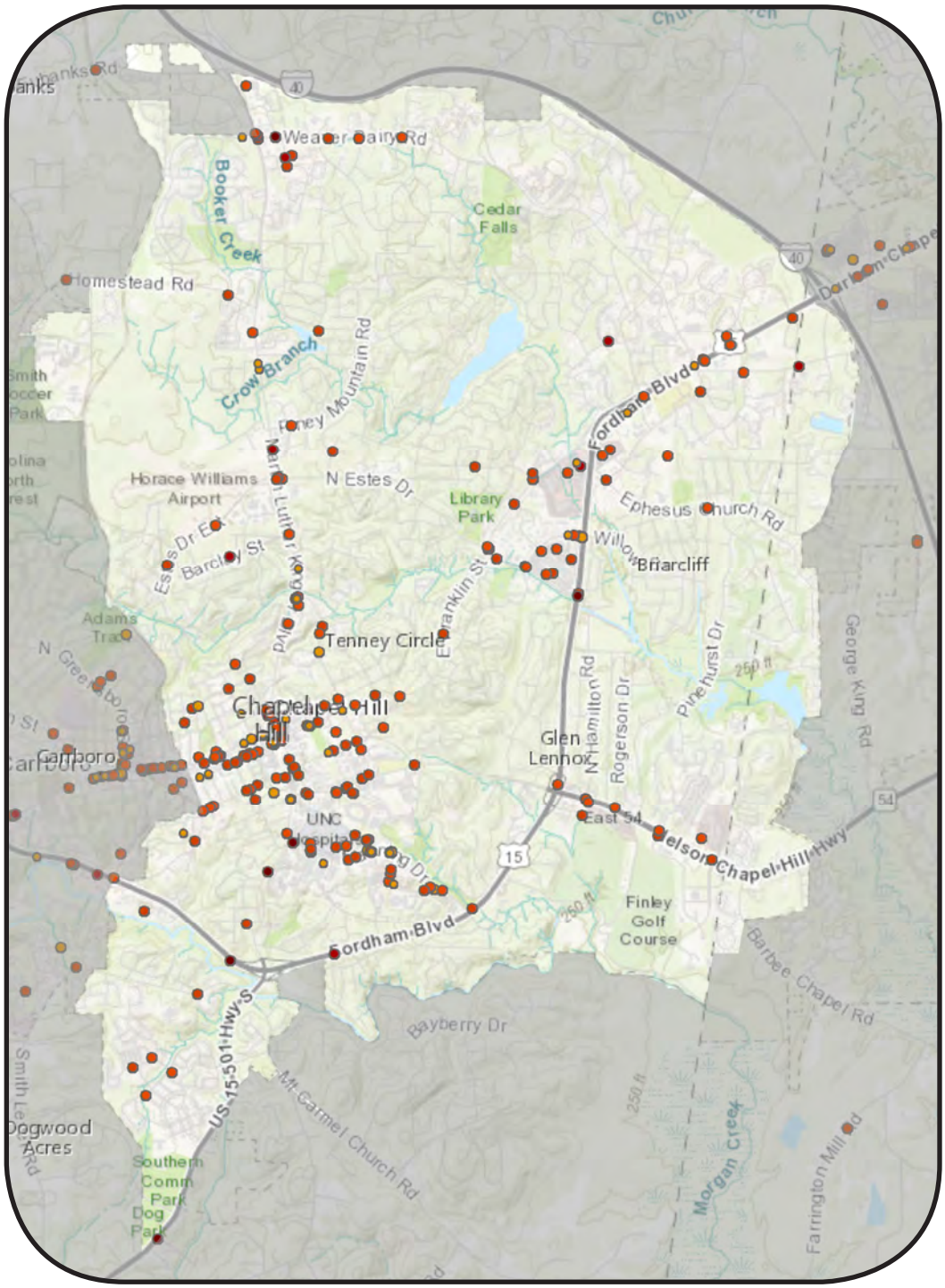
Crash Severity

S. Columbia Street
US 15-501/Fordham Blvd
Martin Luther King Jr. Blvd
Weaver Dairy Road

Crash Severity

This map focuses on the severity of crashes by location. Darker colored circles indicate more severe injury with crashes that resulted in death depicted using a dark red.

Both bicyclist and pedestrian crashes are depicted.

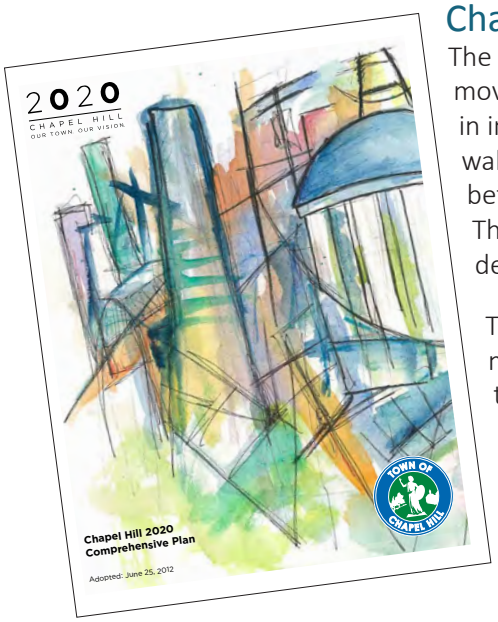


Crash Severity

- Killed
- Disabling Injury
- Evident Injury
- Possible Injury
- Unknown/No Injury

Existing Plans and Policies

Development of the Mobility Plan grew from the need to look at mobility issues from more than just a modal perspective. The 2020 Comprehensive Plan paints a big picture of the Town's transportation vision, while the Greenways Master Plan and the Bike Plan focus on pieces of that vision. The Mobility Plan seeks to identify gaps as well as opportunities to better link the Town's bike, ped, greenway, and transit systems.



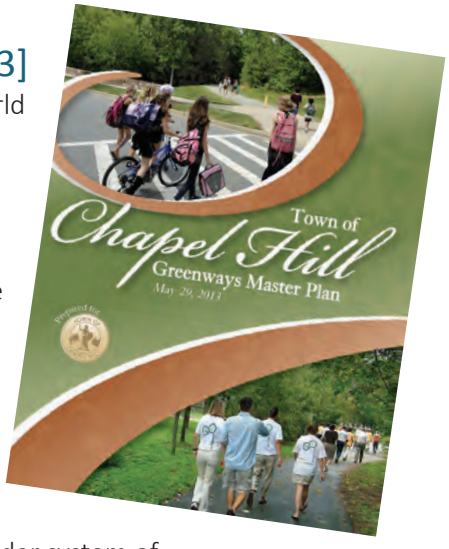
Chapel Hill 2020 Comprehensive Plan [2012]

The Chapel Hill 2020 Comprehensive Plan is a vision for the community of Chapel Hill moving forward and outlines different areas in which the community is interested in improving. One of the key "Big Ideas" outlined in the plan is to create a bikable, walkable, green communities plan that provides safe connections between neighborhoods, schools, commercial destinations, and recreational areas. The plan lays out strategies to encourage changes in growth, land use, economic development, and continued university collaboration.

The plan calls for a holistic transportation system that integrates the modes and minimizes the congestion that comes with a growing community. is key to this theme, recognizing the benefits from the enhanced mobility that multimodal connections can provide.

The Plan identifies six Focus Areas in Town and provides general recommendations for desired connectivity and improvements. The Mobility Plan expands upon the general principles outlined in the plan, giving details to the discussion.

Chapel Hill Greenways Master Plan [2013]



Integrating the urban environment with the natural world is a key tenet of the Greenways Master Plan. The Town of Chapel Hill maintains a popular and growing system for integrating citizens with nature. A thoughtfully developed greenway system can serve the backbone of a non-motorized transportation network, providing safe crossings and access to key destinations and transit for people of all ages and abilities.

In carrying out the Mobility Plan, goals of the Greenway Program should not be overlooked. This plan looks at the opportunities for synchronizing the existing and planned greenway network to the broader system of non-motorized travel. Prioritization elements in this plan that involve greenway projects need to strive to maintain a balance between resource protection, recreational use, and transportation opportunities. Goals and objectives related to the preservation of open

space, the implementation of park trails, and other elements of the plan that are not intended as a transportation function for the Town are outlined and maintained by the Greenways Master Plan.

Chapel Hill Bike Plan [2014]

Many Chapel Hill residents desire safer, more convenient, bicycling options. The town undertook a process in 2014 to identify priority projects that would encourage the "Interested but Concerned" group of bicyclists to ride bicycles more frequently and reduce bicyclist's "traffic stress" in the existing network.

Projects were selected to build a short-term priority network to establish connectivity near the center of Town and recommendations given for long term improvements using separated bicycle facilities such as "cycle tracks." Further, the Town worked with UNC-Chapel Hill to coordinate their bike plan in tandem with this effort to have consistent recommendations in each network plan.

The Mobility Plan builds on this planning effort, recognizing new design tools and bicycle facility types that have quickly entered the planning toolbox since the Bike Plan was developed. Furthermore, it gives a more comprehensive approach, looking at integration with greenways and transit.

Projects in Development

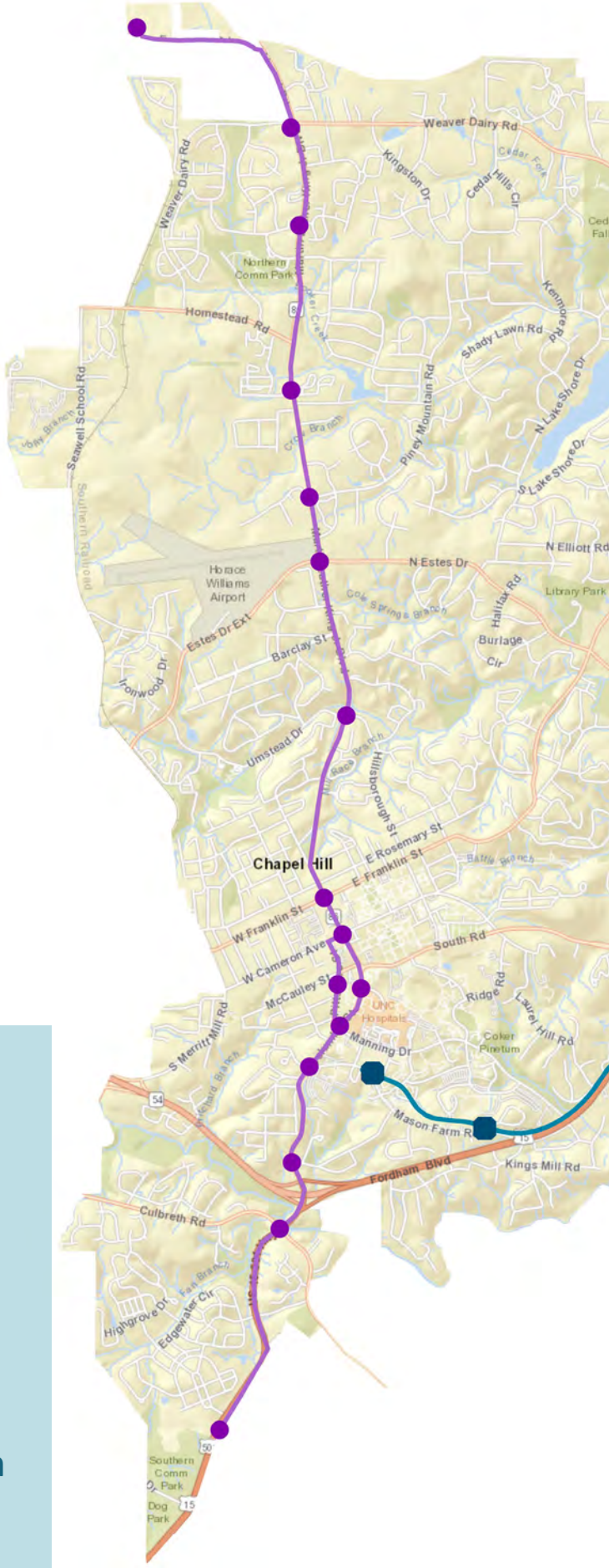
Long Range Transit Planning

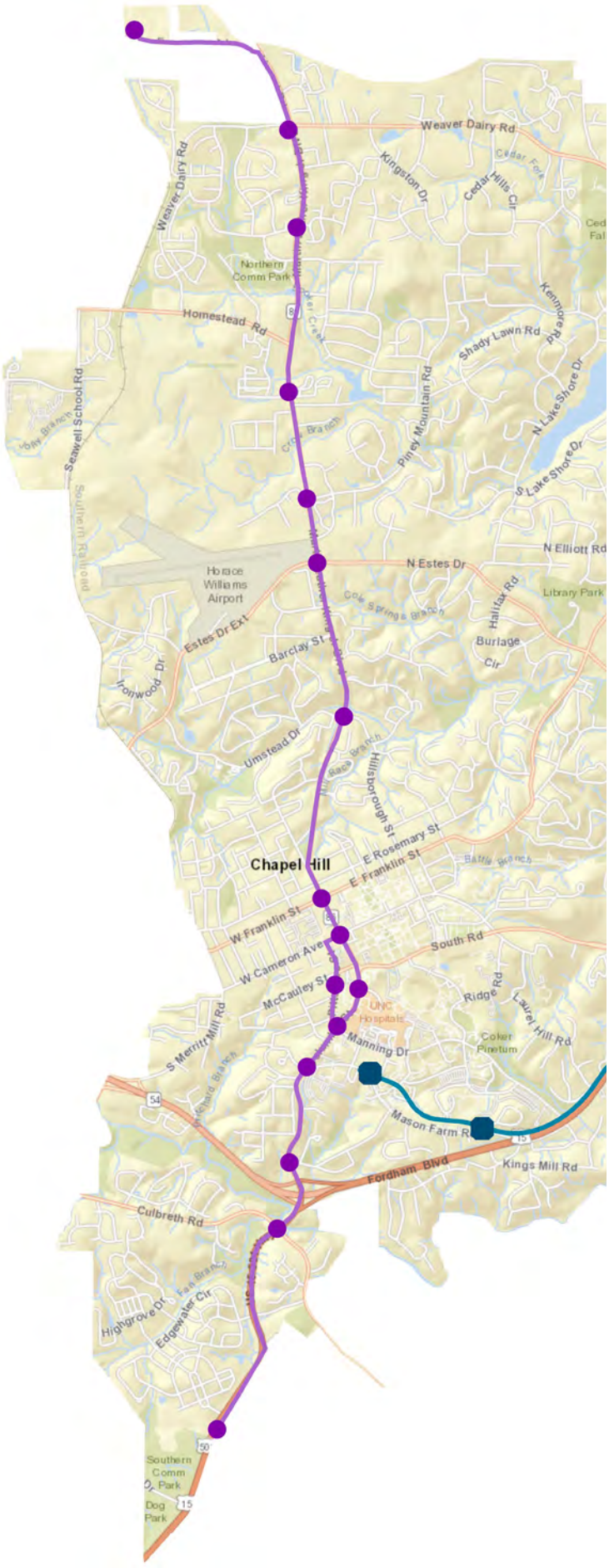
One of the challenges to an effective transit system is the first and last mile connections. The Mobility Plan considers bicycle and pedestrian travel to these future bus rapid transit station areas in the context of a long-term network build out for sidewalk, greenway, and bicycle projects.

Bus Rapid Transit

A Bus Rapid Transit system along the North-South Corridor is currently being designed to improve travel capacity and mobility; provide reliable transit; and create positive opportunities for economic development at stations. The proposed route includes 16 stations along a 7.3-mile route connecting the Eubanks Road Park-and-Ride with the Southern Village Park-and-Ride. One of the challenges to an effective transit system is the first and last mile connections.

The plan considers gaps in the existing pedestrian network and considers bicycle and greenway network linkages to create direct routes to the stations proposed in the Mobility Plan.



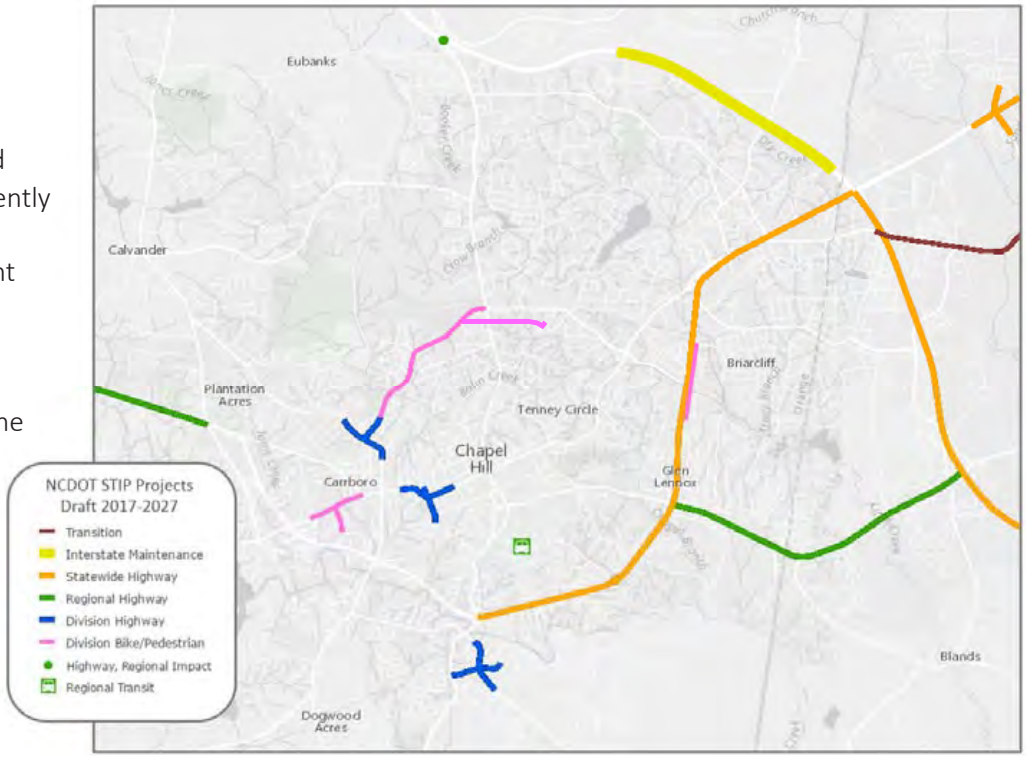


The current plans interact with the proposed North-South BRT (NBRT) project as it stands in Fall 2020. If plans for NSBRT are shifted, the bike/ped connections will need to change accordingly to support a multi-modal corridor.

Projects in Development

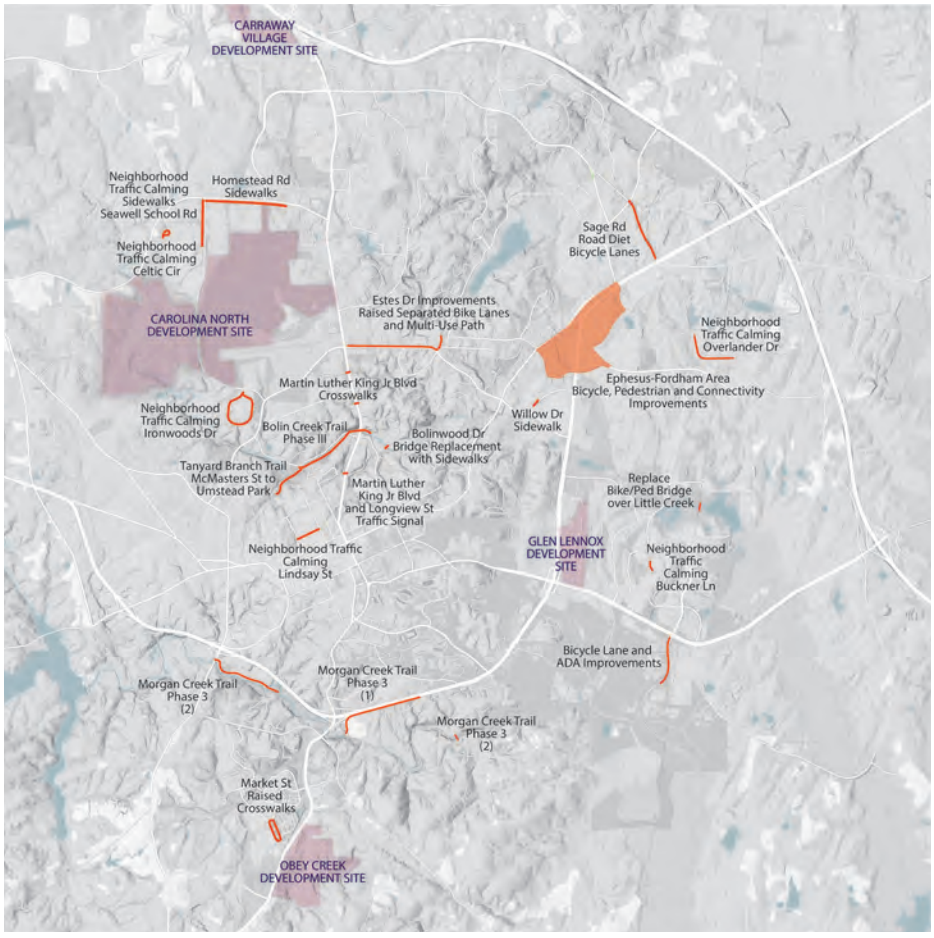
NCDOT Projects

A number of projects in and around Chapel Hill are currently in NCDOT's ten-year State Transportation Improvement Program (STIP). The STIP identifies the construction, funding, and scheduling for transportation projects at the state level over a 10-year period and projects. A list of the projects can be found in **Appendix B**.



Town Capital Projects

Numerous projects for bicycling and walking are included in the Town's Capital Improvement Plan (CIP). These all relate to the goal "Facilitate Getting Around" in the Chapel Hill 2020 Plan. Programmatic funding for traffic calming, ADA & curb ramps, and greenways totals approximately $1.2 million through 2025. More details on projects and funding can be found in **Appendix B**.



In November 2015, voters approved a bond referendum which included funding for improvements throughout the community. The bond contained over $21M in allocations for mobility improvements to biking and walking including $16.2M for Streets and Sidewalks and $5M for Trails and Greenways. Projects funded by the bond are identified from previous planning efforts, studies, and evaluations including the Bike Plan and Greenway Plan. Town staff reviews and prioritizes the Town's capital improvement needs on annual basis for the Capital Improvement Program (CIP) which is how these funds are obligated to projects. A previous bond referendum was conducted in 2003 which allocated $5.6M for Sidewalks and Streets and $5M for overall Parks and Recreation.

2015 Bond Referendum

Streets & Sidewalks $16.2M	Trails & Greenways $5M
Bike and Pedestrian Safety	Greenway System Expansion
Sidewalk Construction	Morgan Creek Trail
Streets Infrastructure	Bolin Creek Trail/Tanyard Branch Trail
Downtown Streetscape	

Development Agreements

Development agreements are contracts entered into by the Town and a developer to expressly define a project's rules, regulations and commitments. These agreements help to meet the Town's transportation needs and comprehensive planning goals in the future. Several bicycle and pedestrian improvements have been incorporated into mixed-use development agreements because of anticipated impacts as a result of the proposed development. More information on the four current development agreements and their associated improvements are available in **Appendix B**.

Needs Assessment

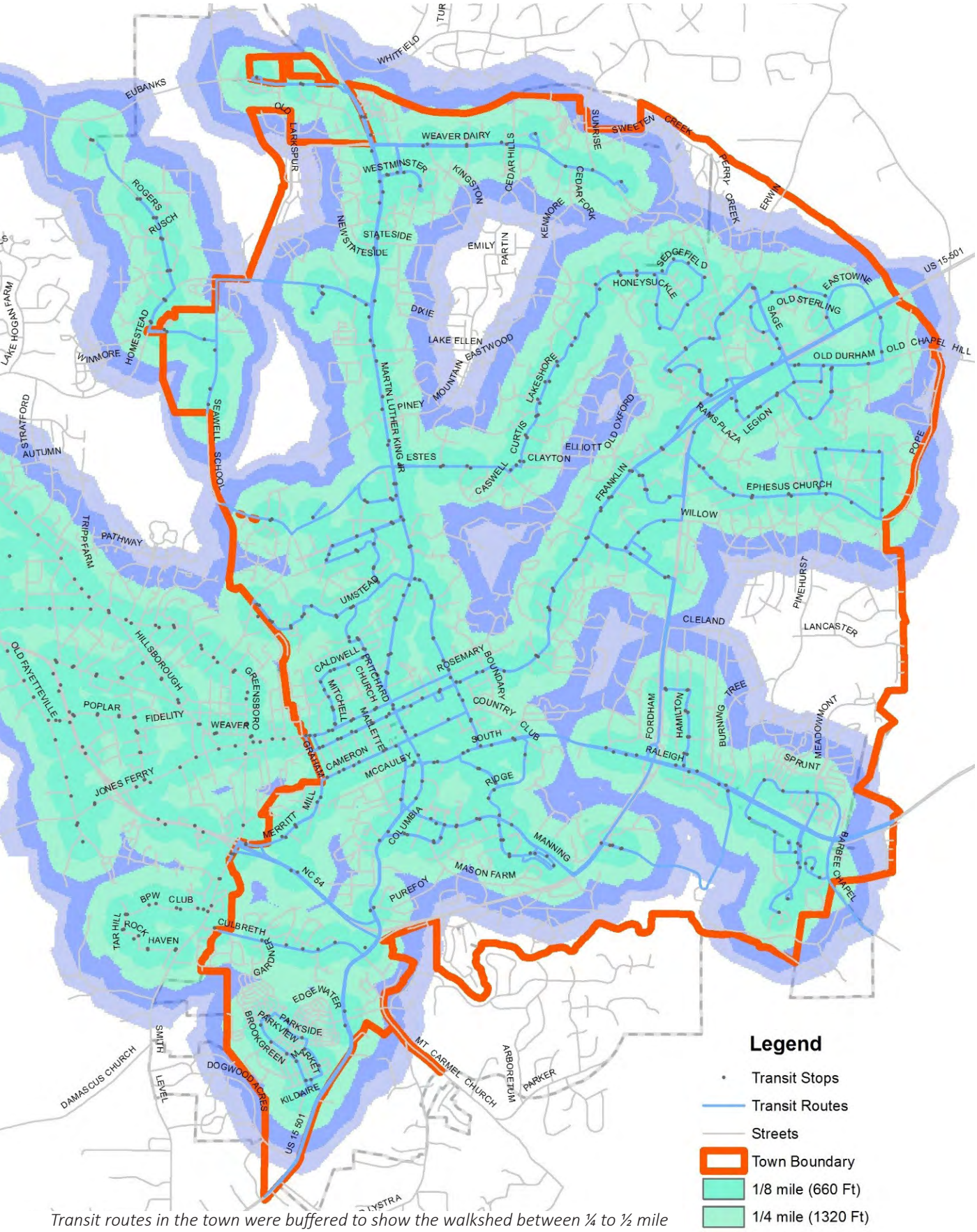
Transit Connectivity

In reviewing the Chapel Hill pedestrian network, sidewalk coverage near transit lines and stops was highlighted to identify gaps where missing sidewalks may hinder residents' access to transit. People are typically willing to walk a quarter mile to a half mile to access transit when conditions for walking are good. Creating and improving safe and comfortable routes for the pedestrian and cyclist is crucial. The routes, with frequent connections to the proposed priority ped/bike network, will act to enable alternate commute habits by residents and help the Town in meeting the goal of 35% alternative commute share by 2025 .

The Town already accounts for this need in their sidewalk prioritization ranking criteria, with points given to projects within ¼- and ½-mile buffers around transit stops. The map on the facing page shows the area in which sidewalks receive those extra points and are prioritized according to proximity to transit.

With the bus rapid transit service planned in the coming years, the effective walk- and bikesheds for these higher-level transit services need to reconsidered in light of Town bike/ped projects. Users may walk further for these premium transit routes, and distances may vary based on the surrounding land uses (Downtown vs. suburban) and the context (tree cover, perceived safety, etc.). Research suggests that buffer distances for sidewalk planning and prioritization around future transit stations may remain at one quarter-mile for Downtown but double to one half-mile for suburban locations.

Evaluating sidewalk gaps in proximity to transit and providing high quality pedestrian environments along transit routes will help the Town meet the goal of increasing non-motorized modeshare.



Transit routes in the town were buffered to show the walkshed between ¼ to ½ mile in Chapel Hill. Gradations in between are included to assist with visualizing walk distances. These buffers are recommended to use as a tool for assigning additional points to the sidewalk prioritization score.

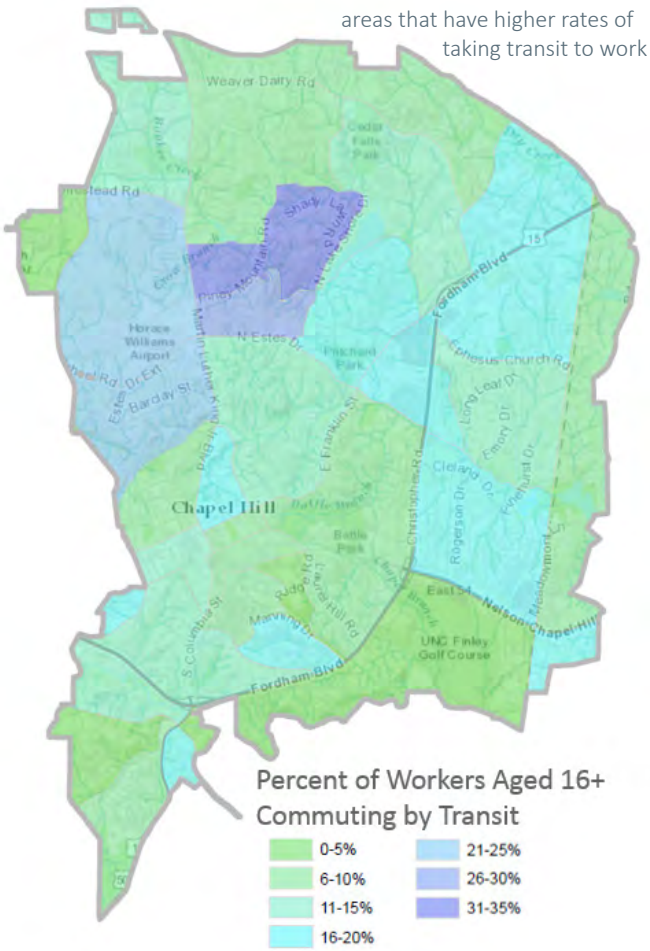
Enhancing First and Last-Mile Connections to Transit

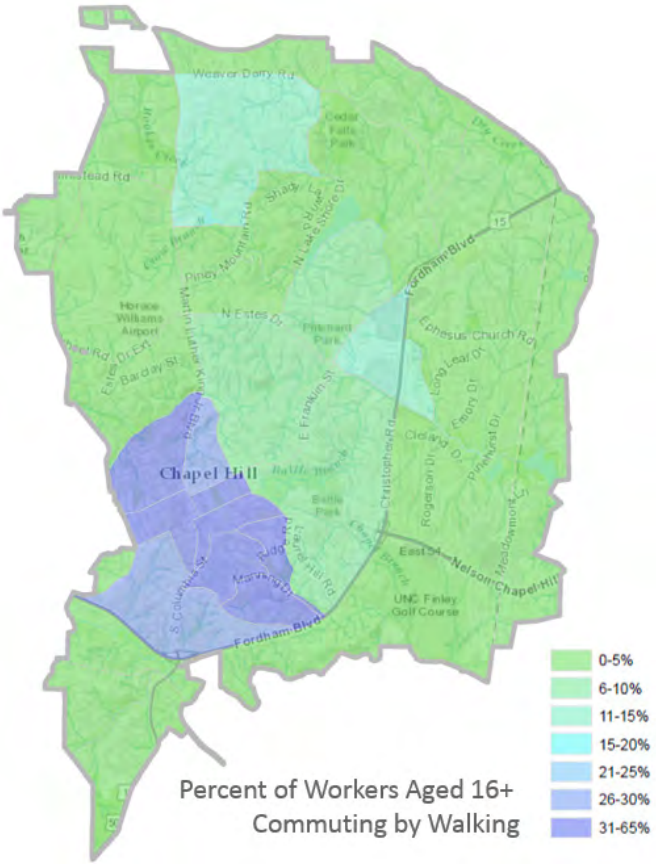
Residents of Chapel Hill have already developed habits around using alternative modes such as walking, bicycling and transit. While the Town's population is increasing overall, there is an overall decrease in the number of people commuting to work in a single occupancy vehicle. The rate of driving alone decreased from 70% in 2009 to 55% in 2015 while commuting to work by bike, foot, and transit rose to over 27%. Many of the those transit trips depend on the "first and last-mile" connections to get to and from the transit corridor. Working to meet the Plan goal to increase the bike/ped/transit modeshare to 35% by 2025 means focusing on these connections to existing and proposed transit stations.

Transit users come from both inside and outside of Chapel Hill. It should be noted that the two maps below do not include workers who reside in communities outside of Chapel Hill and commute into the Town. Looking at boarding/alighting data for 2016, the primary concentrations of transit usage in the town are in the vicinity of UNC-Chapel Hill and in the downtown core. Outside of these areas, riders are using area park-and-ride lots, indicating a propensity for individuals to drive into the area and change modes. Other areas of higher transit use include the Martin Luther King Jr Blvd. corridor, Franklin St., University Place, Ephesus Fordham area, and Meadowmont. Focusing on last-mile connection and intersection improvements in these areas will assist with safety and access for Chapel Hill residents.

Transit Commuters

The darker shaded areas indicate areas that have higher rates of taking transit to work





Walk Commuters

The darker shaded areas indicate areas of the Town with higher rates of walking to work.

Source: 2014 American Community Survey Estimates
Bicycle to work data not available at this geography.

Transit Riders

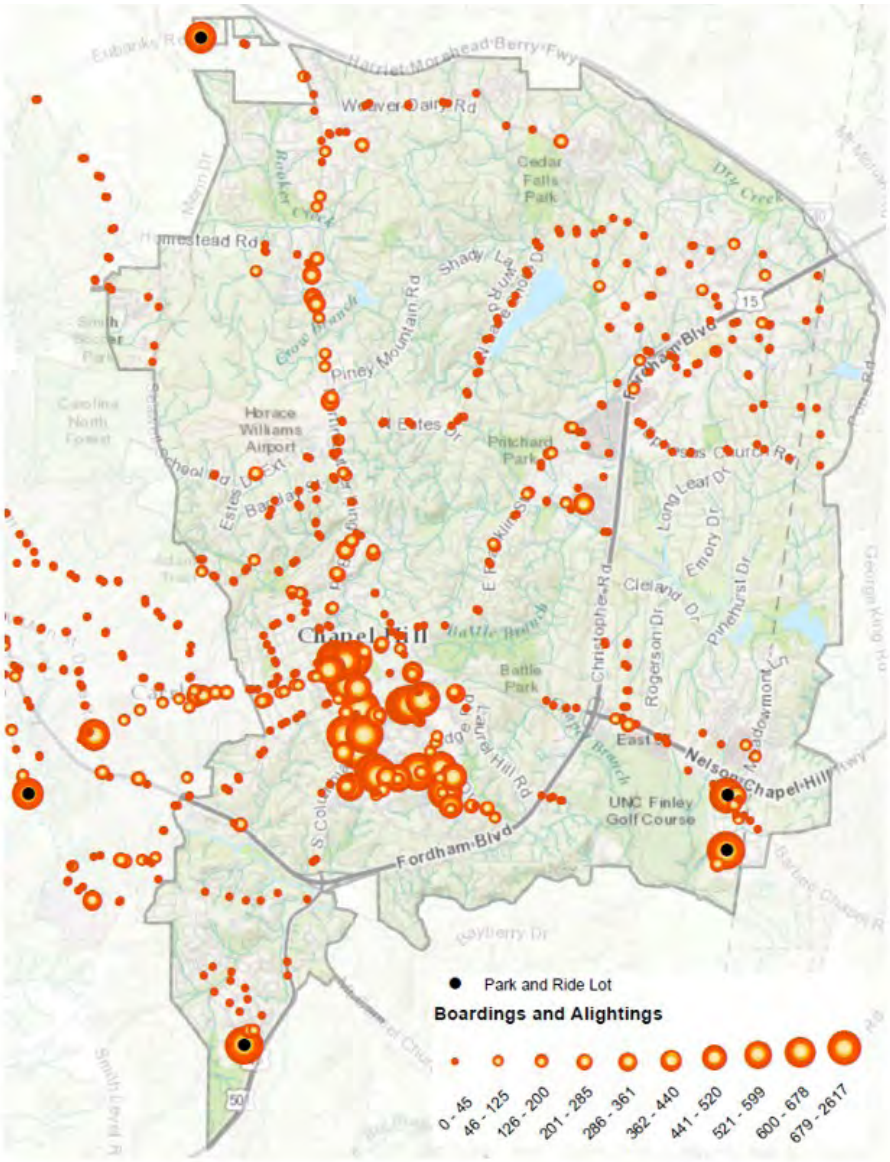
The highest transit usage in Chapel Hill typically occurs at UNC Chapel Hill and downtown stops.

High numbers of boardings and alightings also occur at Park and Ride locations:

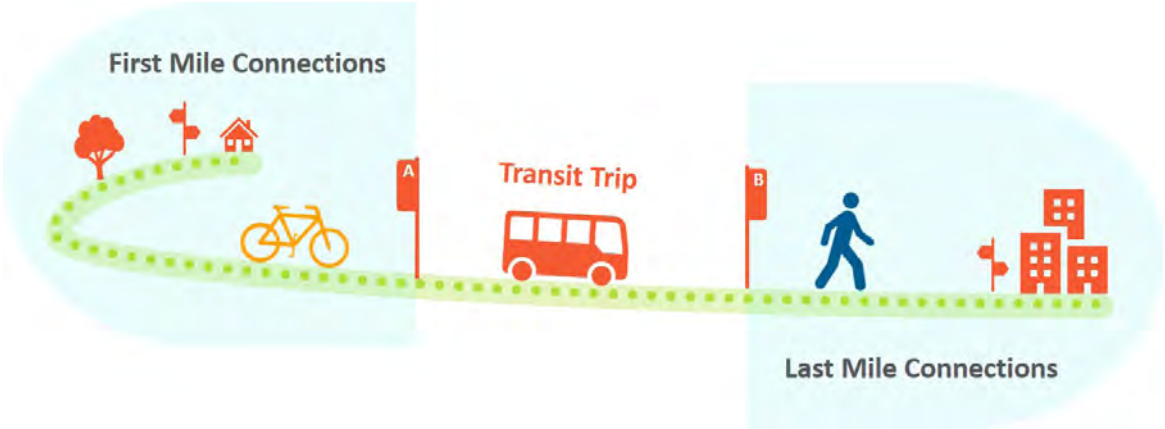
- NC 54 Park and Ride Lot
- Southern Village Park and Ride Lot
- Friday Center Park and Ride
- Jones Ferry Park and Ride
- Eubanks Road Park and Ride
- Chatham County Park and Ride

Transit usage also occurs in high frequency on:

- Martin Luther King Jr. Boulevard
- Ephesus-Fordham District
- University Place
- Highway 54



Source: GoTriangle Developer Resources, Nov. 2016



Regional Connections

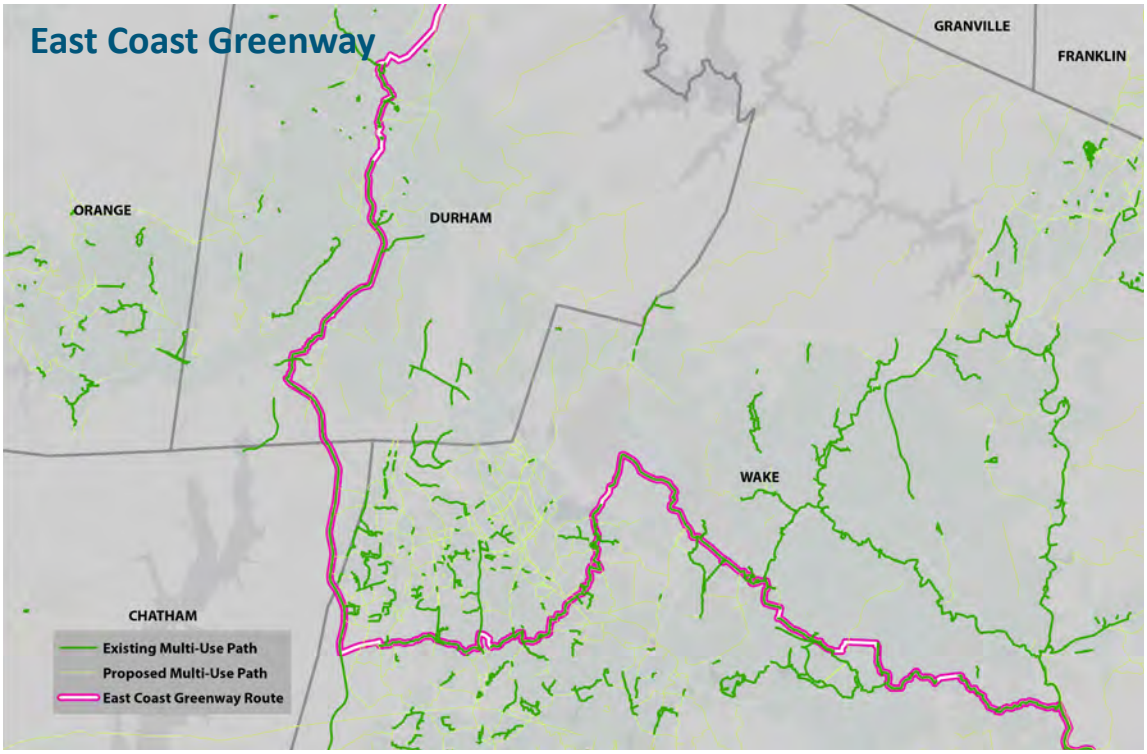
The region is amidst a greenway boom. In 2015, the Raleigh-Durham-Chapel Hill metropolitan area had nearly **300 miles of paved multi-use trails**. In Wake County alone, 250 miles of shared use paths are proposed and the County has more miles of greenway built than any county in the state. In Durham County, 186 miles are proposed. Orange County has not developed a cross-county, regionally significant greenway network but greenways are among the highest interest for future facility needs per the 2030 Orange County Parks and Recreation Master Plan.

Widespread support for greenways in the Triangle region is reflected in voter approval of virtually all bond referenda to fund more greenways.

The two Triangle area metropolitan planning organizations have dedicated increasing amounts of their capital budgets for pedestrian and bike projects, including greenways. In Cary, Knightdale, and Chapel Hill, developers have been required to build greenways as part of new developments. Virtually all communities require the dedication of easements along waterways and lakes to allow for construction of multi-use paths.

Additionally, there is growing public support for the development of on-road cycling facilities, including a leap from traditional facility types. In 2000, there were less than 10 miles of on-road bike lanes in the Triangle, but by 2015, total mileage of bike lanes (centerline) had grown to over 100 miles: Raleigh (39 miles), Durham (36 miles), Chapel Hill-Carrboro (32 miles), and Cary (20 miles). Facilities that go beyond bicycle lanes are being implemented and the “wide outside lane” is being phased out. The first cycle track in the Triangle is being constructed in Raleigh to connect a section of the East Coast Greenway, several municipalities are installing green paint at intersections to increase visibility, and towns including Chapel Hill are starting to implement buffered bike lanes.

Lastly, sidewalks are being built along both busy thoroughfares and rural roads to fill gaps in communities throughout the Triangle. Chapel Hill now has over 130 miles of sidewalk and has achieved a 4% increase in sidewalk mileage since 2005.



Extensive planning and build out has occurred in the Triangle region with existing (dark green) and planned (light green) facilities shown. The East Coast Greenway route is highlighted.

Source: NCDOT Pedestrian and Bicycle Infrastructure Network, March 2016

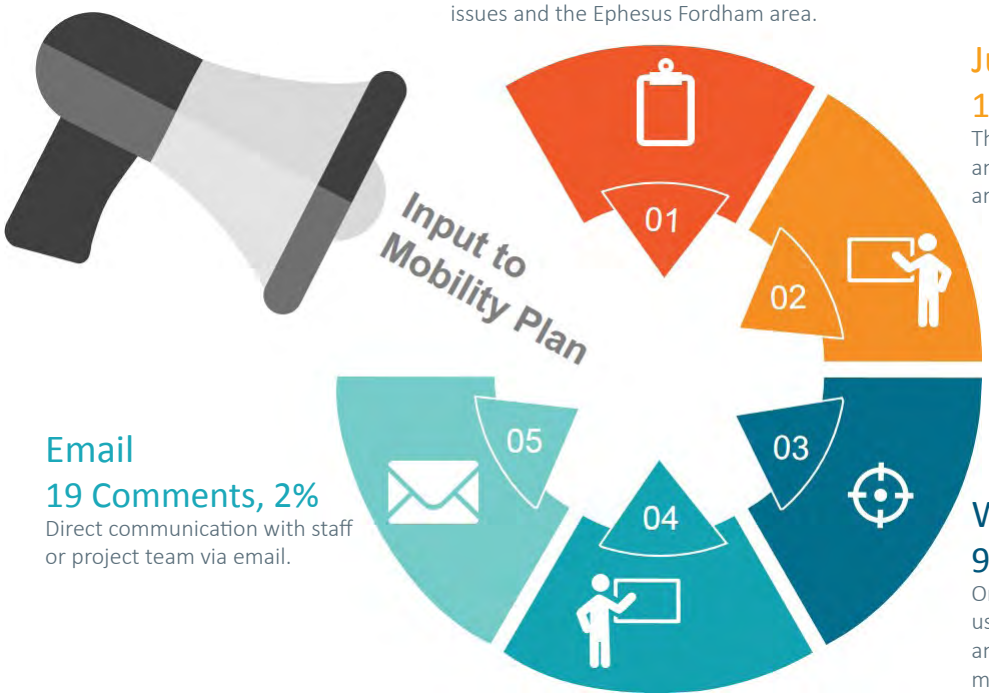
Removing large barriers to active transportation increases commute trips, duration of physical activity, and trail-related spending

Various multi-use trails in Chapel Hill

Public Demand

Through the outreach opportunities discussed in Chapter 2, a wide cross-section of Chapel Hill residents were able to participate in the planning process through a variety of formats. The public input conducted for the plan resulted in **more than 850 comments** regarding mobility as it relates bicycling, walking, and access to transit in the town. In many cases, it was necessary to divide a single comment with multiple ideas/issues into several topics to create the summary and overall themes.

Survey
523 Comments, 61%
In-person and online surveys targeted at gaining more insight into pedestrian needs, accessibility issues and the Ephesus Fordham area.



June 30th Open House
135 Comments, 16%
This public meeting focused on issues and existing conditions in the five focus areas within the Town.

Email
19 Comments, 2%
Direct communication with staff or project team via email.

Wiki-Mapping
98 Comments, 12%
Online web-based mapping tool for users to indicate key intersections and corridors where they experience mobility issues.

September 6th Open House
80 Comments, 9%
This public meeting focused on plan goals, objectives, existing conditions, project types, and prioritization.

With a goal of increasing mobility for bicycling, walking, and transit, the survey asked respondents to identify what improvements would be needed to increase neighborhood walkability, connectivity, and safety. Lack of adequate sidewalks, paths, bike lanes were the most cited responses. Another highly cited improvement was to provide safe crossing facilities.

Location-based comments were further categorized to establish which main corridors and intersections posed the greatest challenges in the Town for walking, bicycling and accessing transit. These locations do not include greenways, which are further discussed in the Greenway and multi-use highlights of the summary. The problem corridors that appeared most often in public input were the high volume/high speed roadways in Town.

The following table highlights the issues and facilities most commented on for intersection, pedestrian, bike, and greenway improvements. Detailed information pertaining to specific issues and projects can be found in **Appendix A**.

Chapel Hill residents have a desire for expanding local greenways into a network and making regional connections.

Respondents' Top 5 most requested locations for improvements...

	...at intersections	...for bike facilities	...for pedestrian facilities	..on greenways
1	Fordham Blvd at Ephesus Church Rd	Martin Luther King Jr Blvd	Lake Forest Neighborhood	Booker Creek Trail
2	Fordham Blvd at Willow Rd	E Franklin St	Homestead Rd	Bolin Creek Trail
3	Fordam Blvd at Raleigh Rd	US 15-501	US 15-501	Grade Separation across US 15-501
4	Fordham Blvd at S Columbia St	Estes Dr Extension	Martin Luther King Jr Blvd	Morgan Creek Trail
5	MLK Jr Blvd at Stateside Dr	Homestead Rd	Numerous minor thoroughfares	Connection for Booker & Bolin Creek Trails

850 Comments

Safety, Especially at Intersections

More than one third of the comments were related to safe crossing of busy streets. The majority of these comments were recommendations for crosswalks and safety improvements related to crossing busy intersections both on bicycle and on foot. Of these, 20 comments gave specifics regarding improvements to intersection signalization including pedestrian timing and bicycle detection.

More than one quarter of comments were related to specific locations for bicycling and walking facilities to improve mobility and access to destinations in the town. Top locations and issue areas were grouped and ranked by street and intersection in the public input summary.

Better Facilities

Increased Connectivity

Residents want to see bicycle and pedestrian facilities link neighborhoods, schools, and commercial centers. Nearly 20% of comments were related to generalized connections in the Town, especially expanding and making connections with a greenway network followed by comments related to making connections between residential neighborhoods.

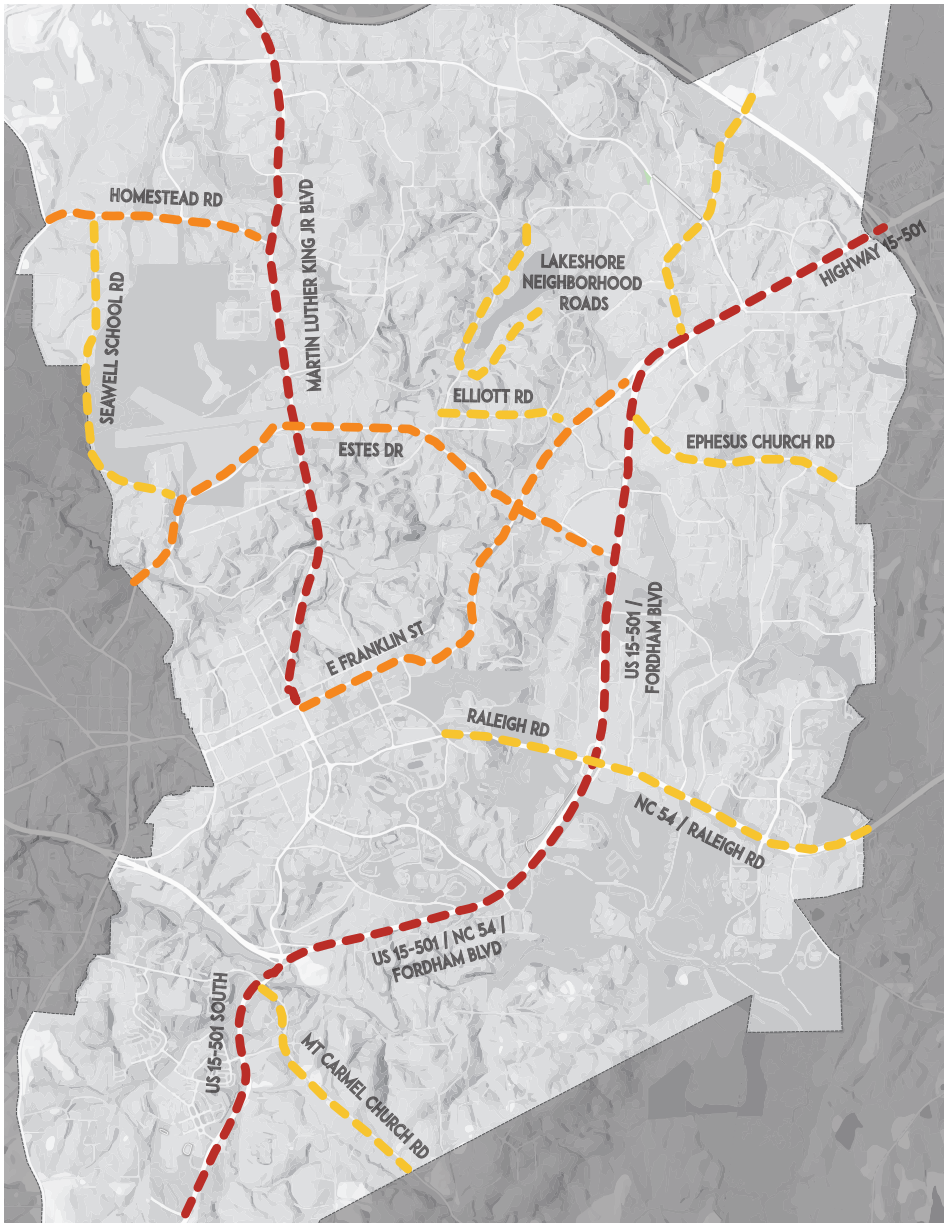
While streets were identified through public input across the entire Town, several corridors were repeatedly identified as being problematic for walking and bicycling.

US 15-501 received more than 150 comments. Martin Luther King Jr Blvd was referenced nearly 100 times. Franklin St received over 50 comments, with the clear majority of these being on the eastern portion of the corridor. Homestead Rd, Estes Dr, Ephesus Church Rd, and Lakeshore Dr were the subject of over 20 comments each.

Residents' comments highlighted frustration and challenges with the corridors listed below.

Corridor Comments By Frequency

More Comments
US 15-501
Martin Luther King Jr. Blvd
Franklin Street
Homestead Road
Estes Drive
Ephesus-Church Road
Lakeshore Neighborhood Roads
Elliot Road
Erwin Road
Raleigh Road
Seawell School Road
Mt Carmel Church Road
Fewer Comments



System Recommendations

During the public involvement process, citizens repeatedly stressed a desire to see better facilities for biking and walking, both in specific locations and Townwide. The Chapel Hill 2020 Plan echoes their desire, calling for "a comprehensive transportation system that provides everyone safe and reasonable access to all that the community offers."

On-Road Facilities - Several street corridors facilitate most of the Town's existing auto travel, but "Complete Street" improvements could provide better accommodations for pedestrians, cyclists, and transit users. The Town adopted a Complete Streets Policy in 2011 to enable users of all ages and abilities to safely move along and across streets. In addition to adopting this policy, the Town has taken efforts to implement the Complete Streets policy in the Engineering Design Manual.

The five major roadways highlighted in the recommendations beginning on page 35 are maintained by NCDOT, therefore comprehensive improvements are most likely to come in the form of major TIP or regional transit projects. With no near-term funding identified for large-scale improvements, the focus for these corridors should be to implement short-term projects that can improve mobility for pedestrians and bicyclists, particularly through sidewalks, shared-use paths and improved crossings. Recommendations include innovative bike treatments and pedestrian enhancements that can be applied through lane reallocations or small, lower-cost projects at key locations. Long-term recommendations represent a multimodal approach to designing an ultimate cross-section for each corridor.

"When you have Complete Streets implemented in Chapel Hill, everyone wants to come to the road."

Kumar Neppalli
Traffic Engineering Manager

Off-Road Facilities - Simply improving these heavily-traveled corridors to accommodate cyclists and pedestrians does not provide the type of low-stress facilities that many residents seek. For a percentage of the population that are "interested but concerned" about riding their bike or walking for daily travel, heavy traffic and its associated speeds and noise are deterrents to getting out of their cars. The Mobility Plan recommends developing a priority network of routes that use neighborhood streets, greenways, and multi-use paths that connect neighborhoods and the Town's focus areas. These six corridors would provide users the option of short linkages to the transit or separated bike facilities on Complete Street corridors, as well as longer but comfortable connections to the Town's commercial centers and ultimately the regional greenway network.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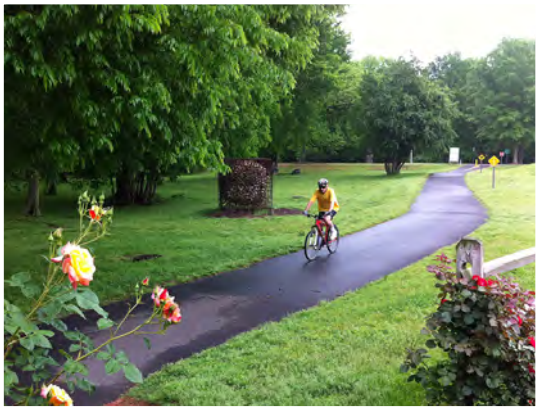



FCX EXPRESS

Facility Types

The Complete Street and Priority Corridors recommendations in this plan include a number of innovative facility types. They are being used across the State and country provide a higher level of protection, separation, and/or visibility for pedestrians and cyclists. The facilities shown below are a range of applications that are appropriate from suburban neighborhood streets to urban thoroughfares.

Buffered Bike Lanes

6-8' standard bike lane buffered from traffic with striping and sometimes bollards

Desirable on roadways with 10,000+ daily vehicle trips

Advisory Bike Lanes

4-6' bike lane dashed on low-volume streets too narrow for dedicated lanes

Signals to drivers that they may drive in bike lane space when a cyclist is not present

Multi-Use Trails

12-14' shared use path with mixed bicycle and pedestrian traffic parallel to a roadway

Very comfortable for most pedestrians & cyclists when volumes are low to moderate

Cycle Tracks

One- or two-way bike-only facility separated from traffic by physical barrier and pedestrians by curb or buffer

Appropriate for heavily-traveled bike routes; special accommodations should be made at intersections

Uphill Climbing Lane

4-6' standard bike lane marked on uphill portion of road with shared lane marking on downhill side

Cyclists have separate space to ride while moving relatively slow compared to motorists; no downhill separation

Two-Stage Turn Queue & Bicycle Boxes

Designated area positioning cyclists ahead of vehicles in traffic lane at signalized intersection during the red signal phase

Increases visibility and reduces signal delay for cyclists

Bike Signal Faces

Bike-specific signal providing priority to cyclists where vehicle or pedestrian movements conflict

Can provide cyclists head start and can simplify bicycle movements through complex intersections

Rapid Rectangular Flashing Beacons

Pedestrian-actuated, flashing signals supplementing signage at unsignalized intersections or mid-block crosswalks

Can increase driver yielding behavior at crosswalks significantly

Intersection Crossing Markings

Pavement markings indicating intended path of cyclists; typically include dashed edge lines with green pavement or sharrows

Provide clear boundary between paths of cyclists and vehicles in adjacent lane and conflict areas

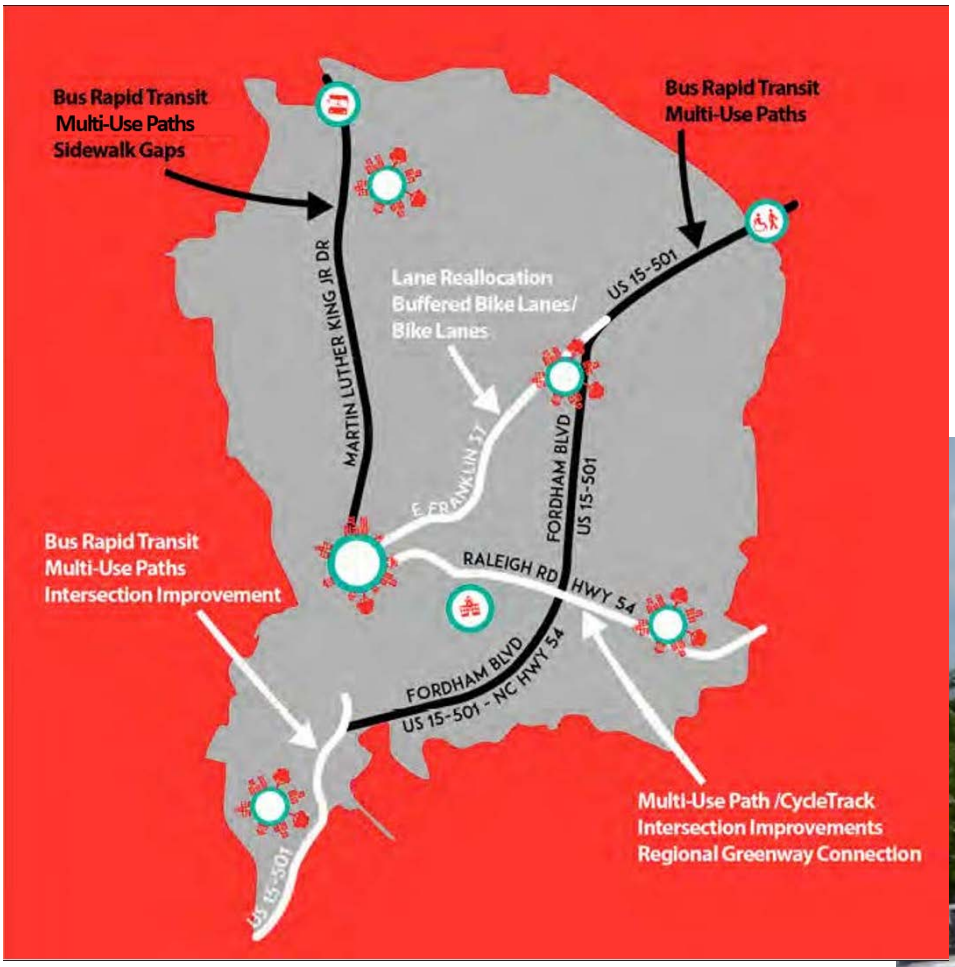
Hybrid/HAWK Signals

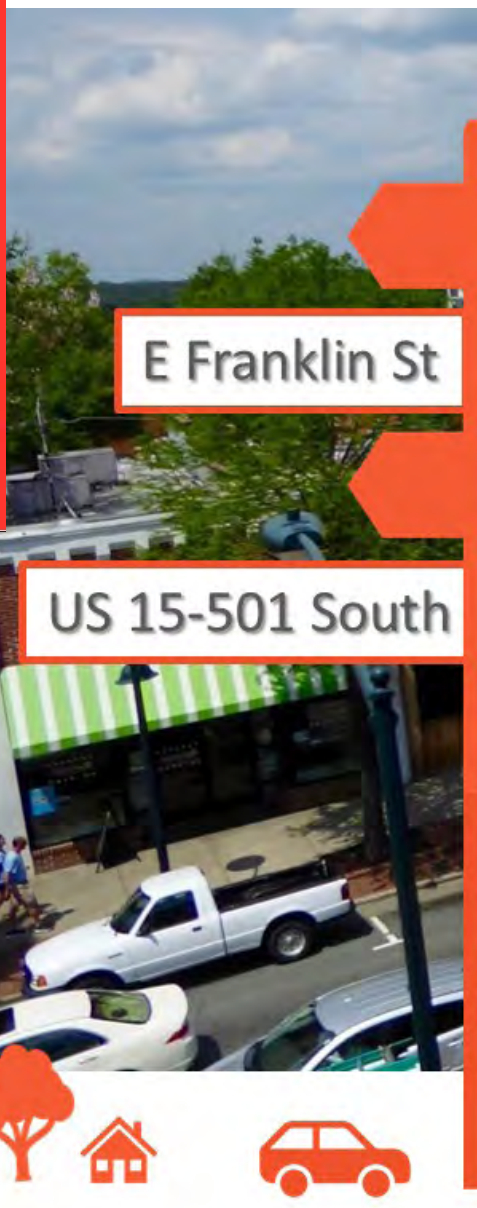
Special signals used for crosswalks/bike crossings on major streets where side streets do not warrant full signal

Improves crossing safety by creating gaps for pedestrians/ cyclists to cross busy streets

What is a Greenway Connector?

A greenway connector is a combination of signing, marking, traffic calming measures, and facilities that allow bicyclists and pedestrians to get safely from point A to point B in a priority corridor.





mobility

the ability to move freely and easily from one place to another

Developing Corridor Mobility

Chapel Hill's five main street corridors—Martin Luther King Jr. Boulevard, E Franklin Street, US 15-501/Fordham Blvd, US 15/501 South, and NC 54/Raleigh Road—all have four lanes or more of traffic. They primarily serve vehicles traveling in and through Town, with some transit accommodation. But they commonly lack continuous pedestrian and bike facilities. Each corridor has gaps in the existing network and filling those gaps should increase ped/bike mobility.

Developing Corridor Mobility
Martin Luther King Jr. Boulevard

what we heard

As many as 25% of the bicyclists are riding on the sidewalk in order to avoid traffic.

Source: Bicycle Counter, Martin Luther King Jr Blvd at Town Hall (2015)

Eubanks Park and Ride

Sidewalk Gap

Development Opportunity Areas

Crossing requests at Stateside Drive

Sidewalk Gap

Crossing requests at Carolina North Trails , Bicycle left turn actuation requested at Piney Mountain Road

Sidewalk Gap

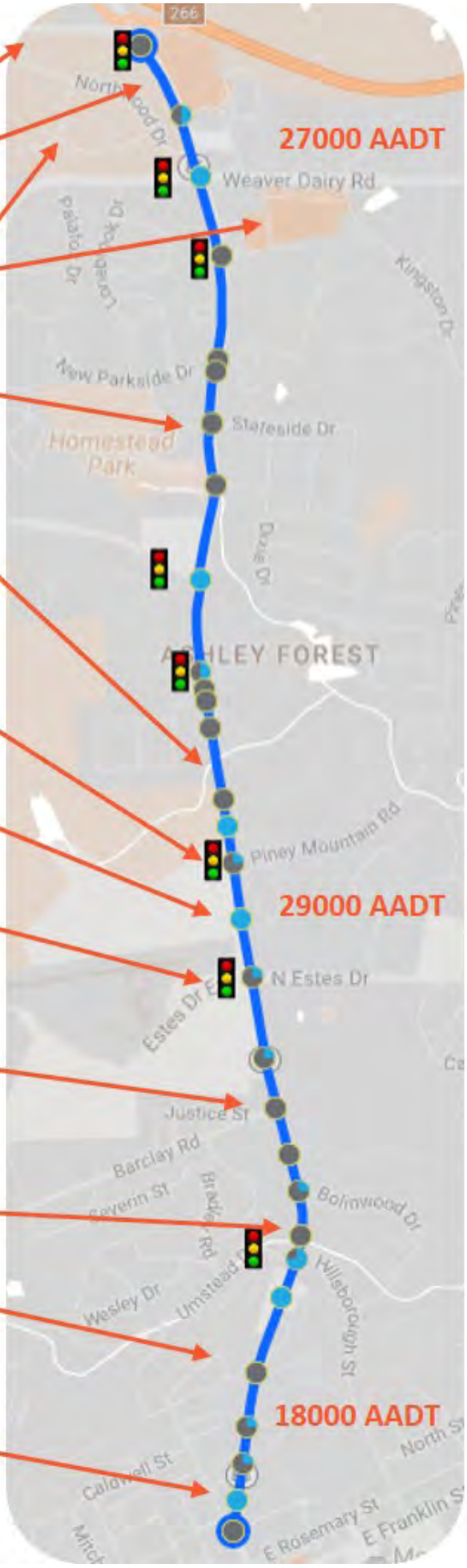
Estes Drive Connectivity Project adds crosswalks and landings on all legs

Crossing Requests at Barclay Road

Crossing requests at Bolin Creek Trail

Crossing Requests at Longview Street

Town Hall Continuous Count Station:
Average Annual Daily Pedestrians (670)
Average Annual Daily Bicyclists (100)



Crossing Opportunities

- No Crossings
- No Crossing of Minor Road
- Two Crossing Legs
- Three Crossing Legs
- All Crossing Legs (or Midblock)

Complete Street Corridors

Martin Luther King Jr Boulevard

Existing Conditions: Martin Luther King Jr Blvd is the most heavily traveled corridor for Chapel Hill Transit, with up to 13 buses per hour for 7 routes (5 regular service, 1 peak-hour, and 1 GoTriangle regional route). Yet, some pedestrian connections to bus stops are hindered by sidewalk gaps and only key bus stops have shelters and mid-block pedestrian crossings with median refuges. Sidewalks along the road are currently 5-feet wide with little or no buffer to fast-moving traffic and many signalized intersections lack crosswalks. In some cases, long distances between marked crossings mean residents cross the five-lane roadway and using the center two-way left-turn lane as a refuge between lanes of traffic.

There are no separated cycling facilities south of Homestead Drive and, with average daily vehicle volumes between 18,000 and 31,000, cyclists may not feel comfortable riding in traffic with sharrows. Counts in 2014-2015 near Town Hall showed that as many as 25% of the bicyclists are riding on the sidewalk in order to avoid traffic. This creates bike and pedestrian conflicts and highlights the need for safe and separated bicycle facilities.

short-term recommendations

Pedestrian facilities should be the short-term focus for improvements since providing separated bike faciilities will require major, long-term projects like road widening. Sidewalk work will create safe and convenient pathways to local destinations and to transit stops.

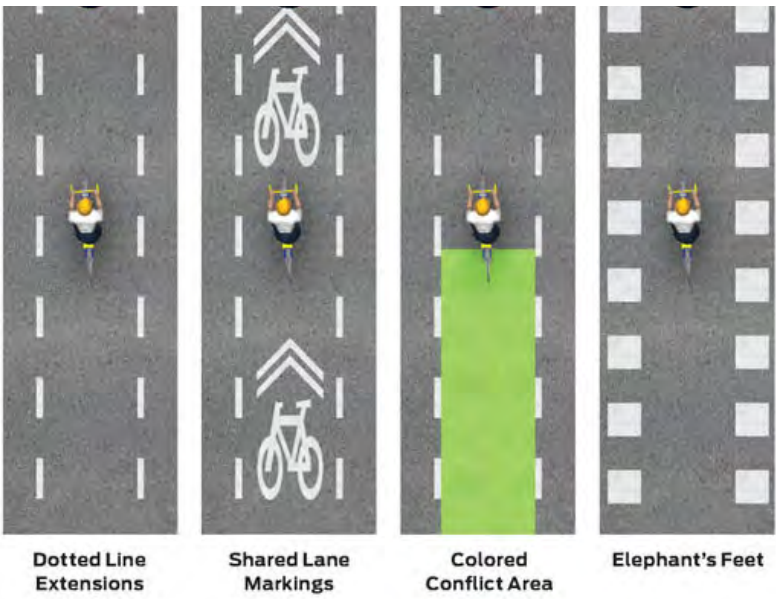
1 Fill **sidewalk gaps** and increase sidewalk width and buffers, most importantly from south of Ashley Forest Road to Northfield Road. Development and Town projects can aim to systematically reconstruct older sidewalk to the Town's required 6-foot width with 8-foot buffer.

3 Construct **Northwood/Perkins sidewalk connector** to replace a worn path along the Duke power easement used by locals that frequent the Chapel Hill North shopping center and adjacent bus stop.

2 Add pedestrian crossings to key intersections:

- **Barclay Road** to provide connections to Chapel Hill Transit
- **New Stateside Drive** to link Homestead Park to existing sidewalks and transit
- **Piney Mountain Road** to link to Carolina North Forest
- **Westminster Drive on the South side of the roadway**

4 Improve bike lanes and markings at major intersections to provide delineation for cyclists and motorists, encourage safe positioning, and increase visibility and awareness of cyclists in the intersection. North of Homestead Road, there are no accommodations at major intersections and bike lanes sometimes end before intersections to make room for turn lanes or medians. Pavement widths are usually adequate to provide bike lanes through the intersections marked by skips, bike lane symbols, and/or green paint. The markings could be combined with bike boxes for the side streets to create two-stage left turn options, aiding with difficult left turns identified in public comments.



Examples of various bike intersection markings
Source: NACTO Intersection Crossing Markings Design Guidance

5 Improve bicycle signal actuation at major intersections by installing detectors or fine-tuning loop sensitivity, in particular for the bike lane approaches at the Weaver Dairy Road intersection.

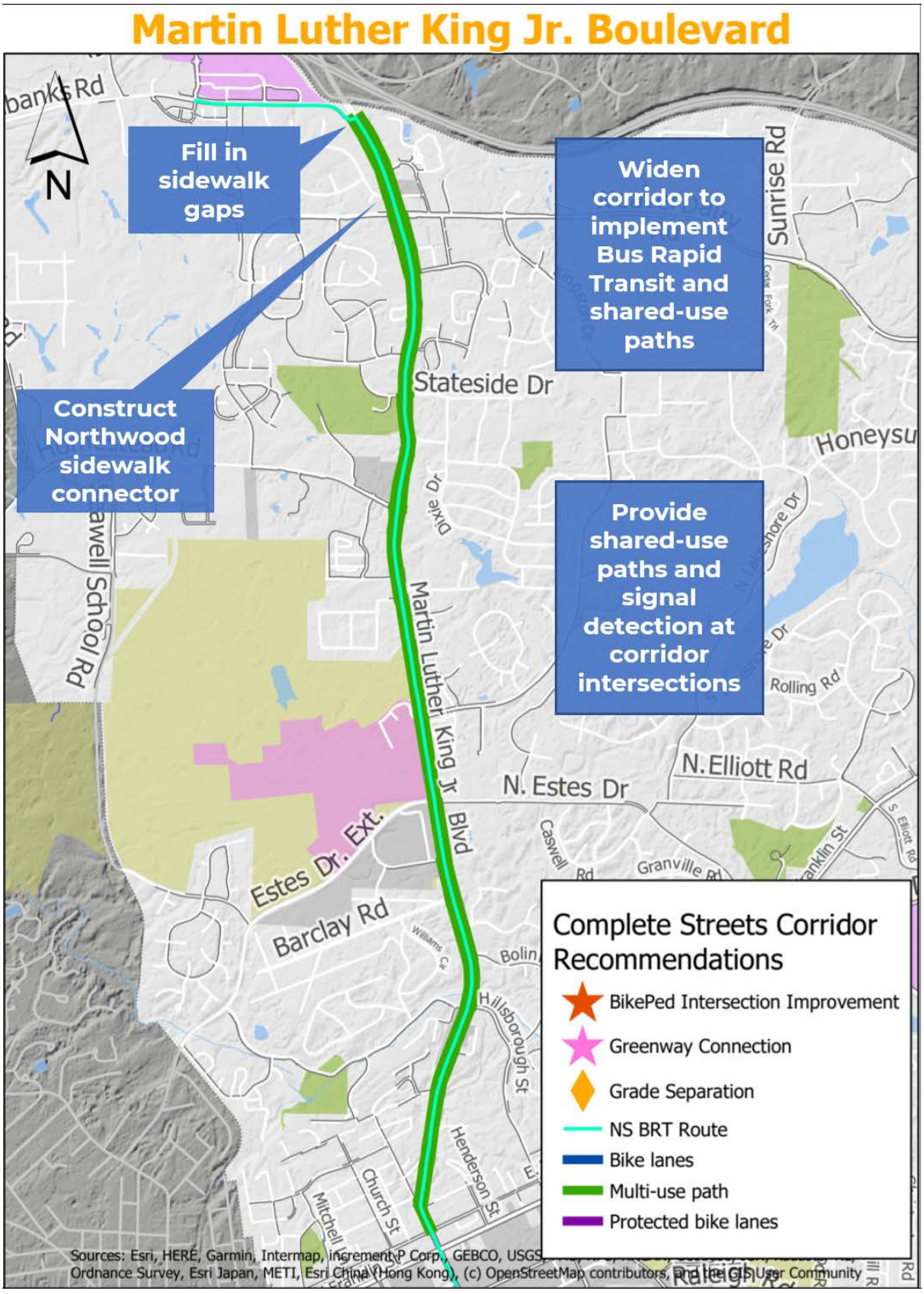
6 Improve connections with Bolin Creek and Carolina North Trails by providing paved paths linking to sidewalks on both sides of the street and curb cuts for cyclists to exit from existing travel and future bike lanes.

long-term recommendations

While the Martin Luther King Jr Blvd corridor is presently a multimodal corridor, long-term recommendations aim to improve all modes. This corridor is part of a future Bus Rapid Transit (BRT route that will go between the Eubanks Park-and-Ride and the Southern Village Park-and-Ride). With BRT implementation, an opportunity exists to transform the corridor into a true Complete Street in the future.

The recommended cross-section includes multi-use paths to increase riders' comfort and upgraded sidewalks to fill in corridor gaps and connect to destinations. The image below shows a 122-foot cross section for the corridor with bus rapid transit, widening to a maximum of 154 feet at key intersections where stops and turn lanes are needed.

Bus Rapid Transit typical concept for Martin Luther King Blvd



Complete Street Corridor Recommendation for Martin Luther King Blvd

East Franklin Street

Existing Conditions: Franklin Street connects Downtown Chapel Hill to the Ephesus-Fordham District and US 15-501 as a four-lane undivided or divided street. It intersects the Bolin Creek and Booker Creek Trails. Improved connections along this corridor would link Downtown and UNC, commercial and retail centers, and the access points to the greenway system. Existing sidewalks along E Franklin St are of minimum width (4 to 5 feet) and have little or no buffer to traffic. There are two regular and two peak hour transit routes serving the corridor.

what we heard

Difficult pedestrian crossing at Elliot Road due to high volumes and right-turn-on-red violators.

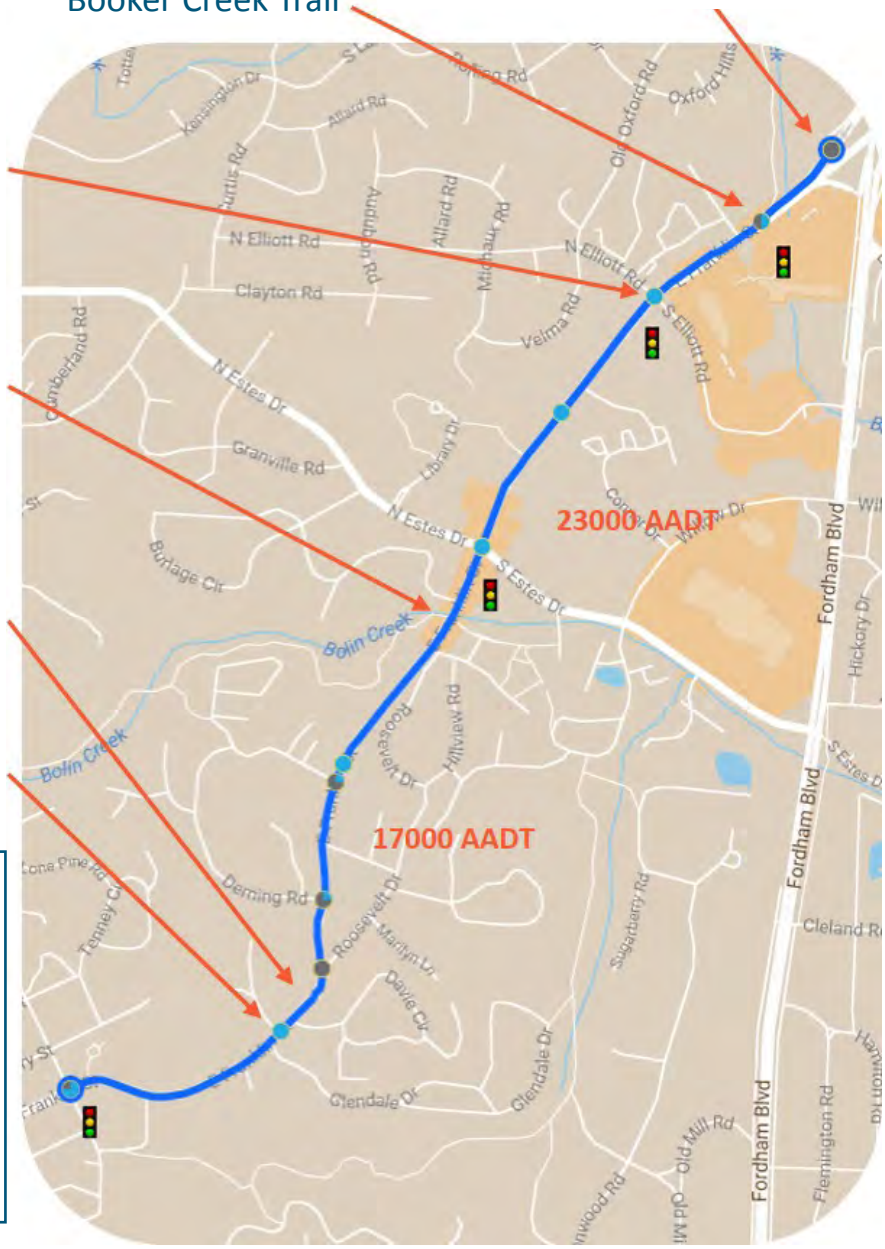
Bolin Creek Trail Connection to Franklin Street via stairs and side roads

Bicyclists often ride on the sidewalk

Four-lane mid-block crossing with no pedestrian refuge

Booker Creek Trail

Desired bicycle and pedestrian connection with Dobbins Drive



Crossing Opportunities

- No Crossings
- No Crossing of Minor Road
- Two Crossing Legs
- Three Crossing Legs
- All Crossing Legs (or Midblock)

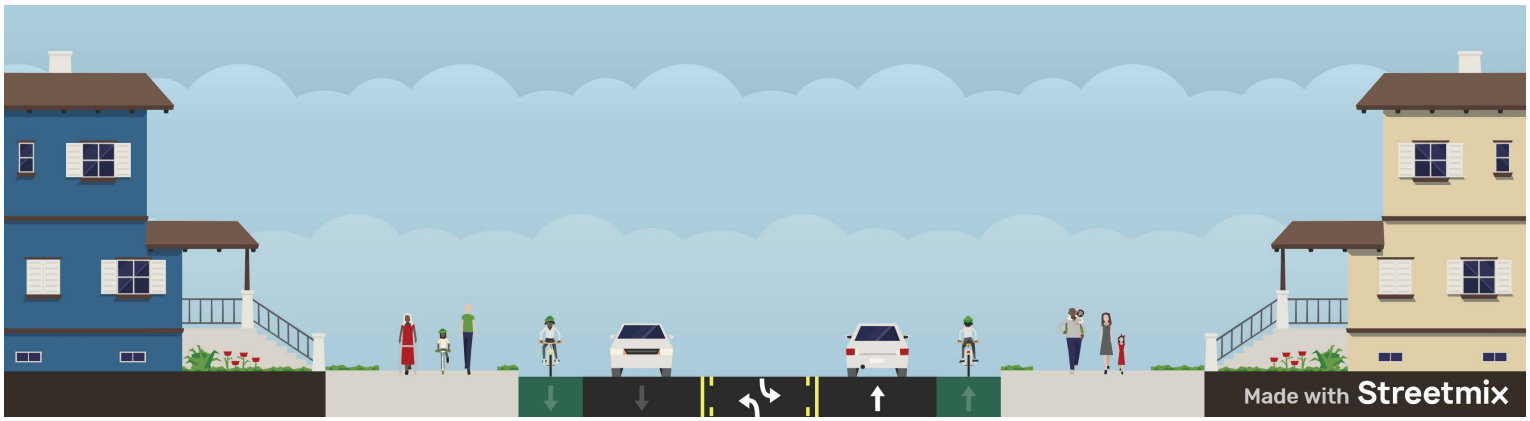
short-term recommendations

A large number of residents requested separated bike facilities along this route.

1

Current traffic volumes west of Estes Drive have been level at 17,000 vehicles per day for roughly the past five years. While this is near the upper limit of capacity for a three-lane roadway, it presents the opportunity to reallocate space from one of the four travel lanes and convert the cross-section to three lanes with buffered bike lanes and multi-use paths along the steep, mostly residential section from Downtown to the Bolin Creek Greenway. A center-turn lane allows space for pedestrian refuge islands to be added at mid-block cross-ings near transit stops. Streetscape and sidewalk enhancements can be implemented with redevelopment or as Town-initiated projects.

E Franklin St from Boundary St to Deming Rd
3-lane Conversion with Bike Lanes and Multi-use Paths

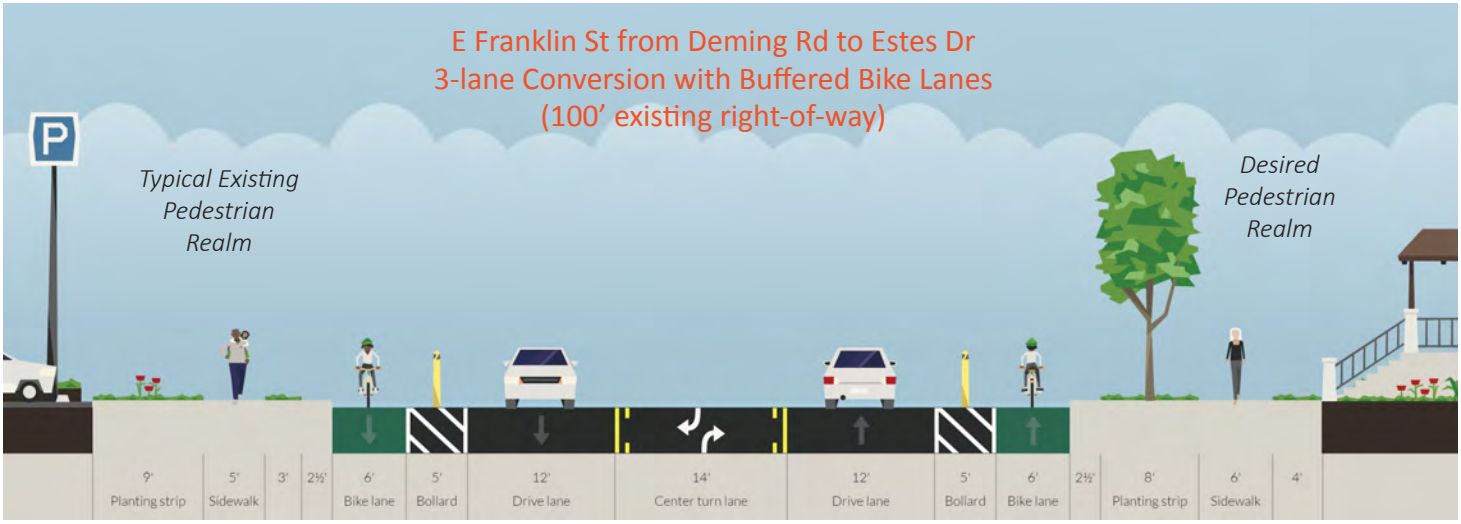


East Franklin Street lane reallocation east of Boundary Street to Deming Road

Traffic volumes east of Estes Drive are too high to eliminate travel lanes for bike facilities. Immediate improvements can be made by implementing the 5-lane concept, which would reduce travel lanes to 10 feet and add 5-foot bike lanes.

2 The roadway widens to five lanes and the right-of-way to 100 feet east Deming Road. Intermediate improvements for this segment include both 3- and 5-lane options, listed below:

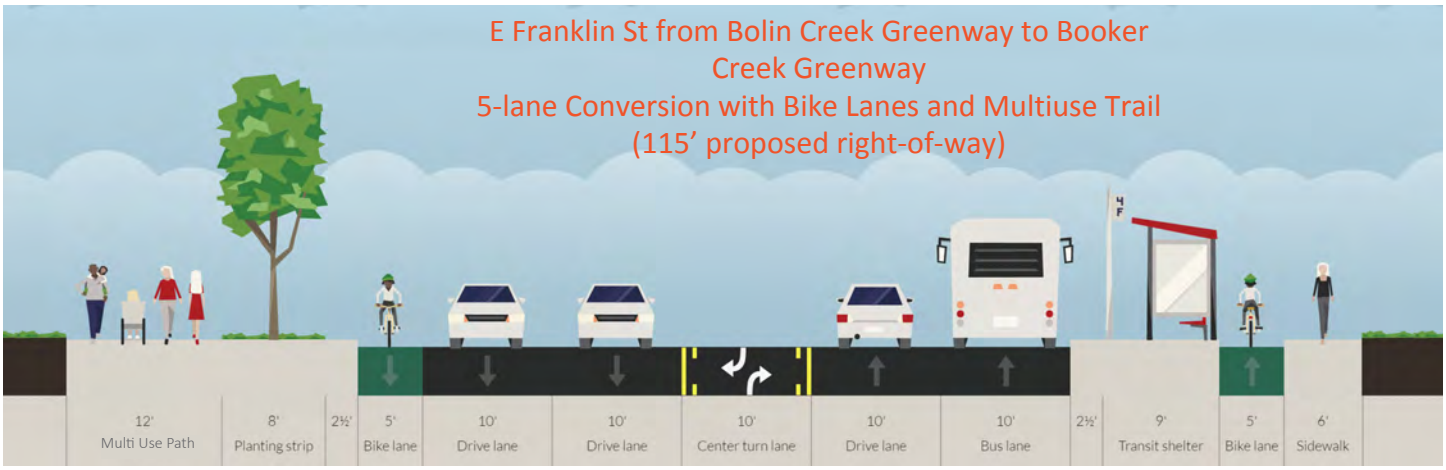
- Converting to a 3-lane segment by reallocating the outside lanes to buffered bike lanes and widening center turn lanes to 14 feet (recommended).
- Maintaining the 5-lane segment and adding 5-foot bike lanes by reducing the travel lane widths to 10-feet, as called for in the Chapel Hill Bike Plan.



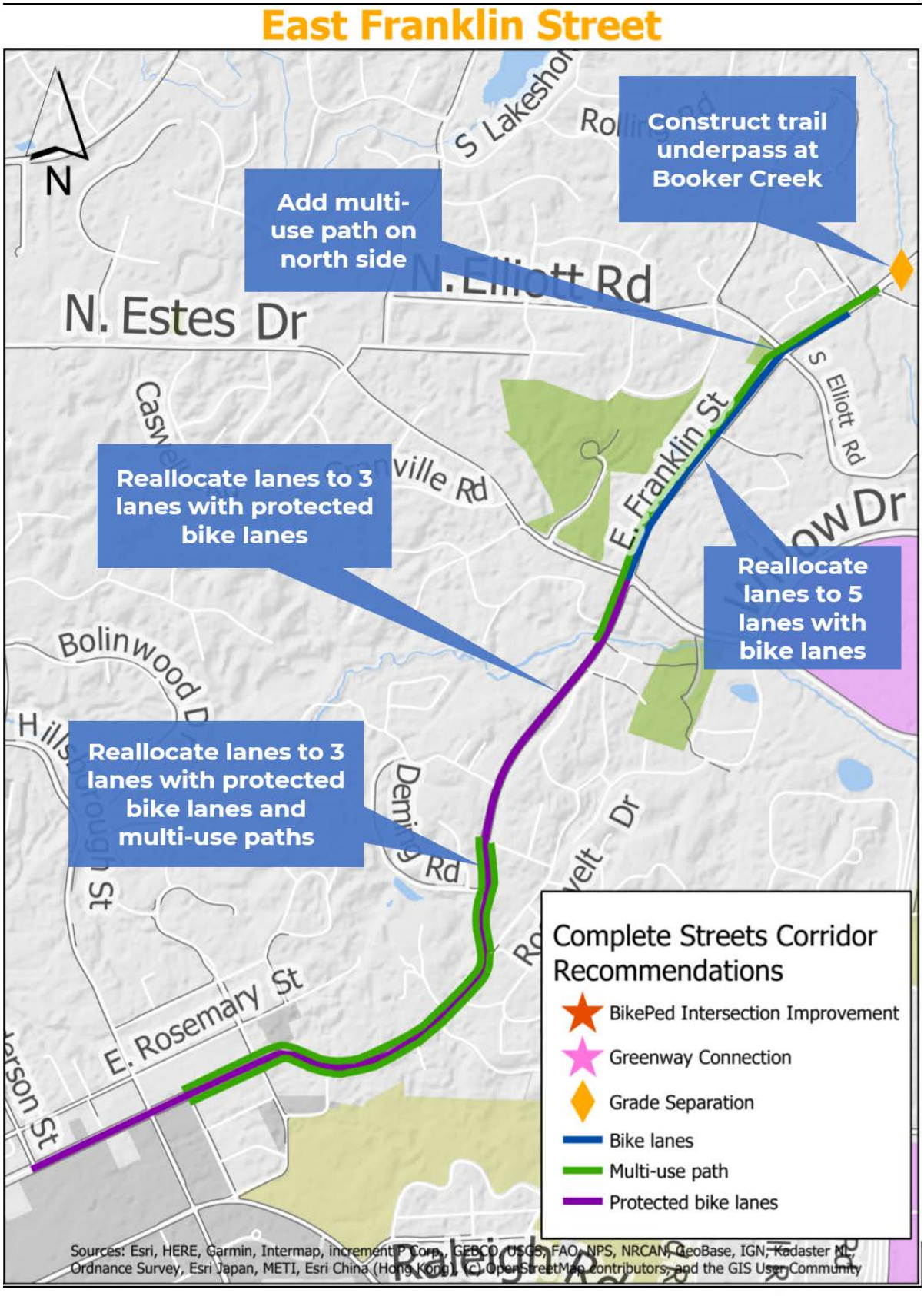
East Franklin Street lane reallocation east of Deming Road to Estes Drive

long-term recommendations

Since E Franklin St varies significantly along its length, the proposed cross-sections will need to be context sensitive in order to minimize impacts to abutting properties. The short-term recommendations establish the recommended bike facilities within the existing curblines, so the main additions in the long-term are to provide proposed shared multi-use trails on north side of the street to link the Bolin and Booker Creek Trails and on both sides of the street from Boundary Street to Deming Road. As transit service increases on the corridor, special consideration should be made to relocate the bike lanes behind bus stops to eliminate bus/bike conflicts.



Ultimate cross section east of Estes Drive



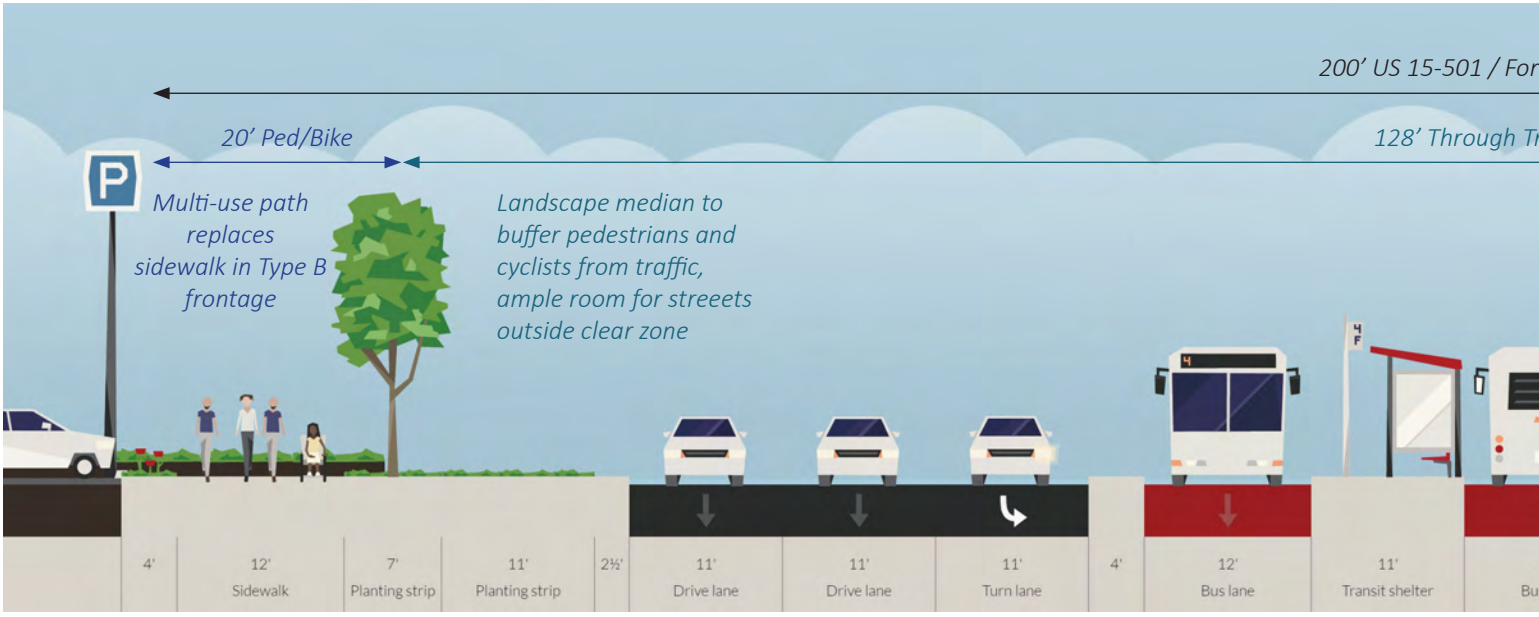
Complete Street Corridor recommendations for E Franklin Street

US 15-501 Fordham Boulevard

Existing Conditions: Comments from the public input show that US 15-501 is perceived as being difficult to navigate as a bicyclist or pedestrian. Any connection between Ram's Plaza and Eastgate Shopping Center requires crossing US 15-501 and heavy traffic, whether on foot or in a car. Sidewalk gaps make it difficult for pedestrians to access bus stops at Ram's Plaza, with residents noting gaps on the south side of Elliott Road, on Europa Dr, along US 15-501, and on Ephesus Church Road.

short-term recommendations

NCDOT and the Town continue to plan and construct intersection improvements to help resolve congestion on the corridor. NCDOT is conducting a feasibility study looking at future widening and improvements, with funding for construction slated to begin around 2025. That study will hopefully indicate that the future of Fordham Boulevard must include all modes to meet the vision of a revitalized District supportive of transit, bicycling, and walking. To create an effective bike and pedestrian network through the Ephesus-Fordham District, there has to be a shared focus on internal and external connections between neighborhoods and the area shopping centers, schools and libraries.

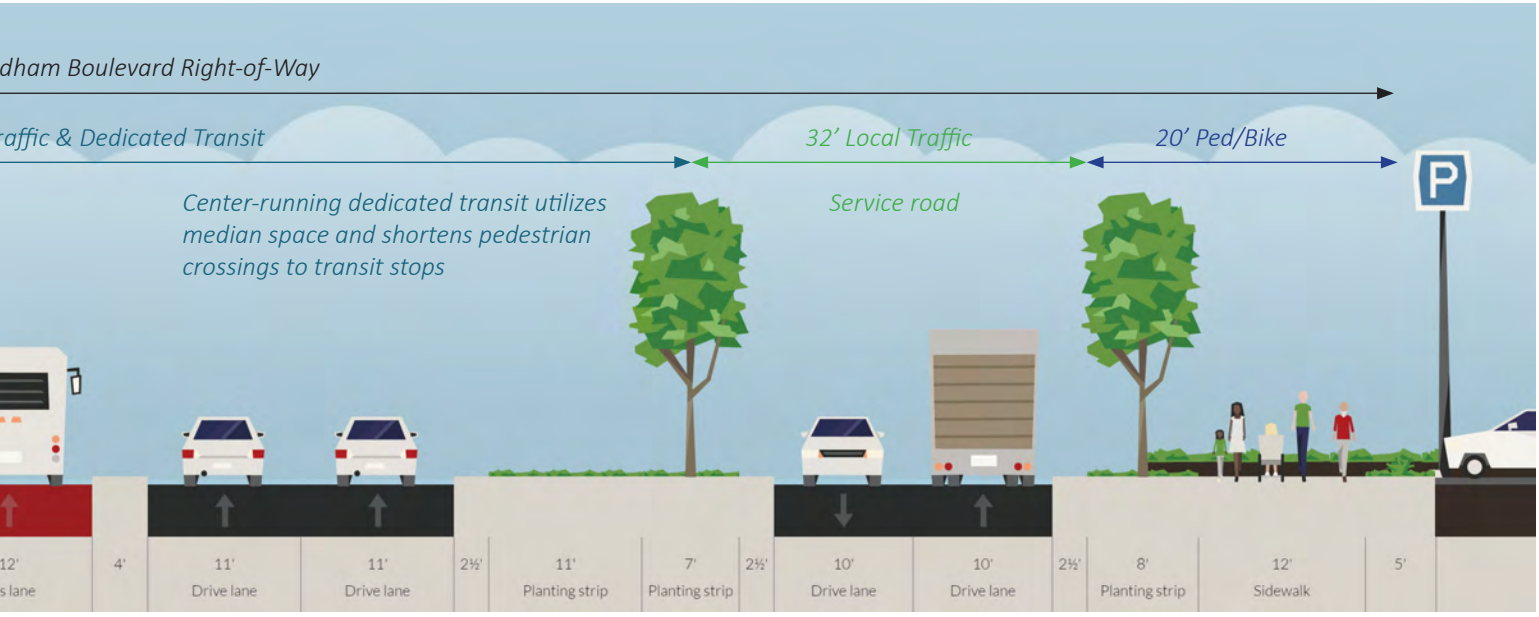


Recommended Fordham Boulevard Complete Street Cross Section

1 US 15-501 connects with major bike facilities along Sage (existing) and Old Durham Roads (proposed) to the north and the Lower Booker Creek and Bolin Creek Trail to the south. To facilitate the low-stress connections that were emphasized in public input, the corridor is recommended to include multi-use pathways along both sides of the roadway. The multi-use paths would replace the six-foot sidewalks required on certain frontages within the District and accompany any redevelopment in the area. The paths would connect to the Booker Creek Trail near Franklin Street and Bolin Creek Trail near Elliot Road. Future bike accommodations to connect to these paths should include buffered bike lanes for Elliott Road as well as bike lanes for Ephesus Church Road, Legion Road, and Erwin Road.

2 Intersection enhancements at US 15-501 with Willow Drive and Elliott Rd in the short term can include signal actuation for bicyclists, repositioned stop bars, pedestrian refuge islands, and crossings to all four corners with ADA-compliant curb ramps.

3 A HAWK signal to allow pedestrians and bicyclists to safely cross US 15-501 at Oteys Rd providing accessibility for neighborhoods to the south, the Morgan Creek Trail, and Fan Branch Trail.



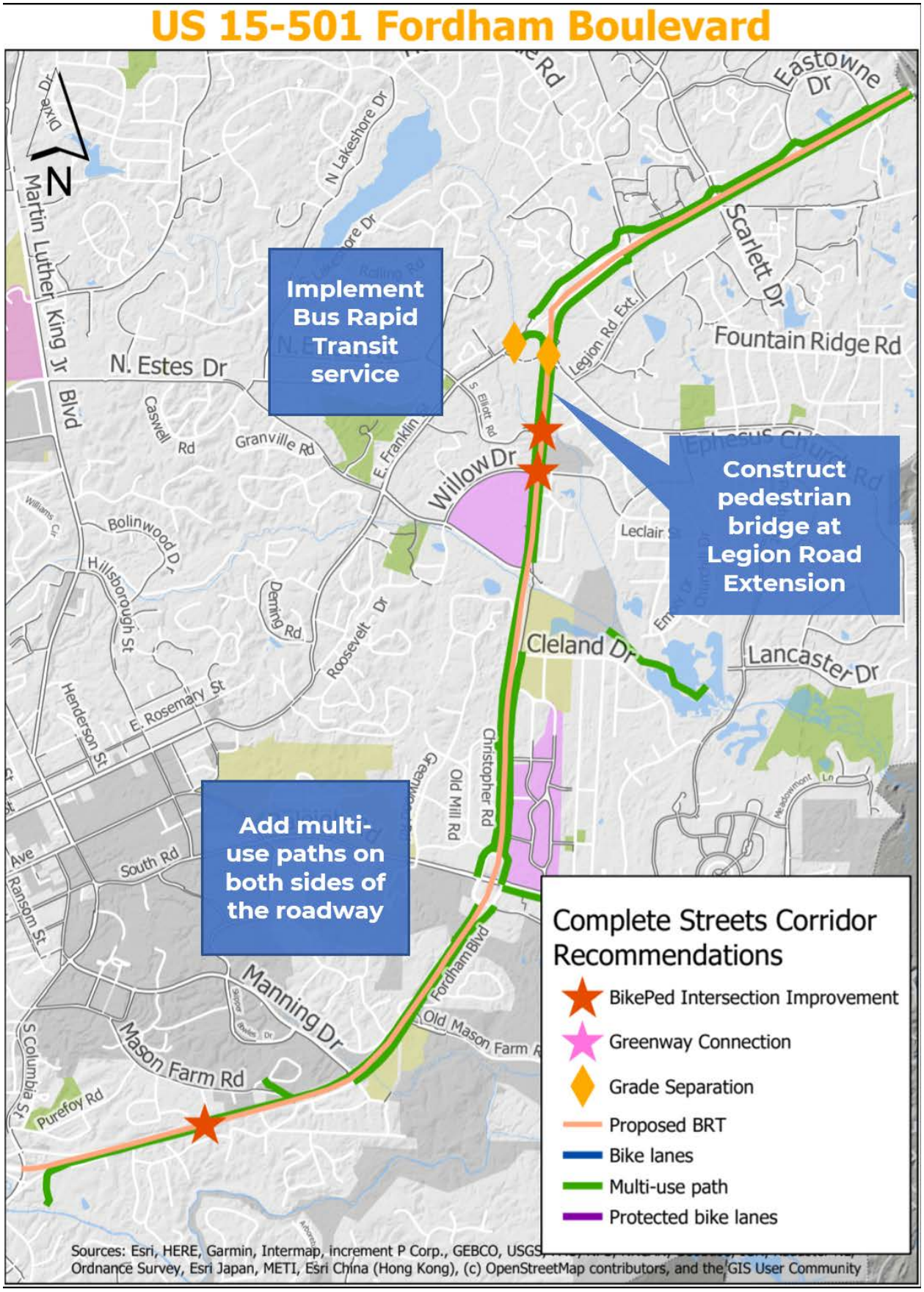
long-term recommendations

While US 15-501 is currently not planned for dedicated transit infrastructure such as light rail or bus rapid transit (BRT) in the Orange County Transit Plan, the ultimate cross-section shown in Figure 40 has been developed with a Complete Streets concept to preserve the option for dedicated transit lanes in the center median. Center-running BRT has several advantages over curb-running alternatives including eliminating conflicts with right-turning vehicles and bicycles, allowing exclusive signal phasing for transit. It also reduces the length of pedestrian crossings and provides a refuge. Because transit stops can serve both directions between the bus lanes, a center-running option also reduces the right-of-way width needed for operations.

The public input showed that there was considerable need for safe, low-stress pedestrian crossings of US 15-501.

Options for crossings developed in 2015 include bridge alternatives for US 15-501 and E Franklin Street. In evaluating the options, a bridge crossing at the future Legion Road extension offers the best potential to incorporate a multi-use path as part of future redevelopment. While a pedestrian overpass at that location will not provide the most direct connection to the Lower Booker Creek Trail, the facility could extend over the open space behind Village Plaza along Booker Creek recommended for stormwater control. The bridge cost is estimated at $3.0 million (2017 $), not including ramps accessing transit in the median. Approximately $1.9 million of that cost is associated with the section that would span the Booker Creek open space.

For information on the Ephesus-Fordham District Plan, see **Appendix D**



Complete Street Corridor recommendations for US 15-501 Fordham Boulevard

US Highway 15-501 South

Existing Conditions: US 15-501 south of Chapel Hill continues to see tremendous growth, with large developments such as Obey Creek. The roadway itself is four-lane divided and provides sidewalks and bike lanes for most of its length south of the NC 54 interchange. There are bicyclist and pedestrian concerns about crossing US 15-501 at Mt. Carmel and Culbreth Roads, navigating the US 15-501/NC 86 interchange, and accessing the greenway system along Morgan Creek and Merritt's Pasture.

what we heard

Transit stop not accessible by residents on Mt Carmel Church east of US 15-501.

No pedestrian crossing of US 15-501. Pedestrian signal needed.

Bicyclists making turns are not detected, requests for bicycle facility striping and signal improvements on approaches to US 15-501.

Intersection improvements needed for pedestrians to cross US 15-501. Transit stops not accessible.

Southern Village Park and Ride and Proposed Bus Rapid Transit Station

Morgan Creek Trail

Sidewalk Gap, No safe access to Morgan Creek Trail

Bicycle facility and traffic calming requests from public

Sidewalk gaps

Obey Creek Development Area

Southern Community Park and Playground

Crossing Opportunities

- No Crossings
- No Crossing of Minor Road
- Two Crossing Legs
- Three Crossing Legs
- All Crossing Legs (or Midblock)

short-term recommendations

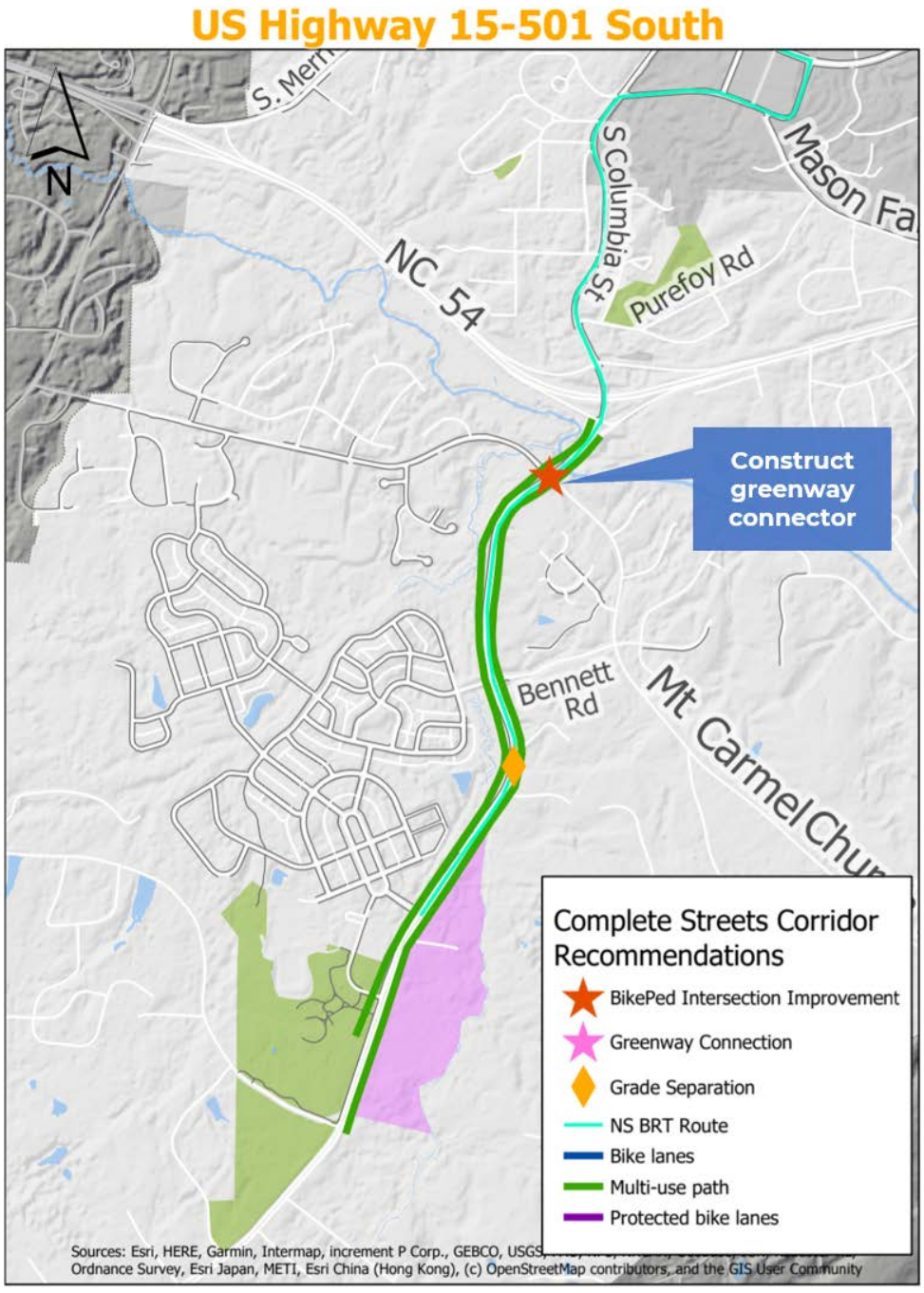
Many of the concerns and issues identified are being addressed by the Obey Creek development a ped-bike bridge across US 15-501 connecting Obey Creek and Southern Village, and a multi-use path parallel to US 15-501 along the property frontage. Beyond the Obey Creek improvements and the presence of multi-use paths and greenway connectors in Southern Village, the short-term focus for the corridor includes:

1. Improve bike lanes and markings at the Mt. Carmel Church/Culbreth intersection: Providing marked bike lanes with skips and bike lane symbols or green paint will provide delineation of space for cyclists and motorists, encourage safe positioning, and increase visibility and awareness of cyclists in the intersection. The markings could be combined with bike boxes for the side streets to create two-stage left turn options.

2. Construct a greenway connector from Mt. Carmel Church Road to Fan Branch Trail: The Fan Branch Trail provides a great link from Southern Village to the Morgan Creek Trail south of US 15-501, but no such connection exists for residents east of US 15-501. The developer of the parcel in the northeast quadrant of the Mt. Carmel intersection has offered to provide greenway easements as part of the development approval process, so the key hurdle will be designing an ADA-compliant grade across steep topography to link under the US 15/501 bridge to Fan Branch Trail.

long-term recommendations

With the provision of a multi-use path along the frontage of Obey Creek and a bike/ped network in Southern Village, the Town may consider eliminating the recommendation for buffered bike lanes along US 15/501 south of Fordham Boulevard. The existing cross-section of US 15-501 therefore is the ultimate cross-section and no widening is needed.

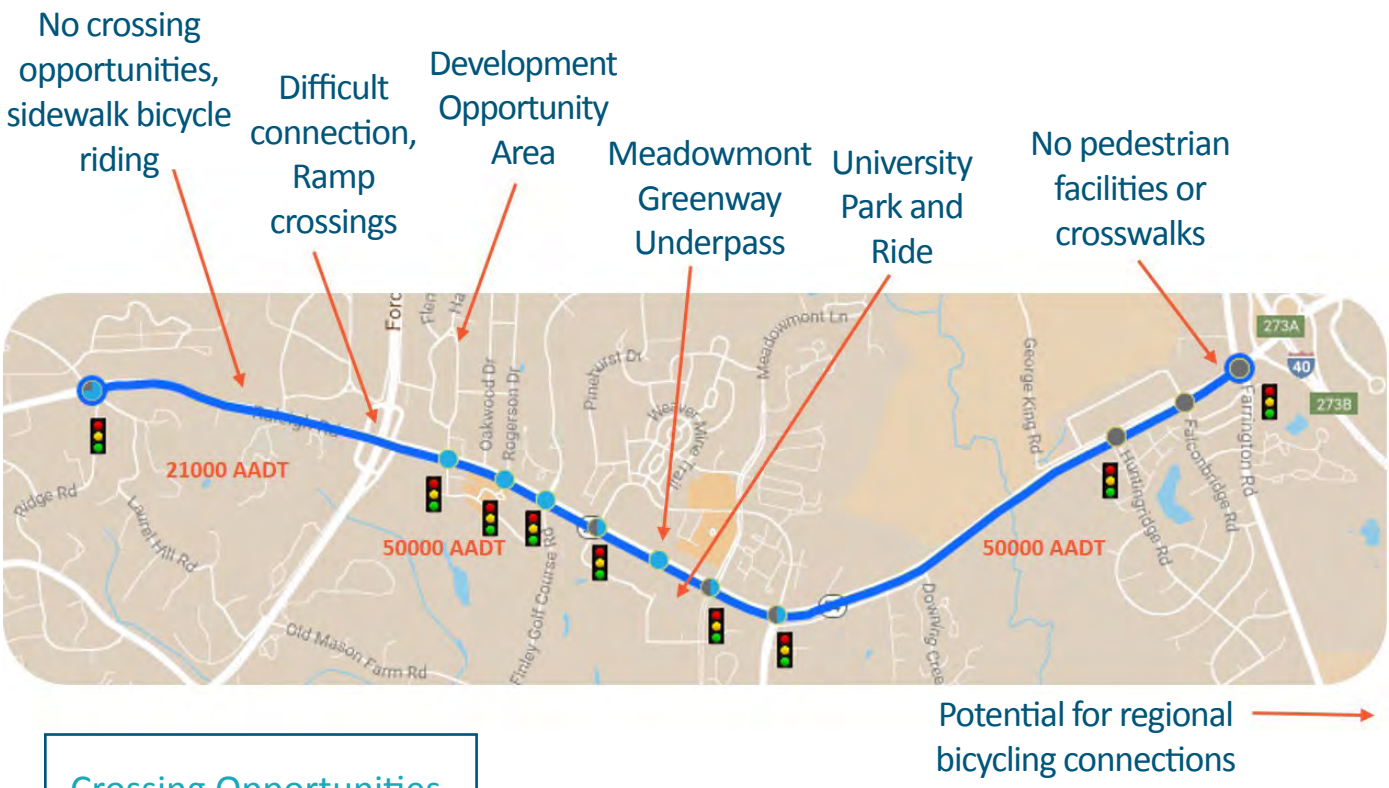


Complete Street Corridor recommendations for US 15-501 South

NC 54 Raleigh Road

Existing Conditions: NC 54 Raleigh Road shuttles travelers in and out of town as a four-lane divided highway, with the segment near Meadowmont Village expanding out to six-lane divided. While there are multi-use paths on both sides of the street between Barbee Chapel Road and Hamilton Road/ Burning Tree Drive, no additional facilities are present beyond standard sidewalks. Traffic volumes are considerably higher east of the US 15-501 interchange (50,000 vehicles per day to the east vs. 21,000 to the west) and the interchange with its ramps represents a significant barrier to cycling and walking. Raleigh Road follows a significant grade from Greenwood Road west to Ridge Road at the edge of campus.

what we heard



Crossing Opportunities

- No Crossings
- No Crossing of Minor Road
- Two Crossing Legs
- Three Crossing Legs
- All Crossing Legs (or Midblock)

short-term recommendations

Multi-use paths are in place east of the US 15-501 but they do not connect through the interchange. The key short-term recommendations focus on intersection crossings at the interchange of US 15-501, near Meadowmont and the continuation of bike facilities west of the interchange to UNC Campus:

1. Installing signalized pedestrian crossings at:
   - the US 15-501 ramps at Highway 54.
   - the intersection with Meadowmont Lane/ Friday Center Drive, and
   - both intersections with Barbee Chapel Roads

2. Developing an uphill climbing lane from Fordham Boulevard to Ridge Road.

Residents feel safe using this signalized pedestrian crossing

long-term recommendations

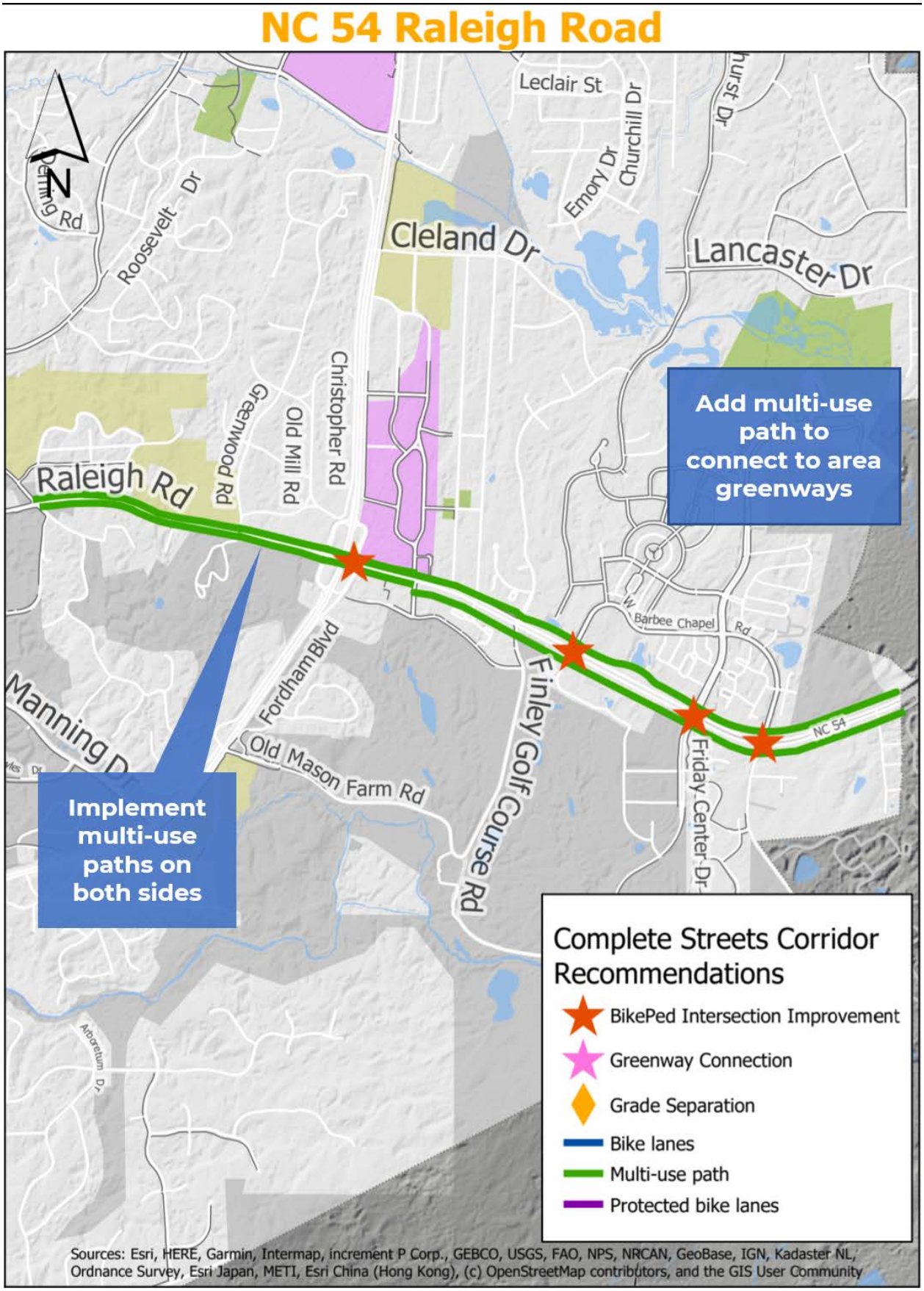
With existing development and topography, it is unlikely a cost-effective bike facility will be built on the north side of the street west of Hamilton Road without major right-of-way impacts. Such an improvement may be best left to implementation with redevelopment of the adjacent commercial sites. Therefore, feasible options for adding a pedestrian and bike link across US 15-501 could be (1) a coordinated multi-use path improvement to connect with a potential signalized mid-block crossing of US 15-501 (to be constructed as part of the Glen Lennox development) or (2) the addition of facilities through the interchange if it is replaced as part of a NCDOT project.

Battle Branch Trail could offer traffic-weary pedestrians and cyclists a parallel option to Raleigh Road. But with a reluctance by residents to improve the single track natural surface trail, two options are possible on the Raleigh Road corridor itself:

1. Construct a multi-use trail on both sides of Raleigh Road from Hamilton Road to Country Club Road: A single shared used path may not be sufficient due to the speed differentials between cyclists traveling downhill (eastbound) and with cyclists climbing uphill (westbound) sharing the space with pedestrians and transit users.

2. Reallocate lane space to provide a separated cycle track on the north side of Raleigh Road: The segment of Raleigh Road west of Greenwood is wider than 50 feet curb-to-curb. This provides the opportunity to add either full bike lanes (if width is 50 feet) or a protected cycle track (if width is 52 feet or greater). Either of these facilities will provide space for cyclists within the existing roadway by reducing the travel lanes to 10 feet to encourage slower vehicle speeds. If a separated facility is selected, the bikeway will buffer pedestrians from vehicular traffic as well and foot traffic will likely increase with more comfortable space for pedestrians and transit users.

The Town should coordinate with the City of Durham and the Durham-Chapel Hill-Carrboro MPO to plan the extension of multi-use paths east as part of the Triangle Bikeway study. There is a 3-mile gap separating the multi-use paths on Highway 54 from a regional network. Filling the gap would provide access for Chapel Hill residents to the American Tobacco Trail and the East Coast Greenway.



Complete Street Corridor recommendations for NC-54 Raleigh Road

Priority Bicycle/Pedestrian Corridors

While the five roads described in the previous section serve as the Town's major vehicular corridors, no similar system exists for non-motorized transportation in Town. Understanding the public's desire to have low-stress transportation options, six priority bike/ped corridors have been developed to connect the key focus areas of the town—Downtown, MLK/I-40, South MLK, Highway 54, North US 15-501, and South US 15-501. By connecting these destinations, residents of the Town will be able to use local street and trail connections to travel throughout Chapel Hill and ultimately access the greater Triangle greenway and bike network.

As priority corridors, projects along these six routes would be given favored status for funding.

Priority Non-Motorized Corridors recommended to complement Major Complete Street Corridors

connectivity

the quality of having the parts or elements logically linked together

Timberlyne Trail

This priority corridor connects the northwestern redevelopment zone along I-40 to downtown Chapel Hill. In the northern portion, it utilizes a low-stress trail option for bicyclists and pedestrians via an existing utility corridor and parallels the proposed Bus Rapid Transit along Martin Luther King Jr. Blvd where there are higher traffic volumes and speeds.

The majority of the trail is proposed in a utility easement, which is land granted by property owners to the utility company for the purpose of constructing, operating, and maintaining powerlines and equipment. A trail would require an additional access easement across approximately 50 properties for purposes of building and maintaining a multi-use path.

Access to future BRT and linkages to adjacent neighborhoods are made possible through several paved connections to the Timberlyne Trail. In the southern portion, the corridor joins Martin Luther King Jr Blvd south of Estes Drive. At this location, protected bike lanes are recommended alongside the Bus Rapid Transit corridor into downtown Chapel Hill.

Improvement Type

1. Timberlyne Trail
   Duke Utility Easement
   from Weaver Dairy Road to
   Martin Luther King, Jr. Blvd
   2.52 miles

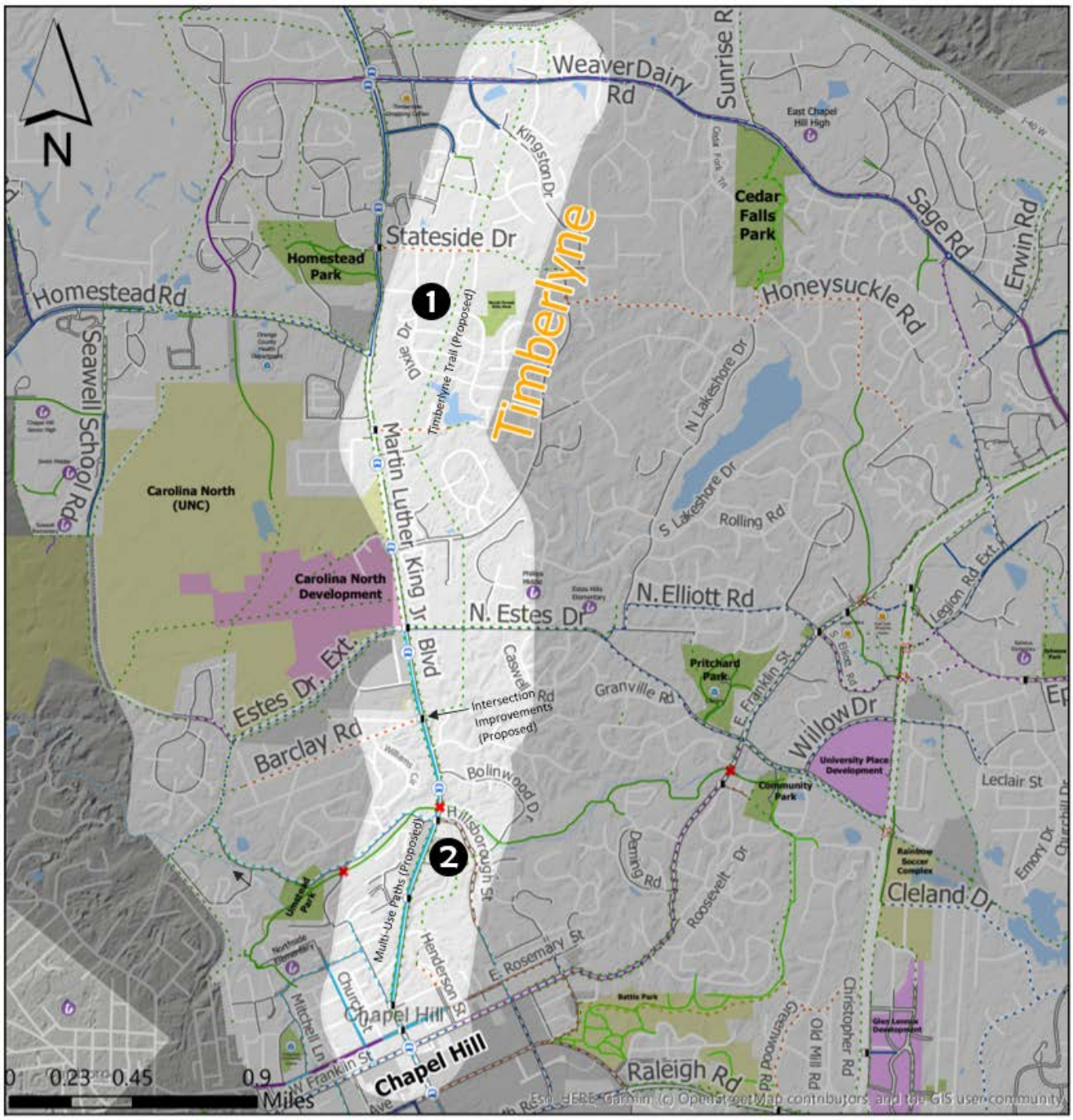
2. a dzfûñπ ¦ ăŜ tI·úKă
   Martin Luther King, Jr. Blvd
   1.24 miles

Total Length **3.86 miles**

Key destinations

along and near the corridor include:

- Downtown Chapel Hill/UNC
- Umstead Park/Bolin Creek Trail
- Estes Hill ES/Phillips MS/Estes Drive Multi-use Trail
- Homestead Park/Chapel Hill Aquatic Center
- Timberlyne Shopping Center
- Town Hall
- Chapel Hill/Carrboro YMCA
- Carolina North
- North Forest Hills Park
- Timberlyne Shopping Center



Town park | UNC campus | Major development | Other park

Future BRT | Crosswalk improvement | Existing underpass | Proposed underpass/overpass

	EXISTING	PROPOSED
BICYCLE	Bike Lane	
	Buffered/Protected Bike Lane	
	Sharrows	
	Signed Bike Route	
	On-Street Greenway Connector	
	Cycle Track	
	Bike Climbing Lane	
MULTI-USE	Multi-Use Path/Greenway	
	Unpaved Greenway	
	ADA Trail	
PEDESTRIAN	Sidewalk	

Priority Bicycle/Pedestrian Corridors

TOWN OF CHAPEL HILL

Mobility Plan 2020 Complete Streets Update

Treelyne Trail

Taking advantage of existing greenways, planned greenways, and a network of low-stress on-street connectors, the Treelyne Trail priority corridor links northern neighborhoods, central neighborhoods, and two parks to the Ephesus-Fordham District. A future underpass will replace the existing Franklin Street at-grade crossing to connect the Lower Booker Creek Trail to the Ephesus-Fordham District.

Key destinations

along and near the corridor include:

- Carraway Village Development
- Eubanks Park and Ride
- Homestead Park/Chapel Hill Aquatic Center
- Upper Booker Creek Trail
- North Forest Hills Park
- Cedar Falls Park/East Chapel Hill High School
- Lower Booker Creek Trail
- Ephesus-Fordham District

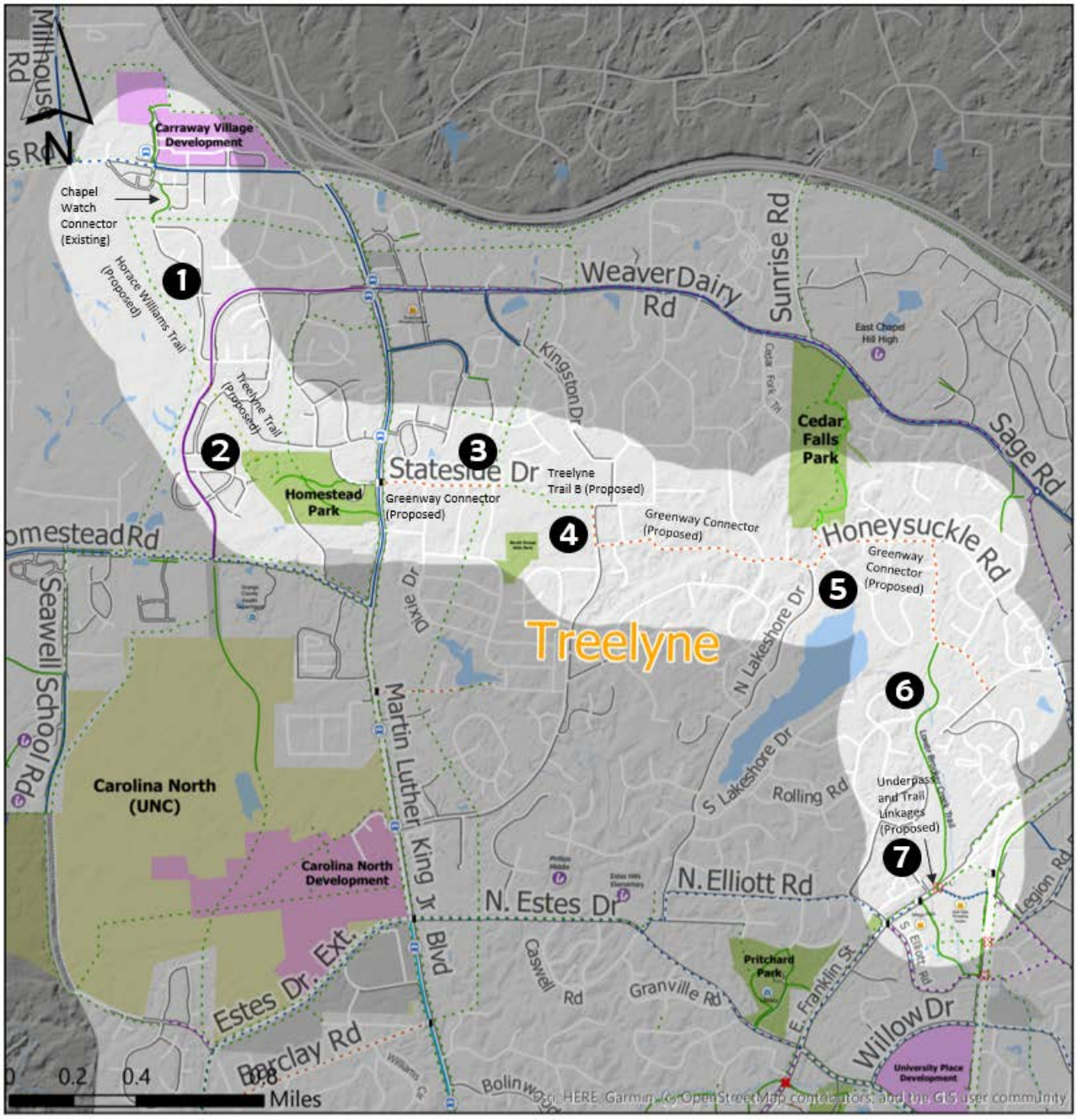
Improvement Type

1. **Horace Williams Trail**- Trail from Carraway Village to connection with Homestead Trail at Weaver Dairy Rd (16% Complete) — **0.95 mile**
2. **Treelyne Trail A** - Homestead Park to Chapel Hill Aquatic Center and Vineyard Square neighborhood — **0.75 mile**
3. **On-Street Greenway Connector** - Bicycle markings, wayfinding, and sidewalks along Stateside Drive from Homestead Park to North Forest Hills Park — **0.53 mile**
4. **Treelyne Trail B** - Stateside Dr through North Forest Hills Park to Piney Mountain Rd — **0.31 mile**

Improvement Type

5. **On-Street Greenway Connector** - Bicycle markings, wayfinding, and sidewalks along Piney Mountain Rd to Booker Creek Rd via Riggsbee Rd, Brookview Dr and Honeysuckle Rd. Uphill portions recommend min. bicycle climbing lane. — **1.57 miles**
6. **Little Booker Creek Trail** - Honeysuckle Road to E. Franklin Street (100% Complete) — **0.80 mile**
7. **Underpass and Trail Linkages** - Underpass of Franklin St; Greenway and sidewalk linkages in Ephesus-Fordham and Dobbins Dr — **0.46 mile**

Total Length 17% Complete — **5.37 miles**



Town park | UNC campus | Major development | Other park

Future BRT | Crosswalk improvement | Existing underpass | Proposed underpass/overpass

	EXISTING		PROPOSED
BICYCLE		Bike Lane	
		Buffered/Protected Bike Lane	
		Sharrows	
		Signed Bike Route	
		On-Street Greenway Connector	
		Cycle Track	
		Bike Climbing Lane	
MULTI-USE		Multi-Use Path/Greenway	
		Unpaved Greenway	
		ADA Trail	
PEDESTRIAN		Sidewalk	

Priority Bicycle/Pedestrian Corridors

TOWN OF CHAPEL HILL

Mobility Plan 2020 Complete Streets Update

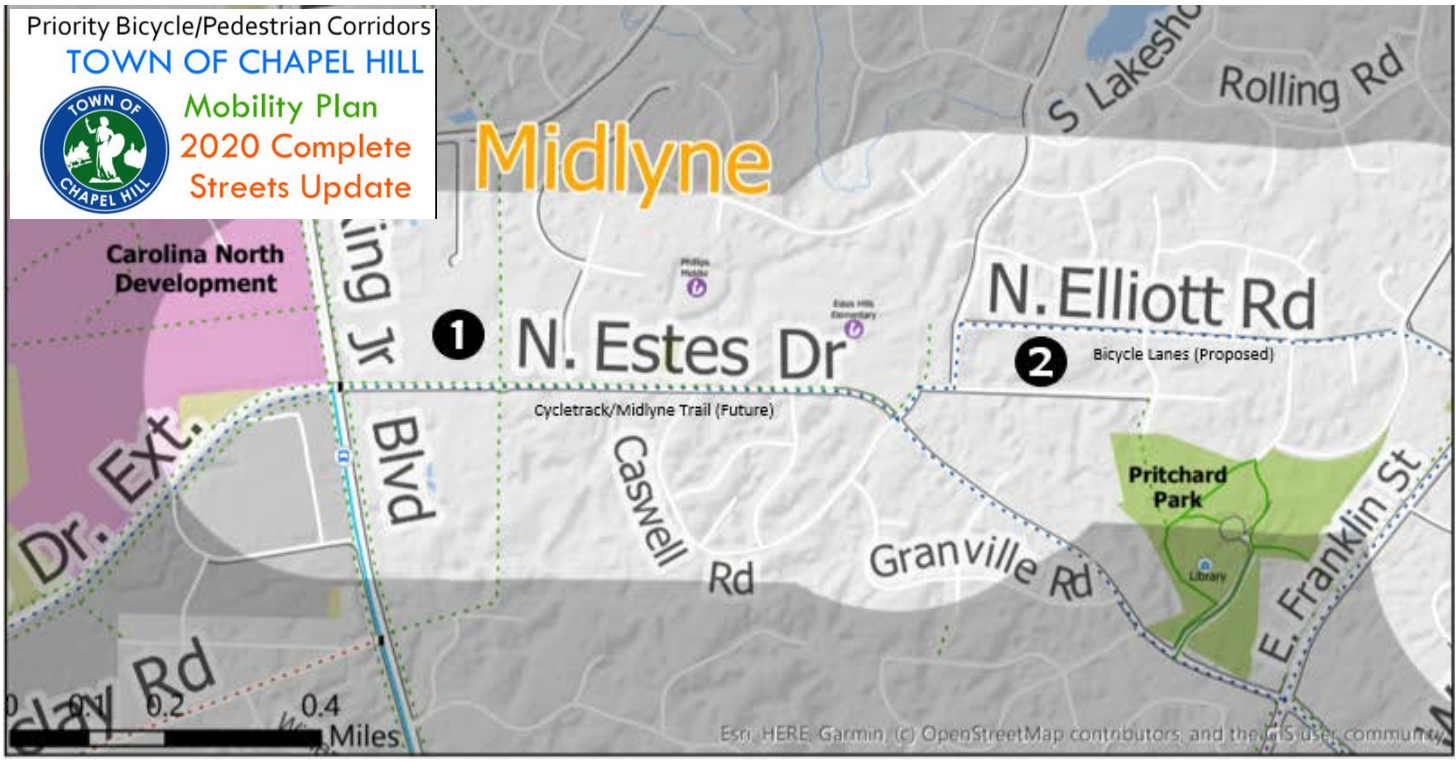
Midlyne Trail

This east-west connector links neighborhoods off Ephesus Church Road through the Ephesus-Fordham commercial district. The route continues west along Elliott Road and Estes Drive past Phillips Middle and Estes Hills Elementary schools to Martin Luther King Jr Boulevard. In the long term, the trail will connect through the Carolina North property to the schools on Seawell School Road.

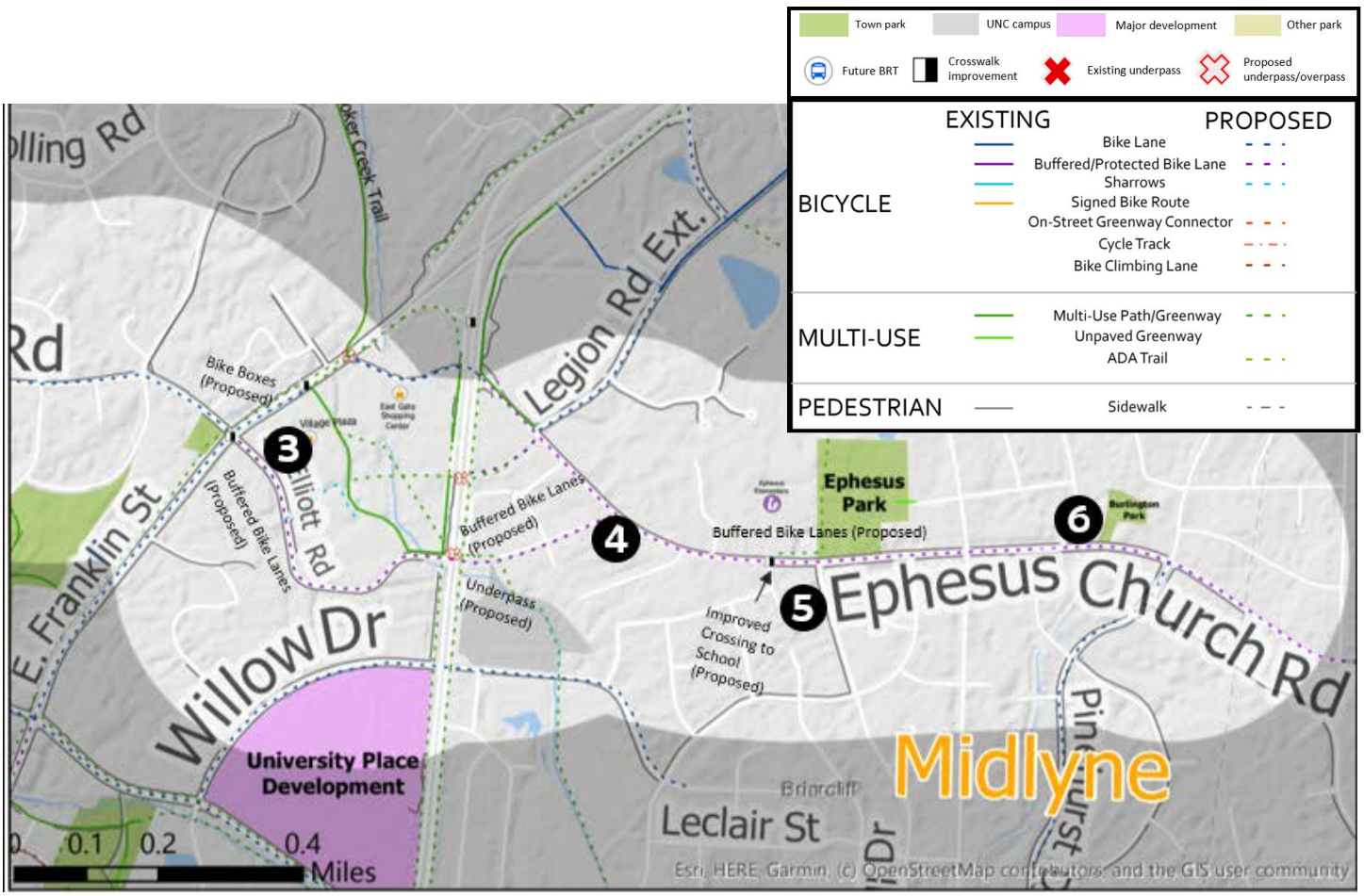
Key destinations

along and near the corridor include:

- Carolina North future development
- Estes Hill Elementary School
- Phillips Middle School
- Estes Drive Multi-use Trail
- Chapel Hill Public Library
- Lower Booker Creek Trail
- Ephesus-Fordham District
- Ephesus Elementary School



	Improvement Type	
1	**Cycle Track and Midlyne Trail** - Cycle Track and multi-use path along Estes Dr. from Martin Luther King Jr Blvd to Estes Hills Elementary/Caswell Rd (In Design)	0.87 mile
2	**Bicycle Lanes and Sidewalk** - Bicycle Lanes on Elliott Rd from Curtis Rd to Franklin St. Sidewalk south side of roadway.	0.73 mile
3	**Buffered Bicycle Lanes and Sidewalk** - Bicycle Lanes with buffer on Elliott Rd from Franklin St to Fordham Blvd. Fill sidewalk gaps.	0.44 mile
4	**Elliott Rd Extension Complete Street** - Complete Street with protected bike lanes and sidewalk from Fordham Blvd to Ephesus Church Rd	0.21 mile
5	**Mid-block Crossing and Sidewalk Gap** - Pedestrian crossing at Ephesus Elementary School. Sidewalk gap between Elliott Rd Ext and Cypress Rd	-
6	**Protected Bicycle Lanes** - Ephesus Church Rd from Elliott Rd Extension to Durham	0.73 mile
	Total Length 28% Complete	2.98 miles



Cross Cities Connector

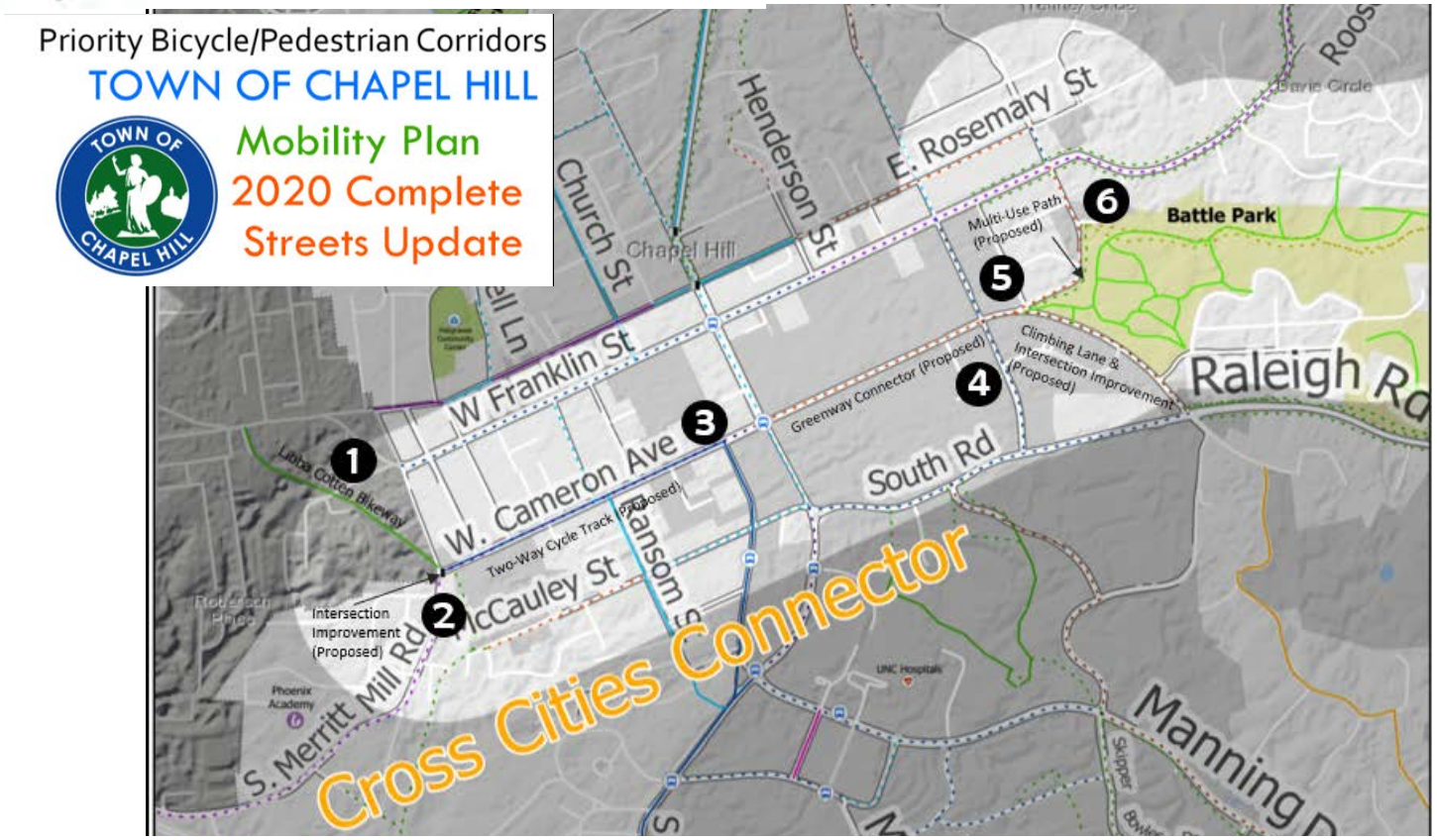
The Cross Cities Connector links Carrboro through downtown Chapel Hill on Cameron Avenue, running through UNC-Chapel Hill before continuing east through Battle Park and the Greenwood neighborhood to Meadowmont via the existing Highway 54 trails. It utilizes the future at-grade 15-501 crossing at the Glen Lennox redevelopment. When completed, this route will link Chapel Hill and UNC to the expansive regional greenway system in Durham, Cary, and Raleigh as well as the East Coast Greenway.

Unpaved options exist for an accessible trail through Battle Park and should be weighed with long-term maintenance and OWASA access needs.

Key destinations

along and near the corridor include:

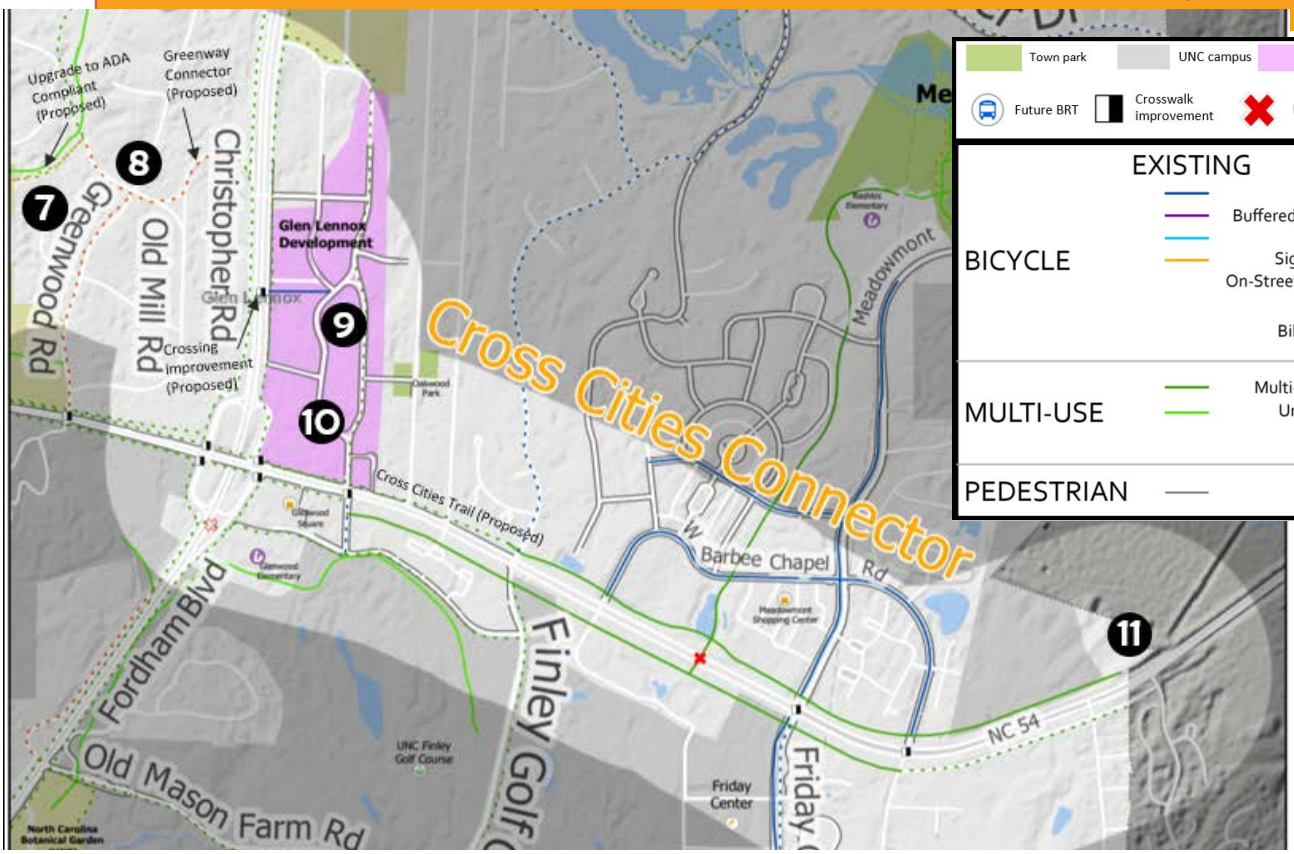
- UNC Campus
- Battle Park
- Glenwood Elementary School
- Finley Golf Course
- Friday Center
- Downtown Carrboro and Chapel Hill
- Glen Lennox, Glenwood and East 54 Retail/Mixed-Use Centers
- Meadowmont Village and Trail
- Links to the regional greenway network



	Improvement Type	
1	**Libba Cotten Bikeway*** - Multi-use connection (Carrboro- 100% Complete)	0.38 mile
2	**Intersection Improvement - Improve** Bicycle and pedestrian transition from Libba Cotten Bikeway at Merritt Mill Rd and railroad crossing at W Cameron Ave	-
3	**Protected Bicycle Lanes - From** Merritt Mill Rd to S. Columbia St.	0.53 mile
4	**On-Street Greenway Connector* - Bicycle markings, and wayfinding on** E Cameron Ave from Pittsboro St to Raleigh St (UNC Campus)	0.47 mile
5	**Climbing Lane and Intersection Improvements** - Bike/ped connections on Boundary St from Battle Park to E Cameron Ave; bicycle boxes and markings between Boundary St, Battle Ln, and Country Club Rd	0.07 mile
6	**On-Street Greenway Connector and Trail** Multi-use path along Boundary St; Bicycle pavement markings and wayfinding signage from E Cameron Ave to Franklin St	0.24 mile
7	**Battle Park Trail** - ADA compliant trail through Battle Park along OWASA easement	0.88 mile
8	**On-Street Greenway Connector - Bicycle pavement markings and wayfinding on** Sandy Creek Trail, Greenwood Rd, and Christopher Rd	0.40 mile
9	**Crossing Improvement at US 15-501** At-grade crossing of US 15-501 north of NC 54 (Glen Lennox Development Agreement)	-
10	**Cross Cities Trail - Multi-use path** from US 15-501 crossing improvement to existing trail on NC 54 (61% complete)	1.80 miles
11	**Cross Cities Trail Regional Greenway Connection*** - Joint design project with Durham Co for multi-use path between NC 54 trail terminus and American Tobacco Trail	3.25 miles

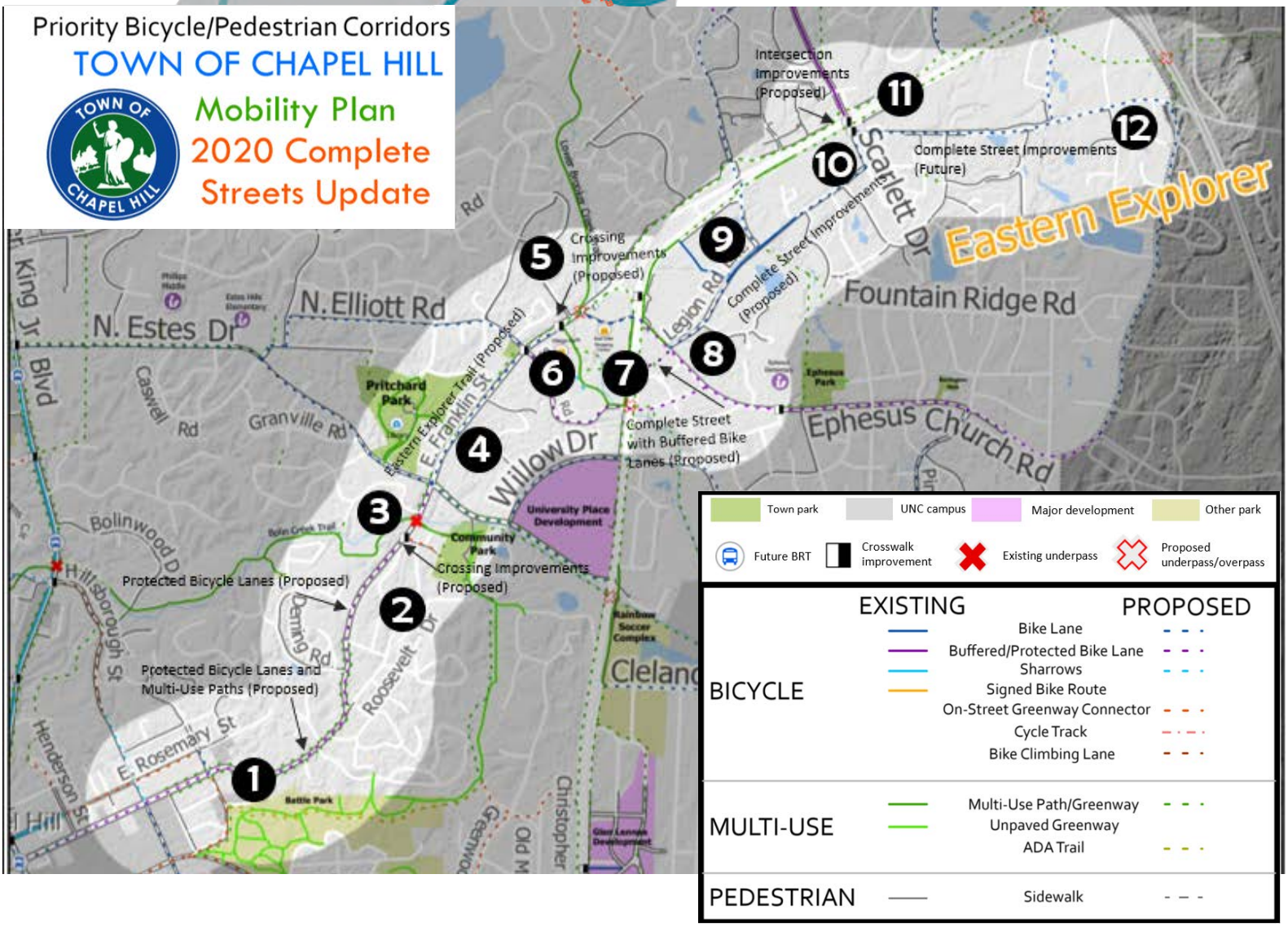
*Connection outside jurisdiction

Total Length 5.08 miles
18% Complete



Eastern Explorer

This priority corridor connects through the Ephesus-Fordham District to Downtown. It uses Complete Streets proposed for Old Durham Rd, Legion Rd, Legion Rd Extension and a multi-use overpass of the proposed Booker Creek open space. It uses off-road multi-use paths through the Ephesus-Fordham District, the northern portion of E Franklin St. The route continues into downtown on E Franklin St. Ultimately, the Eastern Explorer creates a low-stress connection from the east to Downtown Chapel Hill.



Key destinations

along and near the corridor include:

- Downtown Chapel Hill
- Battle Park
- Community Park/Bolin Creek Trail
- Chapel Hill Library
- Lower Booker Creek Trail
- Multi-Family Residential Areas
- Ephesus-Fordham District
- East Gate and Village Plaza Shopping Centers
- Rams Plaza

	Improvement Type	
1	**Bicycle Lanes** - Lane reallocation on E Franklin St from Boundary St to Deming Dr to 3 Lane with protected bicycle lanes and multi-use paths	0.61 mile
2	**Buffered Bicycle Lanes** - Lane reallocation on E Franklin St from Deming Dr to Estes Dr to 3 Lane section with buffered bicycle lanes	0.63 mile
3	**Intersection Improvements and Sidewalk Gap** - Crosswalk to Plant Rd for Booker Creek Trail Access; Sidewalk Gap on Plant Rd and Improved crossing of Plant Rd at Roosevelt Dr	-
4	**Eastern Explorer Trail** - Multi-use trail along north side of E Franklin St linking Bolin Creek Trail to Lower Booker Creek Trail with bridge across Bolin Creek	0.81 mile
5	**Franklin St Crossing Improvement** - Improved crossing and pedestrian refuge from Eastern Explorer trail to Booker Creek Trail through Village Plaza	-
6	**Lower Booker Creek Trail** - Urban section of Lower Booker Creek Trail between Eastgate Shopping Center and Village Plaza (100% Complete)	0.13 mile

	Improvement Type	
7	**US 15-501 Multi-Use Overpass** - Overpass of Booker Creek Passive Open Space connecting Lower Booker Creek Trail with Legion Rd Extension (Ephesus-Fordham Subarea Plan)	0.20 mile
8	**Legion Rd Extension Complete Street** - Complete Street with Buffered Bike Lanes from US 15-501 to Ephesus Church Rd	0.10 mile
9	**Bicycle Lanes and Sidewalk** - Legion Rd Bicycle Lanes and Sidewalks from Ephesus Church Rd to Scarlett Dr	0.80 mile
10	**Bicycle Lanes and Sidewalk** - Scarlett Dr Bicycle Lanes and Sidewalks from Legion Rd to Old Durham Rd	0.11 mile
11	**Sage/US 15-501 Intersection Improvements** - Sage Rd/US 15-501 intersection improvements (Project is part of NCDOT EB 4707A)	-
12	**Complete Street Improvements** - Old Durham Rd Complete Street from Scarlett Dr to Pope Rd with Bicycle Lanes and Sidewalk (NCDOT Project EB-4707A)	0.95 mile

Total Length 4.34 miles
27% Complete

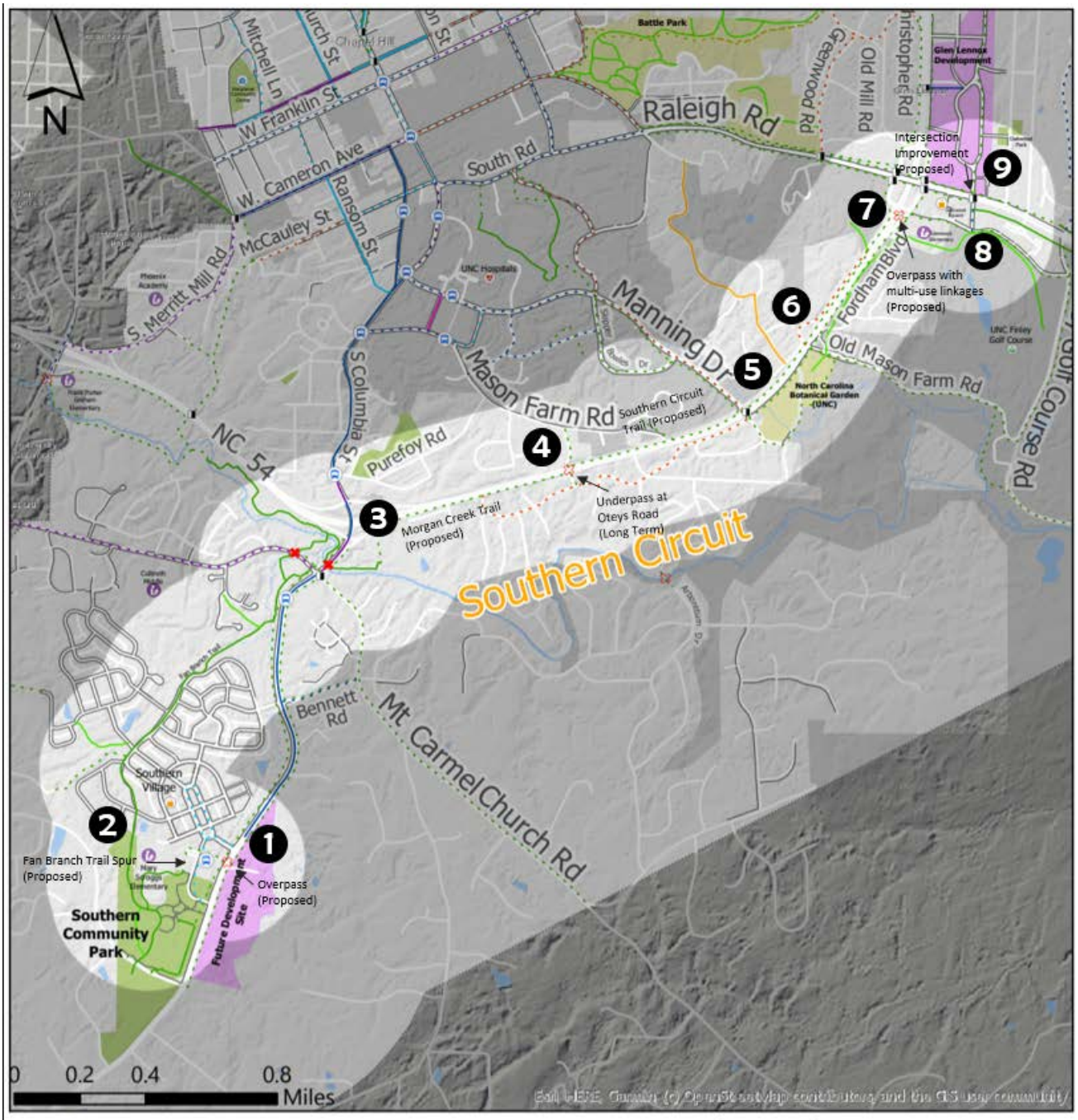
Southern Circuit

The Southern Circuit corridor begins at the Obey Creek Development on US 15-501 and terminates in the east at Hamilton Road. It links two proposed BRT stations with the Fan Branch Greenway and takes advantage of the lower elevations around Morgan Creek to pass under bridges and knit together key nodes and neighborhoods in the southern portion of Chapel Hill. In the short term, trail segments along US 15-501 with at-grade trail crossings are utilized to connect the Morgan Creek Trail to NC 54 along Raleigh Rd. In many cases the proposed multi-use paths connect with the existing trail system along NC 54, utilizing a future bike/ped bridge across US 15-501. Another bike/ped bridge will be built across US 15-501 with the Obey Creek Development to link to the Southern Community Park and the future BRT station at Southern Village Park and Ride.

Improvement Type	
1 **Overpass of US 15-501** - Multi-use connection between Obey Creek Development and Southern Village (Obey Creek Development Agreement)	0.03 mile
2 **Fan Branch Trail and Spur** - Fan Branch Trail with spur to connect with BRT station area (89% Complete)	2.07 miles
3 **Morgan Creek Trail and Extension** - Trail from Fan Branch to Merritt's Pasture, and planned trail extension between Merritt's Pasture and Oteys Rd (31% Complete)	1.02 miles
4 **US15-501 Underpass - Multi-use** underpass at Oteys Rd	-

Improvement Type	
5 **Southern Circuit Trail** - Trail section along north side of US 15-501 from Oteys Rd to Christopher Rd	0.85 mile
6 **On-Street Greenway Connector** - Bicycle markings and wayfinding on Christopher Rd	0.50 mile
7 **Trail Overpass and links** - Trail overpass of US 15-501 with connections to Raleigh Rd, Christopher Rd, and Hamilton Rd	0.42 mile
8 **Bicycle Lanes** - Hamilton Rd from Prestwick Rd to NC 54	0.10 mile
9 **Crossing Improvements at NC 54 and Hamilton Rd** connecting Glenwood Square to Glen Lennox Development Site	-

Total Length 4.99 miles
44% Complete



Town park | UNC campus | Major development | Other park

Future BRT | Crosswalk improvement | Existing underpass | Proposed underpass/overpass

	EXISTING		PROPOSED
BICYCLE		Bike Lane	
		Buffered/Protected Bike Lane	
		Sharrows	
		Signed Bike Route	
		On-Street Greenway Connector	
		Cycle Track	
		Bike Climbing Lane	
MULTI-USE		Multi-Use Path/Greenway	
		Unpaved Greenway	
		ADA Trail	
PEDESTRIAN		Sidewalk	

Priority Bicycle/Pedestrian Corridors

TOWN OF CHAPEL HILL

Mobility Plan 2020 Complete Streets Update

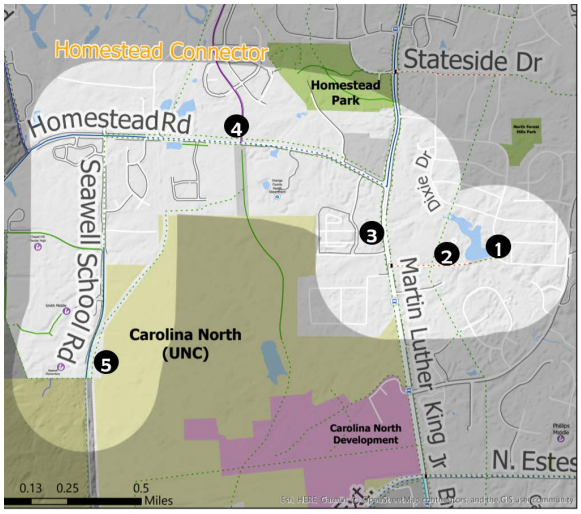
Other Key Linkages

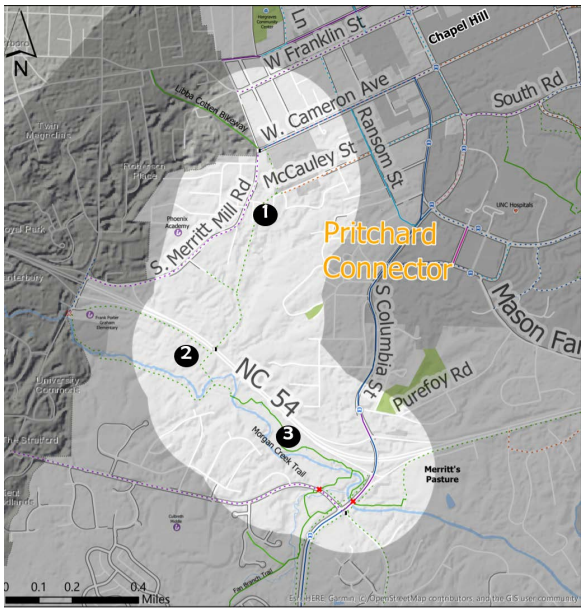
Beyond the six key pedestrian/bike priority corridors, four additional segments supplement the network by providing key connections to neighborhoods, destinations, and transit.

Improvement Type	Description	Total Length
Homestead Connector	Link between Timberlyne Trail and MLK Bus Rapid Transit to schools on Seawell School Rd	**2.78 miles** 11% Complete
1 Multi-Use Path	Greenway connecting Lake Ellen Dr and Taylor St	0.08 mile
2 On-Street Greenway Connector	Bicycle marking, wayfinding, and sidewalk on Taylor St between Lake Ellen Dr and Martin Luther King Jr Blvd	0.26 mile
3 Buffered Bike Lanes and Sidewalk Gap	Multi-use paths on Martin Luther King, Jr. Blvd between Taylor St and Homestead Rd. Sidewalk gap between Taylor St and Homestead Rd (See Complete Street Project on Martin Luther King Jr Blvd)	0.27 mile
4 Homestead Trail	Multi-use path along Homestead Rd between MLK Jr Blvd and Seawell School Rd	1.37 miles
5 Multi-use Paths	Complete multi-use path on Seawell School Rd from Homestead Rd to Seawell Elementary.	0.80 mile
Barclay Connector	Link between Midlyne and Timberlyne to Carrboro	**1.24 miles** 0% Complete
1 On-Street Greenway Connector	Bicycle marking, wayfinding, and sidewalk on Barclay Rd from MLK Jr Blvd to Barclay Trail	0.70 mile
2 Barclay Trail	Multi-use path along Estes Dr Extension from Barclay Rd to Bolin Creek	0.31 mile
3 Bolin Creek Trail Extension	Extension of Bolin Creek Trail from Barclay Trail with a bridge over the creek and at-grade crossing of Estes Dr Ext to connect to Carrboro trail	0.23 mile
BB Little Connector	Link between Ephesus-Fordham District, Meadowmont, and Highway 54	**3.15 miles** 31% Complete
1 Crossing Improvement	Improved Trail Crossing of Elliott Rd to connect with Lower Booker Creek Trail	-
2 US 15-501 Underpass	Lower Booker Creek Trail Underpass of US 15-501	-
3 Lower Booker Creek Trail	Multi-use path between Elliott Rd and Little Creek Trail	0.85 mile
4 Little Creek Trail A & Trail Connection	Multi-use path between Lower Booker Creek Trail and Lancaster Dr	0.55 mile
5 Bike Lanes	Bicycle Lanes and wayfinding on Lancaster Dr (Sidewalks complete)	0.43 mile
6 Little Creek Trail Upgrade	ADA compliant trail between Lancaster Dr and Meadowmont Trail	0.34 mile
7 Meadowmont Trail	Multi-use path between Rashkis Elementary and Underpass of Highway 54 through Meadowmont (complete)	0.98 mile

Improvement Type	Description	Total Length
Pritchard Connector	Low-stress link between Morgan Creek Trail and Downtown	**1.50 miles** 35% Complete
1 Tower Trail	Multi-use path on west side of UNC cogeneration facility, past water tower and through power easement to NC 54	0.66 mile
2 Crossing and Greenway Linkages	Improved crossing of NC 54 between Laurel Ridge and Kingswood Apartments with connection between Tower Trail and Morgan Creek Trail	0.12 mile
3 Morgan Creek	Morgan Creek Trail to Smith Level Rd (in design) and connection with Fan Branch Trail (complete)	0.72 mile

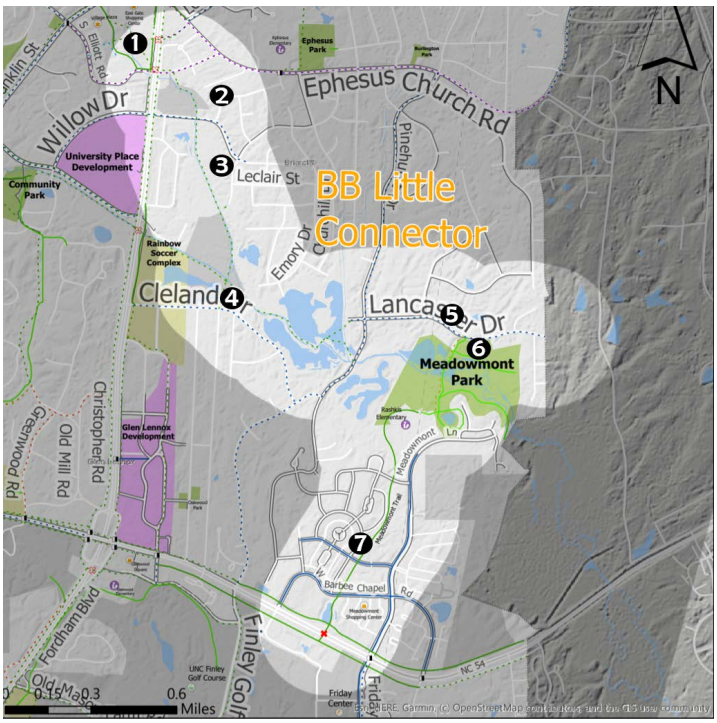
Homestead Connector

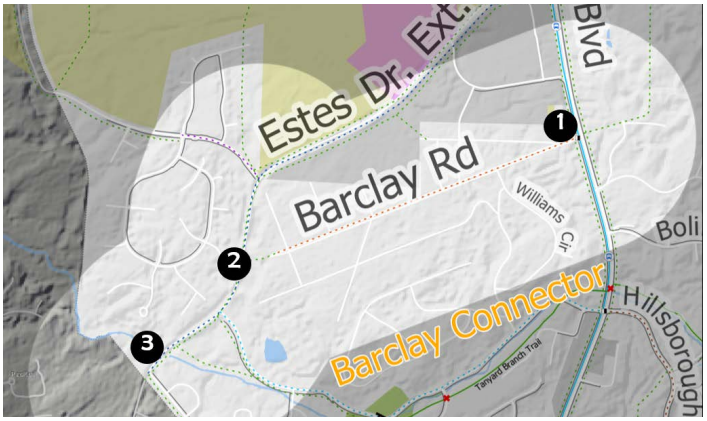




Pritchard Connector

BB Little Connector





Barclay Connector

To realize the vision of the Mobility Plan, the Town will need to implement these recommendations in cooperation with developers, NCDOT, local property owners, and others.

Project Implementation

To realize the vision and fundamental principles of the Mobility Plan, the Town will need to put its plans into action. Implementation is dependent on the cooperation and coordination with developers, NCDOT, GoTriangle, environmental agencies, and local property/business owners.

The following tables provide guidance on moving the Mobility Plan's projects and policies forward with next steps and potential funding options. The projects are broken up into categories for short-, mid-, and long-term implementation.

- The short-term projects represent policies that can be easily implemented with the approval of the Mobility Plan, or shortly thereafter, and projects that can be constructed as parts of redevelopment or small capital improvement projects with some engineering and through existing levels of funding.
- Mid-term projects may include more involved engineering and design, and require funding identification and planning.
- Long-term projects require significant design work and depend on strategic planning amongst Town staff, project approval by outside agencies and significant legwork to identify and secure funding.

Funding

Projects can be funded in many ways, including private and public options. Several mechanisms shown in the implementation tables are given as potential funding options:

- **Developer requirements and exactions:** The form-based code, Land Use Management Ordinance (LUMO), and Comprehensive Plan outline the requirements for developers to construct the infrastructure needed to support the new residents and users. Where facilities are in adopted plans, developers are required to install sidewalks, bicycle facilities, and greenways.
- **Private/public partnerships:** It may be advantageous at times for the Town to enter into agreements with developers to accept payments-in-lieu to help fund larger projects in the future, or to provide developers funding to build more than they are required. These types of case-by-case agreements help complete key connections or incentivize future developments.
- **Capital Improvement Program (CIP) budget/funding:** The Town's CIP is a 15-year financial plan for its major infrastructure needs, establishing priorities and potential funding sources. The CIP is approved annually as part of the Town's budget and allocates tax revenues to, amongst other things, transportation and parks/greenway projects. Revenues for CIP funding include property tax and town fees, but may also receive monies from traditional and innovative sources such as:
    - Bonds: Municipal bonds are financial bonds issued by the Town to fund numerous projects, typically by tax increases outlined in a referendum voted on by residents. For example, Chapel Hill residents approved a $40M general obligation bond in 2015 which included streets, sidewalk, and greenway projects.

  - Municipal Services District: Under North Carolina Law, the Town aids property owners in forming a Municipal Service District to provide specific services to a defined geographic area through special property tax. The tax is approved by and levied on the property owners within that area.
  - Tax Increment Financing (TIF) District: TIF districts are established to fund projects within the District and repay those costs through the incremental increase in tax revenues resulting from redevelopment. TIF districts can be formally established by the Town or "synthetically" administered by monitoring and accounting for the increases in Town financial records.
- **Durham-Chapel Hill-Carrboro MPO (DCHC) funding:** The DCHC Metropolitan Planning Organization receives federal transportation funds for the region that are intended for municipalities to program for local projects. In FY2015-16, approximately $13 million was awarded to localities in the region, including Chapel Hill.
- **NCDOT State Transportation Improvement Program (STIP) funding:** Based on current prioritization formulas, it is a competitive process to receive NCDOT funds. While there is stiff competition for ped/bike projects statewide, the Town has had success in getting bike/ped projects into the STIP.
- **NCDOT Complete Streets Policy:** The Town can use NCDOT's 2019 Complete Streets Policy to fully fund bike/ped upgrades when major highway projects occur.
- **Special federal or non-profit grants:** Examples include the USDOT's TIGER grant program for major infrastructure projects that support job growth and People For Bikes' Big Jump project to cycling in cites.

Complete Street Corridor Improvements

Recommended Improvement	Potential Funding Sources	Estimated Project Cost
Short-term Implementation		
Martin Luther King Jr Blvd		
Sidewalk gaps	CIP funding; with development	$ 510,000
Barclay Rd pedestrian crossing	CIP, NCDOT funding	$ 100,000
Stateside Dr/Piney Mountain Rd/ Westminster Dr ped crossings	CIP, NCDOT funding	$ 305,000
Northwood/Perkins Sidewalk Connector	CIP, DCHC funding	$ 60,000
Bike intersection improvements N of Homestead Dr. (markings, bike boxes, signal actuation)	CIP, DCHC funding	$ 45,000
Bike signal actuation at major intersections at bike lane approaches, including Weaver Dairy Road	CIP, DCHC funding	$ 10,000
Bolin Creek Greenway/Carolina North sidewalk connectors	CIP funding	$ 780,000
E Franklin St		
Lane reallocation for bike lane/buffered bike lane from Boundary St to Estes Dr	CIP, NCDOT funding	$ 985,000
Sidewalk and streetscape improvements (Boundary St to Estes Dr)	CIP, NCDOT funding; with development	$ 660,000
US 15-501 Fordham Blvd		
Multi-use paths (both sides) from I-40 to US 15-501 South	CIP, NCDOT funding; with development	$ 2,200,000
Willow Dr intersection improvements (crosswalks, pedestrian refuge islands, signal actuation)	CIP, DCHC, NCDOT funding	$ 60,000
US 15-501 South		
Bike intersection improvements at Mt Carmel Ch Rd/Culbreth Rd (markings, bike boxes, signal actuation)	CIP, NCDOT funding	$ 175,000
Mt Carmel Ch Rd/Fan Branch greenway connector	CIP funding	$ 350,000

Complete Street Corridor Improvements (continued)

Recommended Improvement	Potential Funding Sources	Estimated Project Cost
Short-term Implementation		
NC 54 Raleigh Rd		
US 15-501 Interchange ped crossings	CIP, NCDOT funding	$ 215,000
Meadowmont Ln/Friday Center Dr/ Barbee Chapel Rd ped crossings	CIP, NCDOT funding	$ 105,000
Lane reallocation for uphill climbing lane (Fordham Blvd to Ridge Rd)	CIP, NCDOT funding	$ 225,000
Long-term Implementation		
Martin Luther King Jr Blvd		
Corridor widening to include curb-running bus rapid transit, multi-use paths, 6' sidewalks, street trees	NCDOT, Federal Transit, Orange County Transit Sales Tax	$ ----- (I-40 to Southern Village)
E Franklin St		
Lane reallocation for bike lane from Estes to Fordham Blvd	CIP, NCDOT funding	$ 985,000
North side multi-use path and multi-use paths from Boundary to Deming	CIP, NCDOT funding; with development	$ ------
US 15-501 Fordham Blvd		
Corridor widening to include center-run bus rapid transit	NCDOT, Federal Transit, Orange County Transit Sales Tax	Feasibility study underway
Grade-separated pedestrian bridge at Legion Rd extension	CIP, NCDOT funding	$ 3.1 million
US 15-501 South		
Change Bike Plan recommendation for buffered bike lanes to planned multi-use paths	N/A	--
NC 54 Raleigh Rd		
Multi-use paths on both sides of the street	CIP, NCDOT funding	$ -------
Bike lanes from Country Club Rd. to 15-501	CIP, NCDOT funding	$ ------

Priority Ped/Bike Corridor Improvements

Recommended Improvement	Potential Funding Sources	Estimated Project Costs
Timberlyne Trail		
Timberlyne Trail - Duke Utility easement from Weaver Dairy Road to MLK Jr Blvd	CIP, NCDOT funding; parks grants	$ 3,100,000
Multi-use paths on MLK Jr Blvd	NCDOT, Federal Transit, Orange County Transit Sales Tax	Part of NSBRT
Treelyne Trail		
Horace Williams Trail - Carraway Village at Weaver Dairy Rd	CIP funding; parks grants	$ 985,000
Treelyne Trail A - Homestead Park to Chapel Hill Aquatic Center and Vineyard Square	CIP funding; parks grants	$ 825,000
On-Street Greenway Connector - Bicycle markings, wayfinding, & sidewalks along Stateside Dr from Homestead Park to North Forest Hills Park	CIP funding	Sidewalk $550,000 Markings $40,000
Treelyne Trail B - Stateside Dr through North Forest Hills Park to Piney Mountain Rd	CIP funding; parks grants	$ 350,000
On-Street Greenway Connector - Bicycle markings, wayfinding, & sidewalks along Piney Mountain Rd to Booker Creek Rd, Brookview Dr & Honeysuckle Rd	CIP funding	Sidewalk $1,620,000 Markings $55,000
Underpass of Franklin St and greenway and sidewalk linkages in Ephesus-Fordham and to Dobbins Dr	CIP, NCDOT funding; with development	$ 905,000

Priority Ped/Bike Corridor Improvements (continued)

Recommended Improvement	Potential Funding Sources	Estimated Project Costs
Midlyne Trail		
Bicycle lanes on Elliott Rd from Curtis Rd to Franklin St; sidewalk south side of roadway	CIP funding; with development	$ 375,000
Elliott Rd widening with buffered bike lanes and sidewalks from Franklin St to Fordham Blvd	CIP funding; with development	$ 3,500,000
Elliott Rd Extension - Complete Street with raised bike lanes and sidewalk from Fordham Blvd to Ephesus Church Rd	CIP, NCDOT funding; with development	$ 4,200,000
Pedestrian crossing at Ephesus Elementary School; sidewalk gap between Elliott Rd Extension and Cypress Rd	CIP, DCHC funding	$ 50,000
Protected bicycle lanes - Ephesus Church Rd from Elliott Rd Extension to Pinehurst Dr	CIP, NCDOT funding	$ ------
Cross Cities Connector		
Intersection/bike-ped improvements from Cotten Bikeway at Merritt Mill Rd and railroad crossing at W Cameron Ave	CIP funding	Dependent on preferred alternative
Two-way cycle track from Merritt Mill Rd to Pittsboro Rd	CIP funding	$ 375,000
On-Street Greenway Connector - Bicycle markings & wayfinding on E Cameron Ave from Pittsboro St to Raleigh St	CIP, DCHC funding	$ 35,000
Bike/ped connections on Boundary St from Battle Park to E Cameron Ave; bike boxes & markings bw Boundary St, Battle Ln, and Country Club Rd	CIP, DCHC funding	$ 20,000
Multi-use path along Boundary St; bicycle pavement markings and wayfinding signage from E Cameron Ave to Franklin St	CIP funding; parks grants	$ 50,000

Priority Ped/Bike Corridor Improvements (continued)

Recommended Improvement	Potential Funding Sources	Estimated Project Costs
Cross Cities Connector (continued)		
Battle Park Trail - ADA-compliant trail through Battle Park along OWASA easement	CIP funding; parks grants	$ 640,000
On-Street Greenway Connector - Bicycle pavement markings and wayfinding on Sandy Creek Trail, Greenwood Rd, & Christopher Rd	CIP funding	$25,000
Cross Cities Trail - Multi-use path gaps between from US15-501 crossing improvement to existing trail on NC 54	CIP, NCDOT funding; parks grants	$ 725,000
Eastern Explorer		
Lane reallocation for bike lane/buffered bike lane from Boundary St to Estes Dr	CIP, NCDOT funding	$ 985,000
Intersection improvements and sidewalk gap - Crosswalk to Plant Rd for Booker Creek Trail Access; sidewalk gap on Plant Rd and improved crossing of Plant Rd at Roosevelt Dr	CIP, NCDOT funding	$ 135,000
Eastern Explorer Trail - Multi-use trail along Franklin St linking Bolin Creek Trail to Lower Booker Creek Trail; Bridge across Bolin Creek	CIP, NCDOT funding; parks grants; with development	$ 840,000
Franklin St Crossing Improvement - improved crossing and pedestrian refuge from Eastern Explorer trail to Booker Creek Trail through Village Plaza	CIP, NCDOT funding; with development	$ 130,000
Grade-separated pedestrian bridge at Legion Rd extension	CIP, NCDOT funding	$ 2,020,000

Priority Ped/Bike Corridor Improvements (continued)

Recommended Improvement	Potential Funding Sources	Estimated Project Costs
Eastern Explorer (continued)		
Legion Rd Extension Complete Street - Complete Street with buffered bike lanes between Fordham Blvd and US 15-501	CIP funding; with development	$ 1,600,000
Bicycle Lanes and Sidewalk - Legion Rd bicycle lanes and sidewalks from Ephesus Church Rd to Scarlett Dr	CIP funding; with development	$ 875,000
Bicycle Lanes and Sidewalk - Scarlett Dr bicycle lanes and sidewalks from Legion Rd to Old Durham Rd	CIP funding	$ 120,000
Southern Circuit		
Overpass of US 15-501 between Obey Creek Development and proposed BRT	Developer Agreement	--
Fan Branch Trail and Spur - Fan Branch Trail with spur to connect with BRT station area	CIP, NCDOT funding; parks grants	$ 260,000
Morgan Creek Trail and Extension - Trail from Fan Branch to Merritt's Pasture, and planned trail extension between Merritt's Pasture and Oteys Rd	CIP, NCDOT funding; parks grants	$ 640,000
US 15-501 Underpass - Multi-use underpass at Oteys Rd	CIP, NCDOT funding	$ 1,000,000
Southern Circuit Trail - Trail section along north side of US 15-501 to Christopher Rd	CIP, NCDOT funding; parks grants	$ 885,000
On-Street Greenway Connector - Bicycle marking and wayfinding on Christopher Rd	CIP funding	$ 30,000
Trail Overpass and links - Trail overpass of US 15-501 near NC 54 with links to Christopher Rd, Raleigh Rd, and Hamilton Rd	CIP, NCDOT funding	$ 1,300,000
Bicycle Lanes - Hamilton Rd to NC 54	CIP funding	$ 25,000
Crossing Improvements at NC 54 and Hamilton Rd connecting Glenwood Square to Glen Lennox Development Site	CIP, NCDOT funding; with development	$ 150,000

Priority Ped/Bike Corridor Improvements (continued)

Recommended Improvement	Potential Funding Sources	Estimated Project Costs
Homestead Connector		
Greenway from Lake Ellen Dr to Taylor St	CIP funding; parks grants	$ 85,000
On-Street Greenway Connector - Bicycle marking, wayfinding, & sidewalk on Taylor St bw Lake Ellen Dr and MLK Jr Blvd	CIP, DCHC funding	Sidewalk $270,000 Markings $20,000
Buffered bike lanes on Martin Luther King, Jr. Blvd between Taylor St and Homestead Rd.	NCDOT, Federal Transit, Orange County Transit Sales Tax	Part of NCDOT corridor widening
Sidewalk gap between Taylor St and Homestead Rd	CIP funding; with development	$ 50,000
Multi-use path along Homestead Rd between MLK Jr Blvd and Seawell School Rd	CIP, NCDOT funding; parks grants	$ 1,415,000
Multi-use path on Seawell School Rd from Homestead Rd to Seawell Elementary School	CIP, NCDOT funding	$ ------
Barclay Connector		
On-Street Greenway Connector - Bicycle marking, wayfinding, and sidewalks on Barclay Rd from MLK Jr Dr to Barclay Trail	CIP funding	Sidewalk $725,000 Markings $45,000
Multi-use path along Estes Dr Extension from Barclay Rd to Bolin Creek	CIP, NCDOT funding; parks grants	$ 325,000
Extension of Bolin Creek Trail from Barclay Trail with a bridge over the creek and at-grade crossing of Estes Dr Ext	CIP, NCDOT funding; parks grants	$ 525,000

Priority Ped/Bike Corridor Improvements (continued)

Recommended Improvement	Potential Funding Sources	Estimated Project Costs
BB Little Connector		
Improved Trail Crossing of Elliott Rd to connect with Lower Booker Creek Trail	CIP, DCHC funding	$ 55,000
Lower Booker Creek Trail Underpass of US 15-501	CIP, NCDOT funding; parks grants	$ 550,000
Multi-use path between Elliott Rd and Little Creek Trail	CIP, NCDOT funding; parks grants	$ 880,000
Multi-use path between Lower Booker Creek Trail and Lancaster Dr	CIP, NCDOT funding; parks grants	$ 570,000
Bicycle lanes and wayfinding on Lancaster Dr	CIP, DCHC funding	$ 25,000
ADA compliant trail between Lancaster Dr and Meadowmont Trail	CIP, NCDOT funding; parks grants	$ 355,000
Pritchard Connector		
Multi-use path on west side of UNC cogeneration facility, past water tower and through power easement to NC 54	CIP, NCDOT funding; parks grants	$ 750,000
Crossing of NC 54 and trail connections between Morgan Creek Greenway and Tower Trail	CIP, NCDOT funding	$ 360,000

Priority Projects

Through the development of the Complete Street Corridors and Priority Ped/Bike Corridors, 20 projects are identified as key projects for the Town to evaluate in detail and to pursue as capital improvements. These key projects represent those requested or mentioned most often by citizens, key linkages in the ped/bike network, or facilities ripe for improvements to provide protected/separated bike facilities.

Selection Criteria - Many plans will develop a prioritization methodology and process for selecting projects for implementation. That prioritization then becomes adopted with the plan and becomes set, with little flexibility to react to specific funding opportunities or shifts in policy priorities.

The top 20 project identified here were selected by considering a number of factors and criteria that should be reevaluated by Town staff year-to-year as they look at funding projects through annual budgets, bonds, grant proposals, and NCDOT/DCHC project submissions.

The road to success is always under construction.

Project Selection Criteria

Partnerships/Cost Share - Is there an opportunity to work with another party (developer, NCDOT, Go Triangle) to share project costs or combine projects?

Are other Town departments completing projects within right-of-way where Complete Street elements can be included?

Safety Impacts - Will the project resolve a proven concern or crash location?

Pending Development - Will the project help serve demand from new development and be funded all or in-part by the developer of the project?

Citizen Requests - Is the project constantly requested by residents?

Connectivity to:

- Pedestrian/Bike Network - Is the project a part of the priority network? Does it provide a connection from a key destination/activity center to the network?
- Transit/Schools/Activity Centers - Does the project connect residents to schools, transit, or activity centers? Does it expand bike-/walksheds to these?

Momentum - Will the project encourage and excite residents to bike or walk more? Can the project serve as a pilot installation to test new ideas or facility types?

Topography - Does topography contribute to a need for a facility that will increase safety and/or potential use?

20 Key Projects + 5 Priority Programs/Policies - These were the most requested in the public input sessions or represent important missing links. When completed and paired with the key policy/program recommendations, these select improvements will help encourage even more residents to walk and bike in their Town.

Recommended Improvement	Network Importance	Corridor	Cost Est.
Complete Street Corridors			
Barclay Rd Pedestrian Crossing	Improves and facilitates safe crossings for residential near Chapel Hill Transit bus stops and Bolin Creek greenway	MLK Jr. Blvd	$ 100,000
Northwood/Perkins Sidewalk Connector	Serve demonstrated pedestrian demand between area neighborhood. shopping centers, and transit stop	MLK Jr. Blvd	$ 60,000
Multi-use paths (both sides) in Ephesus-Fordham District	Establish key linkage between Booker and Bolin Creek Greenways, as well as area shopping centers and redevelopment	US 15-501 Fordham Blvd	$ 2,200,000
Raleigh Road Uphill Climbing Lane	Reallocate lanes from Country Club Ln to median before Quali Hill Ct. to add uphill climbing lane; resurfacing	NC 54 Raleigh Rd	$ 225,000
Meadowmont Ln/Friday Center Dr/ Barbee Chapel Rd ped crossings	Improves and facilitates safe crossings between medium density residential and office nodes in E Chapel Hill	NC 54 Raleigh Rd	$ 105,000
Bike intersection improvements at Mt Carmel Ch Rd/Culbreth Rd	Improves bike wayfinding and safe crossings at large intersection	US 15-501 South	$ 175,000
Priority Bike/Ped Corridors			
E Franklin St Lane Bike Lanes	Improve bike/ped environment on E Franklin St from Boundary St to Estes Dr by converting existing roadway to three-lane roadway; resurfacing	Eastern Explorer/ E Franklin St	$ 985,000
US 15-501 Underpass at Oteys Rd	Create safe, low-stress connection for bicyclists and pedestrians south of US 15-501 to UNC and downtown Chapel Hill	Southern Circuit	$ 1,000,000
Protected Bicycle Lanes and Sidewalk on Ephesus Church Rd	Provide facilities for residents east of US 15-501 to access shopping centers and for families with children to access Ephesus Church Elem	Eastern Explorer	$ ------
Greenway Connectors Marking Package	Sign and mark advisory lanes, bicycle lanes, or uphill climbing lanes to create 3.7 miles of low stress connections for bicyclists in existing ROW Treeline 3, Treeline 5, Cross Cities 4, Cross Cities 8, Barclay 1	Treelyne Cross Cities Barclay	$ 195,000
Greenway Connectors Sidewalk Package	Provide 2.8 miles of sidewalk on both sides to enhance/ supplement longer-term Priority Corridor projects Treeline 3, Treeline 5, Barclay 1	Treelyne Barclay	$ 2,895,000
N Elliott Rd Complete Street	Provide facilities for residents west of E Franklin St to access shopping and for families with children to access Estes Elem & Phillips Middle Schools	Midlyne	$ 375,000
Multi-Use Path: Piney Mountain Rd to Martin Luther King Jr Blvd	Complete Treelyne Trail B multi-use connection between Weaver Dairy Rd and Estes Dr to establish East-West bicycle and pedestrian corridor	Treelyne	$ 350,000
Underpass of Franklin St	Create a safe, low-stress connection east of E Franklin St and users of Lower Booker Creek Trail to access Ephesus-Fordham district	Eastern Explorer/ E Franklin St	$ 905,000
Battle Park Trail	Improve access for users with disabilities by creating an ADA-compliant multi-use trail along OWASA easement and create alternate low-stress route to the Chapel Hill CBD from the East	Cross Cities Connector	$ 640,000
Morgan Creek Trail Extension	Fill missing link to proposed Oteys Rd Underpass for safe, low-stress access along US 15-501	Southern Circuit	$ 640,000
Barclay Trail & Bolin Creek Extension	Provide low-stress alternate to Estes Dr Extension	Barclay Connector	$ 850,000
Cross Cities Connector	Joint Design Study for corridor in partnership with Durham County	Cross Cities Connector	$350,000
W Cameron Ave Protected Bike Lanes	Improve bicycling conditions into UNC Campus on Cameron Ave	Cross Cities Connector	$ 375,000
Multi-Use Path: Piney Mountain Rd and Barclay Rd	Complete Piney Mountain Rd to Barclay Rd portion of Timberlyne Trail to provide safe, low-stress route	Timberlyne	$ 750,000

One of the project criteria listed for consideration is momentum. Certain projects can excite the community, help shift the mindset of residents, and spur the interest of those that may not walk and bike frequently. Therefore developing a select number of signature projects for early implementation can help jump start increased ped/bike/transit commuting and travel and keep the Town's progress moving towards the 2025 35% modeshare goal.

Implementing a high-impact and high-visibility project will engage a wide number of citizens and can potentially provide significant safety and modeshift benefits relative to other projects. Evaluation is an important part of the project to demonstrate the intended goals are met.

Franklin Street Protected Bike Lanes - The conversion of E Franklin Street from Estes Drive west to E Boundary Street will provide a new bike-friendly corridor between Downtown and the UNC Campus and popular business at and along the way to University Mall and Ephesus-Fordham district. The facility also connects bicyclists to the Bolin Creek Greenway and would make it safer for pedestrians who currently share the sidewalk with less confident bicyclists.

Creation of such a visible project with the potential for high ridership could encourage future lane reallocation eastward for Estes Drive to Ephesus-Fordham, establishing a key corridor for bicycling.

Timberlyne Trail from Piney Mountain Rd to Barclay Rd - This trail represents one of the most ambitious concepts in the plan, with the transformation of a power easement through neighborhoods into a potential greenway corridor.

The greenway would provide a proof of concept of creating a low-stress alternative to bike lanes and sidewalks along a major road corridor, and combined with a new crossing at Barclay Rd, would link to neighborhood streets for cyclists and pedestrians trying to get to Downtown or Carrboro. It also links the planned Estes Drive multi-use path and cycletrack to the south towards Downtown.

Beginning planning for this project will help determine both the willingness of Duke Energy to partner on expanding the Town's greenway system and grow the system in the north Chapel Hill.

Policy/Program Recommendations

Infrastructure projects help create a more walkable and bikeable transportation network by working to improve and retrofit existing street corridors and linking off-road connections. By updating the current policies and programs, the Town can encourage growth and development patterns that create a true multi-modal transportation system.

The following sections summarize a few of the programs and policies affecting walking facilities and activities in the Town and provide recommendations for how to improve the pedestrian environment. It also adds to the toolbox by recommending an additional connectivity enhancement to the development ordinance.

NCDOT Complete Streets Policy Update

The 2020 update to the Mobility and Connectivity Plan was spurred by major updates to NCDOT's Complete Streets Policy. The policy, updated significantly in 2019, applies to NCDOT-maintained roads and places the burden on NCDOT to explain why multimodal facilities are not included in major highway projects. All facilities included in an adopted plan will be paid for if NCDOT undertakes a major highway project. This provides a key source of funding for projects on NCDOT corridors, and prompted the Town to include higher-quality facilities.

Below is the cost share formula for both projects included in an adopted plan (left) and not included in an adopted plan (right).

NCDOT Complete Streets Policy (2019)

"This policy requires NCDOT planners and designers consider and incorporate multimodal facilities in the design and improvement of all appropriate transportation projects in North Carolina ... Consideration of multimodal elements will begin at the inception of the transportation planning process and the decisions made will be documented."

COST SHARE AND BETTERMENT

- Pedestrian Facility
- Bicycle Facility
- Side Path
- Greenway Crossing
- Bus Pull Out
- Bus Stop (pad only)

In Plan	• NCDOT pays full cost
Not in Plan, but Need Identified	• Cost Share*
Betterment	• Local pays full cost

*Exception – NCDOT pays full cost for on-road bicycle facility

Cost Share Formula

Population	NCDOT / Local Share
• > 100,000	80% / 20%
• 50,000 to 100,000	85% / 15%
• 10,000 to 50,000	90% / 10%
• < 10,000	95% / 5%

Betterment

- A requested improvement that exceeds the recommendations from a plan and/or exceeds need identified in the project development process
- Aesthetic materials and treatments
- Landscaping in excess of standard treatments
- Lighting in excess of standard treatments

Town of Chapel Hill Design Manual (2017)

"All development must provide access to publicly maintained vehicular, bicycle, and pedestrian facilities..."

"Pedestrian access - access to a street or dedicated recreation area/space containing a pedestrian way..."

"The provision of sidewalks on both sides of the street is required..."

Pedestrian Policies, Guidelines, and Standards

Chapel Hill's Land Use Management Ordinance (LUMO) requires "streets, public alleys, bicycle circulation systems and bike lanes, pedestrian circulation systems and sidewalks, and bus stop amenities shall be provided and designed in accordance with the design manual." The Town's 2017 update of Design Manual requires developers to provide pedestrian access and sidewalks on both sides of all streets. With these two documents, Chapel Hill establishes what many pedestrian plans across the State and country do not- pedestrian access to all sites and buildings and sidewalks on both sides of every street.

While the Town does not have an official pedestrian plan, Chapel Hill staff carry out many of the programs and initiatives common as recommendations in most pedestrian plans. The Mobility Plan is intended to serve as the Town's primary planning document for pedestrian accommodations, and is accompanied the Sidewalk Prioritization list as well as the standards and policies detailed in the Design Manual and area plans.

Design Manual

The 2017 Chapel Hill *Design Manual* calls for typical sidewalks of minimum 5' width on Local Streets, 6' width on Arterials, up to 10' width on Main Streets based on new typologies outlined in the document. The *Streets and Sidewalks Standard Details* should be updated to reflect these recommendations, to include updated accessible ramp details per NCDOT, and to provide details for new bike facilities including buffered bike lanes and intersection striping.

Intersection Safety

The Town will ensure that all bicycle-pedestrian facilities are designed to the highest safety standards feasible at intersection crossings.

Neighborhood Connectors

In order to increase connectivity for non-motorized transportation, the LUMO should be amended to include a requirement for short ped/bike connections between cul-de-sacs and streets with limited connectivity.

Where street interconnectivity is not provided within new site plans (cul-de-sacs, stubs, dead end streets, etc.), the developer would be required to construct paved paths according to the following:

- The developer shall provide a ten-foot (10') wide public access and maintenance easement along these paths, with the paths in the center of the easements;
- The open space shall be provided between lots (not within lots) to maintain connectivity;
- In low-lying areas, the Planning Director may require that the developer construct a boardwalk;
- Where necessary to cross a stream or creek, the developer shall construct a bridge with a minimum path width of eight feet (8') across the bridge;
- The Planning Director may recommend exceptions within a subdivision that are not reasonably expected to draw a significant amount of pedestrian traffic, such as areas where topographic or natural features would make construction of a sidewalk impractical or a practical alternative is available within 1/8 mile.

Chapel Hill can reduce barriers to connectivity by requiring easements to maintain access for non-motorized travelers on cul-de-sacs and limited connectivity streets. The above photos show developments examples in Apex, NC.

Policies and Procedures for Traffic Calming Measures

The Town's *Engineering Design Manual* was revised in 2017 to include criteria for the application of the following traffic calming measures: stop signs, speed tables, pavement treatments, semi-diverters, mid-block closure, forced turn channelization, traffic circles, chicanes, and chokers. The manual does not include a variety of tools often used to improve pedestrian safety, comfort and reduce exposure. Many of these are highlighted in *WalkBikeNC, North Carolina's Statewide Bicycle and Pedestrian Plan*.

The Town should consider amending the Manual to include additional pedestrian-focused treatments including mid-block crossings and associated crossing beacons, in-street pedestrian crossing assemblies, and raised crosswalks. Design criteria for new treatments should be consistent with standards referenced in the state's plan. In addition, the Town should consider adding policies for fixed signal actuation (vs. pedestrian-actuated signals) and leading pedestrian intervals.

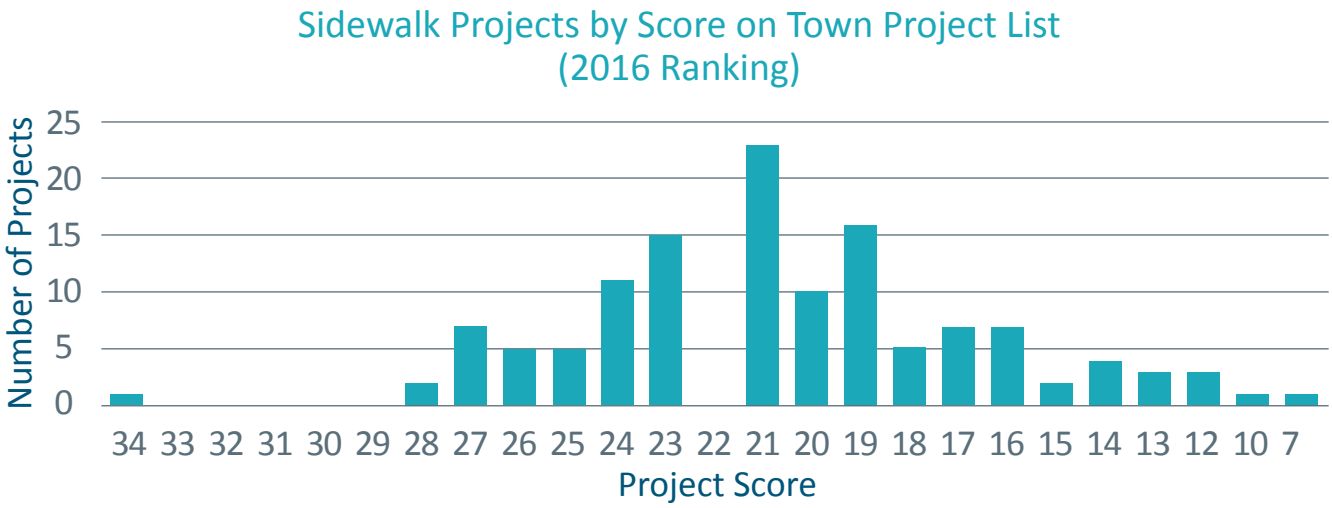
Sidewalk Programs

Reprioritize Sidewalk List

The Town has an existing sidewalk priority list that identifies 92 potential sidewalk projects and ranks them based on a prioritization score. The Town's system develops an overall score out of 36 based on safety, pedestrian, and other criteria in order to determine priorities with limited capital funding options. Typically, sidewalks in the system with high scores fall between 19-27 points, with little room to discern between higher-priority projects.

92 → 158

Increase in Projects on Sidewalk Prioritization List Based on Mobility Plan Evaluation



Sidewalks on the Town project list are clustered making it difficult to discern high priority projects. Additional scoring factors and points related to Focus Areas and Priority Corridors will elevate projects to consider for design and construction.

Additional points are added to the ranking system to bolster projects identified along the Priority Corridors, particularly those in the Town Focus Areas and that can be easily constructed.

New Sidewalk Prioritization Criteria

- Focus Area (3 pts)
  - Within Town Focus Area – 3 points
- Priority Corridors (5 pts)
  - Segment of Priority Corridor—5 points
  - Within Priority Corridor ¼-mile Buffer – 3 points
  - Extends Existing Link to Priority Corridor—1 point
- Constructability (5 pts)
  - In ROW, no/minor physical constraint – 5 points
  - May require ROW/easement, moderate physical constraint – 3 points
  - Requires ROW, major physical constraint – 1 points

Microgap Program and Funding

In some cases, gaps in the sidewalk network may be only short segments, less than 500 feet in length. Whether sidewalks were not built on both streets for a corner lot or individual lots in a subdivision were never developed, these small gaps are often easier to fill by Town field staff in the Public Works Department, without need for design or major site preparation. The Town is recommended to establish a line of funding in the annual operating budget, with initial funding of $50,000 to $100,000, to fund microgap sidewalk projects and sites identified for easy/quick installation of small sidewalk gaps.

ADA Accessibility

To meet accessibility requirements and goals of the Americans with Disabilities Act (ADA) and better serve the nearly 14% of the population estimated to have a disability (U.S. Disability Statistics 2015), an ADA Transition Plan is currently being conducted by the Town. By inventorying curb ramps at over 80 intersections in Downtown Chapel Hill, recommendations for annual funding and implementation strategies are being developed for improving curb ramps, crosswalks, and sidewalk segments. The Town has allocated $50,000 annually for several years to improve ramps and curbs across the Town's network. Based on needs, the Town should:

- Maintain the annual budget item to address the improvements identified in Downtown;
- Continue data collection for other portion of the town using the GPS/GIS application developed for the Mobility Plan and
- Designate an ADA Coordinator in the Town
- Initiate a method for citizens to make ADA improvement request
- Plan upgrades for the spot improvements and projects to create accessible routes recommended in the plan
- Continue to monitor, assess and repair deficient facilities and reexamine progress to determine the need for less or more funding.

In addition, strategies are woven throughout the Mobility Plan including upgrading several ADA compliant greenway paths in key areas, filling sidewalk gaps, decreasing bicycle sidewalk riding, and providing accessibility to transit stops.

Bicycle Policy and Programs

While the Chapel Hill Bike Plan was adopted less than 3 years ago, the level of dialogue over bike facilities has been raised across the nation with numerous cities across North America planning, implementing, or piloting more visible or protected bikeways and treatments, including cycle tracks, protected bike lakes, and green paint applications in conflict areas. Residents who would consider cycling more, commonly referred to as "interested but concerned," are more likely to use protected facilities and the types of facilities where riders of all ages and abilities can feel comfortable because of physical separation from traffic.

The new and improved bikeways come with greater cost than the bike lanes or sharrows that were commonplace in most of NC communities' first bike plans. Some communities are choosing to roll out new facility types through pilot projects to get citizen input. There have been mixed results, ranging from excitement and praise to "bikelash" from drivers where vehicular lanes are reallocated. With citizens requesting bike share programs, bike parking, and additional amenities, elected officials are asking how these investments will benefit their communities beyond providing recreational facilities and quality of life.

These items were not addressed in detail in the Bike Plan and therefore are discussed here to help update the 2014 document in terms on policies, programs, and facility types.

Chapel Hill Bike Plan Vision:

"Chapel Hill is a community where biking is a safe and convenient everyday choice."

Recommended Steps to Start a Bike Parking Program

Step 1

Set up online mechanism for bicycle rack request and advertise to property owners. Identify areas of need for new bike parking and supplemental parking for existing properties. Determine rack type and design. Create a mechanism for funding racks such as a crowdfunding campaign or allocation from the Town budget.

Step 2

In the first year, target a minimum installation of 50 racks through a bulk purchase and 1 additional bike corral by request. Upon installations, advertise and promote rack installations to the public and encourage private entities to submit online requests. Geolocate parking and add to GIS mapping on Town website.

Step 3

Perform review of bicycle parking through parking counts, recorded by locations in GIS file. Quantify additional parking needs through program review and private requests.

Bike Parking Program

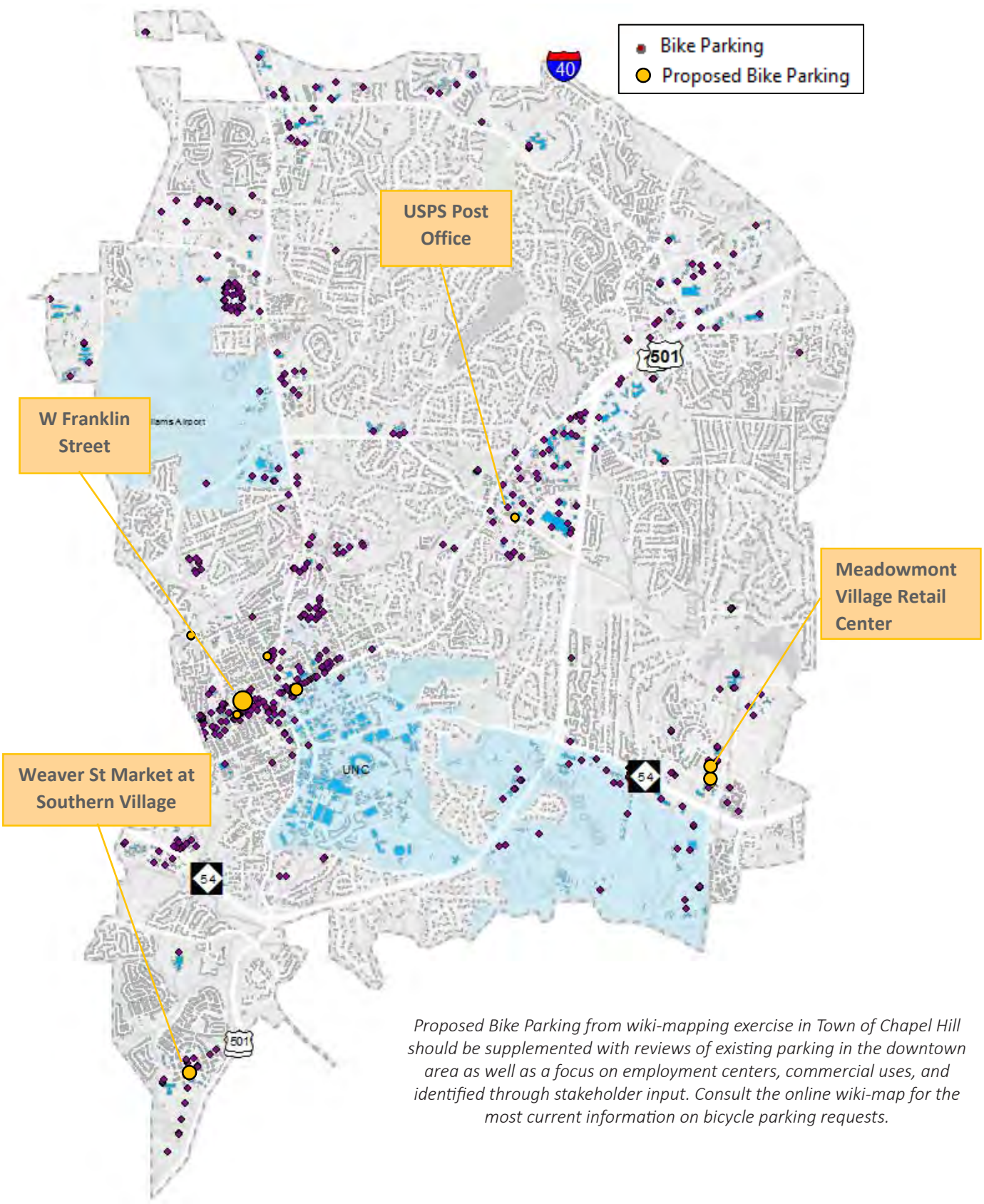
Program Development - To increase parking and create a more bike-friendly town, Chapel Hill should implement a program to provide and expand bicycle parking at existing destinations. In the short term, additional bicycle parking can be provided by assessment of needs and direct outreach, such as:

- Visual observation – Utilize the Town's Meter Parking Patrol to assess the number and location of bikes parked due to lack of legal parking on racks.
- Land use – Review employment centers, commercial uses, high density residential housing, and transit stops to determine needs in those areas.
- User input – Ask cyclists (through clubs, advocacy groups, or online surveys) to identify the most-needed locations. Residents identified numerous locations through the wiki-mapping exercise.

In the long-term, a public-private partnership is recommended for meeting the bicycle parking need at existing locations in Chapel Hill. Individuals attending the Transportation Management Plan trainings can receive information about requesting racks. The requester performs the installations, but suitable racks and siting assistance are provided by the Town through the program. This can be paired with a Bicycle-Friendly Business incentive program. Inverted U-Racks or Bicycle Corrals are recommended and branded versions are available from vendors.

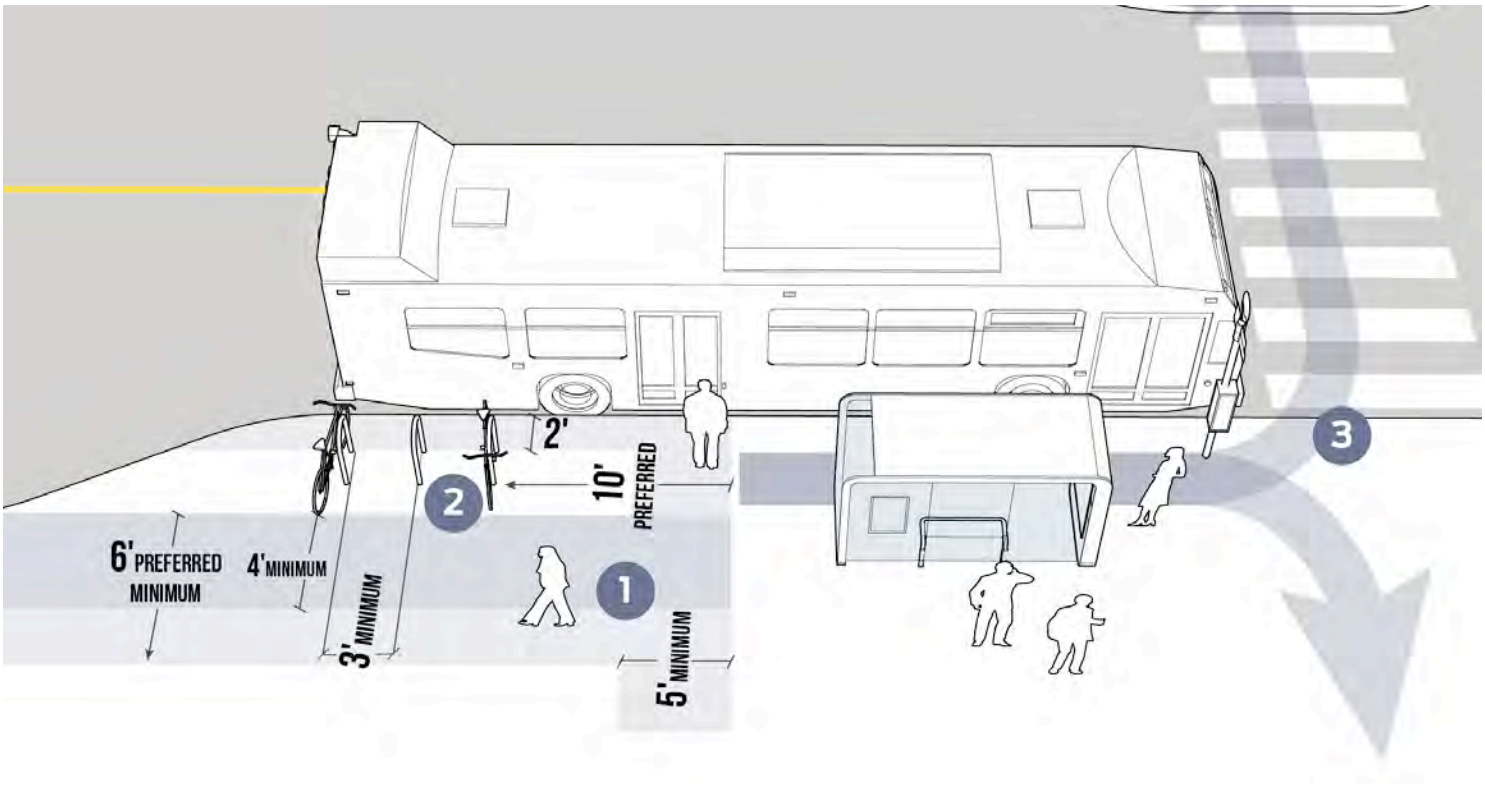
Typically, rack installations can be challenging and are limited by siting constraints, not by the number of racks. If the program is popular and a competitive process for siting racks is required, Town staff should prioritize installations where there are large numbers of illegally parked bikes and places that have received high numbers of citizen requests.

Bicycle Corrals expand downtown and business district parking. This corral in Raleigh, NC is regularly full on weekends and during special events.



Proposed Bike Parking from wiki-mapping exercise in Town of Chapel Hill should be supplemented with reviews of existing parking in the downtown area as well as a focus on employment centers, commercial uses, and identified through stakeholder input. Consult the online wiki-map for the most current information on bicycle parking requests.

Bike Parking at Transit - Bicycling is a great way to complete the first and last mile connection to transit. Transit users are often faced with two options: leave the bike at their station or bring it aboard with them. Providing welcoming, secure bicycle parking facilities helps transit riders feel at ease leaving their bicycle, gives them a designated place to securely lock their bicycle, and expands the catchment area for transit station use. The figure below shows guidance for placement of short-term bicycle parking at a typical transit stop.



Guidance for placement of bicycle parking at a typical transit stop. (Source: NACTO Transit Street Design Guide)

With the planned implementation of Bus Rapid Transit (BRT), the Town can update their design guidelines to require increased bicycle parking at major transit stations, park-n-rides and transit stops. In addition to requirements for covered short-term racks (Type I), cyclists using could be better accommodated with provisions for long-term storage (Type II) at park-n-ride locations. Bike stations provide secure, weather-protected bike storage. Access to bike stations can be integrated with transit fares, online apps, or other types of subscription cards.

Example of Bike Parking Station which provides secure, sheltered long-term bicycle storage for transit users.

Type of Facility	Example	Long Term	Short Term
Major transit facility/ BRT/LRT Station	Proposed expansions of Southern Village & Eubanks Road	5% of auto parking, min of 8	Minimum of 6 covered spaces
Auxiliary Park-n-Ride (300-500 spaces)	Southern Village (390) Eubanks Road (395) Jones Ferry (443)	4% of auto spaces for lots <400 or min of 8 3% of auto spaces of lots >400	Minimum of 14 covered spaces
Standard Park-n-Ride (100-300 spaces)	Carrboro Plaza (145)		Minimum of 8 covered spaces
Transit Stops		N/A	Minimum of 6 spaces

Proposed Revisions to Development Code - The following changes are proposed to existing bike parking ordinance:

- Include parking minimum requirements for transit stations, transit stops, and park & rides
- Increase multi-family residential bike parking to 1 per 2 units (previously 4) based on recent experience with new development
- Specify minimum required spacing between short-term bike parking racks at 24/36" and clear space between racks an any adjacent wall to 36" to add clarity.

Bike Share

With the expansion of bike share programs around the world and in the Triangle area, Chapel Hill aspires to bring a bicycle share system to the community. Bike sharing is a public transportation system which allows users to pick up a bicycle for use and drop it off at any other bike station within the system's service area.

The benefits of an effective bike share systems include:

- Encouraging active transportation and health through physical activity
- Increase in equitable and affordable access to transportation by eliminating an initial barrier of purchasing a bicycle
- Serving the "first and last mile" of a transit trip as an extension to bus or rail services
- Reducing the share of single occupancy vehicles
- Reducing physical space needs for parking facilities

Chapel Hill has already issued a request for information from bike share vendors to help determine the feasibility of such a system in the Town.

Other systems though, are launching or already operating in the Triangle, so the Town will need to consider the potential for coordination and interoperability. The decision should take into account payment methods, system boundaries, station location and sizes, and transit connections.

Coordination with the City of Raleigh or UNC-Chapel Hill could encourage a regional bike share system and provide cost savings with a shared vendor.

These rental bikes in Gainesville, Florida, are similar to the bike share program bikes used by Duke University. (Lauren Johnson/WUFT.org)

System	Vendor	Size	Status	Subscription	Fare
Local					
UNC-Chapel Hill	Social Bicycles	100 bikes	Launch pending	TBA	TBA
City of Raleigh	Beweegen	300 bikes 30 stations	Spring 2018	Annual: $80 Students: $50 Daily : $8	First 30 minutes free $4/half hr additional Reduced rates to students
Others					
Charlotte	B-Cycle	200 bikes 25 stations	Existing	Annual: $65 Students: $15 Daily : $8	First hour is free $4/half hr additional
UNC Wilmington	Gotcha Bike	70 bikes 7 stations	Existing	$25	First hour is free $2/half hr additional
Atlanta, GA	Social Bicycles	500 bikes 50 stations	Existing	$15-20/month students: $25/semester	First 60-90 free (based on subscription) $8/hr additional
Greenville, SC	B-Cycle	40 bikes 10 stations	Existing	Annual: $60 Students: $15 Daily : $5	First hour is free $4/half hr additional

Broadening the Culture and Mindset

As important as the engineering and planning is in creating a multimodal community, so is cultivating the culture and mindset where residents want transportation options and expect the Town to provide them. Commitment to all modes and all users must also be embraced by municipal staff and officials. Chapel Hill possesses that spirit already which can be seen through vision and objectives of the Chapel Hill 2020 Plan, the Bike Plan, regional transit planning efforts, and development standards. The question now is how to further grow the commitment to walking, biking and transit.

Chapel Hill's peers are making strides to become safer and more accommodating for walking and biking. General trends and overarching themes include dedicated bicycle and pedestrian staffing and funding, bikeshare, and a signature project that generates energy within the community.

These initiatives would not only help encourage residents to try different commute and travel patterns, but also educate officials and staff and inspire community action in the Town to participate in events, and even garner support for local projects.

	Chapel Hill NC	Iowa City IA	Charlottesville VA	Corvallis OR	Bellingham WA
Population	58,000	69,000	44,000	53,000	81,000
Bike Commute Modeshare	2.3%	3.7%	3.2%	12.1%	4.3%
Walk Commute Modeshare	12.5%	15.6%	12.6%	9.6%	7.4%
Transit Commute Modeshare	12.4%	9.9%	8.6%	3.0%	5.7%
Total Modeshare	27.2%	29.2%	24.4%	24.7%	17.4%
Staffing Level (FTE)	--	0.75	1.0	1.5	1.0
Bicycle Friendly Community Rank	Bronze	Silver	Silver	Platinum	Silver
Walkscore	35	43	58	48	48
Spending Target for Bicycling and Walking Infrastructure	--	--	Proposed at 20% of CIP in 2015 Bicycle and Pedestrian Master Plan Update	20% of transportation budget	1/3 of total revenue from Transportation Benefit District (contiguous with city limits) funded from two tenths of 1% sales tax
Bikeshare	--	Joint RFP Issued, City and University, 2016	University Bikeshare Vendor: SoBi	City Bikeshare Vendor: Zagster	University Bikeshare Vendor: BIXI

Snapshot Comparison of Key Indicators for Bike & Pedestrian Modes for Chapel Hill and Peer Cities

Performance Measures

Developing metrics and tracking progress is a part of fully integrating pedestrian and bicycle planning into broader, ongoing performance management efforts. With limited resources, it is critical to identify the projects and investments, track progress, develop effective solutions, and prioritize investments. They should promote informed decision-making by relating community goals to measurable effects.

Recommended Performance Measures for Chapel Hill Community Mobility

The Town should begin to track performance measures to measure the outcomes of the Mobility Plan:

Infrastructure Spending - Chapel Hill should quantify and report on infrastructure spending by mode as compared to targets for bicycle, pedestrian, & transit improvements based on the Town's Capital Improvement Plan and Bond projects for transportation infrastructure. Approximately 70% of the FY2017 infrastructure capital program is dedicated to bike/ped improvements, as is a similar percentage of bond programs for transportation. With a bicycling and walking mode share totaling around 15% and transit users who also depend on pedestrian infrastructure, the current spending is well-above **a reasonable target of 30%**

Public comments indicated that street crossings are a large issue for residents.

Miles of Bicycle and Pedestrian Facilities - Reporting miles added annually allows for tracking progress over time. In conjunction with Powell Bill inventories, the Town should continue to track miles of existing sidewalk, greenway, and bicycle infrastructure and update this information on an annual basis.

Crossing Opportunities - Public outreach for the Mobility Plan indicated that street crossings are a large issue for the Town, especially on higher volume state-maintained arterials where there are limited opportunities. Tracking this metric show annual progress on reducing the average distance between improved crossing locations of roadways of 4 or greater lanes. Improved crossings are defined as two-stage or signalized, and can include Rapid Rectangular Flashing Beacons or HAWK Signals.

It is recommended that Chapel Hill track crossing improvements and set the minimum desired distance between improved crossings on 4+ lane arterials at ¼ mile.

Mode Split - The mode split relates to the overall goal of the Mobility Plan to increase trips by walking, bicycling, and taking transit. When evaluating projects, this metric can be used to determine how a project alternative might impact mode choice to reach the goals set by the Town.

The Town should continue to monitor American Community Survey data and document percent increase in combined bicycling, walking and transit mode share of total commute trips, aiming for the plan goal of 35% commuting by bike, walk or transit in 2025.

Bicycle and Pedestrian Counts - Counting volumes of non-motorized transportation users offers useful information on an agency's performance. Chapel Hill conducts location counts for cycling and walking and has existing data on transit usage. These counts are a better gauge of walking and bicycling usage trends than journey to work data available through the American Community Survey since it includes people who are not traveling solely for work purposes on weekdays. Though counts are highly seasonal in nature, and weather dependent, continuous counts provide a good source for looking at change over time.

The Town should provide an annual report of bicycle and pedestrian counts from the stations and, if possible, allow real-time reporting of data to Town open source data locations.

Wayfinding and Signage

Within the low-stress priority network of bicycle and pedestrian infrastructure within the Town of Chapel Hill, there are connections to many destinations. Therefore it will be important to employ a unified wayfinding package at a human-scale. The concept should be implemented through on-street and sidewalk markings, signage, posts, and sidewalk/greenway kiosks to guide people to destinations and draw awareness to the Greenway Connectors.

Every place in a navigable space has a unique perceptible identity. It functions as point of reference in the larger area.

The key types of wayfinding are:

Turn Signs - The intention of this type of signage is to ensure users stay on the designated corridor. These signs should be added before key decision points, so that there is time to make the decision of where to go next.

Confirmational Signage/Marking - Signs or markings that are actually not used to direct people, but act to verify that the user is on the right path. To create a positive experience, these signs ensure that people have comfort in the fact that they are going in the right direction. Conveying the right mood is a key part of what signage can achieve when implemented correctly. Often these are placed after key decision points to confirm a route.

Decision Signage - These mark the junction of multiple routes. They orient users within the local context and provide directions to one or more key destinations.

Awareness Signage - These signs are intended to draw awareness to a route and encourage new users. These signs build awareness of the system by creating a presence for the priority routes outside of the system.

Decision Sign (top) that would be placed at key points in the network as part of an example signing package.

Confirmational Markings (bottom) can be placed at regular intervals on the pavement or sidewalk to verify that the user is on the right path after the decision is made.

Active Routes Coalition Members

School

- Principal and other administrators
- Parents and students
- Teachers
- PTA/PTO representative
- School nurse
- School district transportation director
- School improvement team or site council member
- Adult school crossing guards

Community

- Community members
- Neighborhood or community association members
- Local businesses
- Local pedestrian, bicycle and safety advocates

Town Government

- Mayor's office or council member
- Transportation or traffic engineer
- Local planner
- Public health professional.
- Public Works representative
- Law enforcement officer
- Mobility coordinator

Active Routes to School

North Carolina's support for Safe Routes to School (SRTS) education and encouragement programs is delivered through the Active Routes to School project which is supported by a partnership between the N.C. Department of Transportation and the N.C. Division of Public Health. The Town has support through the Region 5 coordinator. The project is federally funded and will span through June 2019. The project will focus on providing safe, appealing environment for walking and biking, improve the quality of our children's lives and support national health objectives by increasing physical activity, reducing traffic, fuel consumption, and air pollution in the vicinity of schools.

The Active Routes to School program is an opportunity to make walking and bicycling to Town schools safer for children and to increase the number of children who choose to walk and bicycle. **The Town should continue to support and expand 'Active Schools.' It is recommended that the Town work to ensure an active and broad coalition which has representative members from schools, the community, and local government. It should to grow its representative schools, curriculum, and events to support the next generation in healthy active lifestyles.**

Infrastructure Projects - In North Carolina, the Strategic Mobility Formula aligns bicycle and pedestrian projects with SRTS, Transportation Alternatives Program, or Surface Transportation Program funds. The NCDOT Transportation Planning Branch and eligible MPOs direct the use of Congestion Mitigation and AIr Quality funds for bicycle and pedestrian projects. Highway Safety Improvement Program (HSIP) funds are directed by the NCDOT Transportation Safety and Mobility Unit. New requirements under HSIP require better data-gathering on bicycling and walking crashes and safety.

The NCDOT SRTS office asks that the Town and schools work with its Division office to develop a list of priorities. Proposed projects will be scored based on specific criteria for bicycle and pedestrian projects and will need to score well in order to move forward in the prioritization process. The NCDOT Division staff and/or MPO/RPO offices can assist with this process, as well as the Active Routes to School Regional Coordinator.

Bike and Pedestrian Count Program

There is a difference between counting bicycling and walking volumes for short-term, project specific purposes versus having a count program. Since a permanent count cannot be installed in all locations due to lack of funding, an effective program is composed of two elements – continuous counts and spatial coverage counts. Chapel Hill has experience carrying out a data collection plan through collecting coverage counts for the Mobility Report Cards. It is recommended that the Town of Chapel Hill formalize the continuous and coverage counts in order to implement an Non-Motorized Volume Program.

Why Count?

Nationwide communities collect data on vehicle movements, but rarely is data collected on bicycle and pedestrian use. Due to the lack of basic metrics, this means that what is not counted is not funded. Collecting more data can help to increase funding for and put in place better bicycle and pedestrian infrastructure. This is especially important in identifying areas of the highest need, which are often under-represented in public input.

Applications of count data are numerous:

- Performance Measures
- Project Prioritization
- Evaluating the effects of new infrastructure on bicycle and pedestrian activity
- Conducting risk/exposure analysis
- Estimating annual volumes
- Justifying maintenance expenditures

What doesn't get counted, doesn't count.

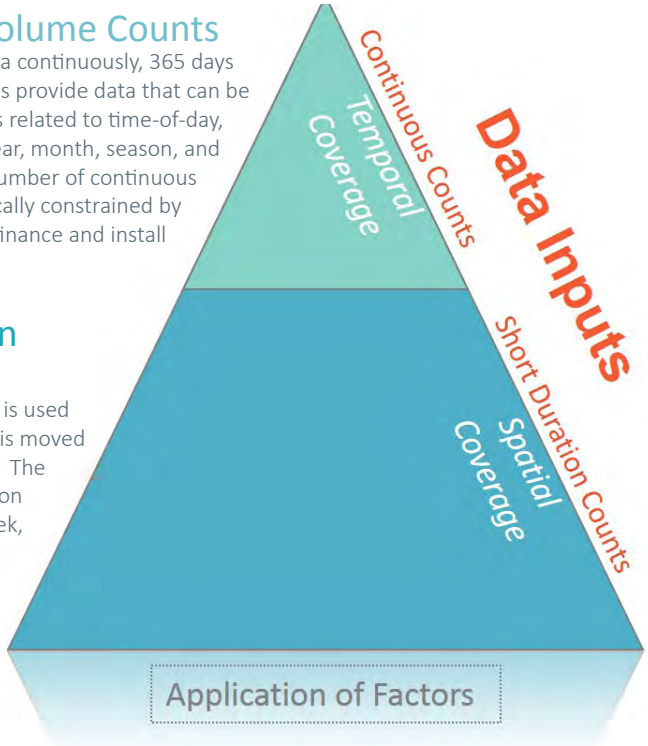
Data gives justification. It allows you to make a case.

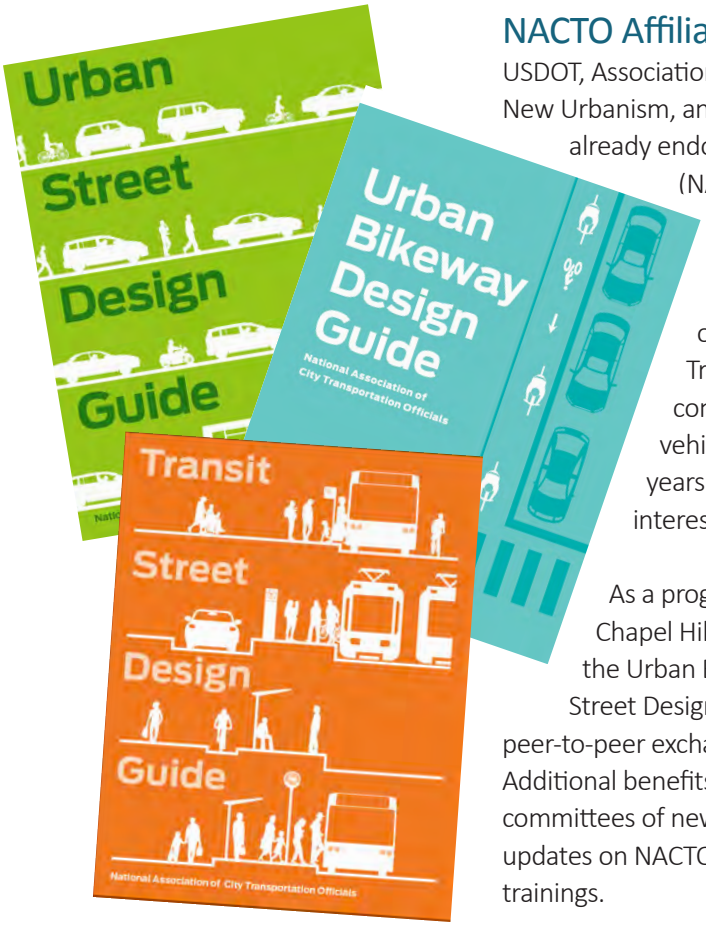
Continuous Volume Counts

Permanent provide data continuously, 365 days per year. These stations provide data that can be used to develop factors related to time-of-day, day-of-year, week-of-year, month, season, and annual volumes. The number of continuous count stations are typically constrained by resources available to finance and install them.

Short Duration Counts

Automated equipment is used for data collection and is moved from station to station. The data is adjusted based on time-of-day, day-of-week, and/or monthly factors that are derived from the continuous count portion of the program.





NACTO Affiliation

USDOT, Association of Bicycling and Pedestrian Professionals, Congress for the New Urbanism, and the Urban Land Institute along with 9 States and 48 cities have already endorsed the National Association of City Transportation Officials (NACTO) Urban Street Design Guide.

Street design standards and practices have long been developed and dictated by state departments of transportation and organizations such as the American Association of State Highway Transportation Officials (AASHTO), and reflect standards more conducive to a rural context where right-of-way is cheap and average vehicular speeds are in excess of 45 mph. It is only in the past few years that we have seen cities and organizations representing their interest as they push for and gain acceptance of urban design standards.

As a progressive town that commonly supports innovative design practices, Chapel Hill could endorse NACTO and incorporate design elements from the Urban Bikeway Design Guide, the Urban Street Design Guide and Transit Street Design Guide into projects. NACTO member and affiliate cities have a peer-to-peer exchange for valuable communication between cities on best practices. Additional benefits of becoming a NACTO Affiliate City are membership on review committees of new and updated guides, travel support for NACTO events, regular updates on NACTO projects, and NACTO staff leadership at Design Guide-based trainings.

Mobility Coordinator

Employing a bicycle and pedestrian staff person as a Mobility Coordinator shows that a community is committed to a comprehensive transportation system; they are critical to integrating and coordinating the Town's plans, projects, and development agreements. Having at least one staff-member focusing on the coordination between bicycle, pedestrian, greenway, and transit accessibility issues is an important step in carrying out the recommendations in the plan. The need for coordination is anticipated to increase over time.

Policy and Program Implementation

While infrastructure improvements take considerable time to design and construct, policy changes and new programs can often take shape shortly after the adoption of a new plan and influence the organizational culture and operations. The table below outlines the implementation schedule for these recommendations that need to be made upon adoption of the plan, with continual ongoing town operations, or within the next two fiscal years.

	Policy/Program	Responsibility
After adoption	Update Design Manual Streets and Sidewalks Standard Details	Public Works Department
	☆Amend LUMO for bike parking requirements	Planning Department
	Reprioritize sidewalk list	
Ongoing/ immediate	Continue to develop a bike/ped count program	Planning Department
	Expand 'Active Schools' Program	
Within year (by or for FY19 budget)	Create a wayfinding and signage package	Planning Department
	☆Update Complete Streets Policy	
	☆Designate an ADA Coordinator	
	Start a bike parking program	
	Track and report performance measures annually	
	Become a NACTO Affiliate	
	Add pedestrian elements to Traffic Calming Policy and Procedures	Public Works Department
	☆Establish sidewalk microgap program	
	☆Initiate an ADA improvement request process	
FY19-20 Fiscal Year	Hire a Mobility Coordinator	Planning Department
	Initiate a Town bikeshare program	
	Plan upgrades for the spot improvements and projects to create accessible routes in the ADA Transition Plan	Public Works Department

5 Priority Programs/Policies + 20 Key Projects - Five priority policy/ program recommendations are starred based on their effect to best incorporate and instill a ped-/bike-focused mentality into the Town's standard operating procedures for development review and capital projects, as well as setting up smaller-scale programs to address access needs across the community. When completed and paired with the 20 key capital projects, residents will find the Town's network and developments easier to walk and bike.

A. Public Involvement Detail Summary

B. Planned Improvement Projects

C. Facility Guidelines

D. Ephesus-Fordham District Plan

Glossary

Americans with Disabilities Act (ADA)	Civil rights law that prohibits discrimination against individuals with disabilities in all areas of public life and all public and private places that are open to the public.
Accessible Pedestrian Signal (APS)	Devices that communicate information about the "walk" and "don't walk" intervals at signalized intersections in nonvisual formats to pedestrians who are blind or have low vision.
Advisory Bike Lanes	Dashed bike lanes on low-volume streets too narrow for dedicated lanes.
Bicycle Signal Actuation	A device at a traffic signal that detects bicyclists and alerts the signal control box of a bicyclist's presence and need to cross.
Bike Box	Designated area positioning cyclists ahead of vehicles in traffic lane at signalized intersection during the red signal phase.
Bike Signal Faces	Bike-specific signal providing priority to cyclists where vehicle or pedestrian movements conflict.
Buffered Bike Lanes	Bike lane buffered from traffic with striping. When bollards or physical separation is used, the facility is often called a Protected Bike Lane.
Bus Rapid Transit (BRT)	Bus rapid transit (BRT, BRTS, busway, transitway) is a bus-based public transport system designed to improve capacity and reliability relative to a conventional bus system. BRT often incorporates dedicated bus lanes and traffic signal priority.
Capital Improvement Plan (CIP)	The Capital Improvement Plan (Program) is a short-range plan which identifies capital projects and equipment purchases, provides a planning schedule, and identifies options for financing the plan. It is the principal planning tool designed to advance the priorities of the Town.
Complete Street	A transportation policy and design approach that requires streets to be planned, designed, operated, and maintained to enable safe, convenient, and comfortable travel and access for users of all ages and abilities regardless of their mode of transportation. Complete Streets allow for safe travel by those walking, cycling, driving automobiles, riding public transportation, or delivering goods.
Curb Ramp	A combined ramp and landing to accomplish a change in level at a curb between the sidewalk and the street. This element provides a transitional access between elevations for pedestrians using wheelchairs, strollers, or other devices with wheels, and must comply with ADA Standards.

Glossary

Cycle Track	One- or two-way bike-only facility separated from traffic by physical barrier and pedestrians by curb or buffer.
Detectable Warning	Standardized surface feature built in, or applied to, walking surfaces to warn pedestrians with vision impairments of their approach to street crossings by delineating the boundary between pedestrian and vehicular routes, and to hazardous drop-offs such as the edge of boarding platforms at transit stations. Detectable warnings must meet ADA Standards. Truncated domes are a type of detectable warning.
Durham-Chapel Hill-Carrboro MPO (DCHC)	See MPOs.
East Coast Greenway	A bicycling and walking route that connects 15 states, 450 cities and towns, and 3,000 miles of people-powered trails from Maine to Florida.
Grade-Separated Crossing	A facility, such as an overpass, underpass, skywalk, or tunnel that allows pedestrians, bicyclists, and motor vehicles to cross each other at different levels to avoid conflicts and improve free flow of each mode.
Greenway Connector	A combination of signing, marking, traffic calming measures, and facilities that allow bicyclists and pedestrians to get safely from point A to point B in a priority corridor.
Hybrid/HAWK Signals	Special signals used for crosswalks/bike crossings on major streets where side streets do not warrant full signal. Photo on page 34.
Intersection Crossing Markings	Pavement markings indicating intended path of cyclists; typically include dashed edge lines with green pavement or sharrows.
Lane Reallocation	A technique to modify the number or width of travel lanes to achieve systemic improvements. Variants of the term reallocation include 4-to-3 lane conversion, lane reduction, and road diet.
Light Rail Transit (LRT)	A transit technology that is lighter than other traditional passenger rail systems like subways or commuter rail. Light rail operates in dedicated tracks with electrical power supplied from an overhead catenary system. The light rail vehicles are designed to operate in mixed traffic or in an exclusive right-of-way, either at grade or on an elevated structure.
Land Use Management Ordinance (LUMO)	Chapel Hill's set of development regulations.

Metropolitan Planning Organization (MPO)	A federally mandated and federally funded transportation policy-making organization in the United States that is made up of representatives from local government and governmental transportation authorities. Chapel Hill is within in the Durham-Chapel Hill-Carrboro MPO.
Midblock Crossing	A marked crosswalk that occurs in a location other than an intersection.
Modeshare	The percentage of commuters who travel to and from work by a certain mode (car, bike, walk, transit, work from home)
Multimodal	A transportation term which refers to planning that considers various modes (walking, cycling, automobile, public transit, etc.) and connections among modes. Multimodal transportation includes the mixing of different modes and supports the needs of all users whether they choose to walk, bike, use transit or drive. It means more connections and more choices.
Multi-Use Path	A facility, which should be designed to meet ADA Standards, that can be used by bicyclists, pedestrians, and other non-motorized users. They are separated from the roadway by an open space or a physical barrier or within an independent-right-of-way. Also known as a “shared use path” or “greenway.”
Non-Motorized	Active transportation which includes walking and bicycling and variants such as small-wheeled transport (skates, skateboards, push scooters and hand carts) and transport by wheelchair. Also known as Human Powered Transport.
NCDOT	North Carolina Department of Transportation
Overpass	A structure or bridge that crosses over a roadway, barrier, or natural feature. Also called a "grade separation."
Pedestrian Refuge Island	A raised island at intersection or mid-block crossing location that helps protect crossing pedestrians from motor vehicles and provides a place of refuge. Also known as a crossing island.
Priority Corridor	A low-stress route prioritized for bicyclist and pedestrian use connecting key destinations in the Town.
Protected Bike Lanes	A bike lane protected from traffic by being raised or physically seperated by a permanent barrier.
Rapid Rectangular Flashing Beacon (RRFB)	A warning beacon activated by a pedestrian at an uncontrolled crossing location which uses an irregular flash pattern to signal drivers of a pedestrian’s presence and desire to cross.
Right-of-Way	A right to make a way over a piece of land, usually to and from another piece of land. It is a type of easement granted or reserved over the land for transportation purposes, this can be for a highway, sidewalk, bike paths, rail transport, canal, as well as electrical transmission lines, oil and gas pipelines.

Glossary

Separated Facility	A bicycle and/or pedestrian facility that is physically separated from motor vehicles and is on, adjacent to the roadway, or in an independent right-of-way. Separated facilities include cycle tracks, protected bike lanes, and multi-use paths.
Shared Lane Markings	A pavement marking symbol used to indicate a shared lane environment for bicycles and motor vehicles. These markings are also called "sharrows."
Traffic Calming	A traffic management approach that is intended to slow cars to speeds that are safer and more compatible to bicycling and walking as they move through commercial and residential neighborhoods. The traffic calming toolbox includes, but is not limited to: diagonal parking, neighborhood traffic circles, narrowing travel lanes, tightening curb radii, median islands, traffic diverters, and speed tables.
Transportation Demand Management (TDM)	The application of strategies and policies to reduce travel demand, or to redistribute this demand in space or in time to result in more efficient use of transportation resources.
Two-Stage Turn Queue Box	A designated area at an intersection intended to provide bicyclists a place to wait for traffic to clear before proceeding in a different direction of travel.
Uphill Climbing Lane	Bike lane marked on uphill portion of road with shared lane marking on downhill side.
Vehicles per Day	A measure of traffic volume and used as the unit for Average Annual Daily Traffic.
Wiki-Mapping	An online engagement tool for planners to identify barriers, problems, or safety concerns and simultaneously collect location information from the public.

APPENDIX A:
Public Involvement Detail Summary

PART 1: Public Outreach Inputs to the Mobility Plan

This section summarizes the public input conducted for the plan which resulted in over 850 comments regarding overall mobility as it relates bicycling, walking, and access to transit in the town. Comments are summarized in Part 2. The following inputs were used for developing the plan:

- 20 agencies represented on the Mobility Plan Steering Committee
- 4 Pop-Up Outreach events were conducted with the intent of 'meeting people where they are' to receive input and feedback
- 505 responses were received to the Mobility Plan survey which was distributed in both paper and online format (3)
- An online wiki-map was made available for map-based input
- 82 Citizens attended and participated in the Open Houses for the Plan, excluding the Open House conducted for the final plan review (Part 4)

Steering Committee

A Steering Committee met during the planning process for information sharing and updates on May 25, 2016. This meeting included an invitation to representatives from the following agencies: UNC, Town of Chapel Hill (TOCH) Planning, TOCH Police Department, TOCH Planning, TOCH Fire Department, NCDOT, GoTriangle, TOCH Communications, GoTriangle, Town of Carrboro, City of Durham, TOCH Communications, DCHC MPO, TOCH Parks & Recreation, TOCH Police Department, TOCH Engineering, TOCH Planning, TOCH Transit, TOCH, Manager. Twenty agencies were represented on the Mobility Plan Steering Committee

Appendix A: Public Involvement Detail Summary

A kick-off meeting was held on March 28, 2016 that covered expectations, the project approach and schedule, data collection, community engagement, stakeholder identification, the Ephesus Fordham sub-area plan, placemaking, and lessons learned.

Pop-Up Outreach

The purpose of developing pop-up stations was to go Chapel Hill residents to get survey input in locations where they typically travel. "Outreach events" were conducted during the month of June. I-pads and survey hard copies were available so residents could fill out information in real time. At the September outreach event, handouts and flyer were used to advertise a timely upcoming public meeting, and the consultant team was available to answer questions.

- **Tuesday June 21, 2016** – Active outreach at Plaza 140 to collect survey input
- **Wednesday, June 22nd** – Team rides various transit routes throughout the day in Chapel Hill to collect survey input
- **Thursday, June 23rd** – Active outreach at Eastgate Shopping Center to collect survey input
- **Friday August 26th –** Active outreach at Cyclicious event at UNC-Chapel Hill

Survey

A survey was developed with Staff guidance so questions were asked to gain insights from a variety of residents on relevant topics. These include current pedestrian, cycling, and transit destinations, connectivity issues, and suggestions for improvements. Emphasis was placed on the Ephesus-Fordham District. The survey was open from mid-June until mid-September 2016 and received 505 responses. Due to the desire for input on pedestrian mobility, walking and accessibility were key components of the survey. A complete survey summary is included in Part 3.

Public Open Houses

Two public open houses were held at the Chapel Hill Public Library. The drop-in style open houses had a variety of interactive boards and a presentation to introduce residents to the planning process, and get feedback on the following: vision and goals of the plan; current issues with bicycling, walking, and access to transit; and voting on prioritization of projects. Both open houses also took open ended feedback for consideration in the plan. Overall 82 Residents attended and Participated in the Plan's Open Houses. See Part 4 for the Open House Summary on September 6.

- Thursday June 30, 3:30-7PM Drop-in session at Chapel Hill Public Library: 39 attendees
- Tuesday, September 6, 4-7 PM Drop-in session at Chapel Hill Public Library: 43 attendees

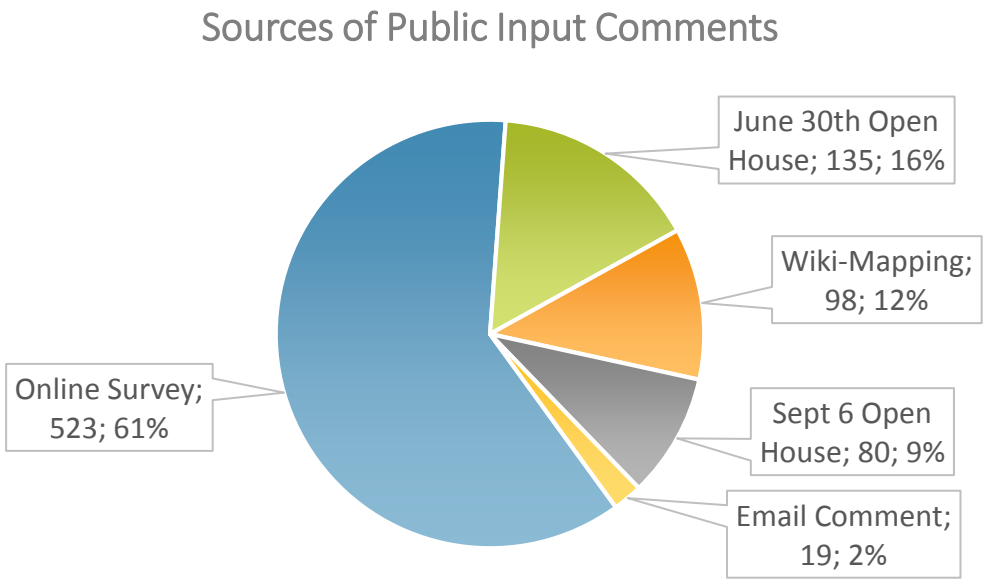
WikiMap

The Town of Chapel Hill used an online tool called WikiMaps to serve as a complement to the survey, and allowing community members to provide visual, map-based input about desired walking and bicycling routes, destinations, and problem intersections. Citizens were able to specify and comment on desired routes, transit stops, dangerous intersections, and destinations currently difficult or impossible to access using alternative modes of transportation.

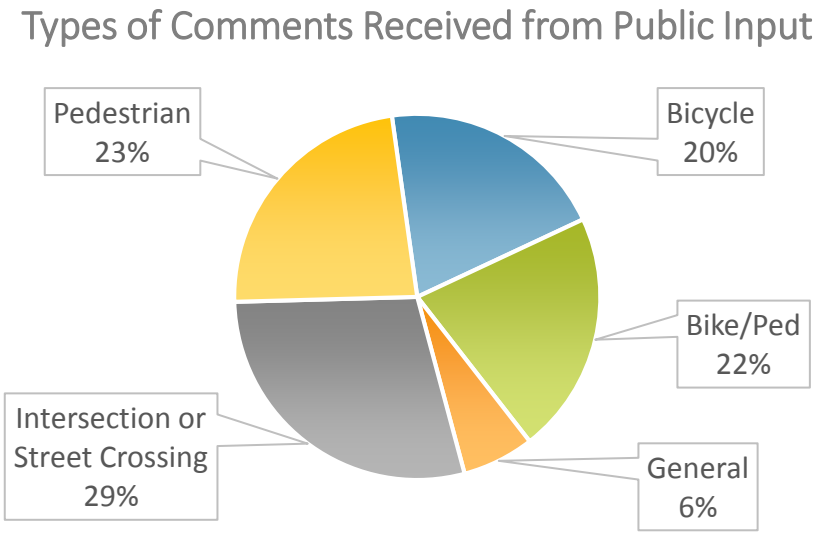
PART 2: Public Comment Summary

This section summarizes the public input conducted for the plan which resulted in over 850 comments regarding overall mobility as it relates bicycling, walking, and access to transit in the town.

Residents of the town were given numerous ways to give input. Over 850 comments regarding mobility issues were received through the open houses, e-mails, and wiki-mapping and Question 5 of the Survey.



These comments were categorized by the type of public input received. Where both modes were listed, a mode was not specified, or where greenways were concerned, comments were categorized as "Bike/Ped." The majority of comments were related to intersections or crossing the street (29%), followed by pedestrian-only comments (23%). Bicycle and joint Bike/Ped comments each comprised around 20% of the overall input.

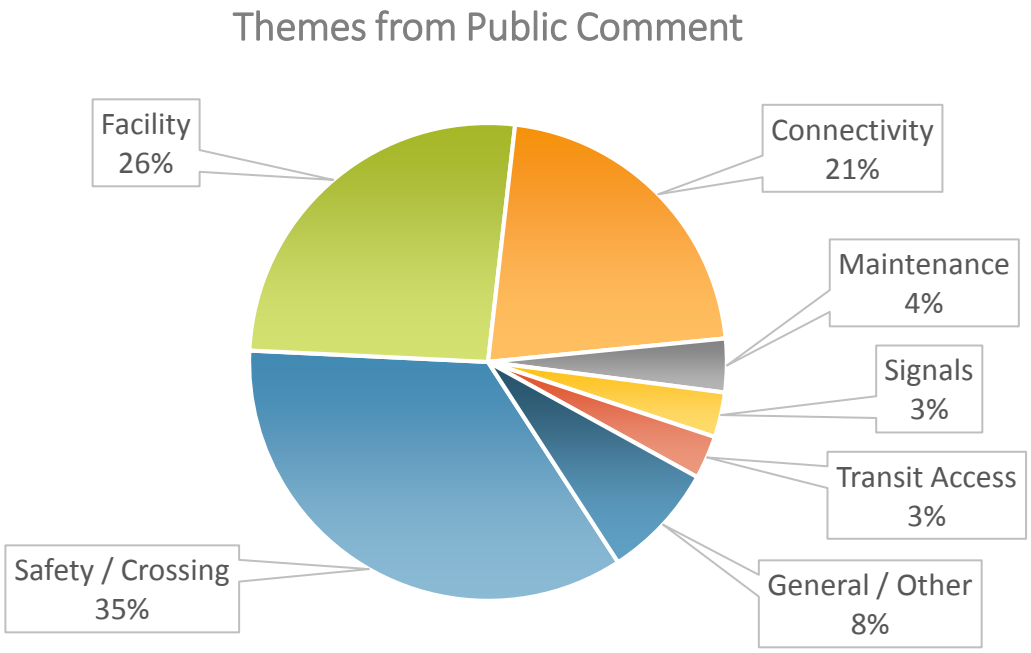


Appendix A: Public Involvement Detail Summary

Major Themes of Public Comments

From the comments, several major themes emerged:

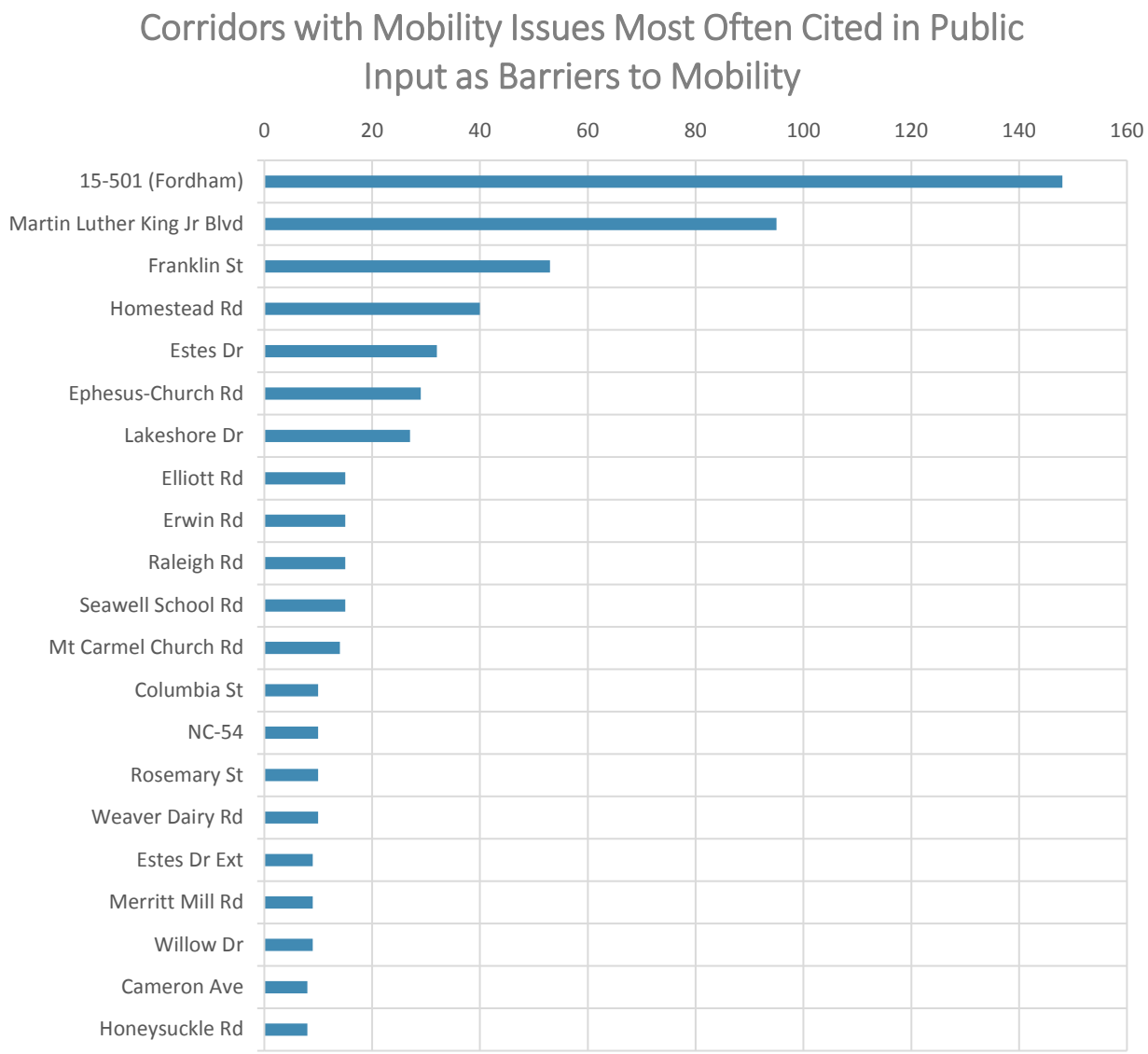
- **Safety, especially at intersections** – Over one third of the comments were related to safe crossing of busy streets. The majority of these comments were recommendations for crosswalks and safety improvements related to crossing busy intersections both on bicycle and on foot. Of these, 20 comments gave specifics regarding improvements to intersection signalization including pedestrian timing and bicycle detection.
- **Facilities** – Over a quarter of the comments were related to specific locations for facilities to improve bicycling or walking in the town.
- **Connectivity** – Residents want to see bicycle and pedestrian facilities link between neighborhoods, schools, and commercial centers. Nearly 20% of comments were related to making connections in the Town. The majority of connectivity comments were related to expanding and making connections with the greenway network followed by comments related to making connections between residential neighborhoods.



A number of comments were related to Maintenance, Signals, and Transit Access. Comments related to parking, lighting, signage and enforcement were cited to a lesser degree an included in the General/Other category.

Corridor Mobility

These comments were further categorized and located to gain a sense of which main corridors and intersections posed the greatest challenges in the Town for walking, bicycling and accessing transit. Greenway comments were considered separately. For brevity, this list does not include locations that were cited in comments less than 8 times.

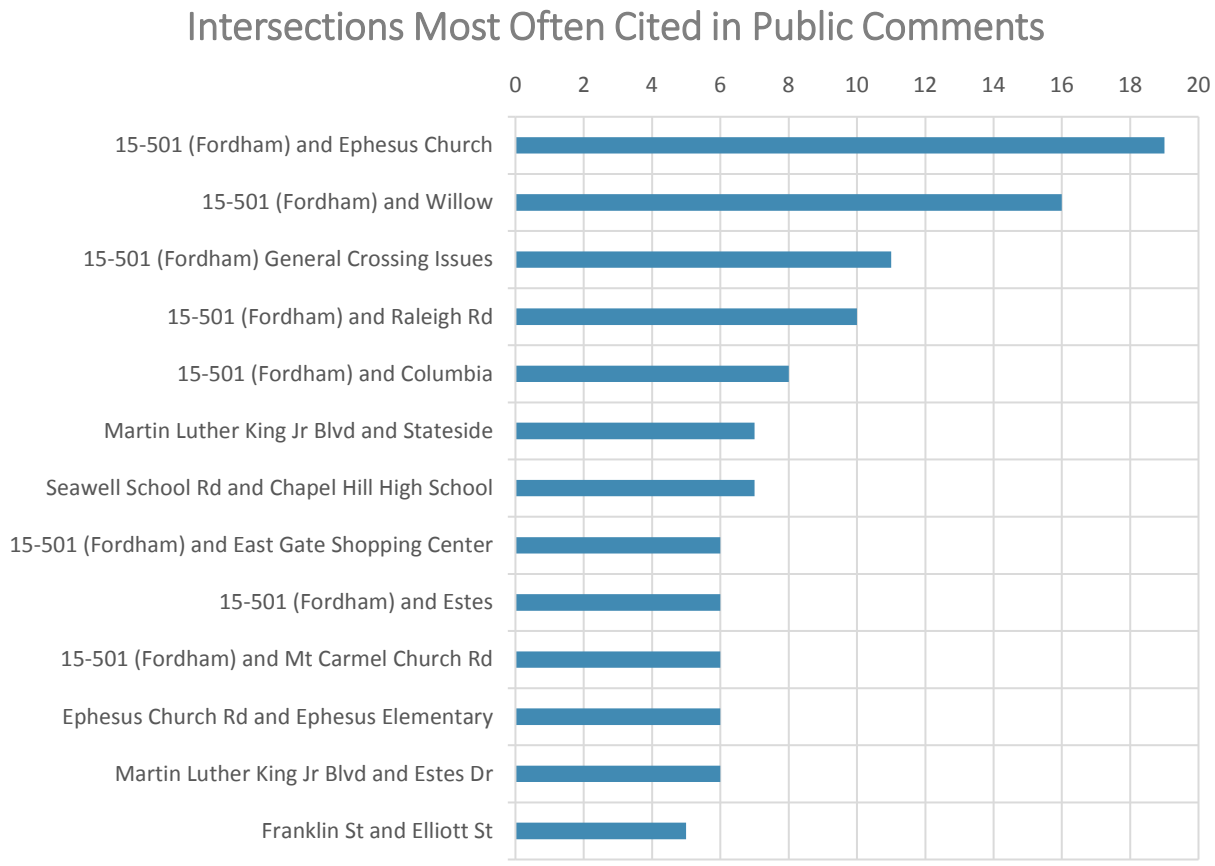


The portion of US 15-501, also called Fordham Blvd, which received more than 150 comments. Martin Luther King Jr Blvd was cited in comments nearly 100 times. Franklin Street received over 50 comments with the vast majority of these being on the eastern portion of the corridor. Homestead Rd, Estes Dr, Ephesus Church Rd, and Lakeshore Dr were the subject of over 20 comments each.

Appendix A: Public Involvement Detail Summary

Intersection Mobility

Where further detail was given, intersections were tagged and grouped from the public comment to further refine avoided, difficult or unsafe crossing locations in the Town. Only locations with five or greater comments are included. Lakeshore Dr was noted as being generally problematic for walking and bicycling due to speeds.



Greenways and Multi-Use Paths

The town received feedback on existing greenways and suggestions for connections and improvements. Many comments were received on general greenway connectivity with residents desiring a robust and low-stress transportation network to meet their daily needs. Connecting the greenway system was often cited to achieve mobility to key destinations in the Town. Public involvement more specific to destinations and more localized issues in the Ephesus-Fordham area are included in **Appendix E.**

Booker Creek and Bolin Creek Trail

Booker Creek Trail was most often cited in comments obtained through the Mobility Plan public involvement. Crossing Franklin Street and creating safe connection to/through East Gate Shopping Center made up the majority of comments related to the trail. Comments also revealed the desire for additional neighborhood connections to this greenway. The majority of specific comments related to the Bolin Creek Trail suggested extending the trail East toward the soccer fields on the other side of 15-501 (Fordham Blvd). A clear connection to/through Community Center and to East Gate Shopping Center was also expressed in many of the comments related to this trail. Citizens are interested in a clear, safe, and low-stress connection between the Bolin Creek and Booker Creek Trail and providing a route into downtown Chapel Hill.

Chapel Hill Greenway Comments	Total
Booker Creek Trail *Extend Across Franklin St to/through East Gate Shopping Center*	**30**
Bolin Creek Trail *Extend East beyond Fordham Blvd, Extend North to Eastgate, Extend West*	**25**
Shared Use Grade Separation over 15-501 *Ephesus Fordham Area*	**21**
Morgan Creek Trail *Extend East to UNC and Beyond, Extend West, Morgan Creek Trail Bike/Ped Grade Separation at James Taylor Bridge*	**19**
Connection between Bolin Creek Trail and Booker Creek Trail (E Franklin St)	**19**
Improve Intersection at Bolin Creek Trail / Connectivity to Greenway System *Martin Luther King Jr Blvd*	**11**
N-S Greenway Connections (Including Carolina North)	**8**
General Greenway System Comments	**6**
Other Trail Connections: Estes Sidepath, McCauley Trail, Battle Brach Trail, Little Creek Trail, Meadowmont	**17**

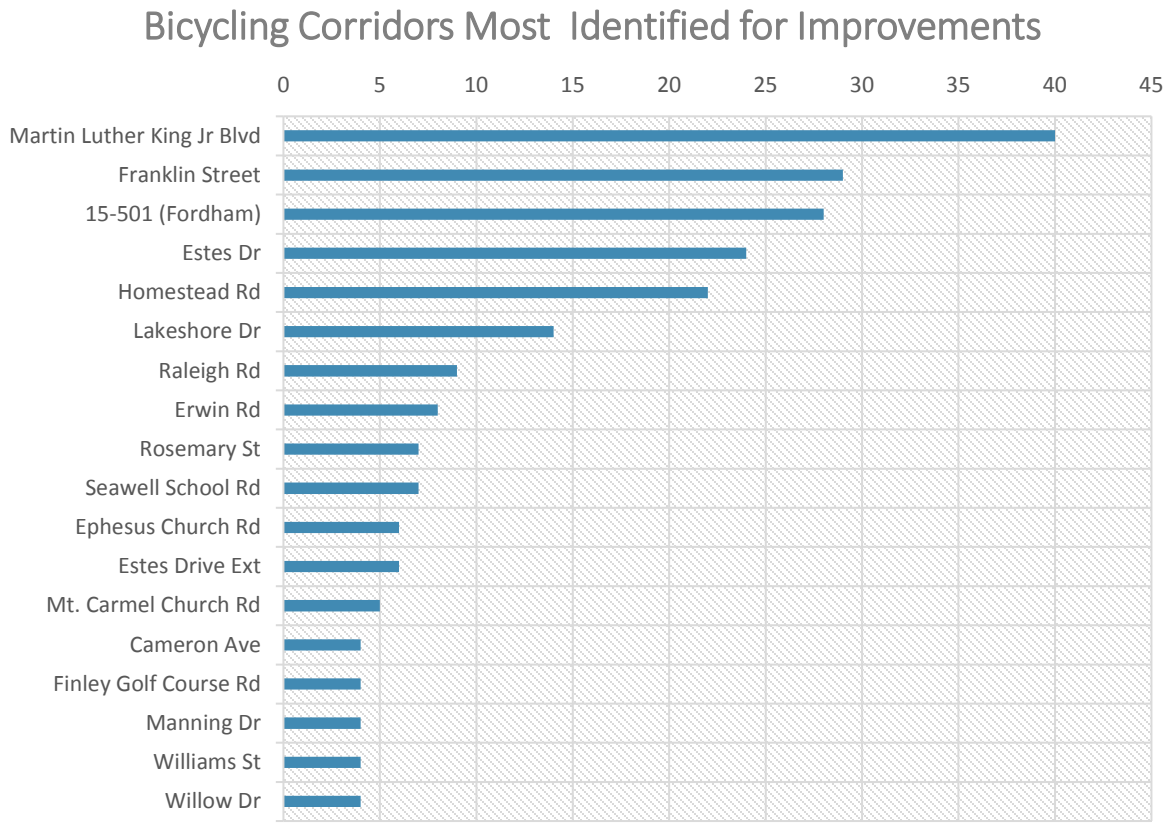
Issues with greenways abruptly ending and stress with crossing intersections at those locations was clearly voiced in the comments. Two key locations were where trails intersect US 15 501 Fordham Blvd and Martin Luther King Jr Blvd. Individuals accessing the Carolina North Forest are often made from Martin Luther King Jr Blvd, Piney Mountain Rd, and Seawell School Rd. There is a desire for more clear, safe, and low-stress connections to this area and a North-South greenway due to conditions on Martin Luther King Jr Blvd. Some comments cited equity issues in this area of town in regard to greenway access. Individuals also cited the desire for making connections within the town and the connection of the greenway system to the Triangle Greenway System.

Appendix A: Public Involvement Detail Summary

Bicycling Mobility

A summary of input specific to bicycling connectivity and issues are highlighted here. In terms of general comments not related to a specific location in the town, connecting with other communities outside of Chapel Hill and providing separated/protected facilities to residents was also expressed.

Roadway corridors that were not specified by mode and those that are listed as being problematic to both modes are included here. Start and end points were not always given. This does not include specific intersection issues which were separated because the input given generally called out intersections as being problematic for both bicyclists and pedestrians. The top corridors identified as being problematic for bicycling or requesting bicycle facilities through the outreach conducted in the Mobility Plan are as follows:

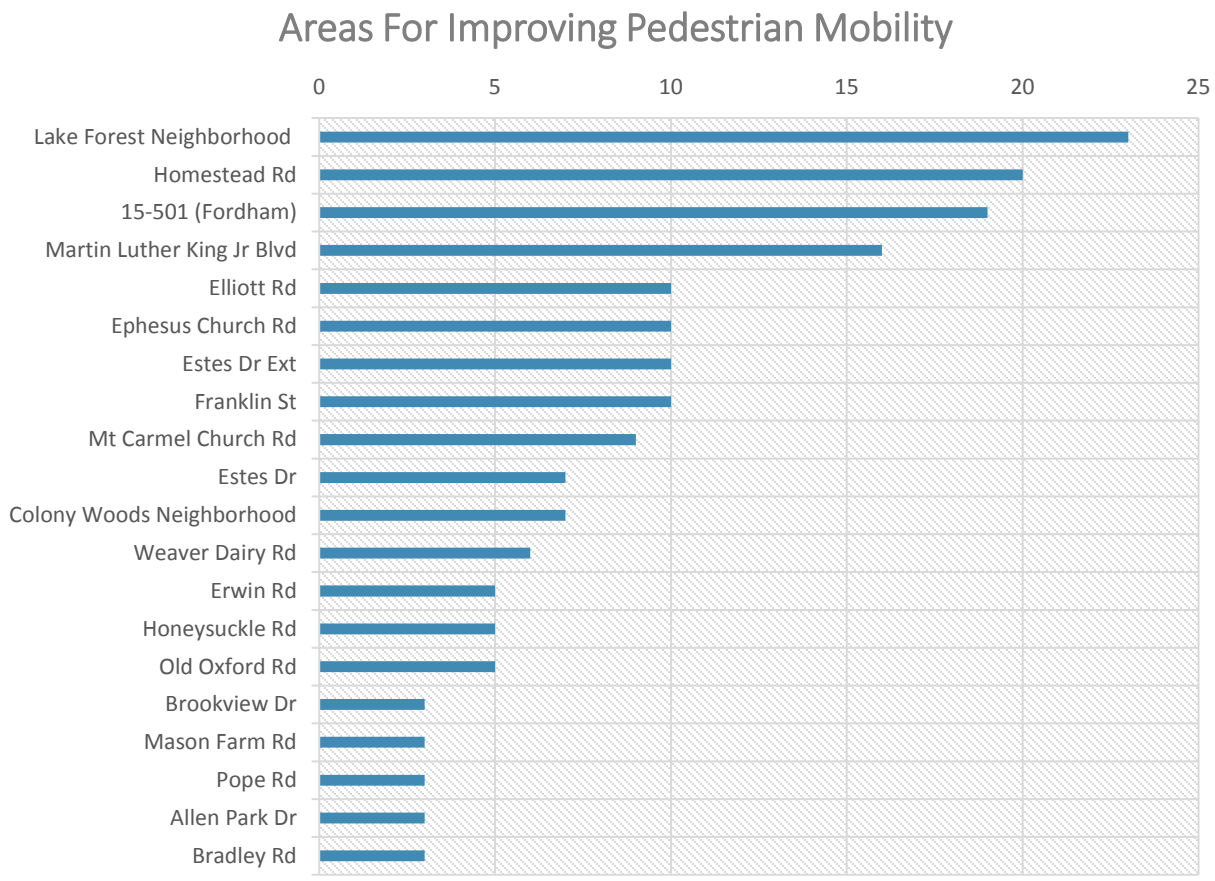


- People identified that not only are shared lane markings not sufficient for bicycle travel on Martin Luther King Jr Blvd, but that a dedicated bicycle facility is preferred here. Reducing travel lanes and slowing traffic were noted by many commenting on the current conditions in addition to the demand for a dedicated facility.
- Franklin St is an important connector between the Bolin Creek and Booker Creek Trail. It is a preferred route into the UNC Campus. Comments suggest speeding and lack of dedicated bicycling facilities as a barrier to traveling by bicycle on this route.
- Fordham Boulevard (US 15-501) was primarily identified as a barrier to travel or is confusing or dangerous to navigate.

- Desired improvements to Homestead Road to access to the schools and senior center were expressed as well as a desire for bicycling options out of the roadway.

Pedestrian Mobility

Input specific to pedestrian connectivity and issues is summarized. The top areas which received comments are shown in the figure.



- Turns, speeds, and topography in the Lake Forest Neighborhood make it dangerous to walk without sidewalks and residents cite that it is unsafe for children to walk and bike to area schools. N Lakeshore Dr, S Lakeshore Dr, Rolling Road, Kenmore Rd, Brookview Dr and Ridgecrest Rd. were requested for improvements.
- Recreation options for the residents of the Seymour Center on Homestead Rd (including connection with the Greenway) were requested. Most comments cite that the sidewalk here is discontinuous and that gaps should be completed, especially between Weaver Dairy Rd and Seawell School Rd.
- US 15-501 is a barrier to pedestrians. The following areas are specifically referenced in regard to discontinuous sidewalks: East Town to Sage Rd, Willow Rd to Estes Rd, and Ephesus Church Rd to Ram's Plaza along the Service Rd.
- Martin Luther King Jr Blvd was also frequently cited in comments, primarily due to gaps in the sidewalk. Areas between Homestead Rd and Airport Drive were frequently referenced for sidewalks.

- On Elliott, streetlights, slower speeds, sidewalk conditions, and lack of sidewalks on both sides of the street were all issues noted. Additionally, a connection is desired between Elliott and Willow in the Ephesus Fordham District.
- Sidewalk gaps were typically referenced on Ephesus Church Rd including Pinehurst to Pope Rd going east, and from Fordham to Ephesus Elementary on the south side of the roadway.
- On Estes Drive Extension, comments reference adding sidewalks or a multi-use path between Seawell and Martin Luther King Jr Blvd. Several comments discuss creating a connection to Ward St and Barclay Rd to shorten walking distances for the Elkin Hills neighborhood.
- Franklin St comments typically describe the corridor as having sidewalks that are crowded. Bicyclists ride on the sidewalk creating conflicts with pedestrians, creating a situation where the current sidewalks are too narrow for sharing. High traffic volumes and speeds near East Gate Shopping Center are also referenced as deterrents to pedestrian travel.

Access to Transit

Comments that discussed some improvement to conditions for accessing transit were grouped and assessed for common locations and themes. General comments cite connecting all bus stops to the sidewalk network in addition to providing ADA compliant level surfaces, transit shelters, and shade. Those comments are summarized here:

- On US 15-501 (Fordham Blvd) the following was noted: Lighting near the transit stops, crosswalks between adjacent transit stops, and access to transit stops on both sides of the road. Specifically, a lack of sidewalk to access the transit stop at Ram's Plaza.
- Arlen Park Dr has a sidewalk gap for residents from Southern Village to access the bus stop.
- Bradley Dr has transit stops that are unsafe to walk to due to traffic, hills, and curves.
- Where the Chapel Hill Library walkway meets Franklin St, a crosswalk on Franklin St is identified to access transit on both sides of the roadway.
- Old Durham Rd has a sidewalk gap between Cooper St and Scarlett St between the bus stops.
- Additional crosswalks on Martin Luther King Blvd for those accessing bus stops on either side of the roadway, including Airport Drive, Barclay Rd and Northfield Dr, and Stateside Dr.
- Sidewalks on Mt Carmel Church Rd and Bennett Drive to access bus stops.
- Sidewalks on Brookview to access transit stops on Honeysuckle.
- Sidewalks on Homestead Rd to access transit on Martin Luther King Jr Blvd.
- Old Oxford Rd sidewalk gap between Booker Creek Rd and Erwin Rd to access bus stops.
- Sidewalk on Ridgecrest Dr to connect with Oxford Rd to create access with transit stops.
- Sidewalks on Rogers Rd to provide access to transit stops.

PART 3: Survey Summary

A public input survey was deployed to gain insight into opportunities for improving mobility in Chapel Hill. A total of 505 responses were received from a wide range of age groups. A very large majority of these respondents walk or bike for leisure/health/recreation purposes. A majority of the respondents also walk or bike for errands/shopping.

The primary obstacles preventing respondents from walking or biking as much as they'd like are a lack of adequate sidewalks and paths as well as incomplete/discontinuous sidewalks or path networks. Other issues revealed in open ended responses include a lack of connectivity between roads, high traffic volume/speed, and unaware/inconsiderate motorists.

The following are the most challenging for walking and biking according to open ended responses.

Roads

- Ephesus Church Road
- Elliot Road
- Fordham Boulevard
- Estes Drive
- Franklin Street

Intersections

- Ephesus Church Road and Fordham Boulevard
- Estes Drive and Fordham Boulevard
- Willow Drive and Fordham Boulevard
- Elliot Road and Fordham Boulevard

Greenway Connections

- Multiple connections with Booker Creek Trail including:
    - Bolin Creek Greenway
    - The park
    - Franklin Street
    - Fordham Boulevard
    - Lower Booker Creek Trail in general was mentioned multiple times

Approximately 1/3 of respondents would not use transit to go to the places they want to go if they could safely walk or ride within the district. Respondents most frequently expressed a desire to go to the following destinations when walking or biking.

- Whole Foods
- Trader Joes
- East Gate Shopping Center
- Community Center/Community Center Park
- University Place
- University Mall
- Ram's Plaza
- Post Office

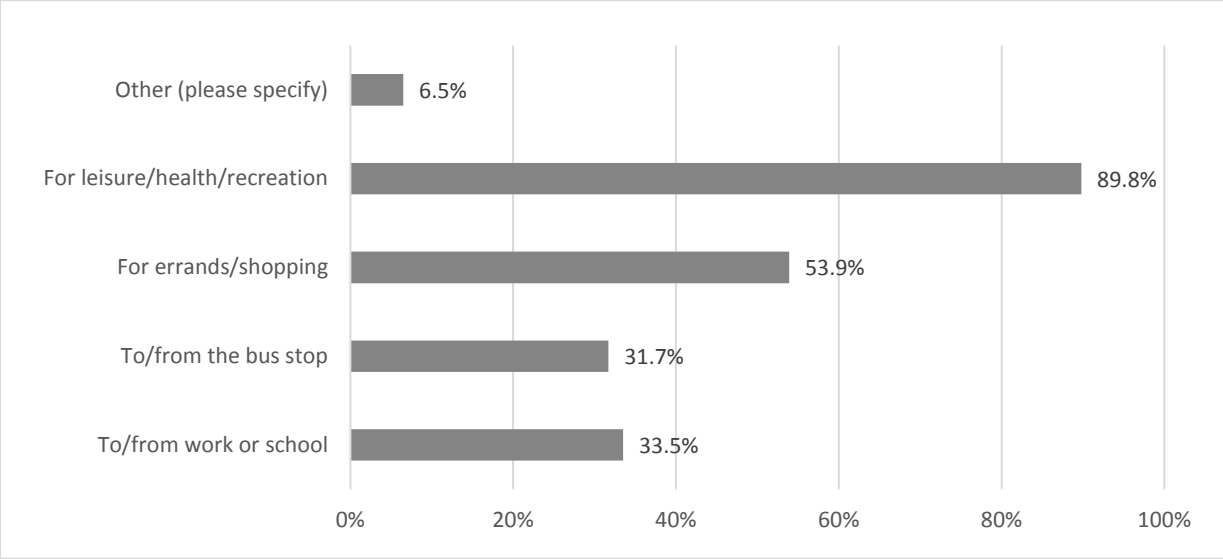
The following solutions are favored among respondents to increase overall mobility, walkability, connectivity, and safety include the following.

- additional sidewalks/paths/bikes lanes, particularly bike/pedestrian paths that are separate from motorists
- better connectivity of existing sidewalks
- additional pedestrian crossings
- reducing the speed of traffic
- increasing motorist awareness of pedestrians and cyclists
- better enforcement of traffic rules for motorists
- more bus routes and bus stops
- a solution for crossing Fordham Boulevard (15-501), such as a pedestrian/cyclist bridge

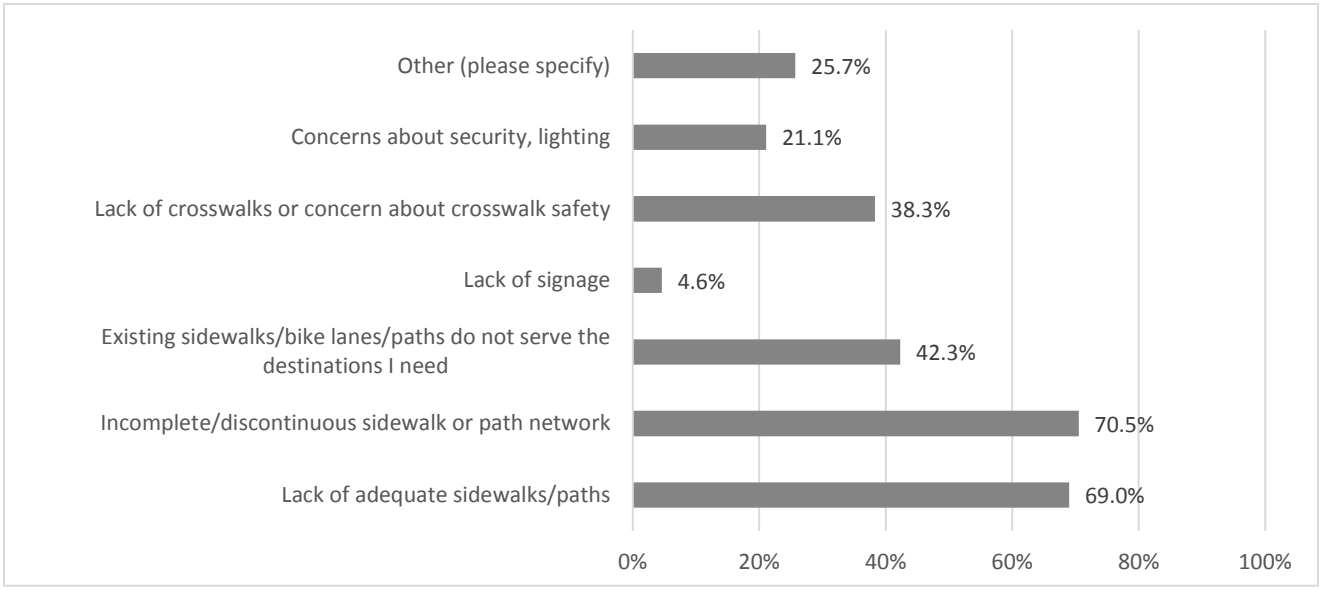
Appendix A: Public Involvement Detail Summary

Survey Questions

Question 1: In what circumstances do you walk or bike to your destination?
A very large majority of respondents walk or bike for leisure/health/recreation purposes. Over half walk or bike for errands/shopping. 1/3 of respondents walk or bike to/from work and school, and almost as many walk or bike to/from the bus stop. Open-ended responses included walking the dog, walking children to school, and walking to a friend's house.



Question 2: What barriers prevent you from walking or biking as much as you would like?
The primary barriers preventing respondents from walking or biking as much as they would like are incomplete/ discontinuous sidewalks or path networks and a lack of adequate sidewalks/paths. Other significant barriers are existing sidewalks/bike lanes/ paths that do not serve the destinations respondents want to visit and the lack of crosswalks or concerns about crosswalk safety. Recurring themes in open-ended responses include discontinuous/lack of sidewalks, fast traffic, and unaware/inconsiderate motorists.

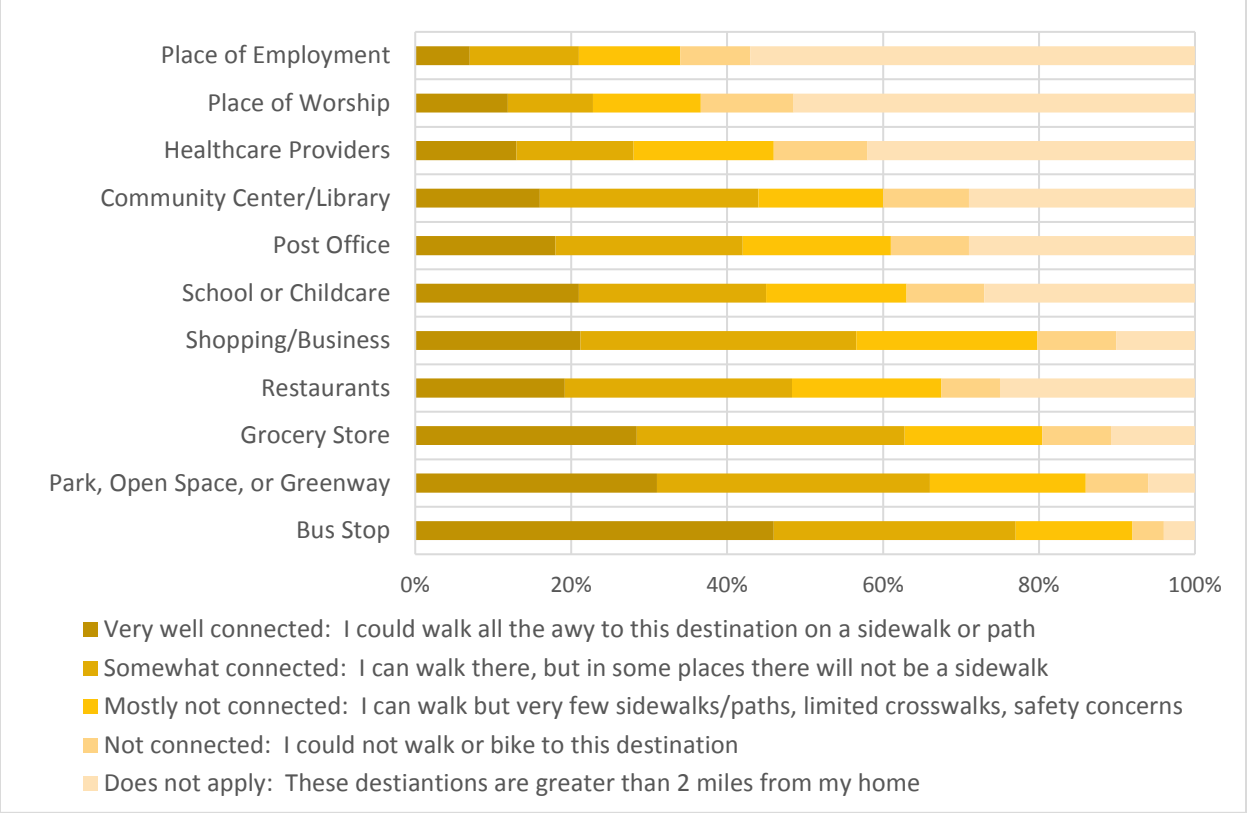


Question 3: How accessible/walkable are the following types of destinations in your neighborhood (can you walk or bike to them)?

The following question asked respondents to identify accessible/walkable destinations. The darker the line, the more accessible the destination from a person's home. Typically bus stops; parks, open space, or Greenways; and Grocery stores are well-connected or somewhat connected to respondents. Places of work, places of worship, and health care providers are often greater than 2 miles. The most opportunity for increasing mobility exists for destinations that are within an accessible distance, who are represented as being "not connected," "mostly connected," or "somewhat connected."

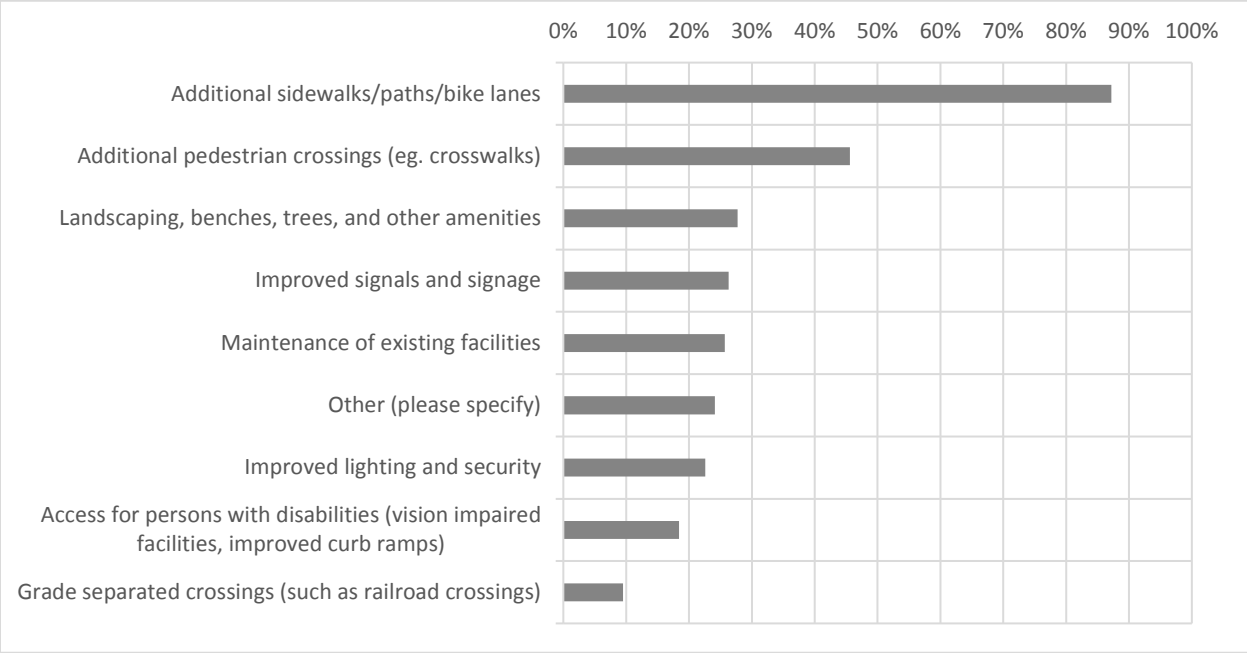
Responses indicate an issue with sidewalk connectivity, particularly connections to the following destinations, with over 60 percent of respondents categorizing these locations as somewhat connected, mostly not connected, or not connected.

- shopping/business
- restaurants
- park, open space, or greenway
- grocery store



Question 4: What improvements are needed to increase the walkability, connectivity, and safety of Chapel Hill and/or your neighborhood?

With a goal of increasing mobility for bicycling, walking, and transit, the survey asked respondents to identify what improvements would be needed to increase the neighborhood walkability, connectivity, and safety. Lack of adequate sidewalks, paths, bike lanes were the most cited responses. Another highly cited improvement was to provide safe crossing facilities Frequently mentioned in open-ended responses were the need for more bike lanes, bike/pedestrian paths that are separate from motorists, reducing the speed of traffic, and increasing motorist awareness and enforcement of traffic rules for motorists.



Question 5: Are there particular locations in your area that concern you with regard to walkability, mobility, connectivity, or safety? Please provide a street or intersection name and a description of the issue.

Recurring issues noted in open-ended responses include the following:

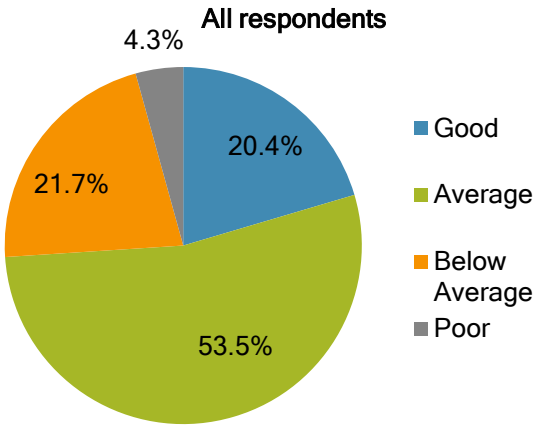
- Lack of sidewalk connectivity on Homestead Rd, such as between Seawell School Road and Martin Luther King Boulevard
- Lack of sidewalks/bike paths along Martin Luther King Boulevard
- Dangerous crossings along Fordham Boulevard, such as at Ephesus Church Road, Willow Drive, Estes Drive, and Sage Road
- Lack of sidewalk continuity on Weaver Dairy Road, such as between Sage Road and Erwin Road

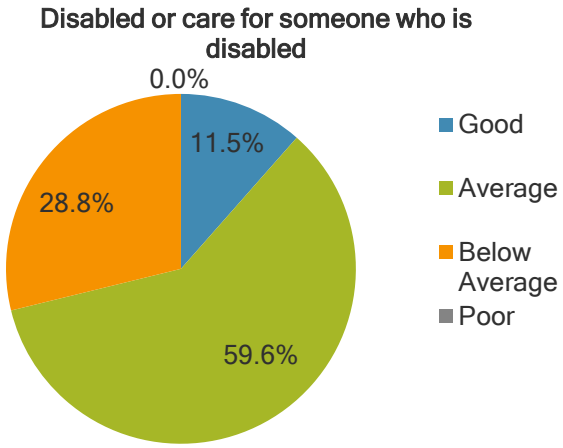
Accessibility Questions

Question 6: What would you like to see Chapel Hill do to increase mobility for persons of all ages and abilities?
Favored solutions for overall mobility as revealed by open-ended responses include more sidewalks, better connectivity of existing sidewalks, more pedestrian crossings, improved enforcement of traffic laws for motorists, paths for cyclists and pedestrians that are separate from motorists, more bus routes and bus stops, and a solution for crossing Fordham Boulevard (15-501), such as a pedestrian/cyclist bridge.

Question 10: How would you rate the current level of accessibility of the Town's sidewalk
Over half of all respondents rated the current level of accessibility of the town's sidewalks as average while nearly 1/3 rate the accessibility as either below average or poor. Responses from people who are disabled or care for someone who is disabled were analyzed separately. A lower percentage of that subset of respondents rated accessibility as good. Although respondents who are disabled or care for someone who is disabled chose a rating of below average, none of them assigned a rating of poor, making the combined categories of below average and poor approximately the same as for all respondents at 1/3.

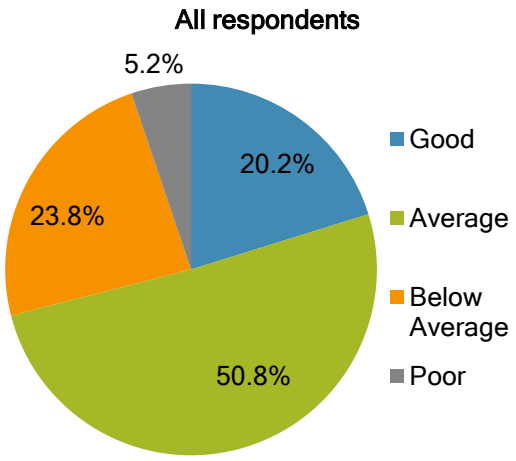
Question 11: How would you rate the current level of accessibility of the Town's pedestrian ramps?
Over half of all respondents rated the level of accessibility of the Town's pedestrian ramps as average, while 20% rated accessibility as good and 21.7% assigned a rating of below average. Respondents who are disabled or care for someone who I disabled rated accessibility of pedestrian ramps as good less frequently.

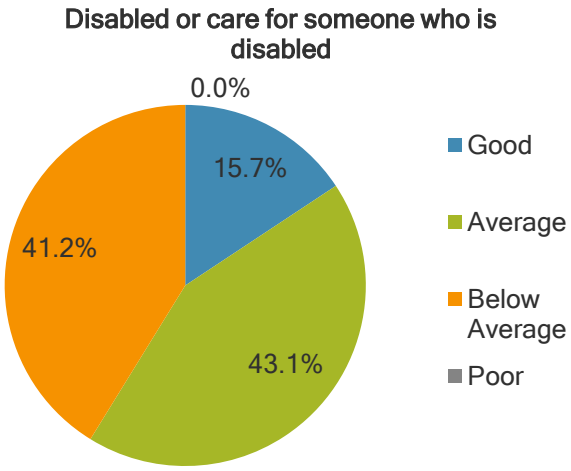




Question 12: How would you rate the current level of accessibility of crosswalks?
Approximately half of all respondents rated accessibility of crosswalks as average while 23.8% rated accessibility as below average and 20.2% rated accessibility as good. Respondents who are disabled or care for someone who is disabled were somewhat less likely to rate accessibility as good, and significantly more likely to rate accessibility as below average.

Appendix A: Public Involvement Detail Summary





Question 13: Please list any specific curb, sidewalk, or crossing locations where you have accessibility concerns.

Recurring accessibility concerns in open-ended responses included the following issues:

- Crossing Fordham Blvd, Mt Carmel Church Rd, Ephesus Church Rd, Sage Rd
- Crossing Martin Luther King Boulevard, such as New Stateside Road, and Estes Drive

Question 14: If the town were to make accessibility improvements to curbs and sidewalks, how would you rank the following priorities? (1 is most important, 6 is least important)

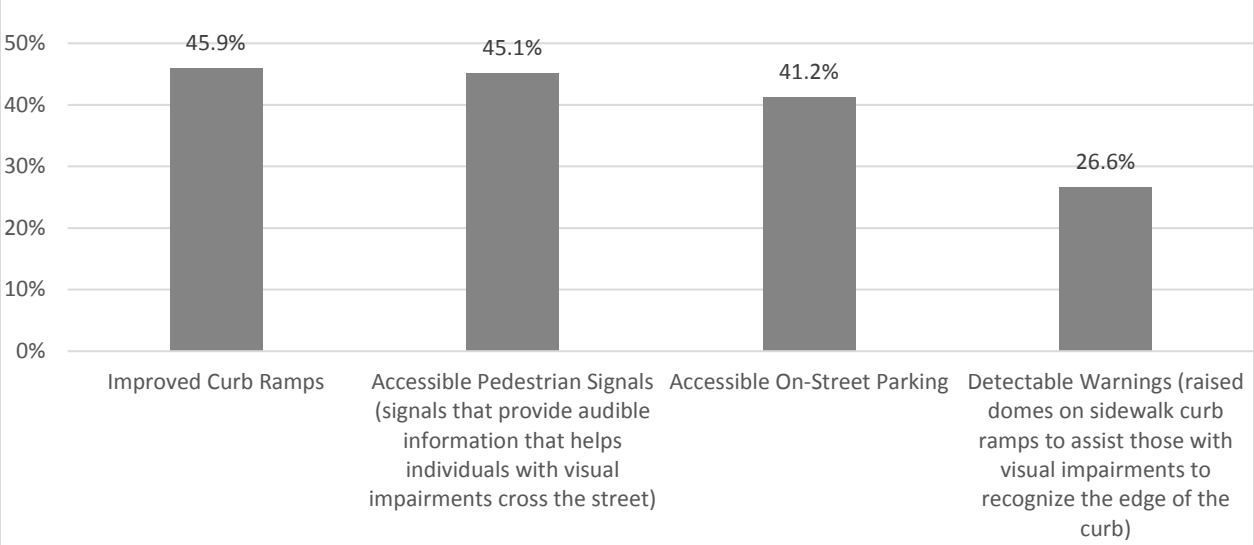
Priority Percentage of Respondents ranking priority as 1 or 2

- Commercial Areas 49%
- Town Facilities 16%
- Bus Stops 47%
- Schools - 60%

Residential Areas 37% Schools are the highest priority for accessibility improvements among respondents with 60% of respondents rating schools as either a 1 or 2 on the scale of 1 to 6. Commercial areas and bus stops are also high priorities, with nearly 50% of respondent rating these areas as either a 1 or 2.

Question 15: What accommodations that increase accessibility do you believe are most needed in Chapel Hill?

All accessibility options presented in this multiple-choice question received a high level of support among respondents, with detectable warnings receiving the lowest percentage of support.



Ephesus-Fordham District Question Subset

Questions 7-9:

Are there challenging intersections or roads within the Ephesus/Fordham Area for walking and/or biking? Please specify.

Many of the same issues identified in Question 5 were also identified by respondents in this question.

The following roads, intersections, and greenway connections are the most challenging for walking and or biking according to open ended responses

Roads

- Ephesus Church Rd
- Elliot Road
- Fordham Blvd
- Estes Dr
- Franklin St

Intersections

- Ephesus Church Rd and Fordham Blvd
- Estes Dr and Fordham Blvd
- Willow Dr and Fordham Blvd
- Elliot Rd and Fordham Blvd

Greenway Connections

Multiple connections with Booker Creek Trail including:

- Bolin Creek Greenway
- The park
- Franklin Street
- Fordham Boulevard

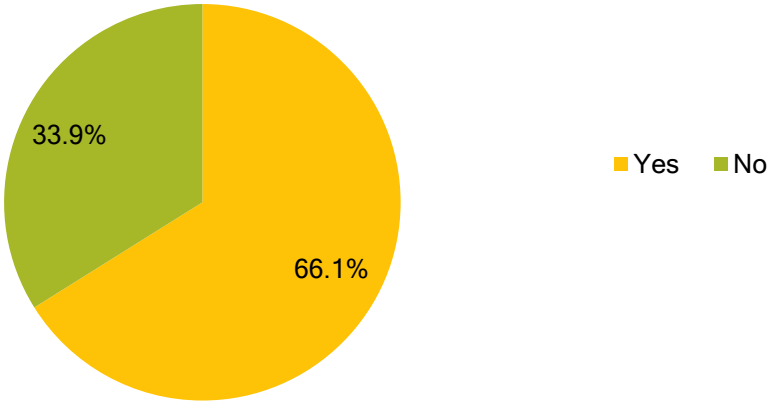
Appendix A: Public Involvement Detail Summary

What destinations within the Ephesus/Fordham Area would you like to walk or ride your bike to?

Respondents most frequently expressed a desire to go to the following destinations when walking or biking.

- Whole Foods
- Trader Joes
- East Gate Shopping Center
- Community Center/Community Center Park
- University Place
- University Mall
- Ram's Plaza
- Post Office

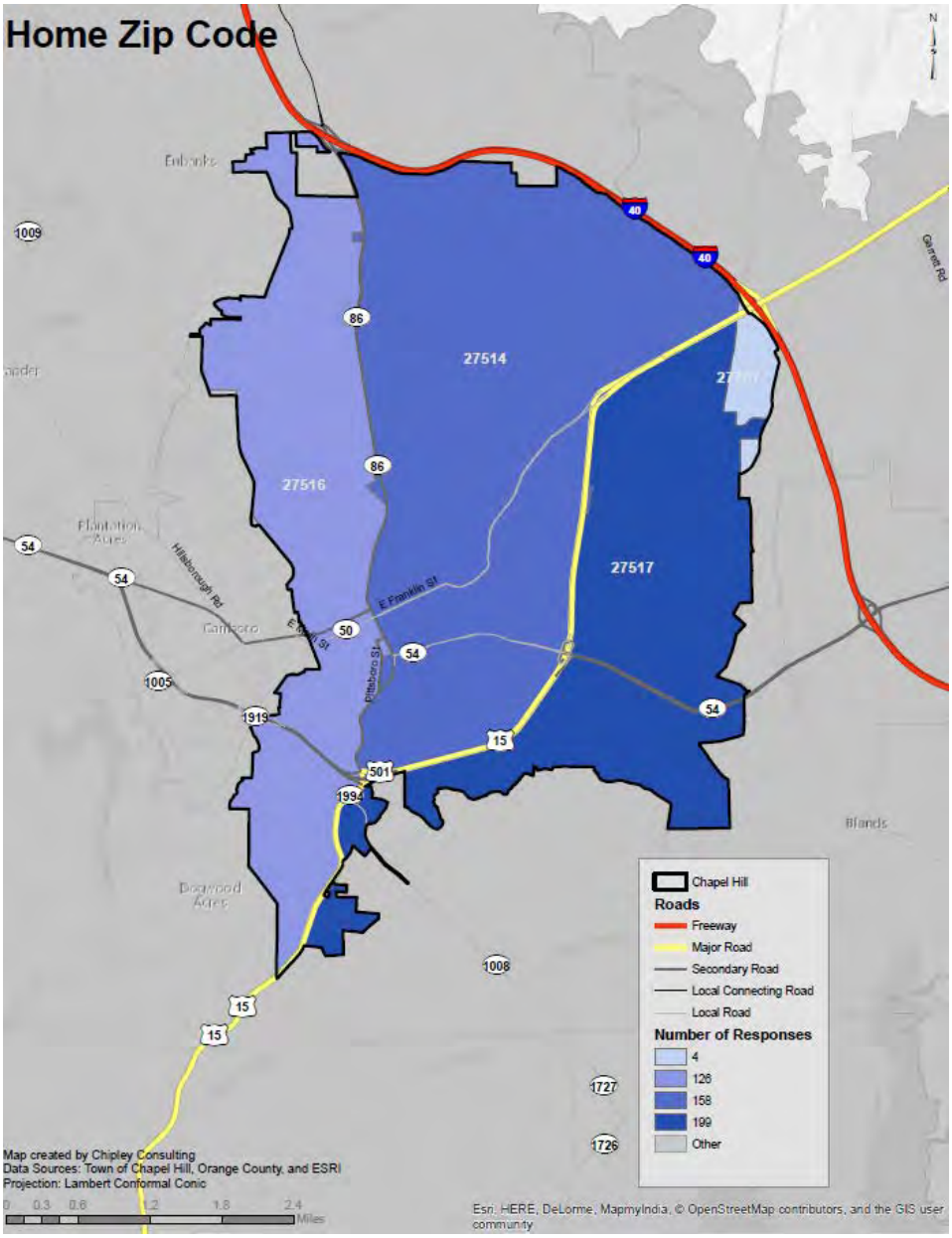
Would you use transit to go to this area if you could safely walk/ride within the district?



Approximately 1/3 of respondents would not use transit to go to the destinations they want to go in the Ephesus/Fordham area if they could safely walk/ride within the district.

Demographic Questions

Question 16: What is your home zip code?

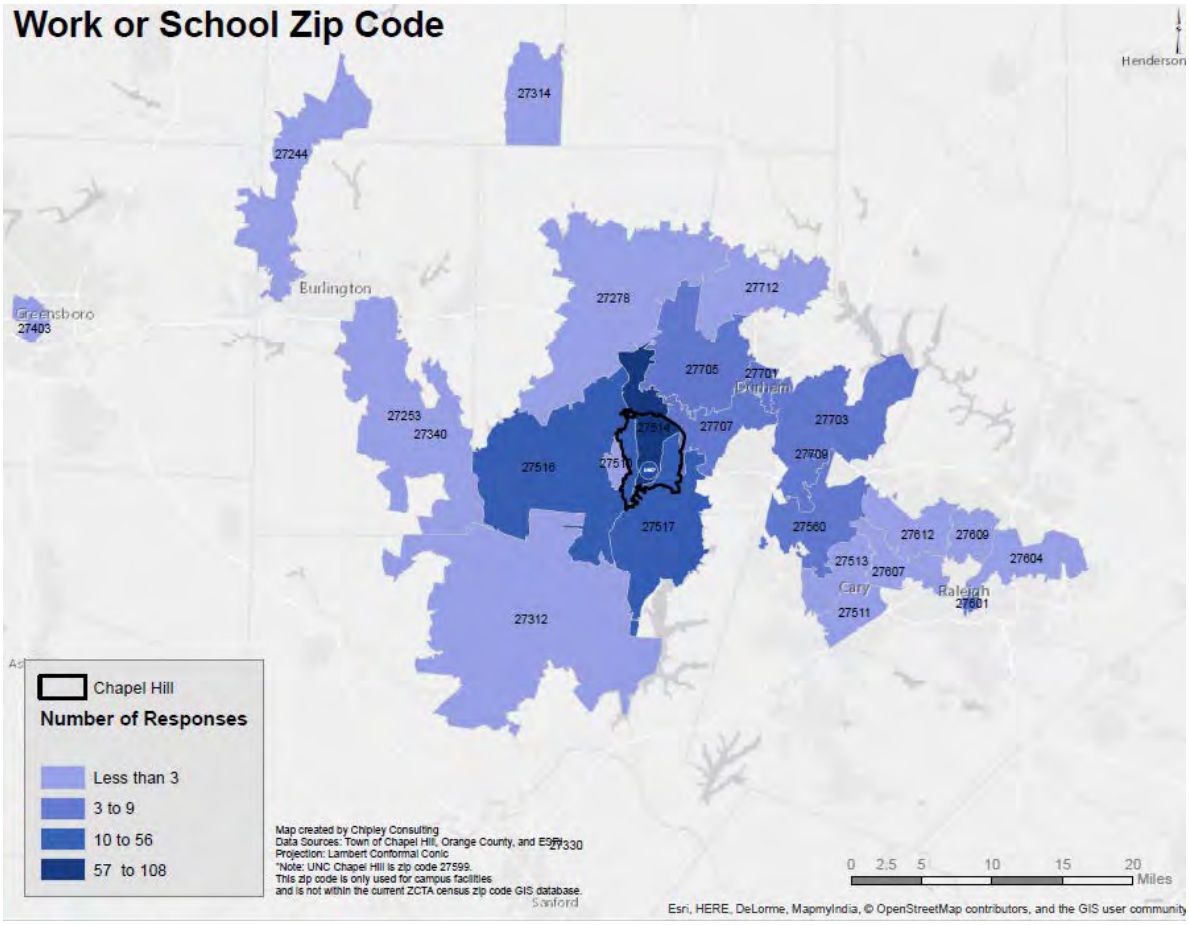


Most respondents live in one of the following zip codes, with a well-balanced proportion of responses from each area.

- 27514
- 27517
- 27518

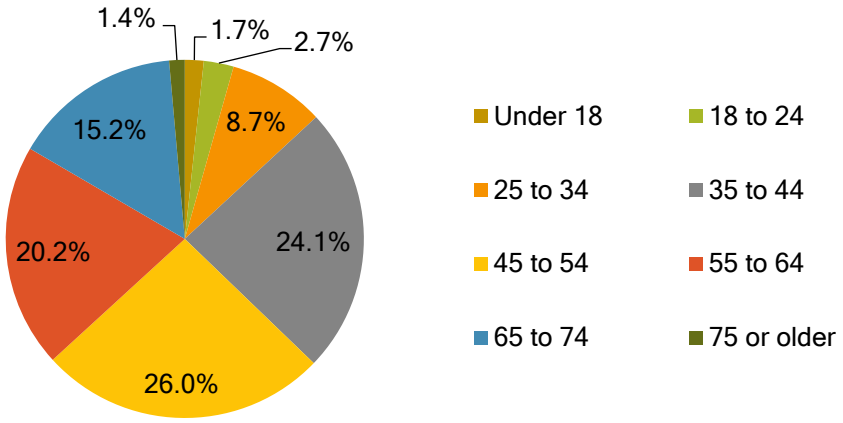
Appendix A: Public Involvement Detail Summary

Question 17: What is your work or school zip code?



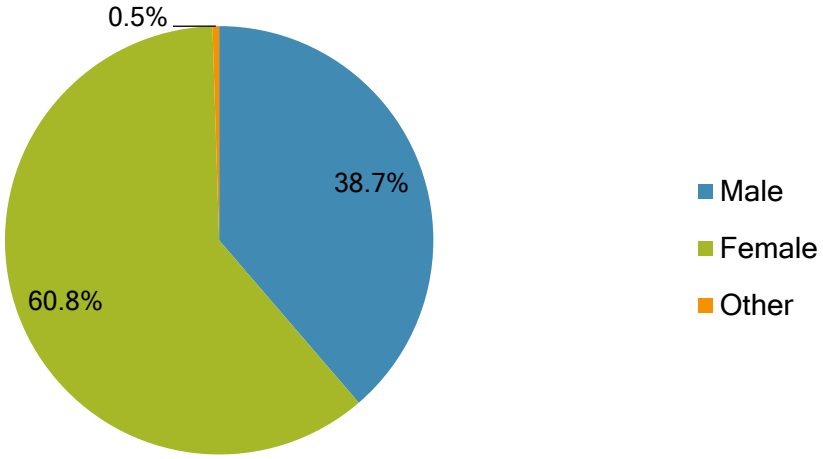
Many Chapel Hill respondents to the survey are commuting outside of the city for school or work. This is consistent with journey to work flows for the Triangle region which shows the majority of commutes to Durham and Wake County.

Question 18: What is your age range?



The ages of respondents were compared to the age distribution of the Chapel Hill population as a whole as described in the Chapel Hill Data book, which is derived from Census data. Responses were very low compared to the Chapel Hill population for age groups under 35, especially ages 18-24 which represent nearly ¼ of the Chapel Hill population but less than 3% of responses. Responses were very high compared to the Chapel Hill population for ages 35 and over.

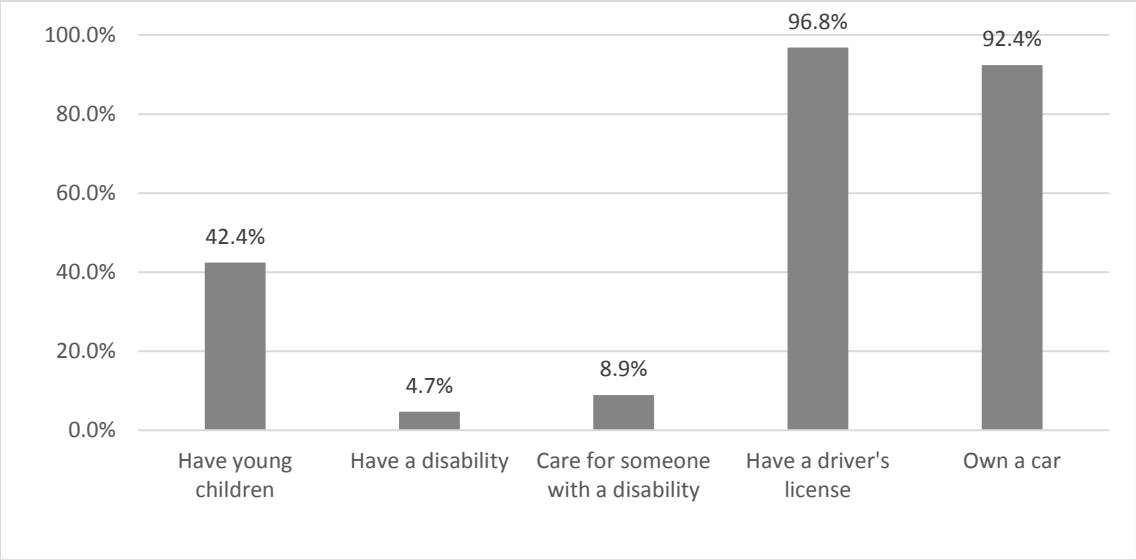
Question 19: What is your gender?



The majority of respondents identify as female while over 1/3 of respondents identify as male and less than 1% as neither male nor female.

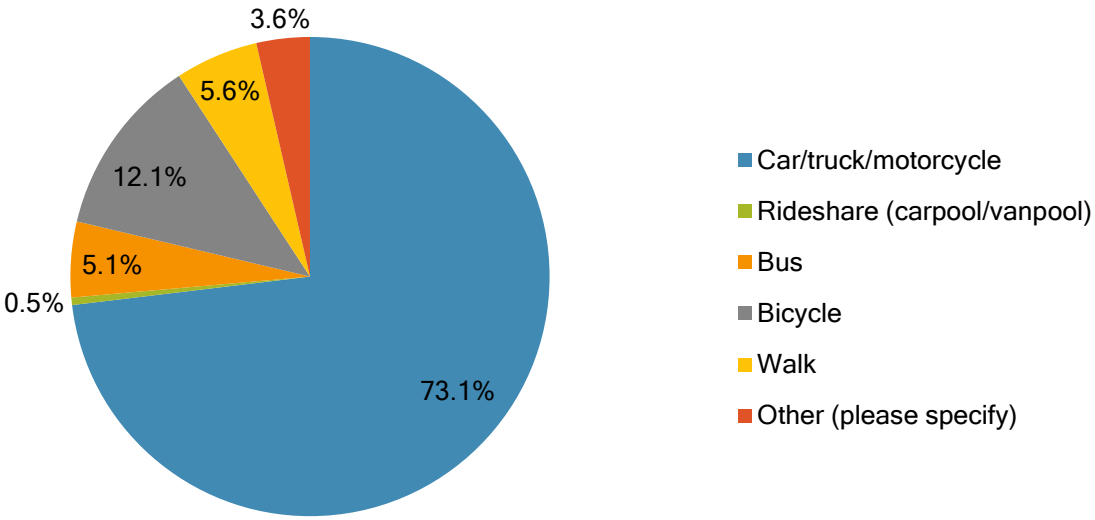
Appendix A: Public Involvement Detail Summary

Question 20: Select all of the following that apply to you.



A large majority of respondents have a driver's license and almost as many own a car. A good balance of responses were received from people who have young children and those who don't. Less than 15% of respondents either have a disability or care for someone with a disability.

Question 21: How do you travel most often?



A large majority of respondents travel most often by car, truck, or motorcycle. 12% of respondents travel most often by bicycle while walking or riding the bus are the modes of transportation for approximately 5% of respondents. Open-ended responses indicate a small percentage of people use an equal mix of multiple modes of transportation rather than favoring a particular mode.

PART 4: September 9 Open House Summary

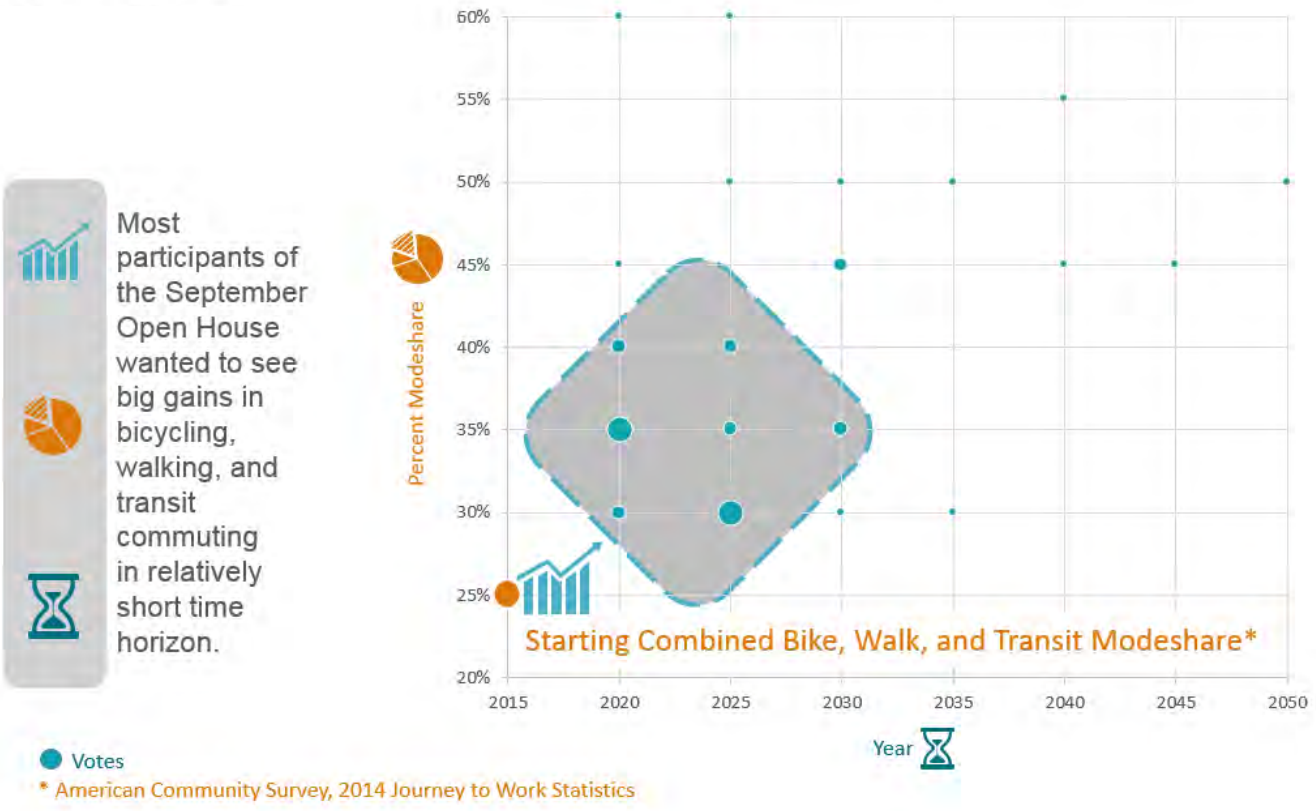
The open house had a presentation followed by five stations to gain specific inputs to the plan. The first was an orientation to the Mobility Plan process and stations, followed by stations where comments and input were taken. As this plan has several inputs on different modes and to alleviate any confusion on components to the planning process, the orientation was beneficial for those who may not have been familiar with the goals of this plan or planning work that is being incorporated. The presentation was followed by an interactive exercise on (1) the goals and vision for the plan, (2) existing conditions and opportunities, (3) expenditures on different types of projects as a town councilor for a day, (4) project prioritization, and (5) an open-ended survey to give additional comments on the plan.

Stations at the Interactive Drop-In Session at Chapel Hill Public Library

Those who commented on the vision and objectives for the plan resulted in a set of reworked objectives based on the originals set forth at the meeting that focused on an (1) integrated system, (2) removal of barriers, (3) a low-stress environment for bicycling and walking, and (4) choices that are attractive to use.

Appendix A: Public Involvement Detail Summary

Reworked Goals and Objectives based on Feedback



Goals Set for Future Mode Shift to Bicycling, Walking and Taking Transit

Comments and inputs based on existing conditions and opportunities and project prioritization were worked into the public involvement summary that follows which combined this information with inputs from the other

Participants of the Open House were also asked to set a goal for the Town to work towards. Given options to vote on how much to increase modeshare by a future date, the participants would like to see combined bicycle, pedestrian, and transit trips increase from a starting point of 25% (*2014, American Community Survey: Journey to Work Statistics*). Most participants wanted to see a shift of 15-20% to these modes within 5-15 years.

Individuals who attended the September Open House were also asked to prioritize how they would allocate a limited amount of pretend Chapel Hill money on different types of projects within the Town. Participants allocated most the money on two types of infrastructure – Separated Bicycle Facilities (21%) and Expansion of Greenways (18%) indicating a preference for facilities that are most separated from motor vehicles. The next two largest allocations went toward pedestrian improvements: Filling network sidewalk gaps (14%) and Major Sidewalk Projects (12%). The categories with 10% or less of the allocations included: Traditional Bicycle Infrastructure, Grade Separated Crossings, and Transit Stop Improvements.

'Councilor for a Day Exercise' Project Allocations

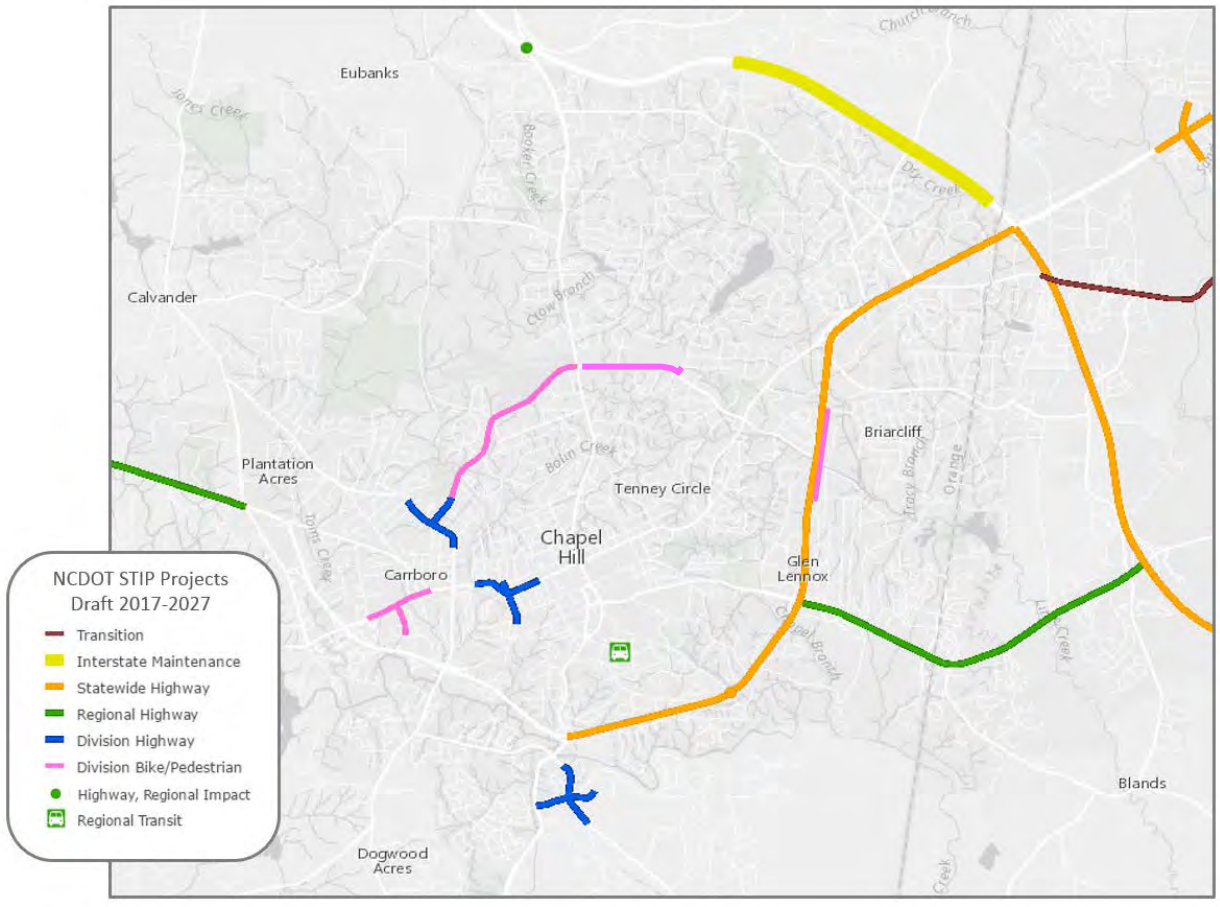
Appendix B – Planned Improvement Projects

Planned Improvements

NCDOT Projects

A number of projects in and around Chapel Hill are currently in NCDOT's State Transportation Improvement Program (STIP). The STIP identifies the construction, funding, and scheduling for transportation projects at the state level over a 10-year period and projects. Passed in 2013, NC's Strategic Transportation Investments law established the Strategic Mobility Formula which is used to allocate revenue based on data-driven scoring and local input. This prioritization process is currently beginning its fifth iteration (P5.0), with the previous two-year cycle wrapping up with the adoption of the FY2018-2027 STIP in Fall 2017. Based on the input of its member communities including Chapel Hill, the DCHC MPO will submit projects for all modes to NCDOT for the P5.0 process for the development of the FY2020-2029 Transportation Improvement Program

The map from the NCDOT State Transportation Improvement Program website shows the locations of these projects within the Town. Project draft summary reports can be found on the DCHC MPO website.



Projects in the NCDOT Draft State Transportation Improvement Program for 2018-2027 Planning Horizon

The STIP should be consulted for most current information on projects:

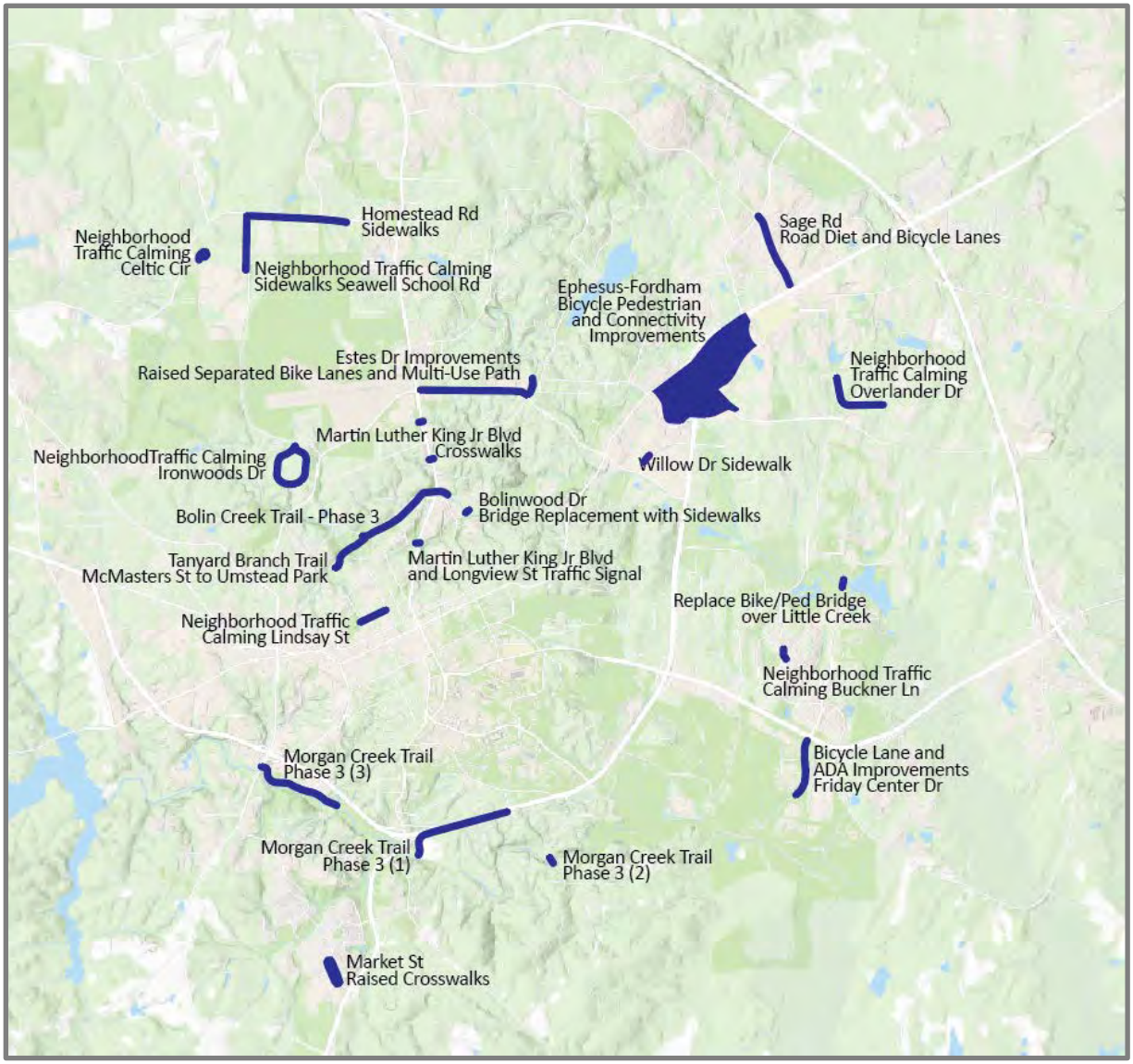
TIP	Route	ROW Year	Const. Year	Project Costs	Description
C-5179	SR 1750 (North Estes Dr)	2017	2017	$2,586,000	NC 86 (Martin Luther King, Jr. Blvd) To Caswell Drive. Construct 5' Sidewalks and 5' Bike Lanes. NC 86 (Martin Luther King, Jr. Blvd) To Elliott Rd in Chapel Hill. Construct 10' Multiuse Path.
EB-5721	Orange County Bicycle Route 1		2018	$558,000	Cleland Dr to Willow Dr in Chapel Hill. Upgrade Existing Off-Road Path and Construct New Section of Path.
U-5854	SR 1008 (Mt. Carmel Church Rd)	2017	2018	$775,000	SR 1913 (Bennett Rd) In Chapel Hill. Construct Roundabout and Related Safety Improvements.
U-5550	US 15-501 NHP C-2170 (Fordham Blvd)		2018	$2,170,000	SR 1742 (Ephesus Church Rd) In Chapel Hill. Intersection Improvements.
TD-5284	GoTriangle 400; 405; 420; 800; 805; CRX; FCXX		2019	$360,000	UNC Hospitals Area in Chapel Hill. Construct Neighborhood Transit Center Transfer Station.
U-5847	SR 1010 (W Franklin St / E Main St)	2018	2019	$775,000	SR 1771 / SR 1927 (Merritt Mill Road) / Brewer Ln Intersection in Chapel Hill and Carrboro. Intersection Improvements.
EB-5886	SR 1780 (Estes Dr). SR 1772 (N Greensboro St) in Carrboro to NC 86 (MLK Jr Blvd)	2020	2021	$4,410,000	Construct Multiuse Path, Sidewalks and Bicycle Lanes.
I-3306AC	NC 86	2021	2023	$16,500,000	NC 86 Interchange Improvements
B-5733	SR 1010 E Franklin St	2023	2024	$1,955,000	Replace Bridge 670039 Over Booker Creek
I-5822	I-40 Interstate Maintenance		2019	$12,450,000	I-85 to E of SR 1734 (Erwin Rd) – Pavement Rehabilitation
U-5774B	NC 54. US 15-501 In Orange Co to SR 1110 (Barbee Chapel Road) In Durham Co	2023	2024	$41,900,000	Upgrade Roadway Corridor and Convert At-Grade Intersection with SR 1110 To Interchange.
U-5304A	US 15-501. NC 86 (S Columbia St)	2024	2026	$ 13,000,000	Interchange Improvements
U-5304B	US 15-501. NC 86 (S Columbia Street) To NC 54 (Raleigh Rd)	2024	2026	$28,714,000	Capacity Improvements, With Sidewalks, Wide Outside Lanes and Transit Accommodations.
U-5304D	US 15-501. NC 54 (Raleigh Rd). To SR 1742 (Ephesus Church Rd)	2024	2026	$32,499,000	Capacity Improvements, with Sidewalks, Wide Outside Lanes and Transit Accommodations.
U-5304E	US 15-501. SR 1902 (Manning Dr).	2024	2026	$15,700,000	Convert At-Grade Intersection to Interchange.
U-5304F	US 15-501. SR 1742 (Ephesus Church Rd) to I-40.	2024	2026	$19,353,000	Corridor Capacity Improvements.

Appendix B: Planned Improvement Projects

Town Capital Projects

Projects for cycling and walking are included in the Town's Capital Improvement Plan (CIP) updated each year with the annual budget. These all relate to the goal "Facilitate Getting Around" in the Chapel Hill 2020 Plan. The program is currently funded through 2025 with the following allocations:

Program	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023-26
Traffic Calming/BP	--						
Curbs/ADA	$50,000	$50,000	$50,000	$50,000	$50,000		$50,000/yr
Greenways	--	$80,000	$80,000	$80,000	$80,000		$80,000/yr



Bicycle and Pedestrian Projects in Town of Chapel Hill Capital Improvement Plan

A more detailed project list is given in the table below which lists the responsible department for carrying out the project and the project status in terms of delivery.

Project	Department	Start	End*	Status
Sage Rd. Road Diet	Planning and Sustainability	6/2016	10/2016	Complete
Bolin Creek Trail Phase III	Parks and Recreation	12/1999	6/2018	Construction/ Implementation
Ephesus Church / Fordham Phase I Roadway Improvements	Public Works	1/2014	6/2018	Construction/ Implementation
Market Street Raised Crosswalks	Public Works	3/2016	11/2016	Complete
Martin Luther King Jr Blvd Crosswalks	Public Works	4/2016	2/2017	Complete
Sidewalk & Bike Master	Public Works	1/2016	1/2018	Complete
Friday Center Drive Bike & Ped Improvements	Public Works	12/2015	9/2017	Acquisition
Annual Street Resurfacing and Reconstruction	Public Works	11/2017	10/2018	Planning
Bolinwood Drive Bridge Replacement	Public Works	11/2016	3/2021	Planning
Ephesus Church Road Sidewalk	Public Works	10/2016	6/2017	Planning
Estes Drive Bike & Ped Improvements	Planning and Sustainability	4/2015	7/2019	Planning
Homestead Road	Public Works	10/2016	11/2018	Planning
Installation of Quick Connections for Emergency Generators at Major Intersections	Public Works	8/2016	03/2017	Construction/ Implementation
Martin Luther King Jr Blvd and Longview Drive Traffic Signal	Public Works	4/2016	5/2017	Planning
Meadowmont Bridges	Parks & Rec	5/2016	5/2018	Acquisition
Morgan Creek Trail Phase 3	Parks & Rec	5/2016	12/2019	Aquisition
Annual Traffic Calming	Public Works	6/2015	6/2017	Post-Construction/ Implementation
Seawell School Road (East) Sidewalk Construction	Public Works	10/2016	02/2018	Planning
Tanyard Branch Trail McMaster Street to Umstead Park	Parks and Recreation	5/2016	12/2019	Aquisition
Variable Message Sign System	Public Works	12/2014	05/2018	Planning
Willow Drive	Public Works	10/2016	10/2017	Complete

Project timelines may shift

Appendix B: Planned Improvement Projects

Development Agreements

The purpose of a development agreement is to strengthen the public planning process by encouraging private participation in the achievement of comprehensive planning goals and reducing the economic costs of development. These can include transportation and infrastructure improvements in addition to other community benefits and reduces the risks associated with development, thereby enhancing the Town's ability to obtain public benefits beyond those achieved through existing regulations and ordinances.

Development agreements are contracts entered into by the Town and a developer to expressly define a project's rules, regulations, and commitments.

Bicycle and pedestrian improvements have been incorporated into several mixed-use development agreements because of anticipated impacts as a result of the proposed development. These agreements help to meet the Town's transportation needs and comprehensive planning goals in the future. The Town of Chapel Hill has entered into the following development agreements:

Carolina North	
Date of Agreement	July 2009
Location	Bordered by Martin Luther King Jr Blvd to the east and Horace Williams Airport to the south
Related Studies/Documents	2016 Carolina North Development Agreement Annual Report
Relationship to Mobility Plan	Midlyne Priority Corridor -- Terminates at the site. As of 2016, construction on the property is on hold and new options are being considered by UNC. Carolina North was identified through public input as a key area for trail-based recreation, mountain biking, and desired walking and bicycling connections. A connection to Chapel Hill Schools is recommended.
• General alignments and descriptions of greenways are provided through the site but may be adjusted and require further study, including a north-south connection, east-west connection and a greenway along Martin Luther King Jr Blvd in conjunction with any frontage improvements. • Traffic calming improvements, bicycle facilities, sidewalk improvements, transit infrastructure, and various other improvements are spelled out in the agreement. • Annual reports performed to provide an update on the items spelled out in the agreement • Formal partnership for planning and funding bicycle, pedestrian, and greenway improvements.	

Carraway Village	
Date of Agreement	May 2014
Location	Eubanks Rd on the Northeast side of Chapel Hill adjacent to the Eubanks Rd Park and Ride.
Related Studies/Documents	The Edge Development Traffic Impact Study (2013)
Relationship to Mobility Plan	Treelyne – Utilizes proposed trail on west side of the site.

- Internal street grid with sidewalks
- 5’ sidewalk and 4’ bike lane on Eubanks Rd
- Access to the existing Eubanks Park and Ride via public streets
- Two-stage pedestrian crossing of Eubanks Rd
- Construction of a shared use path (greenway trail) on the east and west side of the site

Glen Lennox	
Date of Agreement	June 2014
Location	Bordered by Raleigh Rd and Fordham Blvd on the east side of Chapel Hill
Related Studies/Documents	Glen Lennox Development Transportation Impact Analysis (2013)
Relationship to Mobility Plan	Cross Cities Connector – Utilizes Fordham Blvd signalized crossing at Glen Lennox Dr (formerly Muirhead Ln) and proposed greenway and on-street bicycle lanes connection through the site as part of priority network.

- Sidewalks required on public streets, minimum six feet wide if at back of curb
- Bicycle loop detectors and pedestrian devices (curb ramps, audible signals, countdown heads, high vis crosswalk markings, etc.) on approaches to intersection of Hamilton Rd at Raleigh Rd and Glen Lennox Dr at Fordham Blvd.
- Bicycle lanes (5’) on Glen Lennox Dr
- Ten-foot crosswalk and traffic signal between Hayes Rd and Christopher Rd
- North-south greenway with option to connect to Meadowmont greenway on NC 54
- Exclusive bus pull-out on westbound NC 54

Appendix B: Planned Improvement Projects

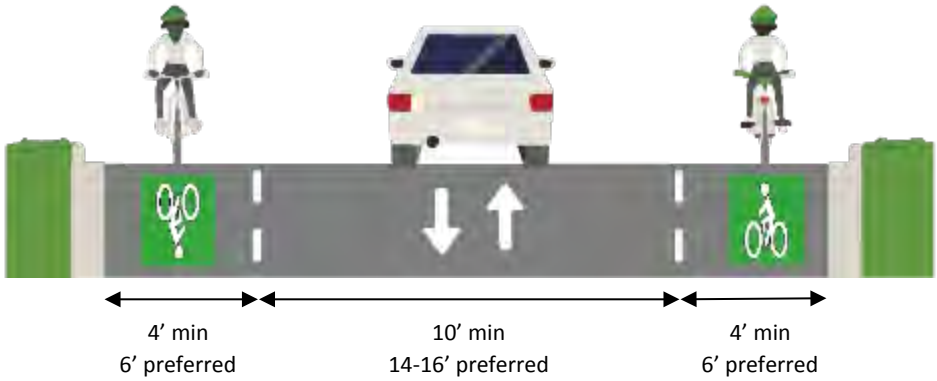
Obey Creek	
Date of Agreement	June 2015
Location	Southern side of Chapel Hill adjacent to Southern Village.
Related Studies/Documents	Traffic Impact Study (April 2014) Village at Obey Creek Design Guidelines
Relationship to Mobility Plan	Southern Circuit Priority Corridor utilizes the proposed bicycle and pedestrian bridge and terminates at the site establishing a key connection to the existing park and ride and proposed BRT station.

- Restriping of S Columbia and US 15-501 from Purefoy Rd to Mt Carmel Church Rd to include bicycle lanes
- A signalized bicycle and pedestrian crossing of US 15-501/Fordham Blvd at Oteys Rd
- A 12’ wide shared use bicycle and pedestrian bridge over US 15-501 between the Obey Creek development and Southern Village, linking Obey Creek to Southern Park and Mary Scroggs Elementary School.
- A paved sidepath parallel to US 15-501 along the property frontage
- Internal sidewalk network with walkable street grid
- Bicycle/pedestrian oriented signage and maps, bicycle racks and indoor storage facilities.
- A bus pull-out between Sumac Rd and Market St along the northbound US 15-501

Appendix C – Facility Guidelines

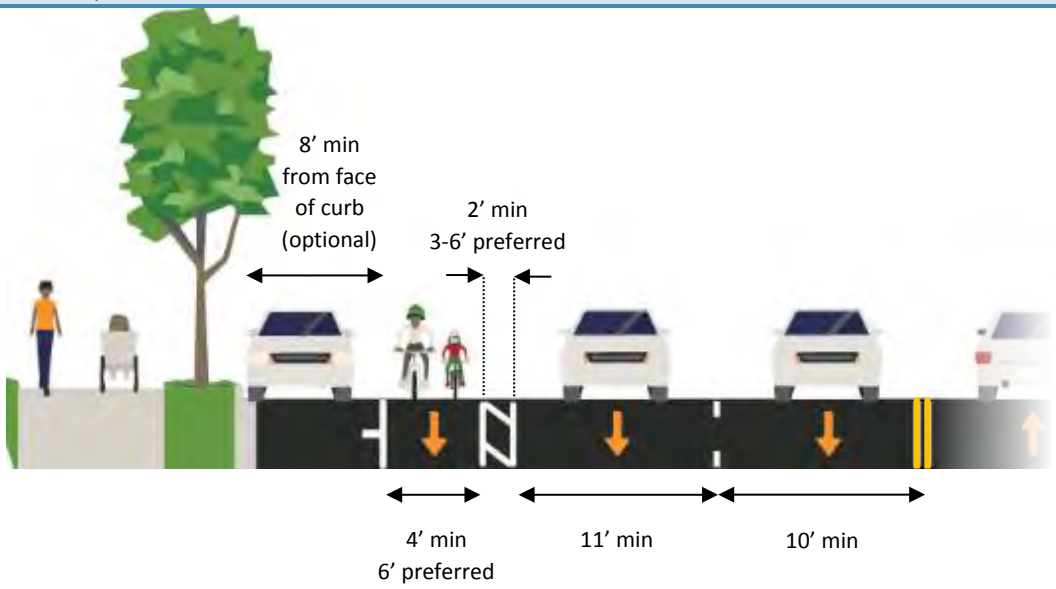
Bicycle/Pedestrian Facilities

Advisory Lanes



Typical Application	• Appropriate for neighborhood/local streets as greenway connectors • Insufficient road width for dedicated bike lanes • Traffic volumes less than 6,000 ADT, speeds less than 30MPH • Not a designated truck or bus route • Not part of a one-way street network
Design Elements	• Minimum width of 10 feet between dashed bicycle lanes, 14-16 feet preferred, 18 feet maximum (on Town streets) • Minimum width of 16 feet between dashed bicycle lanes with FHWA experimental/NCDOT approval (on state routes) • Bicycle operating area 4-6 feet in width • On-street parallel parking optional and may be buffered but if present should be highly utilized • Green colored pavement can be used in mixing/weaving locations and as a background to enhance pavement markings • Bike Lane signs (R3-17) and bicycle lane pavement markings in the dashed area are recommended (Town streets)/required (state routes)
Cities experimenting with Dashed Bicycle Lanes: Minneapolis, MN Columbia, MO Alexandria, VA Boulder, CO Hanover, NH *Example of dashed bicycle lanes on Flynn Avenue in Burlington, Vermont >*	

Buffered Bicycle Lane

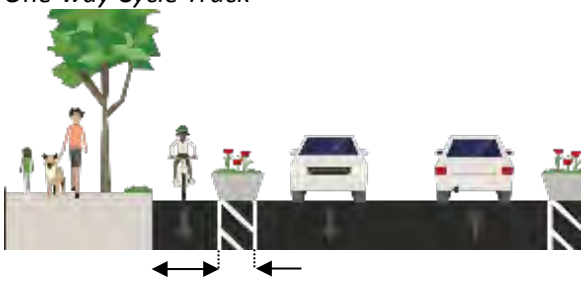


Typical Application	• Arterial street with higher traffic volumes • Posted speed limit at or above 35MPH • On-street parallel parking optional
Design Elements	• Bicycle lane 4-6 feet in width • Buffer width may vary, widths greater than 3 feet include hash mark in between the stripes. • Buffer may be placed adjacent to travel lane and parking. • Delineation (flexible posts, reflective markers, zebra lane separators) are optional, may provide a higher degree of bicyclist comfort
Example of a buffered bicycle lane in Raleigh >	

Appendix C: Facility Guidelines

Cycle Track

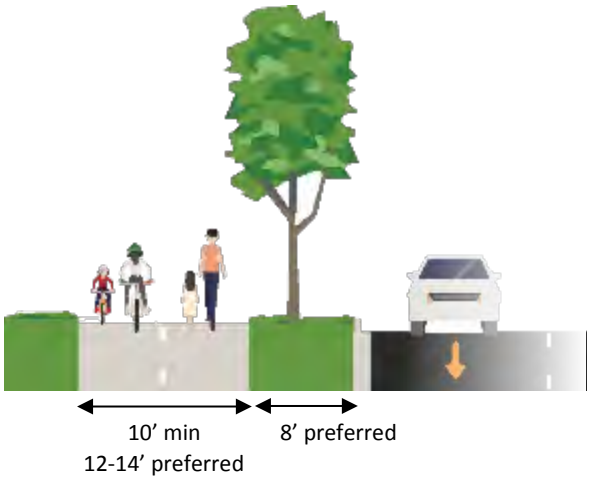
One-way Cycle Track



Two-way Cycle Track

Typical Application	• Used on streets where contra-flow bicycle travel is desired • Routes with high bicycle volumes • High motor vehicle volumes and/or speeds and physical separation preferred and space available
Design Elements	• 4 feet minimum, 6 feet preferred width for bike lanes each direction • One-way facilities on both sides preferred on two-way streets • Two-way facilities on one-way street recommended if not implementing on both streets of one-way pair o Left-side cycle track may be preferred so cyclists closest to barrier travel in same direction as traffic • Directional bike lanes separated by dashed yellow centerline • Physical separation (delineation posts, curbs, concrete barriers, parked cars) are used between travel lanes and cycle track • Minimum buffer width of 3 feet from travel lane or parking lane • Special attention to sight triangles and crossing traffic at driveways and intersections; intersection markings and green paint across driveways recommended
Example of cycle track using planter buffer in Vancouver, BC >	

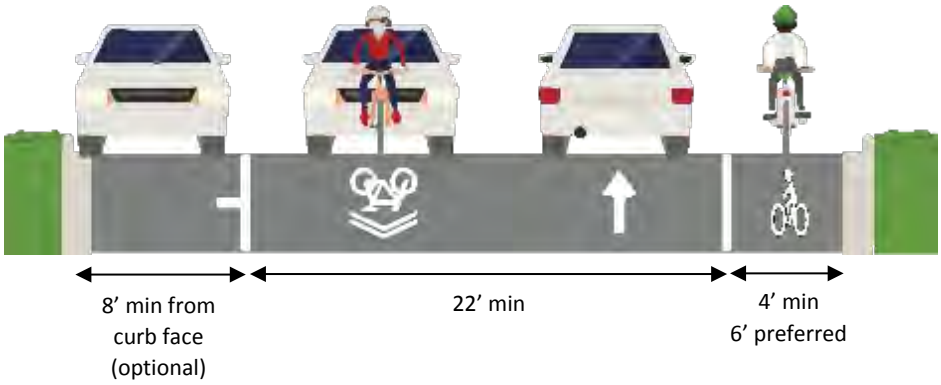
Multi-Use Trail



Typical Application	• Completely separated from the roadway and provided as an alternative to vehicle routes for bicycle and pedestrian travel • Serve as greenway connectors • Along arterials with high volumes and speeds • In easements along streams, utility, and former railroad corridors
Design Elements	• Inviting and safe for users of all ages, skills, and comfort levels • Serves a variety of user types including joggers, dog-walkers, utility cyclists, school groups, in-line skaters, families with trailers/strollers and others • Meets accessibility requirements for surface, grade, cross-slope and intersections • 10+ feet in width for two-directional path with wider trails in locations with high numbers of pedestrians or high user volumes
Example of multi-Use trail in Chapel Hill >	

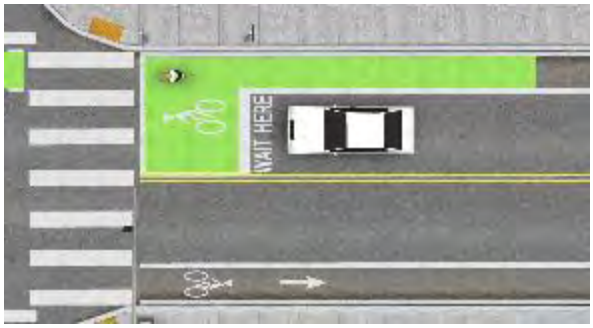
Appendix C: Facility Guidelines

Uphill Bicycle Climbing Lane



Typical Application	• Provided on an uphill grade to accommodate slower moving cyclists. • Used where speed differentials between cyclists and motor vehicles increases safety risks • On the downhill side of the roadway, bicyclists traveling at higher than average speeds may utilize full travel lane • Typical on streets where on-street parking limited ability to provide bike lanes on both sides of street
Design Elements	• Bicycle lane 4-6 feet in width on uphill slope. • May be paired with shared lane markings to indicate bicyclists position of travel on downhill side o Shared lane marking should be centered in travel lane to discourage passing when cyclist travelling at higher speeds • On-street parking may be maintained on one or both sides of street
Example of uphill climbing lane with parking in Raleigh >	

Intersection Improvements

Bicycle Box	Two-Stage Turn Queue Box
 *Source: NACTO*	 *Source: NACTO*
Typical Application	• Used at busy signalized intersections to improve cyclist safety and comfort and provides formal queueing space for cyclists ahead of vehicles • Two-stage turn box used where a significant number of bicyclists turn left from a right-side facility • Two-stage turn box typically located where major bike facilities cross
Design Elements	• Designated to hold queuing bicyclists • Pavement markings include a bicycle stencil and arrow to indicate proper bicycle direction and positioning • Placed in a protected area, typically within on-street parking lane or between stop bar or perpendicular bike lane and pedestrian crossing • Colored pavement should be used as a background
Example of two-stage turn queue box in San Francisco, CA >	

Appendix C: Facility Guidelines

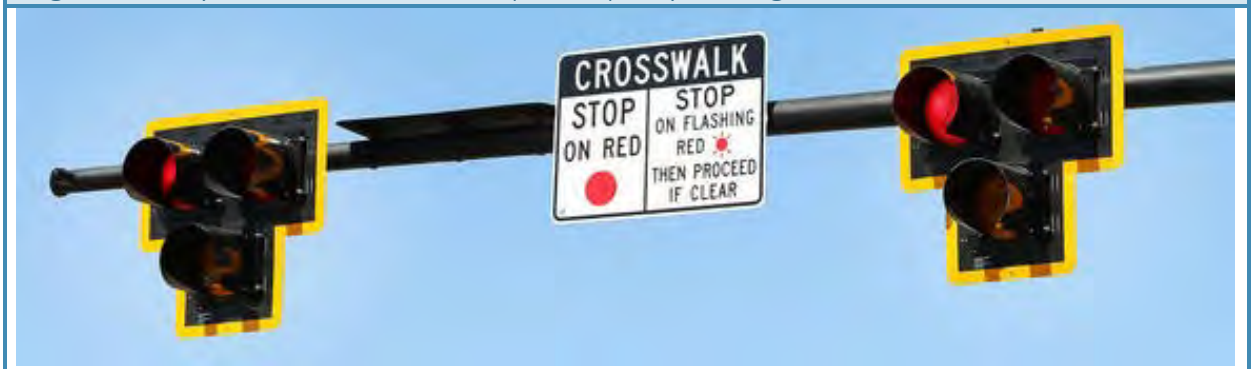
Bike Signal Faces

Source: NACTO

Typical Application	• Where a multi-use path crosses a street, especially where bicycle and pedestrian clearance time greatly differ • At intersections that are complex, with high numbers of bike/vehicle crashes, or near schools. • Transition areas between two facility types, such as a from cycle track to bike lane • At intersections with contra-flow bicycle movements
Design Elements	• Appropriate detection and actuation of bicyclists • Adequate clearance interval • Right turn on red is prohibited where bicycle signals separate through bicycle movements from right turning vehicles

Example of bicycle signals in Denver, CO >

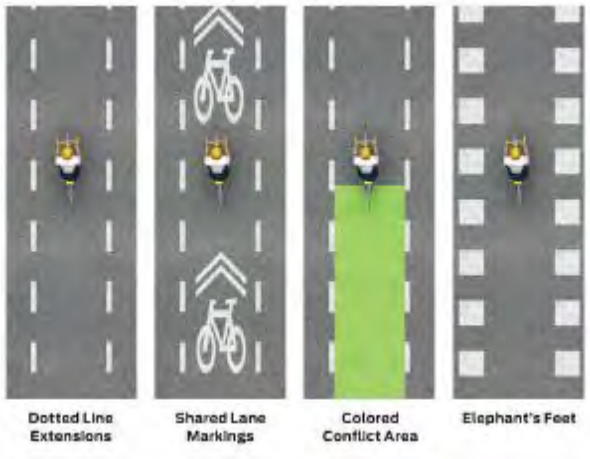
High-Intensity Activated Crosswalk (HAWK) / Hybrid Signals



Typical Application	• Where bicycle and/or pedestrian routes intersect major streets at locations without existing signalized crossings • At mid-block crossings of major roadways with high bicycle and/or pedestrian volumes • At multi-lane locations to counteract multiple threat crashes • At key access points to parks, schools, senior centers and at busy trail crossings
Design Elements	• Must meet warrants for crossing length, motor vehicle volumes and bicycle/pedestrian volumes based on roadway speed • Appropriate clearance intervals and signal timing with consideration for pedestrians and bicyclists • Follows MUTCD standards for design and location of beacons • Refuge islands may be used to create a two-stage crossing • The signal shall normally be dark and initiates upon actuation
Example of HAWK signal with refuge island in Phoenix, AZ >	

Appendix C: Facility Guidelines

Intersection Crossing Markings



Source: NACTO

Typical Application	• Used on wide or complex intersections to guide bicyclists where bicycle path may be unclear • Where vehicle movements typically encroach in bicyclists space, such as across ramp style exits and entries • On roadways with bike lanes or cycle tracks to reinforce bicyclists priority over turning vehicles • Across driveways and intersections, especially to reduce conflict in known problem areas
Design Elements	• Dotted lines are used to "extend" the bicycle crossing space. • Striping width must be a minimum of six inches. • On crossings of two-way paths and cycle tracks, markings should indicate two-way traffic using chevrons and/or bicycle silhouettes • Green paint may be used
Example of intersection crossing markings in Seattle, WA >	

Rapid Rectangular Flashing Beacons

Source: NACTO

Typical Application	• To supplement standard pedestrian crossing and school crossing warning signs at uncontrolled intersections, including ingress and egress crossings of a roundabout • Limited to locations with the most critical safety concerns
Design Elements	• Crossing warning signs (each with RRFB and W16-7p plaque) shall be installed at the crosswalk on each side of the roadway • RRFB must be installed on the same assembly as the crossing signs for the approach the RRFB faces • RRFB shall normally be dark and initiates upon actuation
Example of rapid rectangular flashing beacons in Cary NC >	

Appendix D: Ephesus-Fordham Mobility and Connectivity

Developing a District Mobility Plan through Coordinated Efforts

In developing the Ephesus-Fordham Small Area Plan, the Town of Chapel Hill placed heavy emphasis on connectivity and mobility. Because of that emphasis, the Town requested that special attention be paid to the Ephesus-Fordham District in the development of the Mobility Plan, resulting in a specific task to assess mobility and connectivity issues. The goal of this study is to recommend mobility improvements based on previous work on form-based codes, network improvements, affordable housing, watershed, and transit planning.

Ephesus-Fordham District in Context

The Ephesus-Fordham District is 190 acres and comprises some of the oldest shopping hubs in Chapel Hill. Between 1958 and 1982, Eastgate Shopping Center, Village Plaza, and Rams Plaza were developed for commercial opportunities. Of the 130 acres developed in these hubs, there is little green/open space, large expanses of paved parking lots, limited connectivity between developments, and a complex and difficult environment for people who visit the area on bicycle or on foot. Most of the 190 acres is under commercial use and there has been limited redevelopment in the district over the past ten years.

Appendix D: Ephesus-Fordham Mobility and Connectivity

While some properties continue to operate at or near their peak performance, there is underutilized commercial capacity with low density strip development and aging businesses. Fordham Boulevard through the District is regularly congested during peak periods, resulting in NCDOT's construction of a "super street" north of the study area to increase capacity on the boulevard without major widening. But the area still faces access and circulation challenges for all modes of transportation, particularly at key intersections.

The Existing Land Use Map in Figure 2 shows limited commercial and mixed-use development within the Town, indicated on the map in red and purple. Shops, offices, and apartment complexes only provide about 18.5% percent of Chapel Hill's property tax revenue (2014). While Orange County consistently ranks 1st or 2nd in average income per person in North Carolina, the County ranked 81st out of 100 counties in retail sales tax per person (2012) as Orange County and Chapel Hill residents frequently spend money in surrounding counties. A retail market analysis of Chapel Hill in 2011 found leakage of retail dollars in virtually all categories except for Food & Beverage Stores, Miscellaneous Store Retailers, and Food Services and Drinking Places. Further, there are numerous retail options right outside of Chapel Hill, including commercial centers along Fordham Boulevard and in Durham, Southpoint just down I-40 to the east, and Chatham County retail just across the county line to the south.

Figure 1. The Ephesus-Fordham District (bottom) is anchored by three major single-story shopping centers, car dealerships and low-rise office uses. Recently, denser development projects have taken place in the District (top left), trending away from auto-oriented patterns typical to the eras in which the properties developed (top center). Some infrastructure improvements have coincided with these developments (top right).

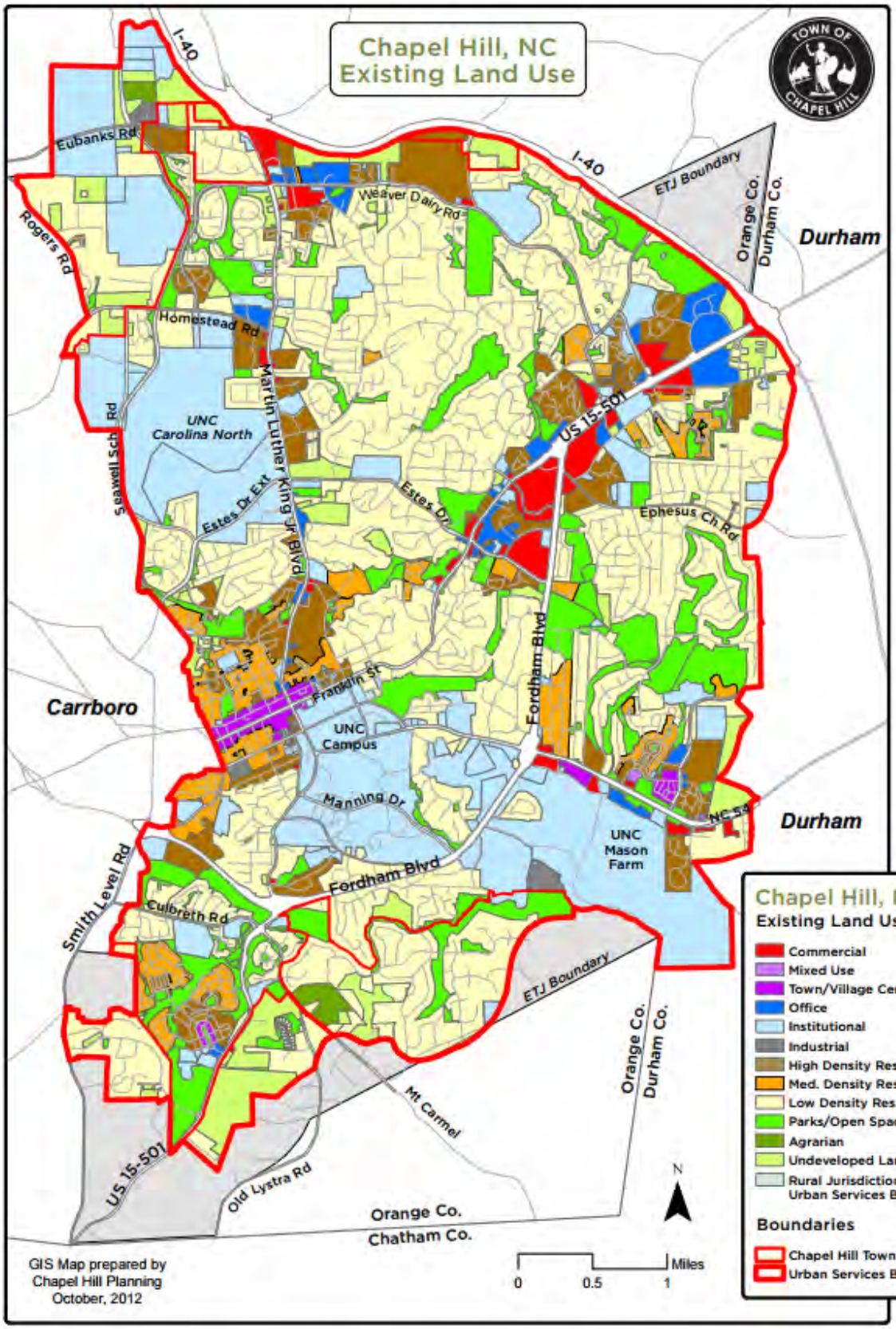


Figure 2. Existing Land Use map in Chapel Hill shows limited commercial and mixed-use development in the Town.

Appendix D: Ephesus-Fordham Mobility and Connectivity

Purpose, Vision Statement, and Fundamental Principles

The purpose of the 2011 Ephesus Church/Fordham Small Area planning initiative was to consider current transportation conditions, define future land uses, and determine solutions for the existing transportation network in order to encourage reinvestment in properties within the study area.

The vision of that small area plan was for the area to be a part of an active and vivacious neighborhood where residents can walk for basic services and utilize public transit to other destinations. The premise is to see this area redeveloped, reconnected, more accessible, and more supportive of transit and the surrounding neighborhoods. That is the vision of the Mobility Plan as well, understanding the important interaction between transportation and land use.

The following fundamental principles were developed to guide the planning effort:

- Respect Chapel Hill's unique environment and values;
- Assist in meeting market demands for mixed-use development with retail, offices, and residences;
- Support the preservation of adjacent neighborhoods;
- Develop in a manner which is supportive of public transit;
- Improve existing level-of-service (LOS) for district roadways and intersections; and
- Improve the quality of the existing suburban fabric of the planning area through better building design, connected street networks, and accessibility.

Existing Plans and Studies

Through efforts conducted by the Town, Chapel Hill has set goals to encourage investment, increase density, and improve transportation conditions in the Ephesus-Fordham District. Ultimately, the efforts are directed to transform an area characterized by retail space surrounded by expanses of parking into a walkable, mixed-use district.

To achieve this, the Town has completed the following efforts since 2010, each moving planning for the District closer to the ultimate vision and principles set forth by Town Council:

- Town of Chapel Hill Retail Market Study (2011);
- Ephesus Church Road/Fordham Boulevard Small Area Planning Traffic Analysis (2011), including a recommended transportation framework; and,
- Ephesus-Fordham Zoning District (2014).

Public input during these efforts included visioning workshops with residents and business owners, public meetings, and review with the various Town boards, committees, and Council.

The establishment of the Ephesus-Fordham zoning district in 2014 specifically defines the area targeted for redevelopment. The new zoning district is a form-based code that set the rules for how the district will be built in order to change over time from a suburban style shopping center into the mix of uses proposed by the small area plan. The Town has continued to make progress on the planning efforts through a number of initiatives and studies aimed at implementing and refining the earlier plans, including those listed below:

- Form-Based Code Revisions (Fall 2016 - Spring 2017) – With the implementation of the most recent revision to the Ephesus-Fordham form-based code, Council asked for refinements to the new standards to establish clearer guidance and expectations for property owners looking to redevelop. In fall 2016, Town staff presented a series of revisions to the form-based code based on recommendations by land use planning consultants. On March 6, 2017, the Town Council adopted a series of text amendments designed to improve walkability and publicly accessible space within the District, as well as a companion zoning atlas amendment that applies to District frontages.
- Ephesus Church/Rams Plaza Improvements (in progress) – Based on the recommendations and findings of the 2011 Small Area Planning Traffic Analysis, the Town and developers in the Ephesus-Fordham area are currently working on three roadway improvement projects to improve circulation and safety:
    - Fordham Superstreet U-turn: This Town of Chapel Hill project will allow motorists to cross Fordham Boulevard and access Rams Plaza from the north.
    - Ephesus Church-Fordham Intersection Improvements: This project aligns Ephesus Church Road with the entrance to Eastgate Shopping Center. The project not only improves vehicular flow but non-motorized transportation as well with the inclusion of new bike lanes, bike detection loops, sidewalks, and crosswalks.
    - Rams Plaza Access Improvements: This project will provide additional ways to enter and exit the plaza (Figure 3). Private development projects will fund a future multi-use bicycle and pedestrian path.
- Affordable Housing Goals (Town project / with development) – Partnering with non-profit housing providers like DHIC to develop a low-income housing tax credit project on Town-owned land was the top recommendation identified in the Affordable Rental Housing Strategy adopted by the Council in February2014. Twenty percent or a minimum of 300 housing units in the Ephesus-Fordham District will be

Figure 3. Mobility Improvements Near Ram's Plaza

classified as "affordable housing." The creation of affordable housing increases the likelihood of a residential population in the District that will be more reliant on transit and non-motorized transportation to reach jobs and/or educational institutions as well as to conduct everyday errands.

- Subwatershed Study and Plan for the Lower Booker Creek (January 2017) – This plan is part of an initiative set forth by Town Council to address stormwater quantity (flooding) and quality as well as protect and restore natural stream corridors. The study looks at current stormwater management and the potential effects of future development to develop recommendations for capital projects. The plans call for three improvements that affect existing and future mobility improvements in the District:
    - Elliott Road Storage Area and Passive Green Space: The plan proposes a 5.5-acre project to increase stormwater storage capacity. This could impact greenway connections and the pedestrian/bicycle facilities planned in and around Eastgate and Village Plaza shopping centers.
    - Two stormwater BMPs (Best Management Practices) to control water pollution along the east side of Fordham Boulevard just south of Cosgrove Avenue and Ephesus Church Road. Both recommended sites limit options to include pedestrian/bicycle facilities along the corridor between Booker Creek Greenway and Old Durham Road.
- Ephesus Church Road/Fordham Boulevard Planning District Traffic Impact Analysis (TIA) – A multimodal TIA was developed to determine whether the impact of future development in the District will require additional improvements to Fordham Boulevard corridor. The study found that some improvements to Fordham Boulevard may be needed to manage vehicular congestion that could occur outside of the District. The study also found that with some minor improvements, the current planned roadway network that came out of the initial 2011 traffic study can accommodate the projected growth for the year 2030 within the E-F District.

Public Input

As part of the public input process for the Chapel Hill Mobility Plan, citizens were asked to identify current transportation-related issues, problems and concerns around Town. Of the over 850 comments collected, over 150 were related specifically to the Ephesus-Fordham District.

Destinations: The survey asked participants to identify the most common destinations in and around the Ephesus-Fordham District. Residents' responses highlight desirable bicycle and pedestrian connections within the Ephesus-Fordham District and nearby, including several Town facilities. The most common responses were the following:

Destinations within Ephesus-Fordham District

- Eastgate Shopping Center (Trader Joe's, Performance Bicycle, Starbucks)
- Village Plaza (Whole Foods, Elliott Road Shopping)
- Ram's Plaza (Food Lion, CVS)

Nearby destinations

- Chapel Hill Library
- University Place (Silverspot Cinema, Harris Teeter)
- Chapel Hill Community Center
- US Post Office
- Town Greenways

Connectivity: Comments generally referenced US 15-501 as a major barrier to bicycling and walking. Only a few comments suggested adding bike facilities on Fordham Boulevard, which is a high-speed arterial. Most suggested connectivity around Fordham Boulevard linking low-stress side streets and creating access to destinations by expanding multi-use facilities. A number of comments suggested specific sidewalk connections, but most were focused on intersections and crossing issues at key locations.

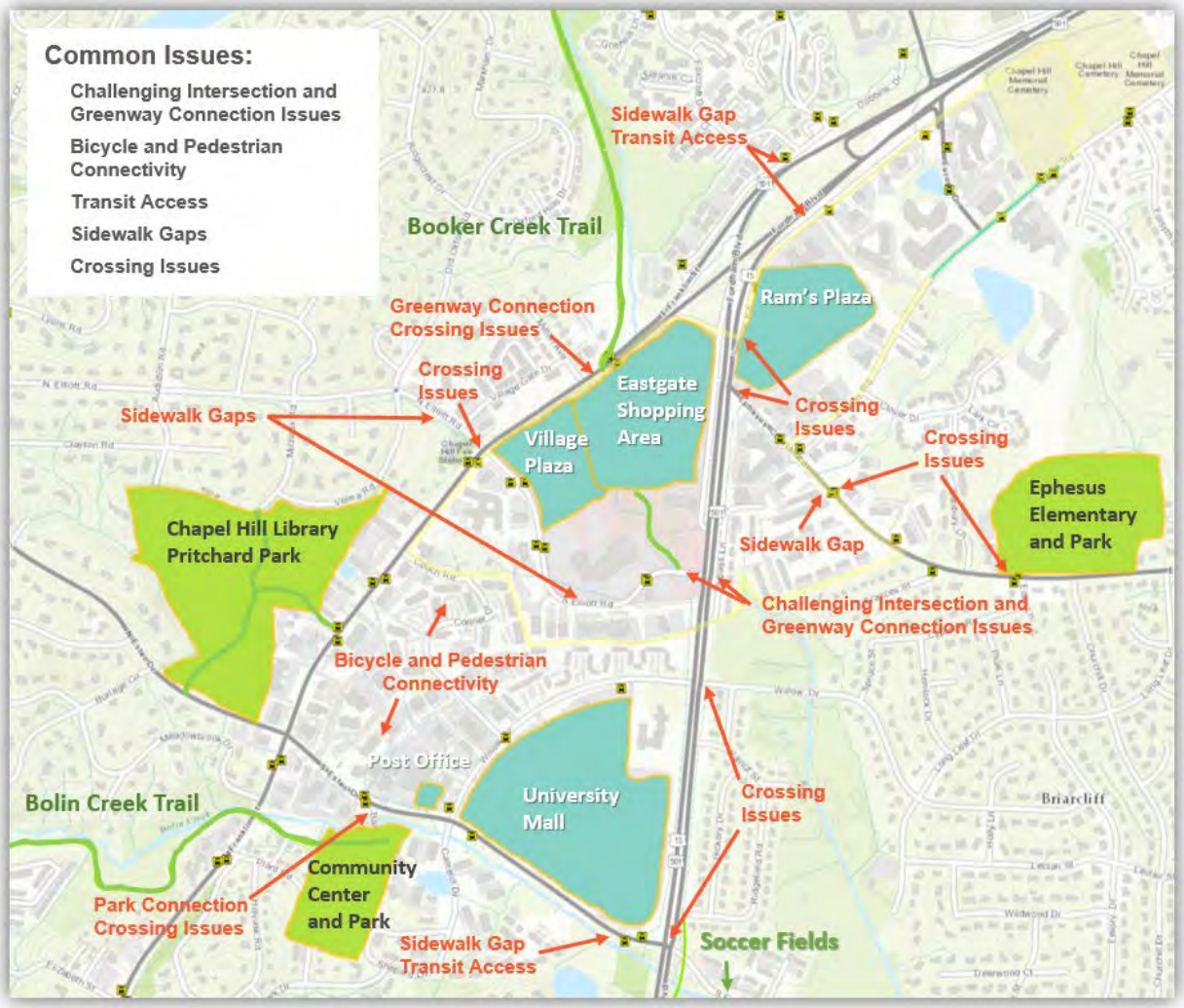


Figure 4. *The Ephesus-Fordham District is an asset-rich area with many key destinations identified by citizens during the public input process, but mobility for bicycles and pedestrians is limited.*

Crossings: Fordham Boulevard is the subject of the most concern overall in the Town's Mobility Plan input process. This corridor alone received nearly 150 individual comments. Many comments highlighted issues with bicycle and pedestrian crossings of Fordham Boulevard (Figure 5). A pedestrian overpass somewhere in the vicinity of Ephesus-Fordham was requested over 20 times, with residents citing crossing issues at specific intersections like Ephesus Church Road, Willow Drive, Eastgate Shopping Center near Booker Creek Greenway, and Franklin Street at Elliott Road. Respondents noted that motorists often disregard pedestrians and cyclists when turning in and out of driveways and intersections.

Appendix D: Ephesus-Fordham Mobility and Connectivity

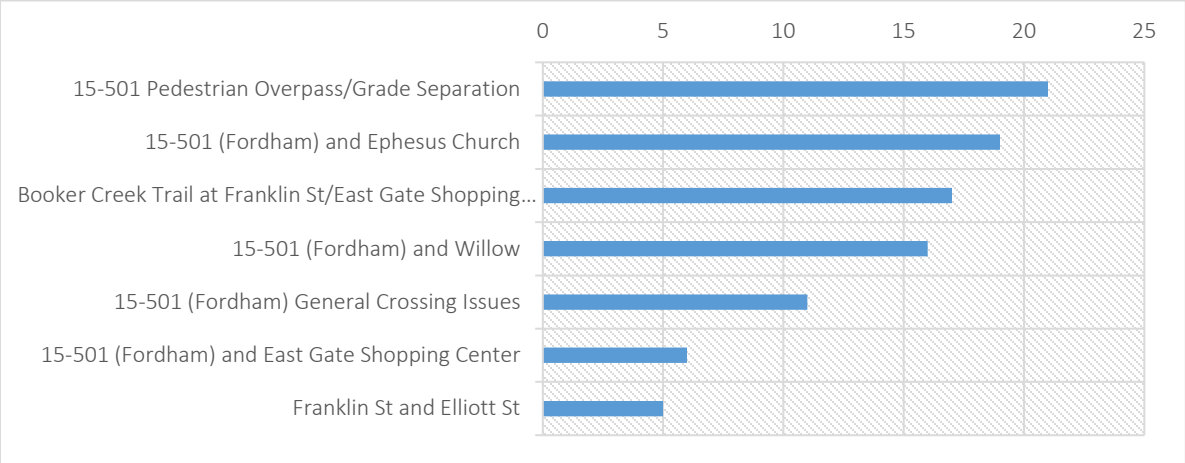


Figure 5. *Crossing issues most often identified in public input specific to the Ephesus-Fordham District*

Greenways: Comments from residents show that they desire safer, more direct connections to the Booker Creek and Bolin Creek Greenways. They included a desire for:

- a safe, well-marked crossing of E Franklin Street from the Booker Creek Greenway with clear linkage through Eastgate Shopping Center to Ephesus Church Road;
- a direct connection between Bolin Creek and Booker Creek Greenways;
- a connection between Bolin Creek Greenway, Community Park, and the shopping areas to the north with a safe crossing of Estes Drive; and
- an extension of the Bolin Creek Greenway across Fordham Boulevard with a connection to the existing greenway segment along the corridor to the east.

Transit Access: Of the nearly 300 respondents, 66% said they would use transit to reach the Ephesus-Fordham District if they could safely walk or ride in the area. Comments specific to transit access requested a pedestrian connection to access the transit stop at Ram's Plaza, a safe crossing of Fordham Boulevard to reach transit stops on opposite sides of the roadway, and ADA-compliant access with level landings, shelters, and shade at transit stops.

Existing Conditions

Street Network

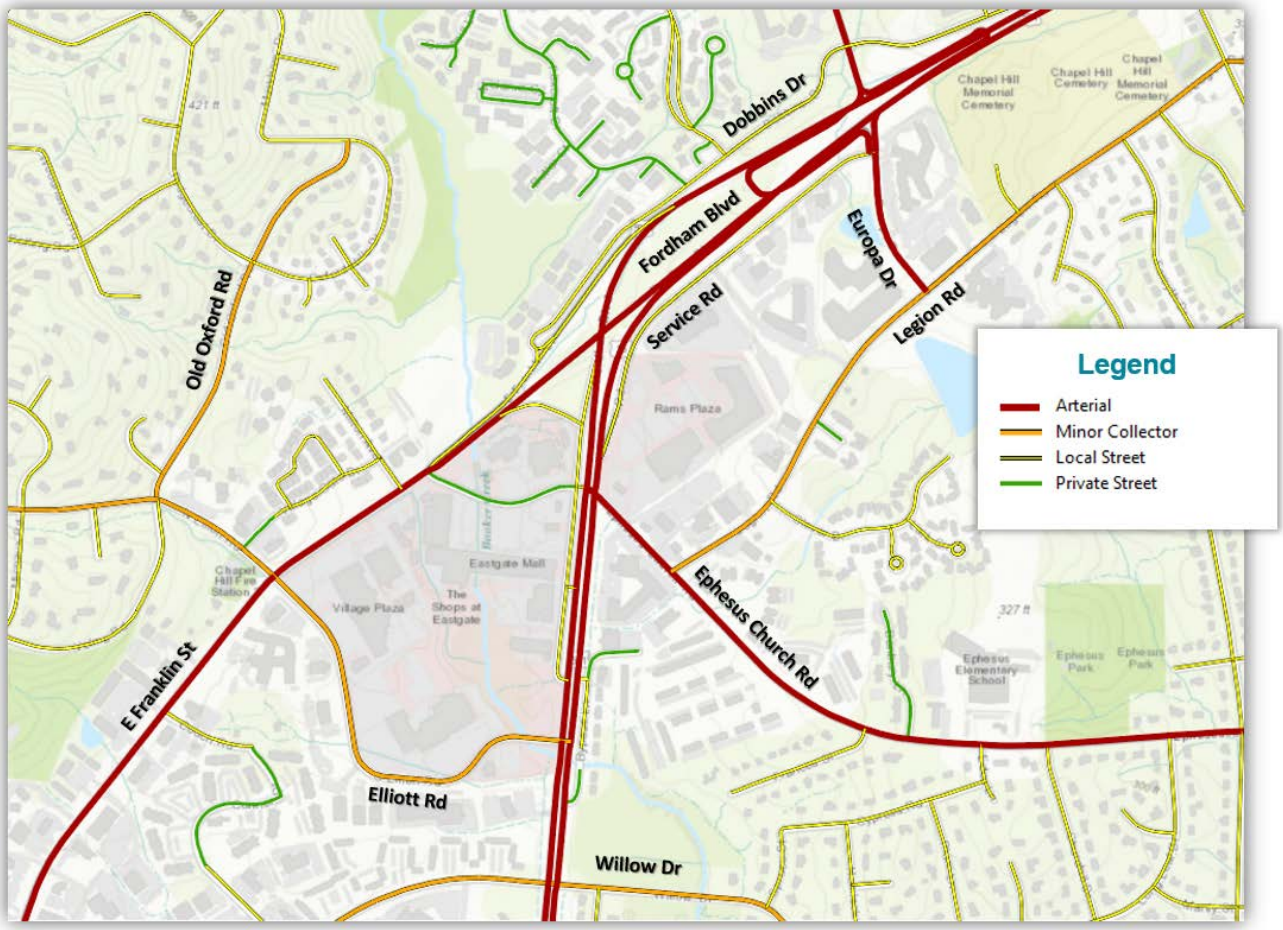


Figure 6. The existing street network borders the Ephesus-Fordham District with few local streets to provide circulation within or connections through the area.

Figure 6 shows that the District is well served by arterials and major streets on its boundaries, but a lack of local streets and connectivity within Ephesus-Fordham means traffic congestion and delays are common on those major streets. Limited connectivity means traffic volumes, particularly left turns, are high at the relatively few intersections. NCDOT and the Town continue to plan and construct improvements to help resolve congestion on the corridor.

Appendix D: Ephesus-Fordham Mobility and Connectivity

Bicycle/Pedestrian Network

To create an effective bike and pedestrian network within the District, attention must be paid to the external connections that link the network to the larger community—neighborhoods to shopping centers, schools to libraries, Downtown to the District. Figure 7 shows the existing and planned facilities included in the Town's Greenway and Bike plans. Planned improvements include extending Booker and Bolin Creek Greenways east of Fordham Boulevard and creating future bike accommodations for Elliott Road, Franklin Street, Fordham Boulevard, Ephesus Church Road, Legion Road, and Erwin Road.

Better bicycle and pedestrian connections to the west along E Franklin Street and towards Downtown Chapel Hill are also desired, particularly as a link to the UNC Campus. There are no low-stress connections between Ram's Plaza and Eastgate Shopping Center, due to long crossings and heavy traffic movements on Fordham Boulevard at Ephesus Church Road.

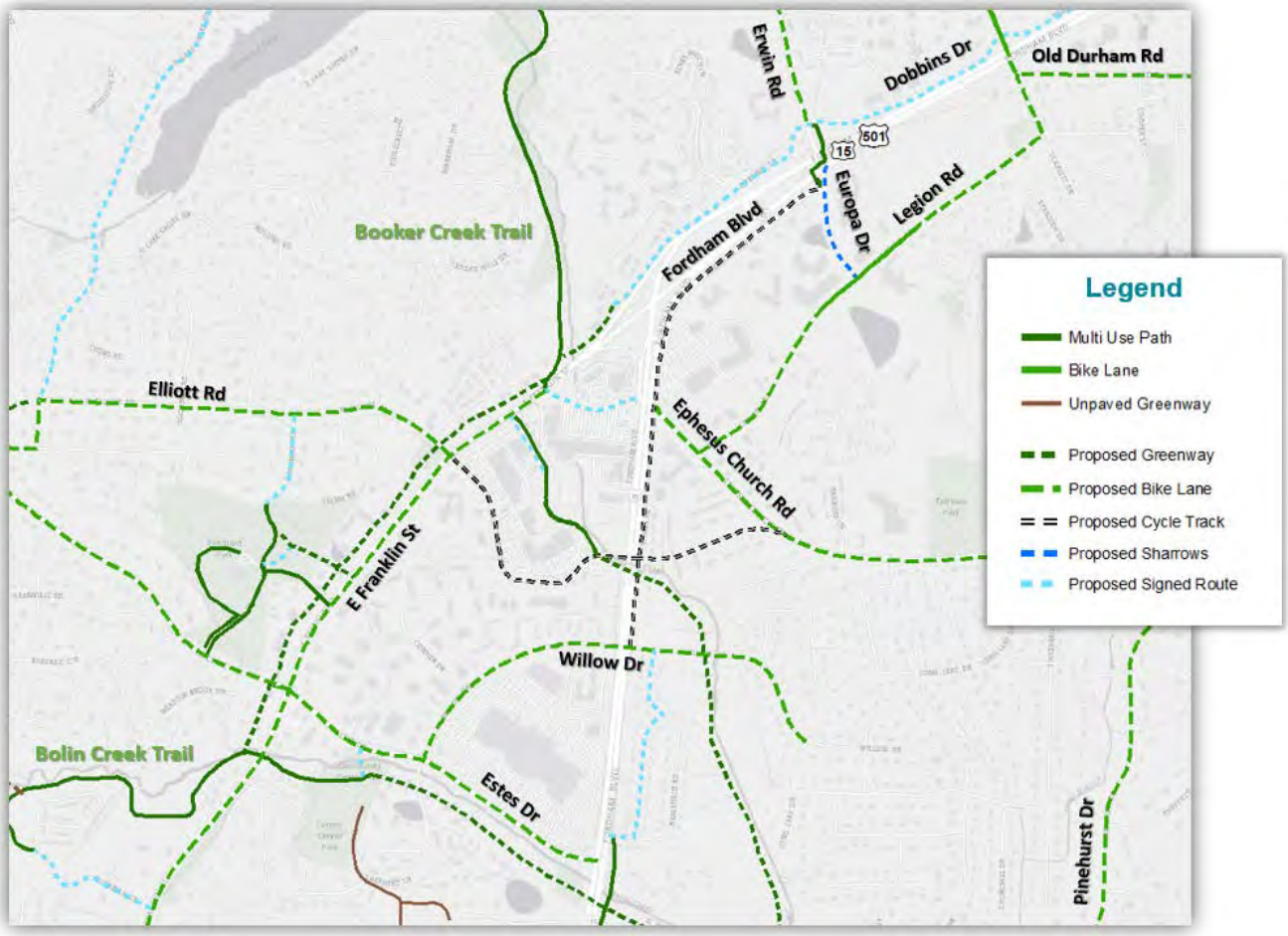


Figure 7. Existing and Planned Bicycle and Pedestrian Network Facilities in the Ephesus-Fordham District as they are laid out in the 2014 Chapel Hill Greenway Plan and the 2013 Chapel Hill Bike Plan

Access to Transit

The District is currently served by three regular Chapel Hill Transit routes (CL, D, F) and one express peak-hour route (DX). GoTriangle Route 400 and 405 also serve the District. Figure 8 shows transit stops in and around the District and a heatmap of daily boardings and alightings. Chapel Hill Transit's Elliott Road and Ram's Plaza stops represent the transit stops with the highest ridership in the District.

Much like the street network, the transit network only serves the edges of the District, with no penetration into the developments. Street-side bus stops leave transit users with long walks across auto-oriented parking lots to get to stores and services, and the stops themselves sometimes offer seating but rarely shelters at locations directly adjacent to busy streets.

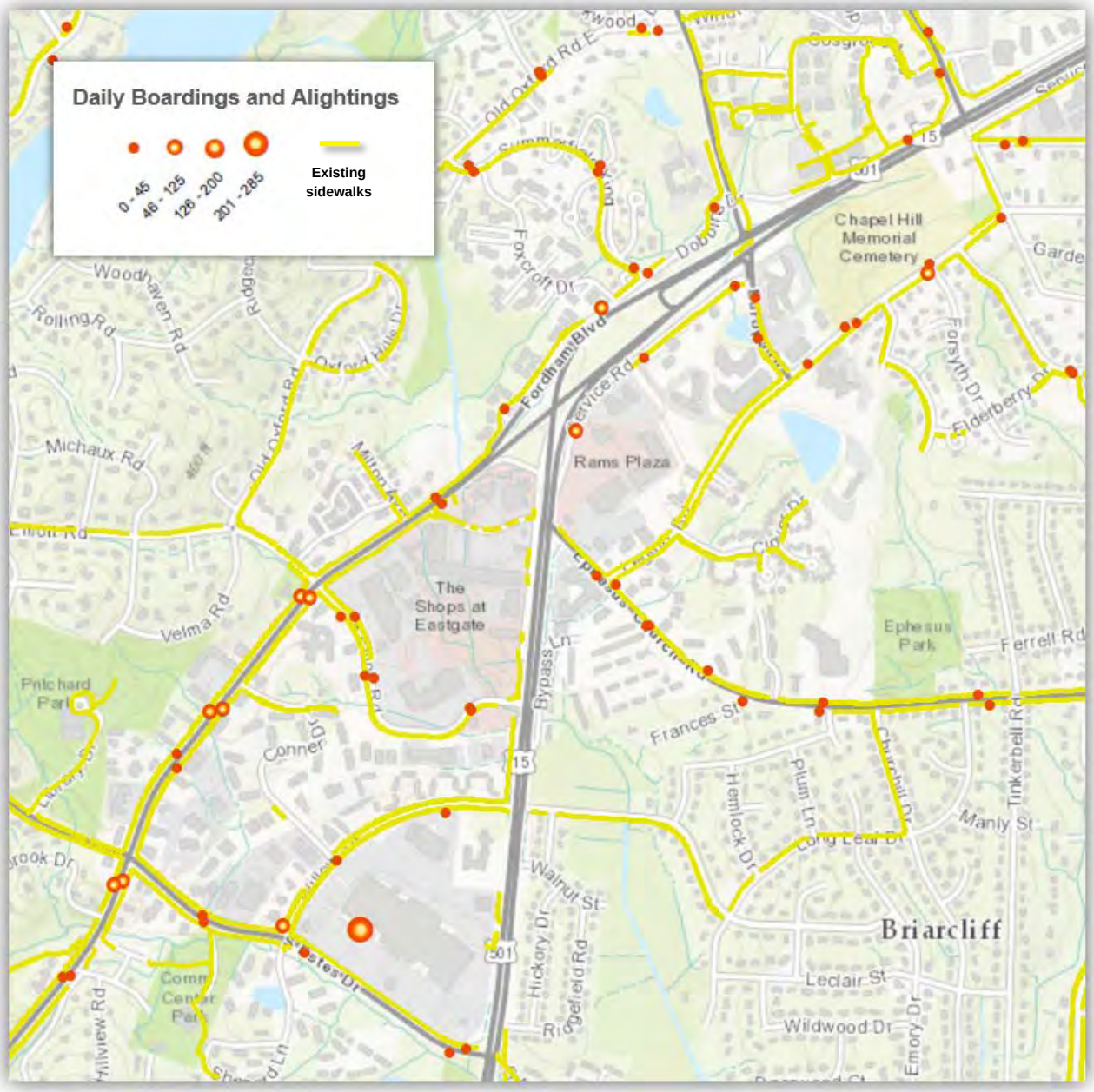


Figure 8. Existing sidewalk coverage and transit stops around the Ephesus-Fordham District showing daily boarding and alighting data from Chapel Hill Transit

Ephesus-Fordham Mobility Recommendations

US 15-501 Fordham Boulevard

With Fordham Boulevard serving as the spine for the Ephesus-Fordham District, it is appropriate to focus on this main arterial first. Fordham Boulevard ushers 48,000 vehicles per day (2015) through the District, but needs to serve multimodal, not just vehicular, capacity. NCDOT is conducting a feasibility study looking at future widening and improvements to Fordham Boulevard, with funding for construction slated to begin around 2025. That study will hopefully indicate that the future of Fordham Boulevard must include all modes to meet the vision of a revitalized District supportive of transit, bicycling, and walking. With a 200-foot right-of-way, the ultimate cross-section proposed in Figure 9 can accommodate all users and still provide green space with landscaping and buffers.

Transit: While Fordham Boulevard is currently not planned for dedicated transit infrastructure such as light rail or bus rapid transit (BRT) in the Orange County Transit Plan, the ultimate cross-section has been developed with a Complete Streets concept to preserve the option for dedicated facilities running in the center median. Similar BRT routes are being designed for Martin Luther King Jr. Boulevard in Chapel Hill and on four routes in Wake County. Center-running BRT has several advantages over curb-running alternatives including eliminating conflicts with right-turning vehicles and bicycles and allowing for exclusive signal phasing for transit. It also reduces the length of pedestrian crossings by providing a center-island refuge, addressing a key public input concern about crossing Fordham Boulevard. A center-running option also reduces the right-of-way width needed for operations because stop locations from both directions of service are collocated in the median.

With dedicated transit proposed along the corridor in the future, select intersections will need to be identified as potential future station locations, giving transit priority, and improvements at those intersections should be designed to preserve space for future bus lanes, stations, and crossing locations. Any discussion of widening Fordham would need to consider how it could affect future transit service and whether the inside lanes could be converted ultimately to accommodate the cross-section.

Vehicular: The proposed cross-section below offers an alternative that maintains four through travel lanes in the corridor. At intersections, exclusive right-turn lanes could be accommodated by utilizing the wide outside planting strips without sacrificing street trees located at the edge of the NCDOT-required clear zone (15 feet from the back

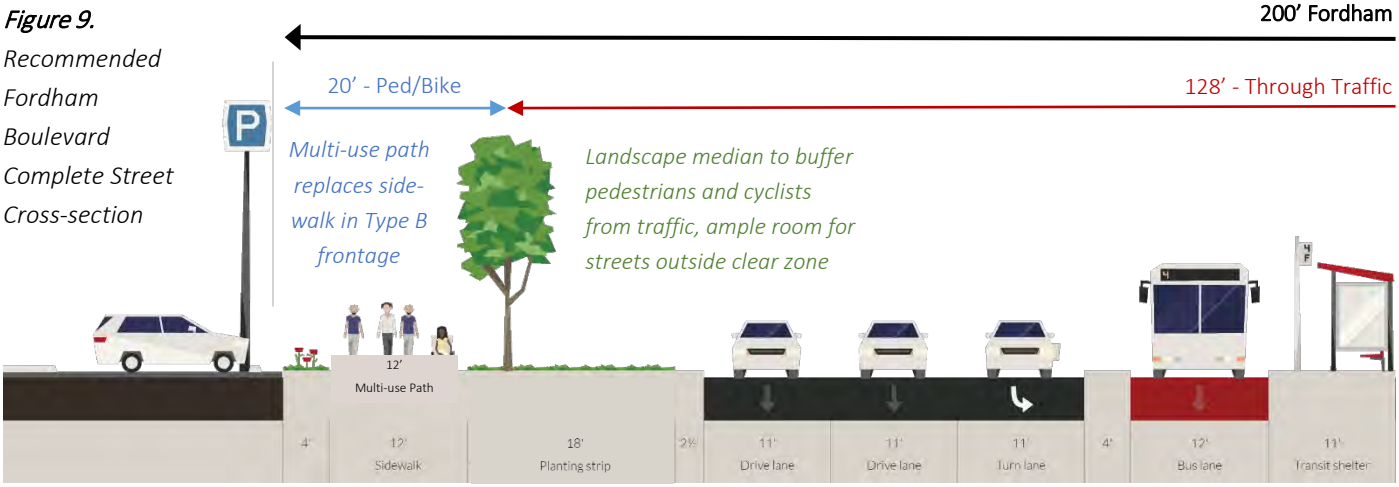


Figure 9. Recommended Fordham Boulevard Complete Street Cross-section

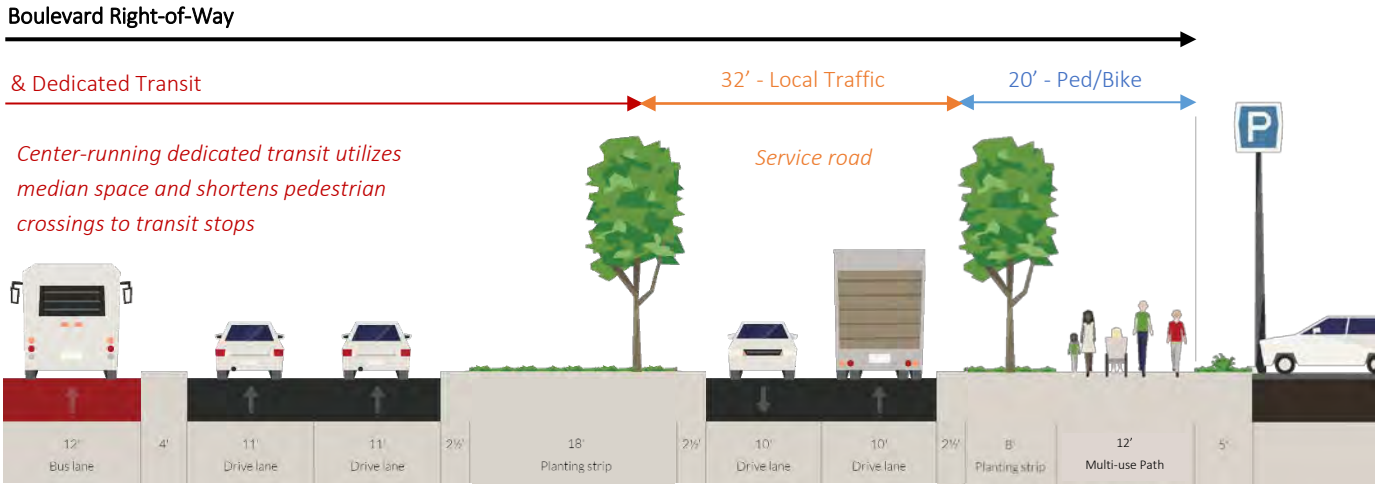
of curb). Dual left turns could be provided at locations where transit stations are not planned. Where transit is prioritized around Ephesus Church Road and Legion Road intersections in the future, vehicular priority is recommended at the Elliott Road intersection to facilitate heavy turning movements associated with the shopping center.

The proposed cross-section also preserves space for a service road for local traffic and access to adjacent businesses. While the preferred location for a street is shown in the typical section, it does not exactly match the existing alignments. Maintaining those would result in smaller planting strips or loss of the ability to place street trees along the boulevard. Developers could also have the option to forego the service street providing access and parking through a more developed local street network. The space gained along the frontage could accommodate additional green or public space or stormwater treatment measures, but should be activated with bike facilities and pedestrian-scale amenities.

Pedestrian/Bike: The Fordham Boulevard corridor is as important to bike and pedestrian connectivity as it is to vehicular traffic. Therefore, the proposed multi-use paths should be the focus of near-term improvements initiated by the Town and developers, leaving NCDOT to focus on long-term roadway and transit improvements. With major bike facilities along Sage and Old Durham Roads to the north and the Lower Booker Creek and Bolin Creek Greenway corridors, and to facilitate low-stress connections emphasized in public input, the Fordham corridor is recommended to include multi-use pathways along both sides of the roadway. The multi-use paths would replace the six-foot sidewalks required on frontages with parking lots (Type B frontages) within the District.

Table 1. Components of Fordham Boulevard Complete Streets Concept

Fordham Boulevard			
Right-of-way	200’	**Frontages**	Type B (typical)
Median	43’ for dedicated bus rapid transit	**Travel Lanes**	Arterial – four 11’ lanes Service road – two 10’ lanes
Bike Facilities	10-12’ multi-use path; location may vary along corridor	**Planting Zone**	18’ planting strips, street trees 15’ from curb face 4’ hedge planting strips behind sidewalk (min)
Sidewalks		**Parking**	No on-street parking



Appendix D: Ephesus-Fordham Mobility and Connectivity

Several gaps exist in the sidewalk network that make it difficult for pedestrians to access Chapel Hill Transit at Ram's Plaza. The public input process identified gaps on the south side of Elliott Road between Franklin Street and Fordham Boulevard, on Europa Drive, along US 15-501, and on Ephesus Church Rd. These gaps have been added to the sidewalk prioritization list and targeted for construction to enhance the pedestrian network.

The public input showed that there was considerable interest in developing safe, low-stress crossings of Fordham Boulevard. Several options for crossings were developed in 2015, including alternatives to take pedestrians and cyclists over Fordham Boulevard and under Franklin Street.

Three options for crossing Fordham Boulevard were considered, including constructing a pedestrian bridge near 1) Ephesus Church Road, 2) the future Legion Road Extension, or 3) Elliott Road. The overpasses would create an important connection across the highway where pedestrians currently have to use a 145-foot crosswalk. After evaluating each of the options, the consultants recommended a bridge near the future Legion Road Extension as the best alternative. The new bridge has the potential to be integrated with future redevelopment of the Days Inn site or the southern portions of Eastgate Shopping Center, and would incorporate long ramps that would carry pedestrians and cyclists up and over the roadway.

While the Elliott Road option had the most direct connection for the Lower Booker Creek Greenway, the Legion Road alternative can make that important connection to the greenway by carrying the bridge over the greenspace behind Village Plaza along Booker Creek. The longer bridge would cost an estimated $3.0 million (2017 $) and create a more iconic feature with views over the creek and greenway. If the bridge only spanned Fordham Boulevard, the cost would be reduced to an estimated $1.1 million, and still have an optional greenway connection to Lower Booker Creek trail around the north edge of the open space.

An underpass for East Franklin Street was also recommended, and is already highlighted in the Town Greenway Plan. The underpass would link the Lower Booker Creek Greenway to the northern side of the Ephesus-Fordham District. The existing, under-utilized ramp that connects northbound Franklin Street to the service road on the east side of Eastgate shopping center would be converted to a greenway link to the proposed multi-use trails along Fordham Boulevard. The project also includes a 100' pedestrian bridge over Booker Creek to connect the culvert to the trail and a newly recommended multi-use path along Dobbins Drive.

Village Plaza *Booker Creek Passive Open Space*

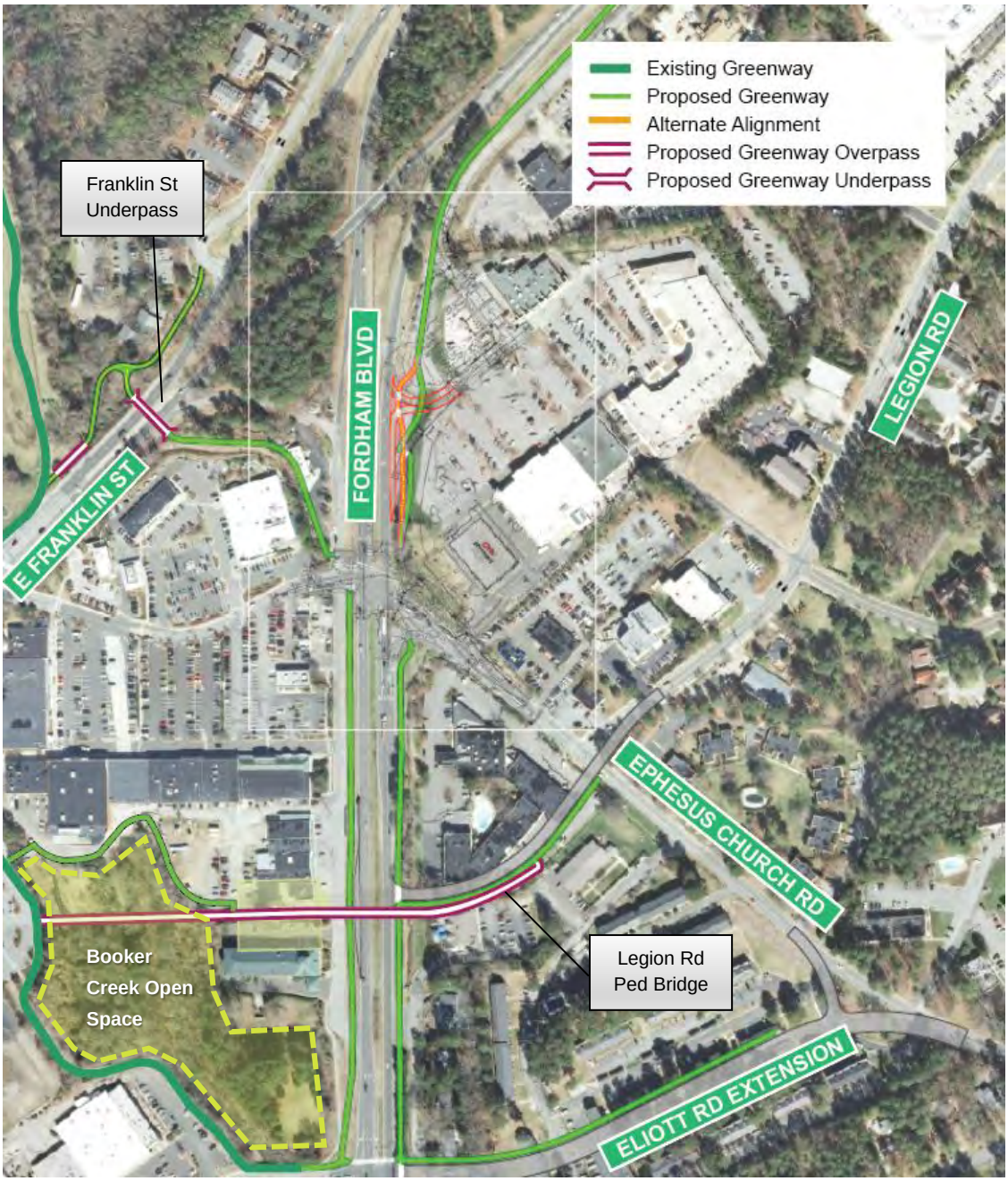
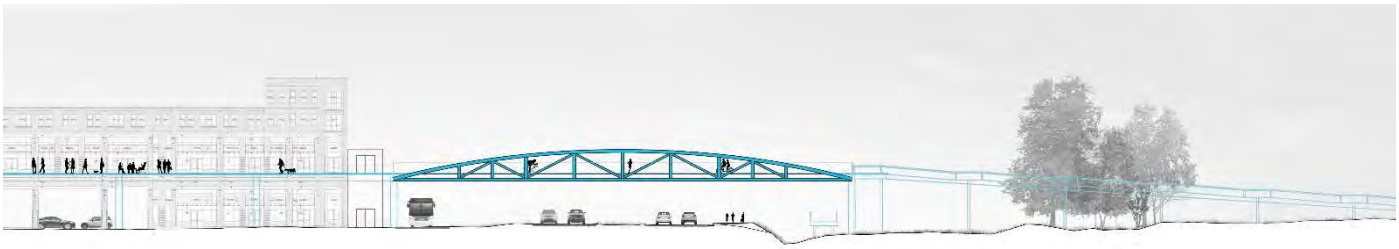


Figure 10. *Recommended multi-use bridge concept across Fordham Boulevard at Legion Road Extension, with extension over Booker Creek open space, including the design perspective below*



Potential Days Inn site redevelopment *Bridge over Fordham Blvd.* *Ramps along Legion Rd extension*

Appendix D: Ephesus-Fordham Mobility and Connectivity

Table 2. Grade Separation Options and Cost Estimates for Creating Connections to the Core Network and Greenways in the Ephesus-Fordham District

Grade Separation	Details	Issues and Opportunities	Estimated Cost
Fordham-Legion Pedestrian Bridge	Single span pre-fab bike/ped bridge Two ~400' Ramps at 5% slope 17.5' vertical clearance over Fordham Blvd.	Option to extend over Booker Creek passive open space Ability to tie into redevelopment Ability to tie to future transit in Fordham Blvd median Can be coordinated with design/construction of Legion Rd. extension Does not directly connect the Booker Creek Greenway segments across Fordham Blvd	$1.1 million - $3.0 million
Franklin Street Pedestrian Underpass	Single span pre-fab over Booker Creek Bike/ped culvert under Franklin St. w/ lighting	Creates path on west side of Franklin Spans and avoids floodway Recommended as Priority #1 barrier to address in Greenway Plan Connects greenway to north section of Ephesus-Fordham District Provides low-stress connection between NB/SB local and regional transit stops on Franklin St	$625,000

Street Network

Creating a tighter local street network within the district will provide the opportunity to make Ephesus-Fordham more pedestrian- and bike-friendly by changing the way users circulate in the area. New streets will increase internal connectivity between destinations, provide sidewalks and bikeways, and shorten trip distances. Fordham Boulevard is currently the primary carrier of north-south through traffic and most traffic accesses the district off Fordham Boulevard. With upgrades and/or extensions to Legion, Ephesus Church, and Elliott Roads and the creation of a new collector street linking the service road and Legion Road south of Europa Drive, traffic will be distributed to multiple intersections rather than being focused at Ephesus Church Road. Therefore, it is important to evaluate the appropriateness of the existing street classification and recommended street improvements (Figure 11).

Arterials: Elliott Road from Franklin Street to Fordham Boulevard should be reclassified to upgrade it to minor arterial status, based on its importance to vehicular and cycling through traffic on the south side of the District. With the proposed realignment of Ephesus Church Road combined with the Elliott Road extension, this street will become as the main circulator around the southern side of the District, allowing access to commercial development but also linking neighborhoods east and west of the area. Upsizing this segment of Elliott represents a transition from it being an arterial to the east and a collector to the west. The new cross-section will require additional right-of-way, and should constructed with emphasis on access management and separation between cyclists and motor vehicles with the recommendation of buffered bike lanes.

Europa Drive south of Fordham Boulevard should be reclassified from an arterial to a minor arterial, deemphasizing vehicle traffic and creating stronger pedestrian/bicycle linkages between the Lower Booker Creek Greenway, the recommended Dobbins Drive multi-use path, the northern portion of Ephesus-Fordham, and Legion Road.

Collectors: With more emphasis on Elliott Road for vehicular traffic, some of the streets within the District should be reclassified as collectors to help support a greater focus on non-motorized transportation, including Ephesus Church Road north of the Elliott Road extension, the Legion Road extension, and any upgrade to the street proposed to

cross Eastgate Shopping Center. A new collector road is also planned to cross the north side of Rams Plaza between the Fordham service road and Legion Road.

Local Streets: Implementation of the form-based code for Ephesus-Fordham looks to fill in the local street network in areas where large lots with shopping centers and automobile retailers once existed or currently sit. The recent code revisions include a requirement for 1,600-foot block perimeters with 450-foot maximum block length. Those standards mean that redevelopment will have flexibility in creating a denser, more walkable street network. Building that network is dependent on total redevelopment to complete the street grid. New developments, particularly those on large parcels, will need to build numerous local streets even with the maximum block size. Local streets will make up the majority of new streets in the District.

District Streets: These streets provide access along the sides and backs of new buildings where parking is not required. Due to the density of street required in the District Plan, they represent a smaller cross-section street while providing vehicular, bike and pedestrian access, and landscaping.

Service & Residential Alleys: Alleys provide residents and businesses access to garages, parking decks, loading docks and service entrances necessary to conduct their everyday lives and work.

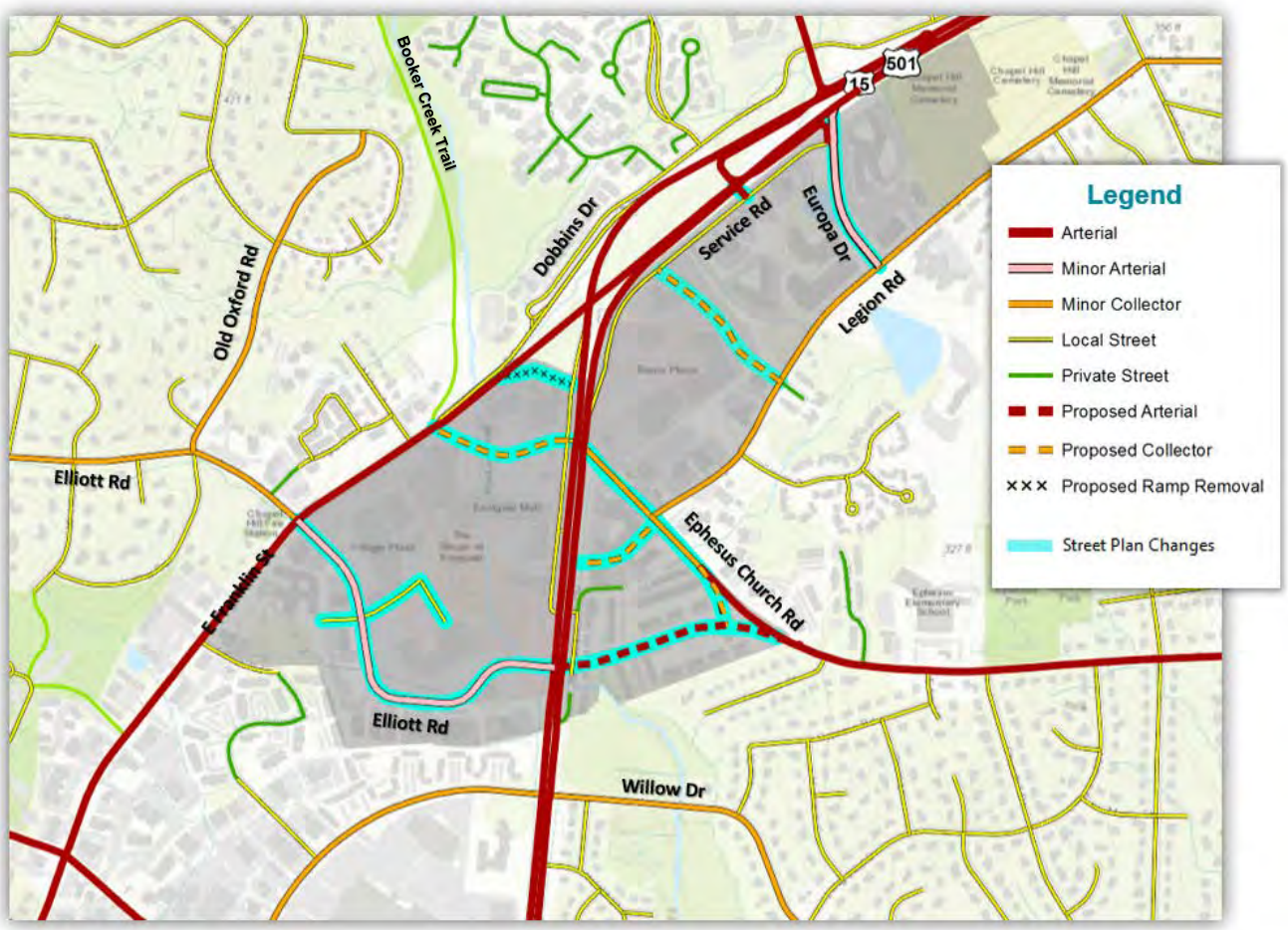


Figure 11. Existing streets and proposed changes to the street network in the Ephesus-Fordham District. New internal streets in the district (shown in grey) will occur with redevelopment according to the Block Perimeter and Regulating Plan

Non-Vehicular Street: This street alternative is used only by bicycles and pedestrians, and may be considered as part of the street grid for the purpose of satisfying block length requirements. Characteristics of a non-vehicular street include a public access easement separating development sites, a wide multi-use path with a planting zone on each side, and connectivity to adjacent streets. Non-vehicular thoroughfares are appropriate in special cases, such as where an adjacent parcel is already developed and a vehicular street connection is infeasible, but pedestrian and bike connectivity is still achievable.

The right-of-way or easement width indicated for District Streets, Alleys, and Non-Vehicular Streets may need to increase in certain cases to allow for a future widening of the street up to Local Street standards. This determination would be made based on site conditions such as the development potential of adjacent sites. The ability to upgrade streets in the future gives the Town flexibility to support long-term growth in the Ephesus-Fordham District.

The District code includes specific illustrations for street frontages (Figure 12) outlining parking and pedestrian accommodations. Vehicular and bicycle accommodations are included in the cross-sections for each street classification. Figure 13 provides illustrations and common elements for each street type. The cross-sections are based on the Town's standard details and the frontage types developed for the code. Each profile outlines the required laneage, bike facilities, sidewalk widths, and parking. On commercial collectors and local streets, on-street parallel parking is required with Type A frontages, but diagonal and perpendicular parking can be used at the expense of wider rights-of-way.

In addition, redevelopment of the District should also balance accessibility with mobility. Short block lengths coupled with numerous driveways would hamper the desired street frontages with on-street parking and a continuous pedestrian realm. Therefore, the Town should enforce strict access management policies in the Ephesus-Fordham District, particularly along Type A street frontages, to limit the number of driveways crossing the sidewalk. Consideration should be given to restrict local street access to right-in right-out at select intersections with collectors and most arterials. For example, parking lot, garage access, and delivery zones should be focused on Type B frontages or on district streets and alleys.

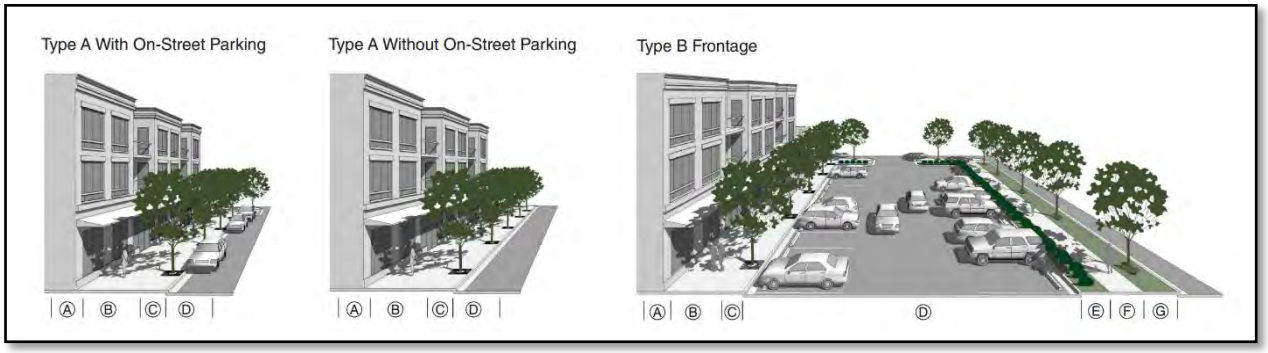
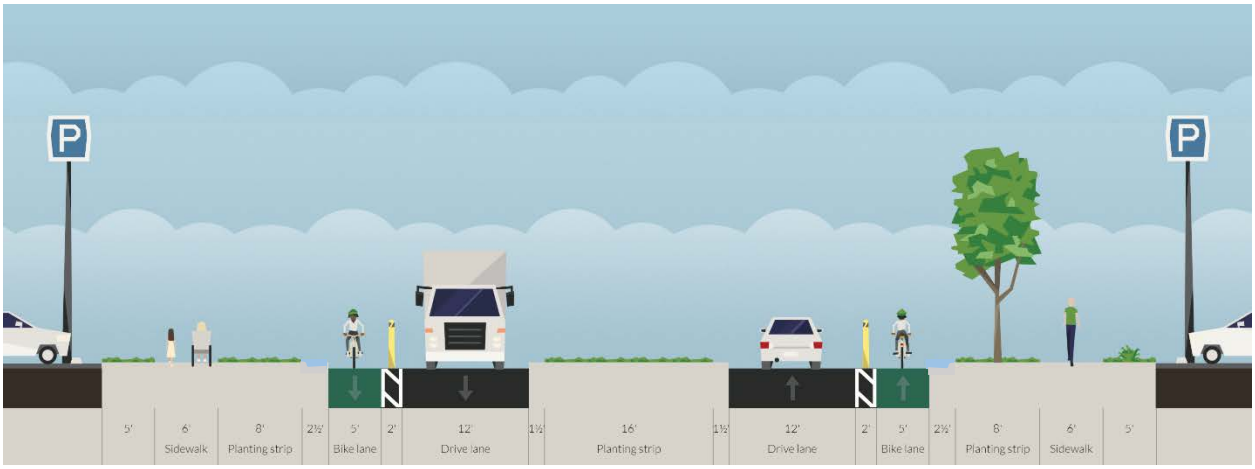
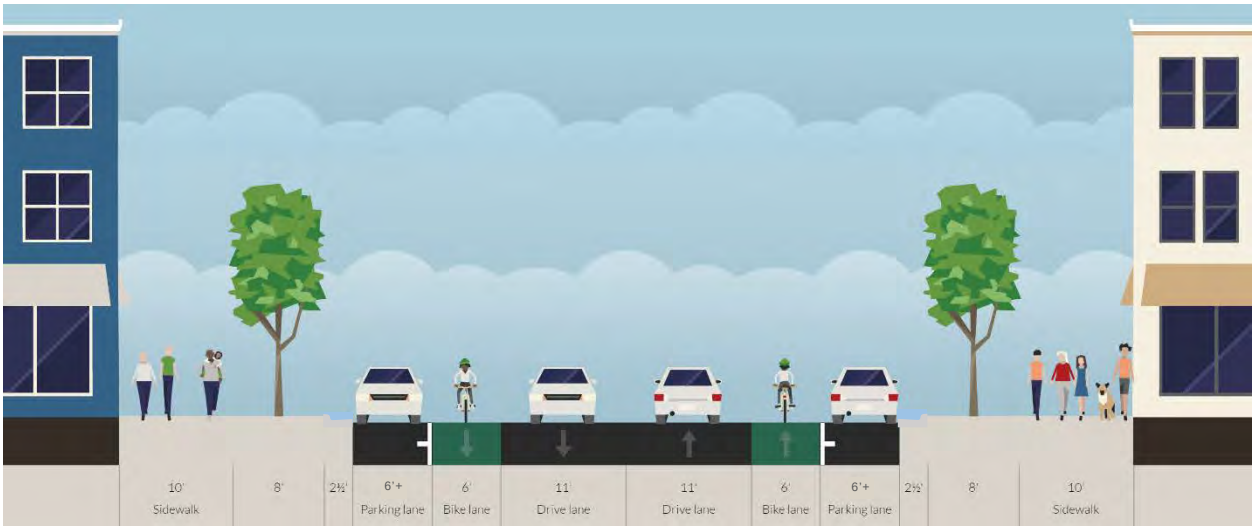


Figure 12. *Illustrations of street frontages from Ephesus-Fordham District form-based code*

Figure 13. *Proposed typical sections for Ephesus-Fordham District*



Arterial with Buffered Bike Lanes			PRIMARY STREET
Right-of-way	Arterial – 117' min, 124' typical Minor Arterial – 93' min, 100' typical	**Frontages**	Type B (typical)
Median	Landscaped: 9' minimum, 16' preferred + 1.5' mountable curb & gutter Center Turn Lane: 12' minimum	**Travel Lanes**	Arterial – four 12' lanes Minor Arterial – two 12' lanes
Bike Facilities	Buffered* bike lanes (5' lane + 2.5' curb & gutter, 2'min buffer*) ** Buffer required when speed limit ≥ 35mph*	**Planting Zone**	8' planting strip 5' hedge planting strips behind sidewalk
Sidewalks	6' minimum	**Parking**	No on-street parking



Collector with Bike Lanes – Commercial Context			PRIMARY STREET
Right-of-way	85' minimum	**Frontages**	Type A (typical)
Median	None	**Travel Lanes**	Two 11' lanes
Bike Facilities	6' bike lanes adjacent to parking	**Planting Zone**	8' tree grates in sidewalk
Sidewalks	18' minimum (minimum 10' extending to 18' between street trees)	**Parking**	2.5' curb & gutter Parallel – 8' minimum (including gutter) Perpendicular – 18' minimum 60° diagonal – 16' typical

Appendix D: Ephesus-Fordham Mobility and Connectivity

Figure 13 *(continued). Proposed typical sections for Ephesus-Fordham District*

Collector with Bike Lanes – Residential Context			PRIMARY STREET
Right-of-way	73' min	**Frontages**	Type A (typical)
Median	None	**Travel Lanes**	Two 11' lanes
Bike Facilities	5' bike lanes min + 2.5' curb & gutter	**Planting Zone**	8' tree grates in sidewalk
Sidewalks	18' minimum (minimum 10' extending to 18' between street trees)	**Parking**	None

Local Street with Sharrows			PRIMARY STREET
Right-of-way	75' min	**Frontages**	Type A or B (according to code)
Median	None	**Travel Lanes**	Two 11-12' lanes
Bike Facilities	Shared lane markings (i.e. sharrows)	**Planting Zone**	Type A - 8' tree grates in sidewalk Type B - 8' planting strip 5' hedge planting strips behind sidewalk
Sidewalks	Type A - 18' minimum (min 10' + 8' between street trees) Type B - 14' minimum (min 6' + 8' between street trees)	**Parking**	8' min (including gutter) 2.5' curb & gutter

Figure 13 (continued). Proposed typical sections for Ephesus-Fordham District

District Street			SECONDARY STREET
Right-of-way	55' minimum	**Frontages**	Type A (typical)
Median	None	**Travel Lanes**	Two 11' lanes
Bike Facilities	Shared lane markings (i.e. sharrows)	**Planting Zone**	8' tree grates in sidewalk
Sidewalks	14' minimum (min 6' + 8' between street trees)	**Parking**	Loading/unloading only

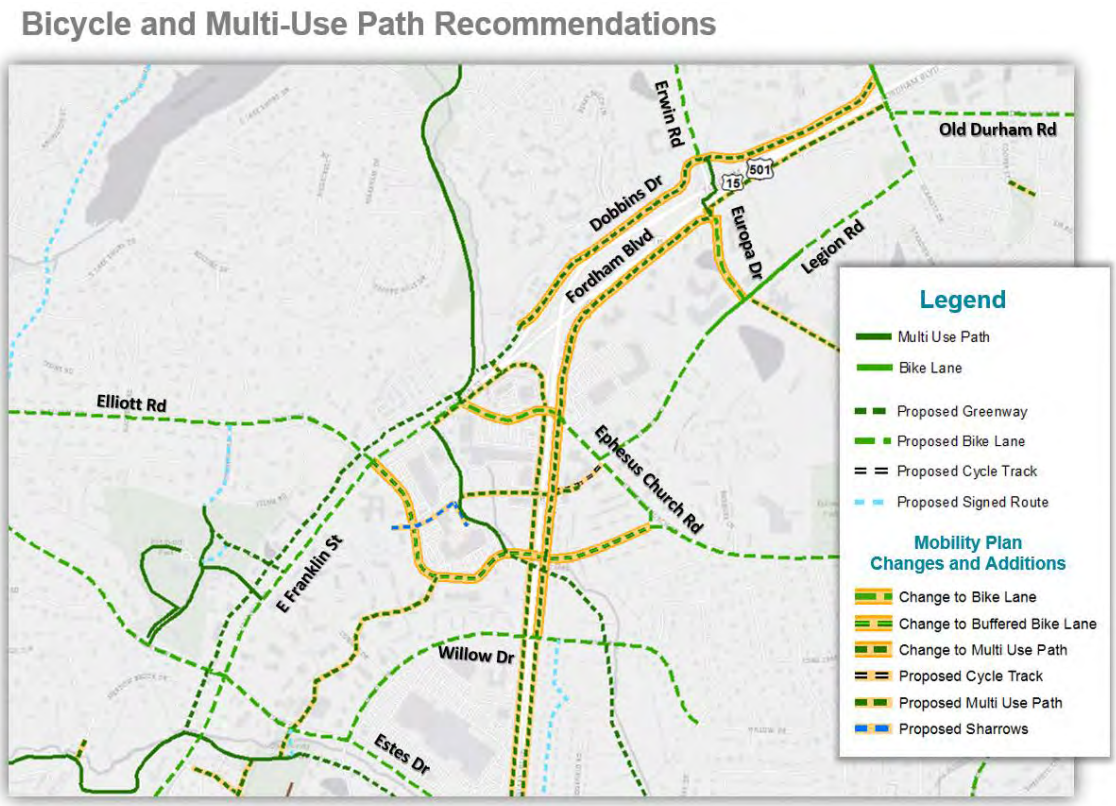
Alley – Residential or Service			SERVICE STREET
Easement	30' minimum	**Frontages**	Service – Loading areas, service entrances Residential – Garages or parking deck access
Median	None	**Travel Lanes**	Service – Two 10' unmarked lanes Residential – Two 9' unmarked lanes
Bike Facilities	None	**Planting Zone**	None
Sidewalks	Service - 6' minimum (one side) Residential – 8' minimum (one side)	**Parking**	Loading/unloading only
Note	*Section can be converted to woonerf-type, pedestrian-oriented streets by raising vehicular street to sidewalk level (concrete or pavers) and select installation of street trees, furnishing, and other calming features.*		

Bicycle & Pedestrian Network

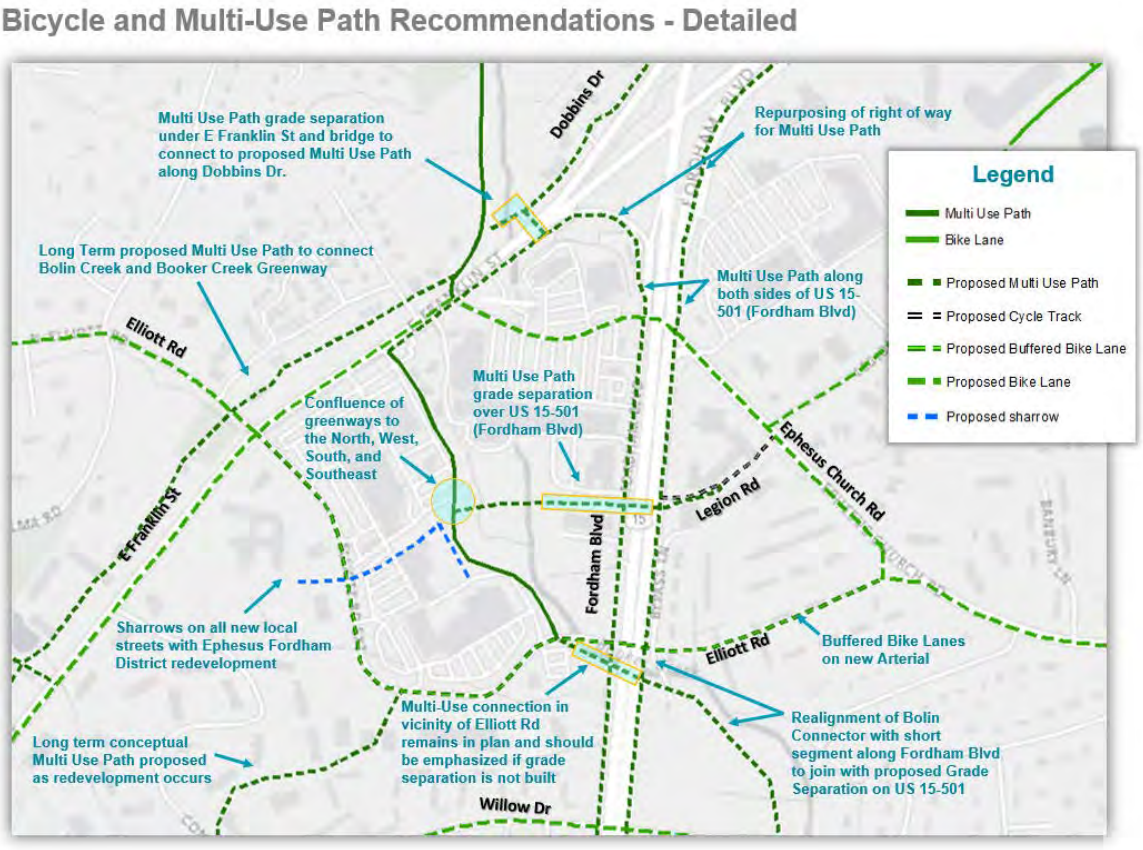
As discussed in the previous section, the newly approved block length and perimeter standards ensure a compact street network that is bikable and walkable. The addition of pedestrian pass-throughs connecting to wide sidewalks along the street frontages required in the code further increase pedestrian routes. A dense pattern of local streets with multiple connections in any redevelopment scenario means short blocks will disperse motorized and non-motorized traffic, keeping speeds low with frequent intersections and on-street parking. Therefore, separated bike facilities are recommended only for collectors and arterials within and along on the edges of the district, as well as along Fordham Boulevard to create the core network for cycling in the District. Recommendations are shown in Figures 14-15.

Outside of redevelopment, long crossing distances and heavy turning traffic are deterrents to pedestrian crossing Fordham Boulevard between the District's various activity centers. For cyclists, lack of dedicated facilities, clearly defined space, and signal actuation at intersections are problematic. The difficulties were reflected in the public input, with crossings of the Fordham Boulevard corridor representing largest number of responses from citizens. Several key recommendations are made to improve the bicycle and pedestrian circulation and access:

- Multi-use connections west of Fordham Boulevard: A greenway path across or around the Booker Creek open space and connecting to the Fordham pedestrian overpass provides a key link that then connects to the pedestrian and bicycle networks within and external to the District. This spur off the Lower Booker Creek Greenway would connect users to the sidewalks and multiuse paths on Fordham Boulevard and the connections north running under E Franklin Street and along Dobbins Drive.
- Multi-use connections east of Fordham Boulevard: The core network is further enhanced by multi-use facilities on both sides of Fordham Boulevard that tie into the pedestrian overpass and link existing and planned sections of the Lower Booker Creek Greenway. Separated facilities can be constructed on Fordham Boulevard in the wide right-of-way if space can be claimed from the existing service roads or drainage swales. A proposed multi-use connection along the northern parcel boundary of the American Legion property is also recommended, creating a bicycle and pedestrian link with and between neighborhoods to the east.
- Bicycle Facilities: With the Fordham multi-use paths and the pedestrian overpass anchoring the bike network, strategic updates to the Bike Plan (2014) are recommended:
  - Separated facilities (cycle tracks or multi-use paths) for the Legion Road extension, considering the extension will be a focal point for cyclists coming from the north- and southeast, particularly Old Durham Road.
  - Buffered bike lanes along the minor arterials of Elliott Road and Europa Drive, to provide low-stress connections for cyclists on streets that will continue to handle large volumes of traffic.
  - Bike lanes along the Eastgate access road between the Booker Creek Greenway and Fordham Boulevard, and for Ephesus Church Road north of the Elliott Road.
  - Sharrows on local streets.
- Pedestrian Facilities: Numerous sidewalk gaps were identified and proposed facilities in and around the district are shown in Figure 16.



Figures 14-15. *Recommended bike improvements link facilities surround the Ephesus-Fordham District (above) but also facilitate bicycle connectivity across Fordham Boulevard and mobility between developments (below).*



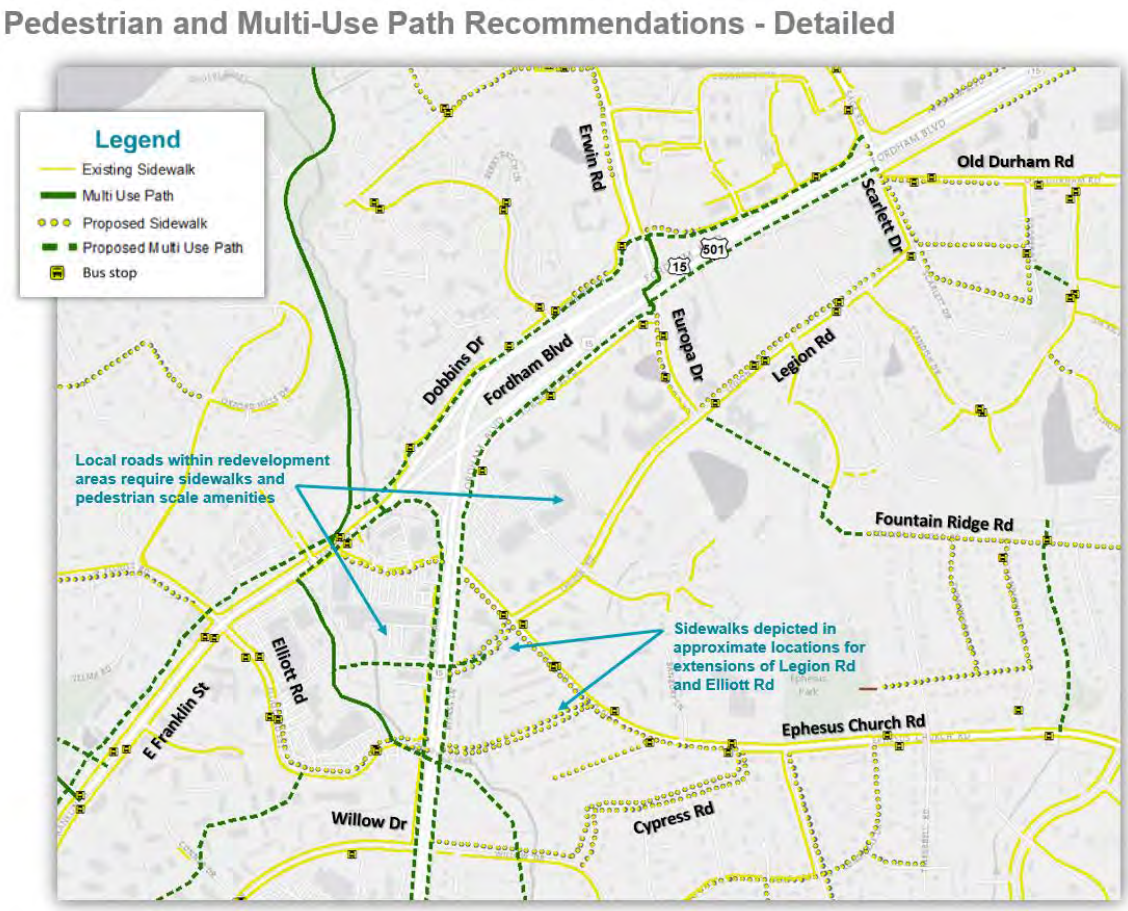


Figure 16. Recommended changes to the pedestrian network emphasize connections to transit and multi-use paths and close sidewalk gaps. Local roads and road extensions within the Ephesus-Fordham District will require sidewalks pedestrian scale amenities at the time of construction.

These recommended improvements play a key role in the development of the non-motorized priority corridors conceptualized in the Mobility Plan. These priority corridors serve to connect the six focus areas around Chapel Hill by knitting together Town greenways, multi-use paths, and neighborhood sidewalks and bikeways to create a network of pedestrian and bicycle corridors parallel to the major roadways. By connecting these destinations, residents of the Town can use local street and trail connections to access the priority corridors and then travel to major destinations throughout Chapel Hill, as well as access the greater Triangle greenway and bike network.

Three of the priority corridors connect to the Ephesus-Fordham District:

- Treelyne Trail connecting N MLK/I-40 focus area to the Ephesus-Fordham District via the Lower Booker Creek Greenway and neighborhood streets in north Chapel Hill
- Midlyne Trail connecting S MLK focus area to the Ephesus-Fordham District on bike facilities and pedestrian pathways alongside Estes and Elliott Drives
- Eastern Explorer Trail connecting Downtown to Ephesus-Fordham and Durham via bike lanes and multiuse paths along E Franklin Street, Dobbins Drive, Legion and Old Durham Roads

Implementation

To realize the vision and fundamental principles of the Ephesus-Fordham District, the Town will need to put its plans into action by implementing these recommendations through the cooperation and coordination with developers, NCDOT, GoTriangle, environmental agencies, and local property/business owners. The following tables provide guidance on moving the Mobility Plan's projects and policies forward with next steps and potential funding options. The projects are broken up into categories for short-, mid-, and long-term implementation. The short-term projects represent policies that can be easily implemented with the approval of the Mobility Plan, or shortly thereafter, and projects that can be constructed as parts of redevelopment or small capital improvement projects with some engineering and through existing levels of funding. Mid-term projects may include more involved engineering and design, and require funding identification and planning. Long-term projects will require substantial design work and depend on significant planning by Town staff, project approval by outside agencies, and funding mechanisms.

Projects in the District can be funded in several ways, including private and public options. While the form-based code places the burden of local street construction and improvements for adjacent streets on developers, the larger street improvements and many of the pedestrian, bicycle, and greenway projects will be the responsibility of the Town to prioritize and identify for funding. Several mechanisms shown in the implementation tables as potential funding options are defined here:

- **Developer exactions:** The form-based code, Land Use Management Ordinance (LUMO), and Comprehensive Plan outline the requirements for developments in Chapel Hill to construct the infrastructure needed to support the new residents and users.
- **Private/public partnerships:** With numerous property owners and a large district, it is likely that individual sites will only build out short segments of larger projects. Therefore, it may be advantageous at times for the Town to enter into agreements with developers to accept payments-in-lieu to help fund larger projects in the future, or to provide developers funding to build more than they are required in order to complete key connections or incentivize future developments. The Town development code provides guidance for right-of-way or easement dedication and a phasing schedule for both public improvements by the developer and those to be constructed by the Town.
- **Capital Improvement Program (CIP) budget/funding:** The Town's CIP is a 15-year financial plan for its major infrastructure needs, establishing priorities and potential funding sources. The CIP is updated annually as part of the Town's budget and allocates tax revenues to, amongst other things, transportation and parks/greenway projects. Revenues for CIP funding includes property tax and town fees, but may also receive monies from traditional and innovative sources such as:
  - **Bonds:** Municipal bonds are financial bonds issued by the Town to fund numerous projects, typically by tax increases outlined in a referendum voted on by residents.
  - **Municipal Services District:** Under North Carolina Law, the Town aids property owners in forming a Municipal Service District to provide specific services to a defined geographic area through special property tax. The tax is approved by and levied on the property owners within that area.
  - **Tax Increment Financing (TIF) District**: TIF districts are established to fund projects within the District and repay those costs through the incremental increase in tax revenues resulting from redevelopment. TIF districts can be formally established by the Town or "synthetically" administered by monitoring and accounting for the increases in Town financial records.
- **Durham-Chapel Hill-Carrboro MPO (DCHC) funding:** The DCHC Metropolitan Planning Organization receives federal transportation funds for the region that are intended for municipalities to program for local projects. In FY2015-16, approximately $13 million was awarded to localities in the region, including Chapel Hill.

Appendix D: Ephesus-Fordham Mobility and Connectivity

- **NCDOT State Transportation Improvement Program (STIP) funding:** Based on current prioritization formulas, it is a competitive process to receive NCDOT funds. While there is stiff competition for ped/bike projects statewide, the Town has had success in getting bike/ped projects into the STIP.
- **Special federal or non-profit grants**: Examples include the USDOT's TIGER grant program for major infrastructure projects that support job growth and People For Bikes' Big Jump project to cycling in cites.

Pedestrian/Bicycle/Greenway Improvement Strategies

Recommended Improvement/Policy	Potential Funding Sources	Estimated Cost to Town	Next Steps
Short-term Implementation			
Sidewalk Gaps	CIP Funding	$325,000	Identify priority segments and funding (Ephesus Church Rd, Eastgate Shopping Center Dr, Legion Rd)
Pedestrian Pass-throughs	Developer Exactions	--	Adopt land use recommendations to revise pedestrian pass-throughs
Franklin St. Ramp closure/ Greenway Conversion	CIP Funding	$200,000	Consult with NCDOT Division office about potential road closure and ROW abandonment
Europa Dr. Improvements: Bicycle Lanes and Sidewalks	Developer Exactions + CIP Funding	$475,000	Develop conceptual plans for alignment
Legion Road Bicycle Lanes	Developer Exactions + CIP Funding	$800,000	Develop conceptual widening plans
Mid-term Implementation			
Elliott Rd. Improvements: Buffered Bike Lanes and Sidewalks	Developer Exactions + CIP Funding	$4.5 million	Monitor developer site plans and consider for future transportation bond
Franklin St. Underpass and Booker Creek Multi-Use Bridge	CIP Funding, Special grant funding	$625,000	Develop design plans to make shovel ready as potential funding identified
Fordham Blvd Multi-Use Paths (Willow Dr. to Europa Dr.)	Developer Exactions + CIP Funding or NCDOT STIP	$1.85 million	Monitor developer site plans and consider for future transportation or parks bond
Dobbins Drive Multi-Use Path	CIP Funding	$1.5 million	Develop alignment feasibility study
Long-term Implementation			
Fordham Blvd Multi-Use Overpass	CIP Funding, NCDOT STIP	$1.1 - 3.0 million	Investigate potential score in NCDOT SPOT prioritization process Develop design plans to make shovel-ready; identify potential funding
Fountain Ridge/Europa Multi-Use Connector	Developer Exactions, CIP Funding	$475,000	Monitor potential sale of American Legion property, including considering property purchase

Street Improvement Strategies

Recommended Improvement/Policy	Potential Funding Sources	Estimated Cost to Town	Next Steps
Short-term Implementation			
Street Plan Updates/Street Classification Changes	--	--	Prepare Comprehensive Plan amendments
New Ephesus-Fordham Street Cross-sections	--	--	Adopt Mobility Plan and amend District Code in tandem with land use recommendations
District Local Street Network	Developer Exactions	--	Adopt land use recommendations to revise block perimeters and lengths
Collector North of Rams Plaza	Developer Exactions	--	Review development plans for consistency and alignments
Mid-term Implementation			
Eastgate Collector Street	Developer Exactions	--	Add facility to proposed streets in Street Plan
Elliott Road Extension	Developer Exactions + CIP Funding	$4.2 million	Develop conceptual engineering plans for alignment and cost estimate
Long-term Implementation			
Legion Road Extension	Developer Exactions + CIP Funding	$1.6 million	Develop conceptual engineering plans for alignment and cost estimate

APPENDIX E:
NC 54 Pedestrian and Bicycle Corridor Safety Study

NC 54 Pedestrian and Bicycle Corridor Safety Study

Final Report

PREPARED FOR

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12/31/2019

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1

Introduction

This section describes the study's purpose, context, and schedule. The study began in Fall 2018 and concluded in December 2019. The study area is a 4.5-mile section of NC 54 from Manning Drive in Chapel Hill to Old Fayetteville Road in Carrboro.

1.1 Study Purpose

The purpose of the NC 54 Pedestrian and Bicycle Corridor Safety Study (hereafter "the study") was to develop a consensus framework for NC 54 that utilizes a systems-based approach to address bicycle and pedestrian safety through short and medium-term improvements. Neighboring institutional, municipal, and private stakeholders have inquired of the North Carolina Department of Transportation (NCDOT) for specific safety and bicycle and pedestrian improvements at intersections and locations along the corridor. This study sought to collectively address those requests through a cohesive set of recommendations for bicycle, pedestrian, and transit safety improvements.

The study was funded by the NCDOT Traffic Safety Unit. The Traffic Safety Unit manages NCDOT's Highway Safety Improvement Program and partners with stakeholders to implement and evaluate strategies to reduce fatal and serious injury crashes on North Carolina's roadways. The Study Team, facilitated by VHB, included staff from the Town of Carrboro, Town of Chapel Hill, Chapel Hill Transit, University of North Carolina at Chapel Hill,

NCDOT Division 7, and the NCDOT Integrated Mobility Division. Together, the Study Team focused on four primary activities:

- Assess existing multimodal travel conditions and development within the corridor;
- Identify priority locations for considering short and medium-term traffic and safety impacts;
- Develop bicycle, pedestrian, and transit safety improvements within the corridor, from immediate to up to (ten) 10-year implementation timeframes;
- Conduct public outreach initiatives through the planning process.

1.2 Study Context

NC 54 between Manning Drive in Chapel Hill and Old Fayetteville Road in Carrboro provides essential local and regional transportation for a full range of transportation services and modes. The roughly 4.5-mile section of NC 54 is a four-lane partial access-controlled principal arterial highway that experiences daily vehicle volumes from 18,000 (western study limits) to 45,000 (eastern study limits) (Figure 1). It is a unique section of roadway between an urban-to-rural transition to the west and increasing congestion and complex lane configurations to the east.

There are grade separated interchanges at Jones Ferry Road, NC 86/US15-501/S Columbia Street, and Smith Level Road, and numerous signalized and unsignalized full and limited movement intersections and access points along the corridor. Multifamily housing, commercial properties, schools, and recreational assets like parks and greenways, and frequent bus service create demand for walking and bicycling trips. These conditions create a challenging environment for safe pedestrian crossings and access to transit.

As Chapel Hill, Carrboro, Orange County, and the University of North Carolina (college and medical facilities) have grown, the function of NC 54 has continued to evolve. Much of the corridor's multifamily housing predates the widening of NC 54 (between Old Fayetteville and NC 86), and it now fronts a regionally significant and high-volume roadway with high operating speeds. Many of the corridor's residents are dependent on Chapel Hill Transit (CHT) service for access to services and employment and cross the four-lane median divided roadway at unmarked crossing locations to reach or return from transit stops. The Towns of Carrboro and Chapel Hill are expanding access to greenways and park systems along NC 54, and the Towns are also exploring new bicycle connectivity across NC 54 at key interchange and intersection locations. The transportation function of NC54 is confronting priorities of mobility, accessibility, and safety for all modes.

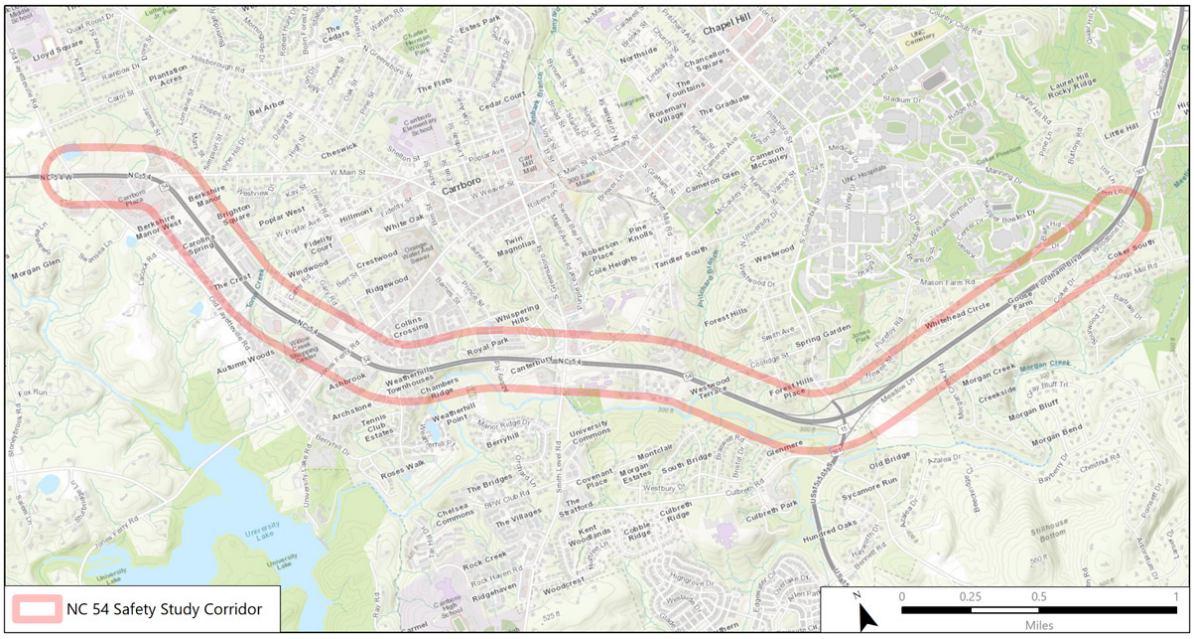


Figure 1 - NC 54 Safety Study Project Area

1.3 Schedule and Outreach Program

The study schedule was approximately twelve months, from Fall 2018 to December 2019. The study team met four (4) times during the project. The team met initially to review the scope of the project and participate in a field assessment. The team met a second time to review initial data analysis findings. The study team met a third time to discuss an approach to selecting countermeasures sites for priority consideration, as well as to prepare for an initial public workshop. The team met a fourth time to review proposed countermeasure recommendations and prepare for the second public workshop.

The study outreach included community workshops, one hosted in Carrboro in April 2019 and the second hosted in Chapel Hill in November 2019. To further engage the public, a project website was developed to provide general updates about the project, provide access

to an online interactive mapping tool, and to provide a link to a survey asking the public to provide input on bicycle and pedestrian transportation safety problems, potential solutions, and priorities for NC54.

2

Study Area Background

This section summarizes the corridor's transportation infrastructure, operations, crash history, relevant plans, and results from the field review. Additional details and analyses are included within the Existing Condition Report in the Appendix.

2.1 Transportation Infrastructure

The NC 54 study area from Manning Drive to Old Fayetteville Road is a 4-lane median divided state highway with the federal functional classification of principal arterial. It is a partial access-controlled highway with a posted speed of 45MPH and 12' travel lanes. While the lane and median cross section largely remain consistent throughout the corridor, the width of shoulders and presence of curb and gutter changes. There are 28 intersections in the NC 54 study area. Four intersections are signalized: Manning Drive, West Poplar Ave, Main Street, and Old Fayetteville Road. There are three interchanges at NC 86/US 15/501, Smith Level Road, and Jones Ferry Road. The remaining intersections are stop-controlled with either right in/right out access or right out/left in access. There are median openings at several intersections along the corridor that allow full access: Kings Mill Road, Morgan Creek Road, Laurel Ridge/Kingswood Road, and Oleander Road.

The corridor lacks consistent and connected linear pedestrian facilities, and crossing accommodations are present only at signalized intersections. Sidewalks are mostly limited to connecting transit stops to more densely developed residential and commercial centers along the corridor, except for those at West Main Street and Old Fayetteville. Sidewalk segments are typically 5' wide and 100' long with curb ramps at intersections. There are also few dedicated bicycle facilities along the corridor. There are partial, parallel, and perpendicular facilities, such as the Morgan Creek Greenway, to NC 54 that connect to larger bicycle networks in Carrboro and Chapel Hill.

2.2 Traffic Operations

AADT volumes were highest closer to Chapel Hill, near the eastern end of the corridor. AADT volumes peak at 40,000 vehicles per day east of Columbia Street, and it decreases at it moves to the west to an AADT volume of 20,000 vehicles per day, west of Jones Ferry Road. Observed pedestrian crossing counts were highest near the eastern and middle portions of the corridor, at locations with elevated AADTs, observed speeds, and Chapel Hill Transit service (Figure 2). Traffic speeds are higher than the posted speed limit along most of the corridor, posing risk for serious injury or fatal crashes with pedestrians who frequently cross

the road. 85th percentile speeds measured were highest east of Columbia Street in the eastbound direction (Figure 3).

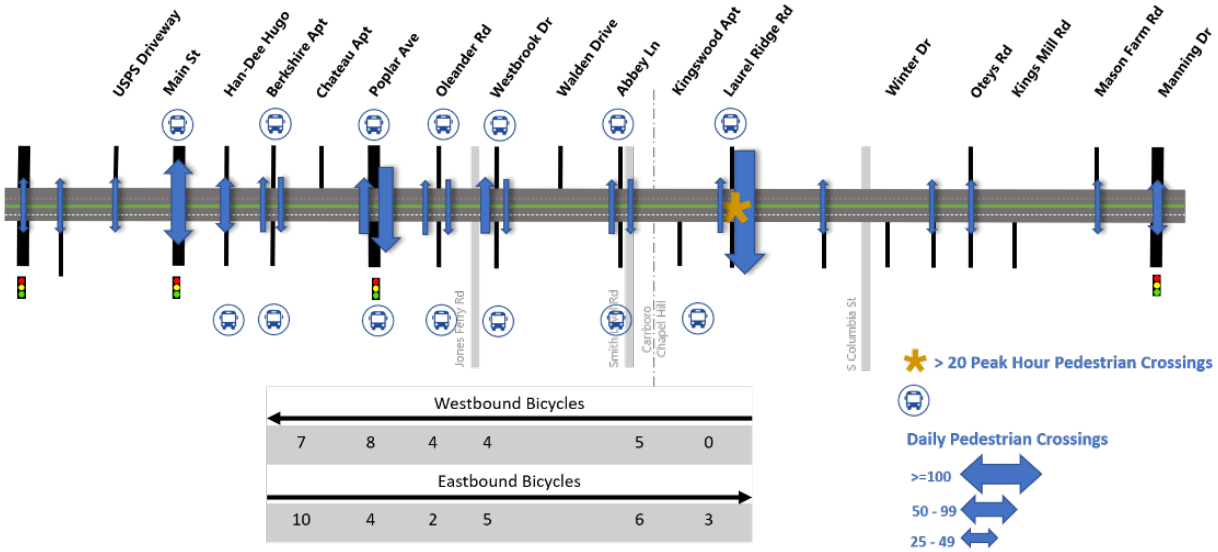


Figure 2 - Daily Pedestrian Crossings and Bicycle Volumes

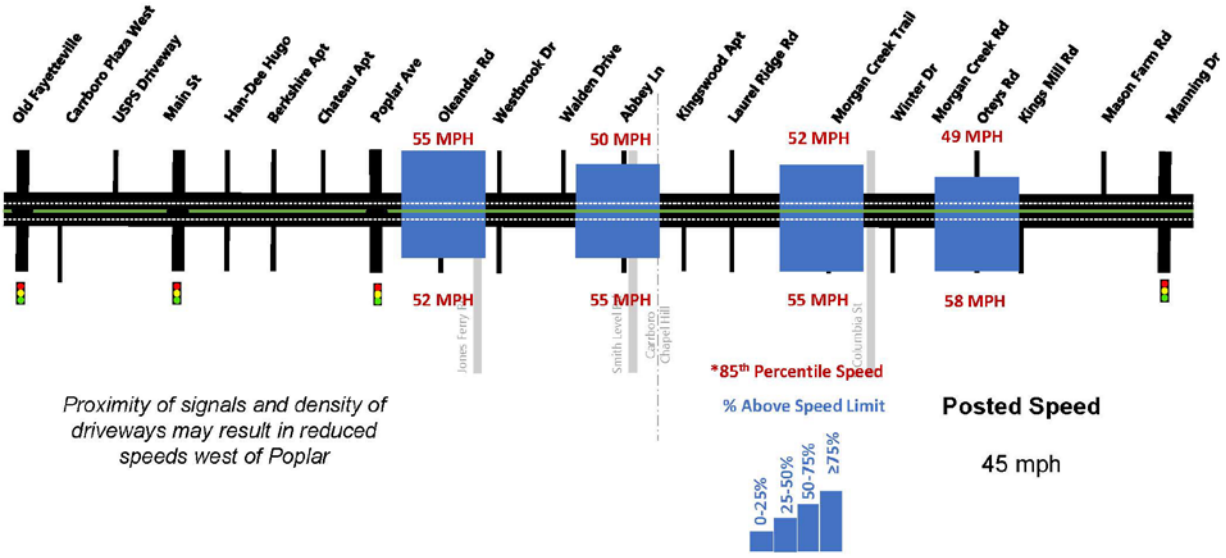


Figure 3 – Vehicle Speed – 7 Day Average

2.3 Safety and Crash Analysis

Ten-year crash data (12/01/2008 – 11/30/2018) was obtained from the NCDOT for NC 54 from SR 1107/SR 1937 (Old Fayetteville Road) to SR 1902 (Manning Drive). All reported crashes within the study limits and within 350 feet of the road centerline were reviewed. During this period, there were 18 reported bicycle and pedestrian crashes of 787 overall reported crashes (Figure 4). While none of the NC 54 crash rates exceed the statewide average for similar facilities, the conditions and locations of the bicycle and pedestrian crashes provided direction for improving safety. A majority of bicycle and pedestrian crashes occurred in the daylight, on clear days, and during off-peak hours. For pedestrian crashes, 75% occurred while the pedestrian was attempting to cross the roadway, while the remainder occurred when the pedestrian was walking along the shoulder of the road. All the cyclist crashes occurred when the cyclist was traveling straight in the travel lane. Just over half of crashes occurred in an intersection.

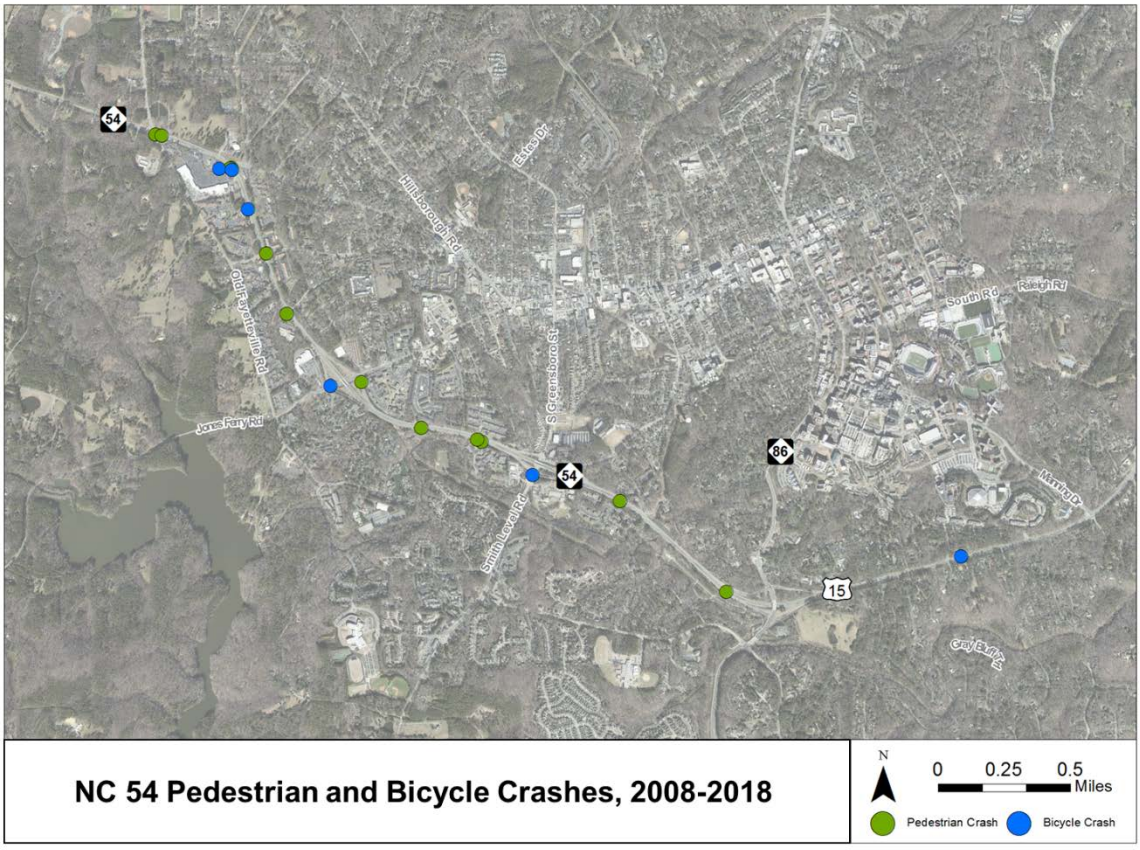


Figure 4 - NC 54 Pedestrian and Bicycle Crashes, 2008 - 2018

2.4 Relevant Plans

There are numerous studies and plans for the study area from the Towns, the Durham Chapel Hill-Carrboro MPO, and NCDOT that seek to improve safety, operations, and non-motorized connectivity along and across the corridor. These plans are detailed in the Appendix. Three of the most relevant plans include the Town of Carrboro's pending 2019 Bicycle Plan Update, Town of Chapel Hill Greenways Plan, and TIP Project U-5304A/B/E. The Town of Carrboro's bicycle plan seeks to improve bicycle crossings at major intersections like Old Fayetteville Road, Jones Ferry Road, and Smith Level Road and develop parallel shared-use paths along NC 54. The Town of Chapel Hill's Greenway Plan has recommended the extension of the Morgan Creek Greenway east from NC 86/US 15 501 along NC 54 to Oteys Road and beyond. Finally, the TIP projects of U-5304A/B/E seek to improve the interchanges and intersections of Manning Drive and NC-86/US 15 501 and widen NC-54 from NC-86 to Raleigh Road; the ultimate cross section and design is to be determined.

2.5 Field Visit

On January 30, 2019, the Study Team met at the Chapel Hill Public Library for a project kick-off meeting and to prepare for a multi-hour field visit of the corridor. The Study Team noted several positive and negative features of the corridor from the perspective of improving multimodal safety. Negative issues that could affect safety outnumbered the corridor's positive features. The Study Team noted the lack of adequate lighting, and that existing lighting was positioned to light the roadway and not pedestrian crossing locations. Vehicle speeds were reported above the posted limit during off-peak periods, and the roadway's topographical changes made visibility poor near locations like West Main Street and Oteys Road. The Study Team also noted the lack of overall connected pedestrian and bicycle facilities both along and for crossing the roadway, despite the presence and observation of pedestrians crossing NC 54. Observations from the field visit supported the development of the conceptual improvements, and they are detailed in the Appendix.

3

Development of Conceptual Improvements

This section summarizes the Study Team's process for the identification of priority locations and the corresponding development of conceptual safety improvements.

3.1 Approach to Identifying Sites

The Study Team employed a multi-pronged approach to identifying locations along the corridor for improvements. These included identification of bicycle and pedestrian hot spots, systemic analysis (application of risk factors to the network), and a systems approach that incorporated planned network improvements. The results of these analyses led the Study Team to focus on several signalized and unsignalized locations for evaluation of improvements such as new traffic controls, addition of pedestrian signal phases, and other countermeasures designed to improve pedestrian visibility.

A detailed review of existing pedestrian and bicycle networks and planned improvements revealed gaps in the non-motorized network and opportunities to address both mobility and safety. These improvements included parallel networks, internal connections between private sites (i.e. multifamily developments) facilities like sidewalks and transit, and crossing locations that supported access to transit and greenways, among other paths of travel across the corridor. The results from the analysis of network connectivity—existing, planned, and potential—is illustrated in Figure 5 below. Several important non-motorized connections are proposed by local agencies but are scheduled for beyond the 10-year implementation timeframe for this study. These locations include the next phase of the Morgan Creek Greenway system across Smith Level Road and approaching NC 54 at Oteys Road.

Figure 5 - Network Connectivity

3.2 Alternatives Testing

After the identification of priority locations, the Study Team developed and tested a range of pedestrian and bicycle safety improvements to determine impacts on vehicular operations. Improvements, including new traffic signals and added pedestrian phases to existing signals, were tested against "No Build" scenarios (i.e. no changes to the operations of the location) using both present day roadway volumes and estimated 10-year future year traffic volumes. Each improvement was evaluated for its effect on intersection LOS, vehicle delay, and vehicle queues. Results varied depending on the tested improvement; while some crash countermeasures produced varying levels of delay and extended vehicle queues, like the introduction of a new signal, others did not have significant effects, like the addition of lighting and pedestrian signal heads. These results are detailed in the Appendix.

3.3 Review of Draft Concepts

The draft conceptual improvements were reviewed with both the Study Team and during a public workshop. Modifications and additional information were incorporated into the conceptual illustrations when deemed to improve non-motorized and vehicular safety, support mobility, and be implementable within the study's scope. Comments from the public and institutional and governmental stakeholders are included in the Appendix. The final recommendations are described in Section 4 below.

4

Recommended Improvements and Future Study

This section describes the recommended safety improvements at locations across the corridor, identifies issues and projects for continued study, and explores pathways for project implementation.

4.1 Recommended Improvements

After review of the anticipated safety benefits and interaction and impacts on other modes, the following improvements were identified for nine locations. The locations were selected based on crash history and risk for severe injury pedestrian crashes. These improvements were recommended for several reasons such as improved pedestrian and bicycle mobility to established crossing locations, reduced risk for severe crashes, and/or feasibility for implementation within a 10-year window. Other improvements under consideration beyond the near-term implementation program are noted in Section 4.2 for future study. The images accompanying each site's recommendations are not to scale and are for conceptual planning purposes only.

4.1.1 Manning Drive

Recommendations:

- Install pedestrian signal heads on the south leg of the intersection.

Figure 6 - Manning Drive

4.1.2 Kingswood/Laurel Ridge

Recommendations:

- Modify the intersection from full access to signalized left-in, right-out intersection
- Add high visibility crosswalks at realigned crossing
- Relocate bus stops to support near-side crossings and modified intersection
- Increase overhead lighting near crossings at intersection

Figure 7 - Kingswood/Laurel Ridge

4.1.3 Smith Level Road

Recommendations:

- Add high visibility crosswalk markings and pedestrian signal phases across all legs of NC 54 eastbound ramps
- Install pedestrian signal heads on the four corners of the Smith Level Road and NC 54 eastbound ramps

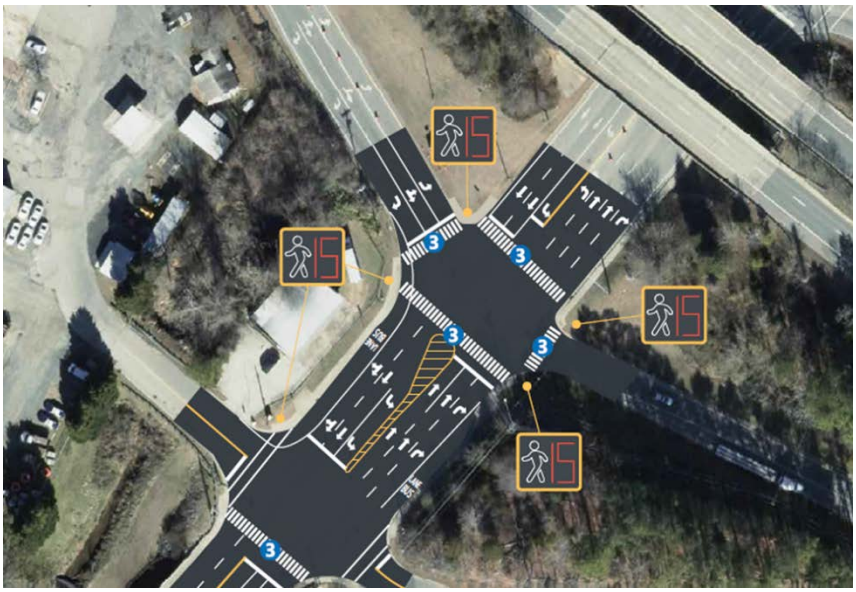


Figure 8 - Smith Level Road

4.1.4 Abbey Lane

Recommendations:

- Modify the intersection from unsignalized left-in, right-out intersection to a two-phase traffic signal
- Add high visibility crosswalks at realigned crossing
- Relocate bus stops to support near side crossings and modified intersection
- Extend sidewalks to relocated bus stops
- Increase overhead lighting near crossings at intersection

Figure 9 - Abbey Lane

4.1.5 Westbrook Drive

Recommendations:

- Modify the intersection from unsignalized left-in, right-out intersection to signalized condition;
- Add high visibility crosswalks at realigned crossing;
- Relocate bus stops to support near side crossings and modified intersection;
- Extend sidewalks to relocated bus stops;
- Increase overhead lighting near crossings at intersection.

Figure 10 - Westbrook Drive

4.1.6 Jones Ferry Road WB Ramps

Recommendations:

- Add high visibility crosswalk markings, pedestrian phases, and pedestrian signal heads across all legs of the NC 54 westbound ramps;
- Add pedestrian refuge island across Jones Ferry Road;
- Reduce vegetation on northwest corner of NC 54 WB onramp to improve visibility of crossing pedestrians.

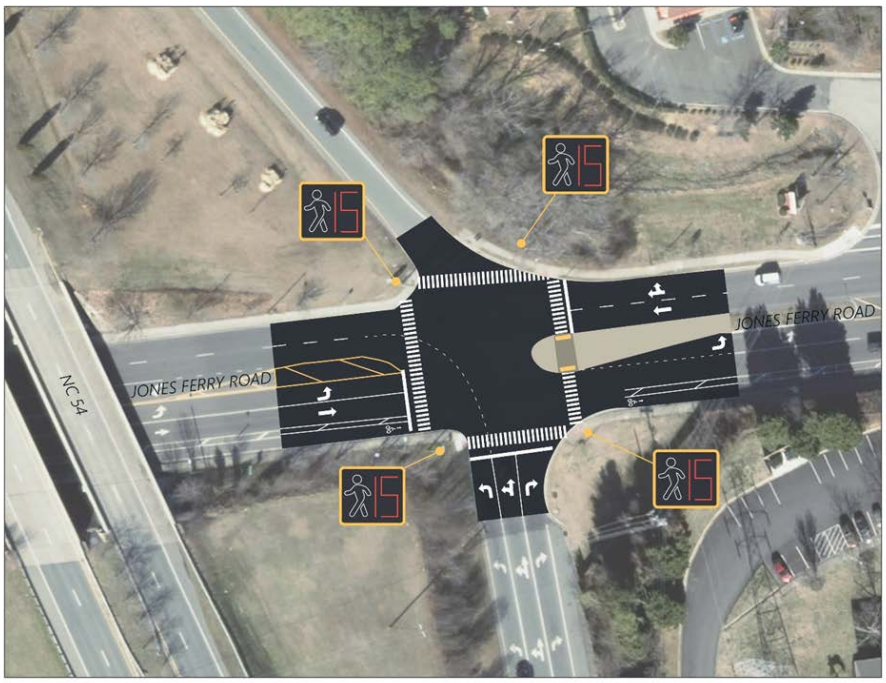


Figure 11 - Jones Ferry Road WB Ramps

4.1.7 W Poplar Ave

Recommendations:

- Add high visibility crosswalk markings across all legs;
- Add pedestrian signal heads on the southeast and southwest corners;
- Extend sidewalk on southeast corner of W Poplar Ave to existing bus stop;

Figure 12 - W Poplar Ave

4.1.8 W Main St

Recommendations:

- Transition existing crosswalk markings to high visibility continental crosswalk markings.

Figure 13 – W Main Street

4.1.9 Old Fayetteville Road

Recommendations:

- Implement Leading Pedestrian Interval (LPI) to improve vehicle yielding at crosswalk.

Figure 14 - Old Fayetteville Road

4.2 Locations and Potential Improvements for Future Consideration

4.2.1 Oteys Road

The Study Team evaluated Oteys Road and determined that it may be a good candidate for an at-grade or grade separated crossing location for further study in the future. Currently, Oteys Road lacks formal pedestrian facilities or bus service on either approach to NC 54; and these are key factors in establishing a marked crossing for NC54. While that location is included in long range connectivity and greenway plans, the Town of Chapel Hill does not have near-term (within the next 10 years, for the purposes of this study) plans to build a formal pedestrian network at Oteys Road. At such time a pedestrian or greenway network is established at Oteys Road, then NCDOT and the Town may re-evaluate opportunities for a crossing.

4.2.2 NC 86/US 15/501 Interchange Bicycle Connectivity

During the public engagement phases, comments supported exploring ways to improve North/South bicycle connectivity across the US 15/501 interchange and connect to the Morgan Creek Greenway system. Bicycling across the overpass was perceived as uncomfortable, and getting to/from the existing bicycle lanes on the overpass to/from the greenway was seen as a barrier. The Study Team looked at potential improvements to address those concerns. One such option includes a lane reduction/consolidation on the overpass that would support the conversion of the existing bicycle lanes to a two-way separated bicycle lane and a bicycle-oriented transition from NC-86 to the Morgan Creek Greenway on the southern side of the overpass. This and other potential bicycle network improvements should be considered within the upcoming TIP U-5304A, US 15-501/NC 54 interchange project.

4.2.3 Smith Level Road Bicycle Connectivity

Participants also noted challenges to North/South bicycle connectivity along Smith Level Road under NC 54 during the public engagement phases. This study recommends that the Town of Carrboro and NCDOT evaluate the potential for a lane reduction/consolidation of Smith Level Road from just south of the Eastbound ramps through the underpass. Such a lane reconfiguration could support the extension of the existing bicycle network through the intersection, providing an essential link between the network within Carrboro's urban center, the Morgan Creek Greenway, housing, and schools.

4.2.4 W Main Street Shared-Use Path Crossing

The Town of Carrboro is in the final stages of completing an update to its comprehensive bicycle master plan. As of Fall 2019, the draft recommendations included a shared-use path along the north side of NC 54 from Smith Level Road to W Main Street. It is recommended that the Town of Carrboro and NCDOT consider and evaluate options for bicycle connectivity across this signalized intersection. Considerations should include whether bicyclists will be

required/expected to dismount and cross as pedestrians, or if bicyclists will have separate crossing area (e.g. green painted with dotted lines parallel to the marked crosswalk).

4.2.5 Old Fayetteville Road Shared-Use Path Crossing

The same recommendation for the consideration of bicycle crossing treatments applies to the anticipated shared-use path at Old Fayetteville as noted for W Main Street above in 4.2.4.

4.3 Implementation

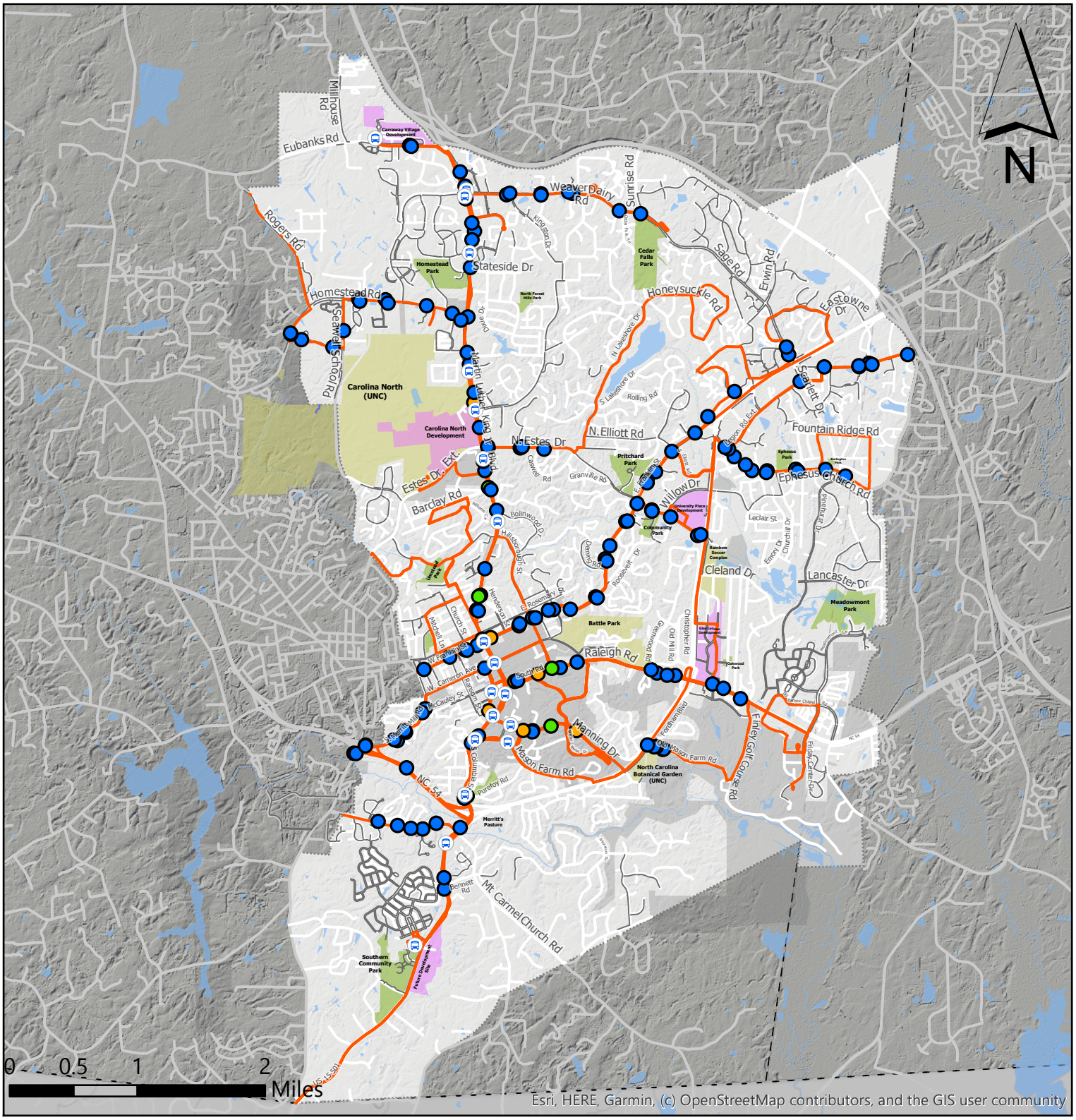
NCDOT will evaluate each of the site-specific improvements for eligibility through the Highway Safety Improvement Program (HSIP) and other implementation opportunities such as Division 7 operations and maintenance programs. Recommendations such as those shown at currently uncontrolled intersections (i.e.,Westbrook Drive, Kingswood/Laurel Ridge) may be considered as individual projects. The NCDOT SPOT/TIP process may also be considered for improvements that do not meet criteria for safety programs.

4.3.1 Coordinating and Updating Local Plans

It is recommended that the institutional and governmental entities impacted by this study's findings incorporate the recommended projects in their respective transportation plans. For example, the study's recommendations of formal signalized crossings at Abbey Lane and Westbrook Drive would likely support improved connections and greater utilization of the expanding Morgan Creek Greenway system. Municipalities could also incorporate the study's recommendations into a reprioritization of projects based on local interests. Including this study's recommendations in existing bicycle, pedestrian, transit, multimodal, or greenway plans could take the form of an update or amendment. This plan coordination would also support future project development and implementation between the local units of government and institutions with NCDOT.

Appendix

APPENDIX F:
Chapel Hill Transit Stop Improvements



Chapel Hill Transit Bus Stop Enhancement

TOWN OF CHAPEL HILL

Mobility Plan 2020 Complete Streets Update

Bus Stop Enhancements

- 4'x6' Landing Pad
- 6'x10' Shelter Pad
- 8'x12' Shelter Pad
- NS BRT Stations
- Transit Routes
- Chapel Hill Jurisdictional Limits