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

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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

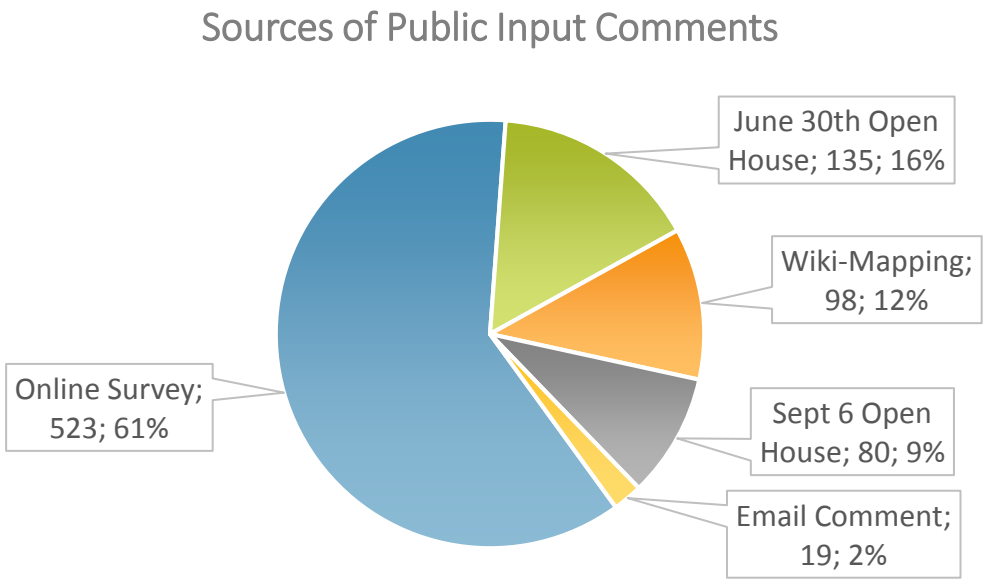
WikiMap

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.

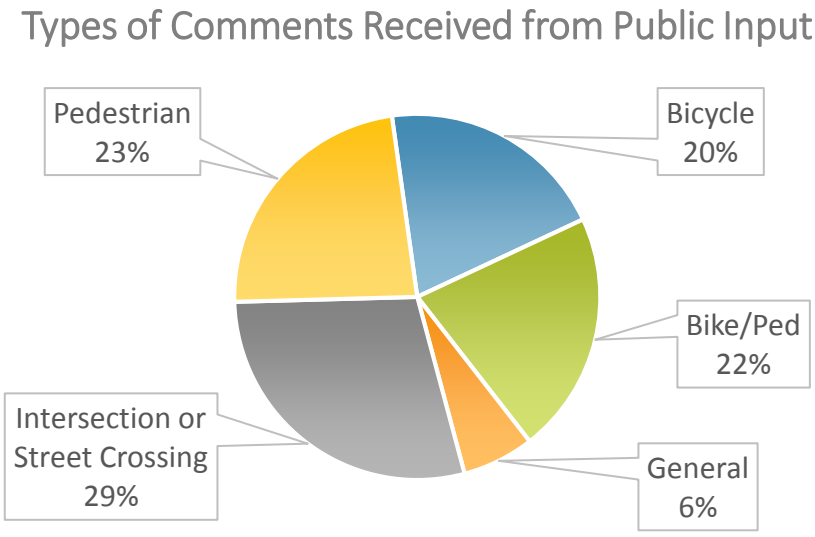
PART 2: Public Comment Summary

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.

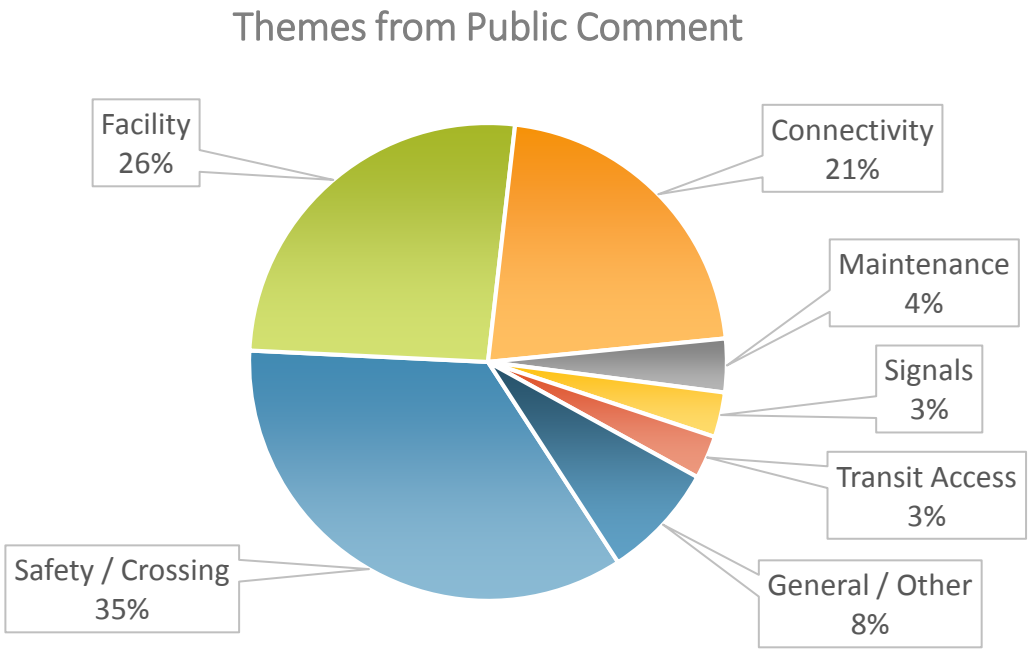


Appendix A: Public Involvement Detail Summary

Major Themes of Public Comments

From the comments, several major themes emerged:

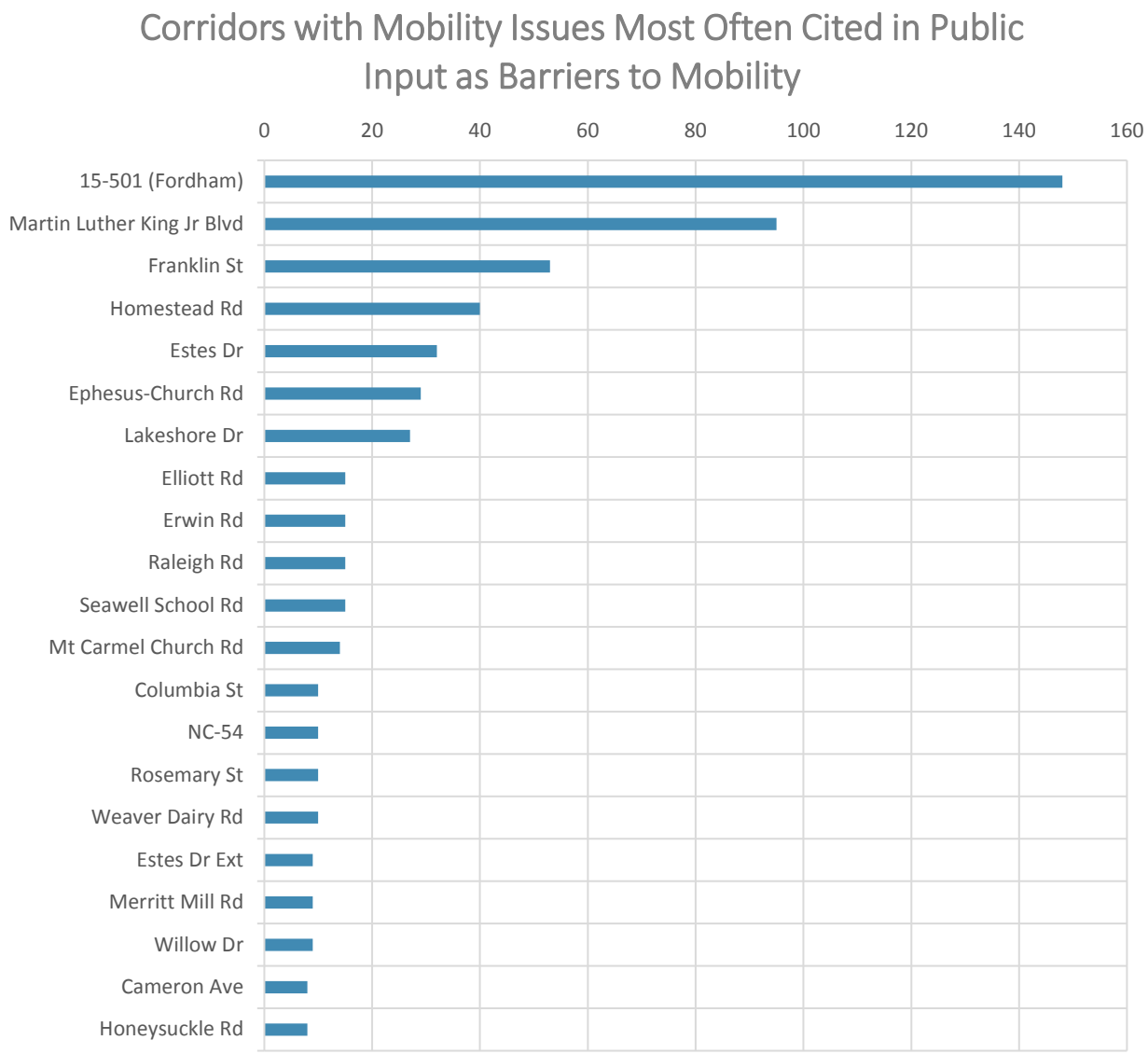
- **Safety, especially at intersections** – Over one third of the comments were related to safe crossing of busy streets. The majority of these comments were recommendations for crosswalks and safety improvements related to crossing busy intersections both on bicycle and on foot. Of these, 20 comments 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.

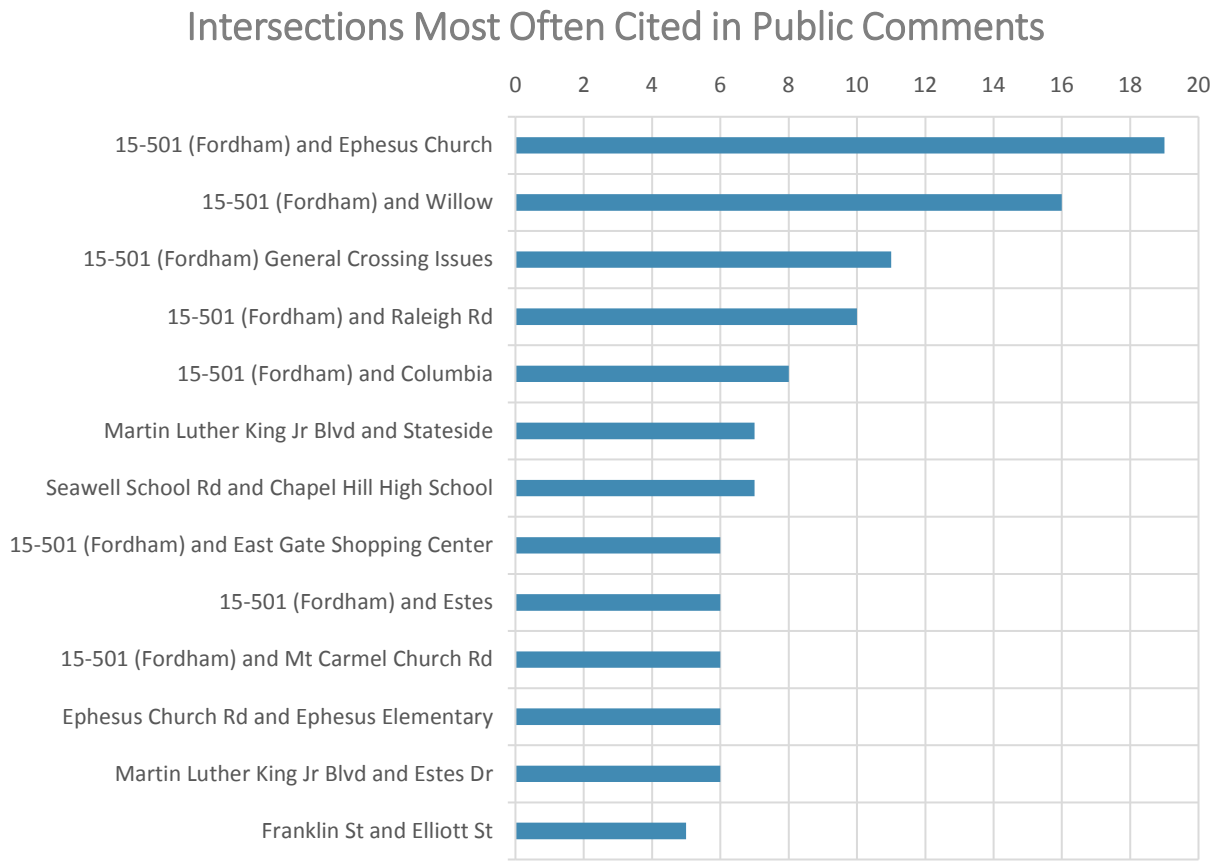


The portion of US 15-501, also called Fordham Blvd, which received more than 150 comments. Martin Luther King Jr Blvd was cited in comments nearly 100 times. Franklin Street received over 50 comments with the vast majority of these being on the eastern portion of the corridor. Homestead Rd, Estes Dr,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

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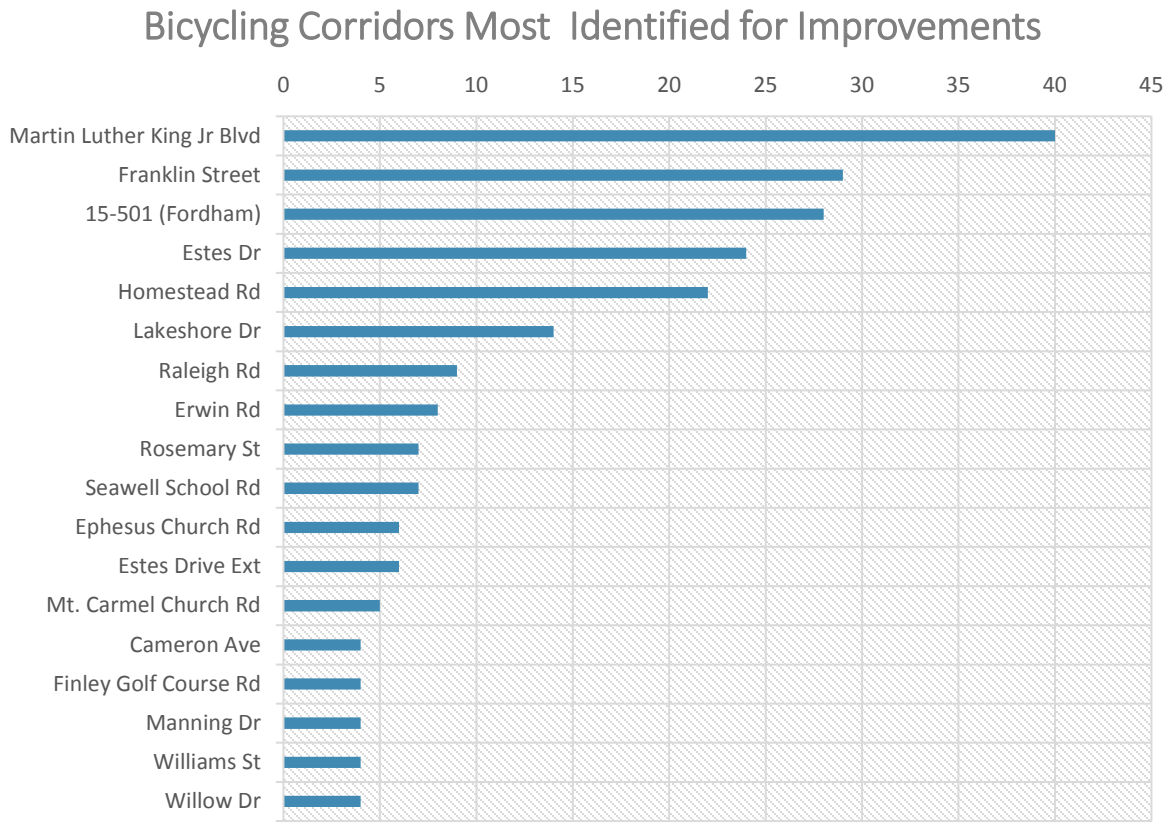
Bicycling Mobility

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:

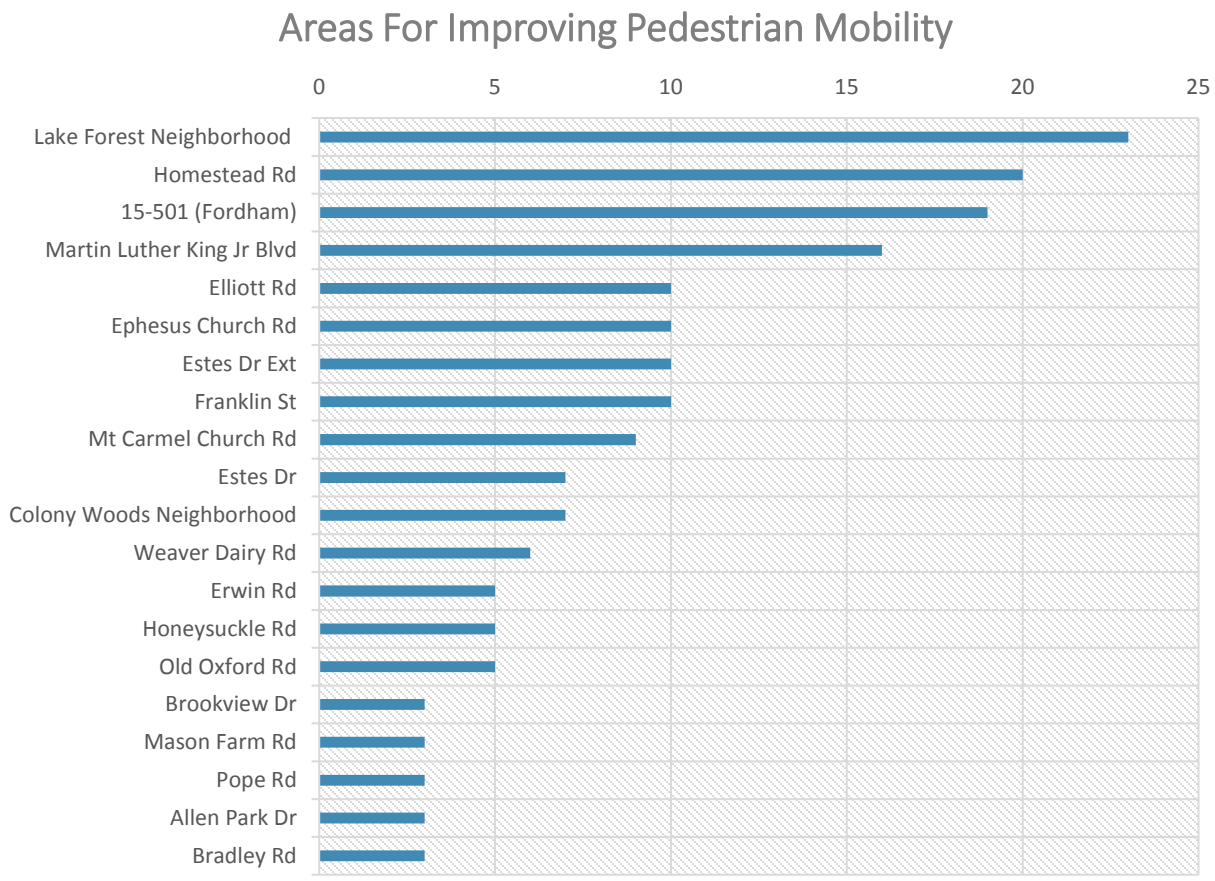


- People identified that not only are shared lane markings not sufficient for bicycle travel on Martin Luther King Jr Blvd, but that a dedicated bicycle facility is preferred here. Reducing travel lanes and slowing traffic were noted by many commenting on the current conditions in addition to the demand 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

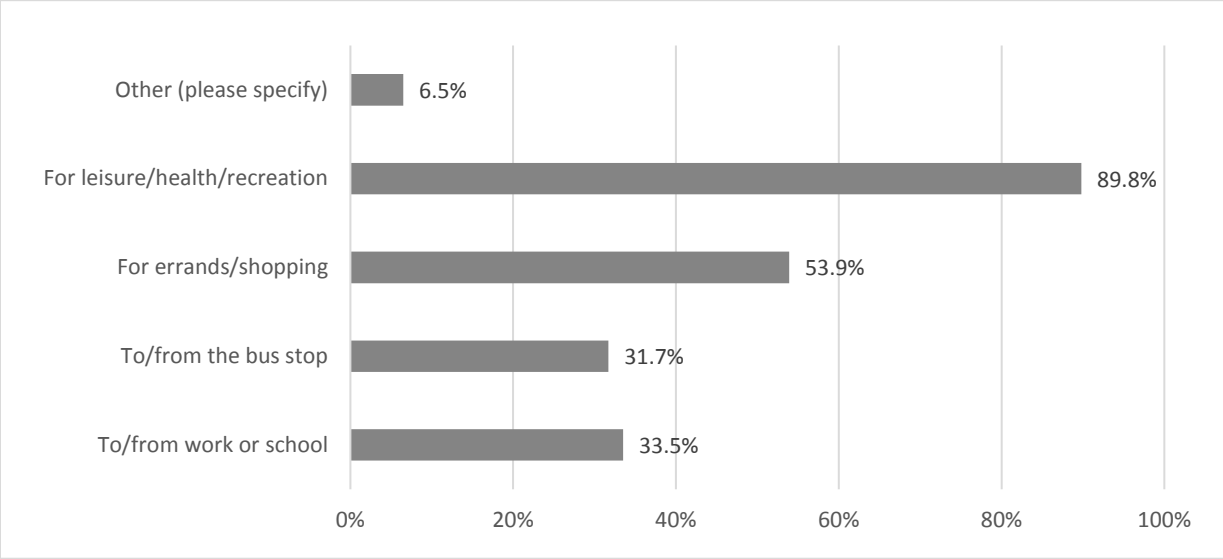
The following solutions are favored among respondents to increase overall mobility, walkability, connectivity, and safety include the following.

- 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

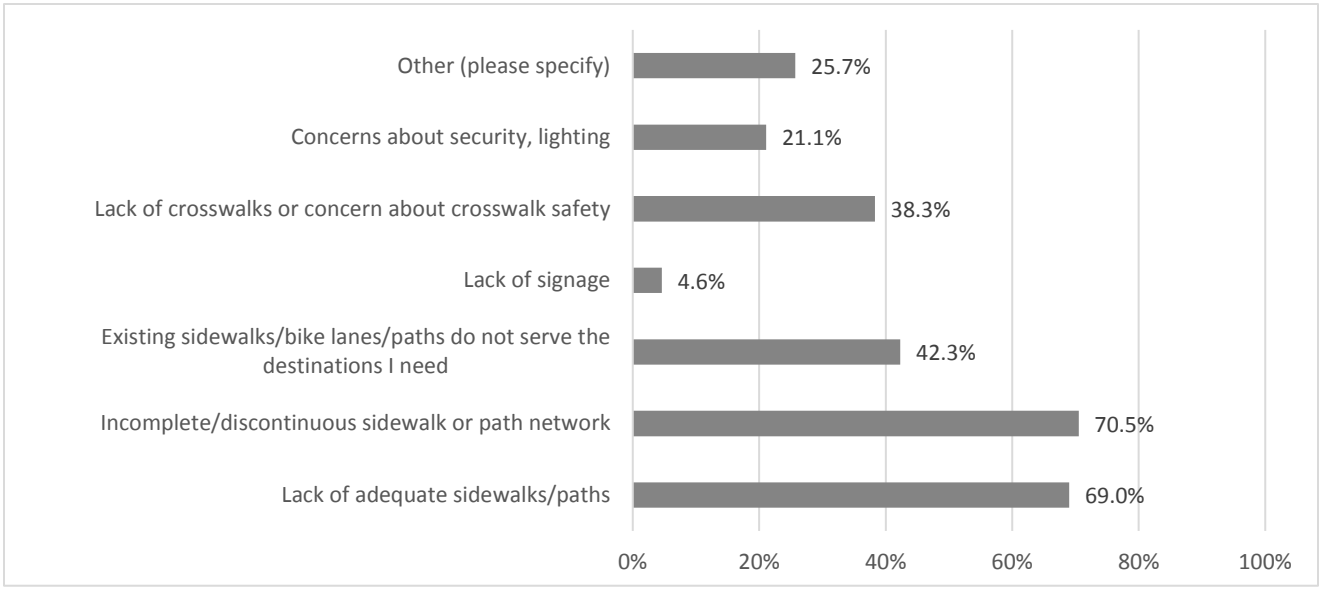
Appendix A: Public Involvement Detail Summary

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.

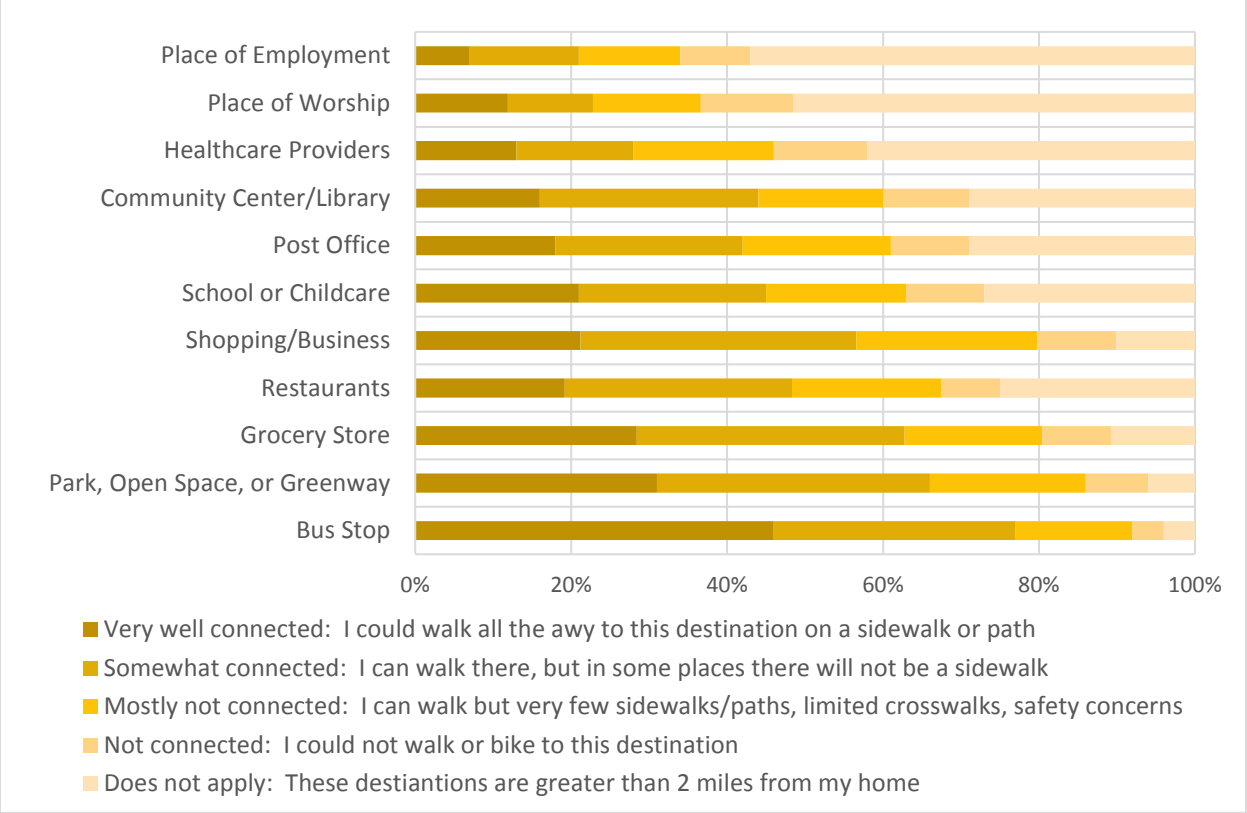


Question 3: How accessible/walkable are the following types of destinations in your neighborhood (can you walk or bike to them)?

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."

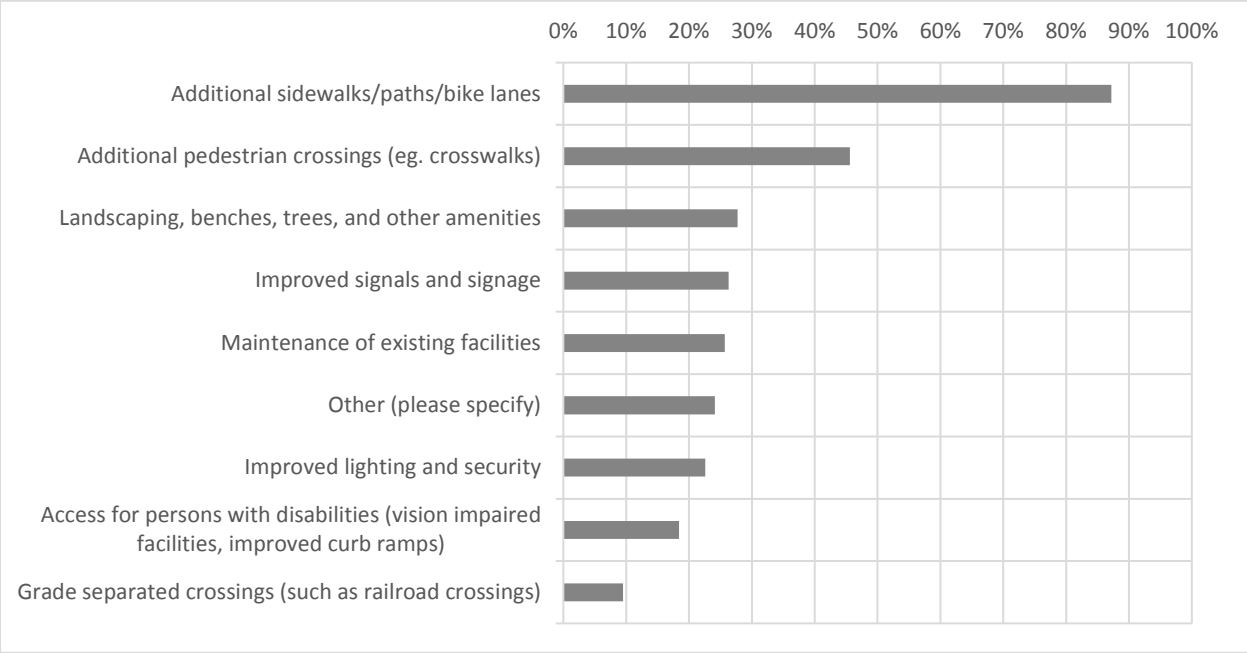
Responses indicate an issue with sidewalk connectivity, particularly connections to the following destinations, with over 60 percent of respondents categorizing these locations as somewhat connected, mostly not connected, or not connected.

- 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:

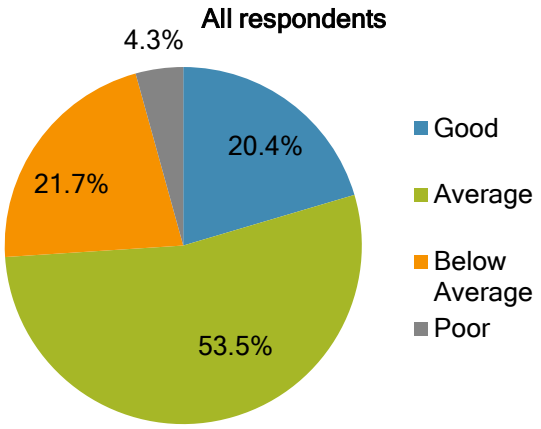
- Lack of sidewalk connectivity on Homestead Rd, such as between Seawell School Road and Martin Luther King Boulevard
- Lack of sidewalks/bike paths along Martin Luther King Boulevard
- Dangerous crossings along Fordham Boulevard, such as at Ephesus Church Road, Willow Drive, Estes Drive, and Sage Road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

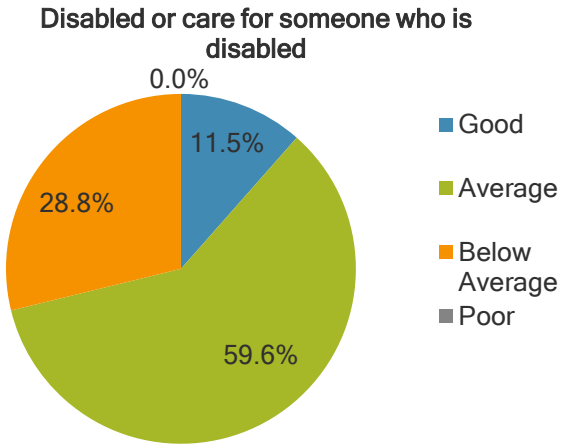
Accessibility Questions

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.

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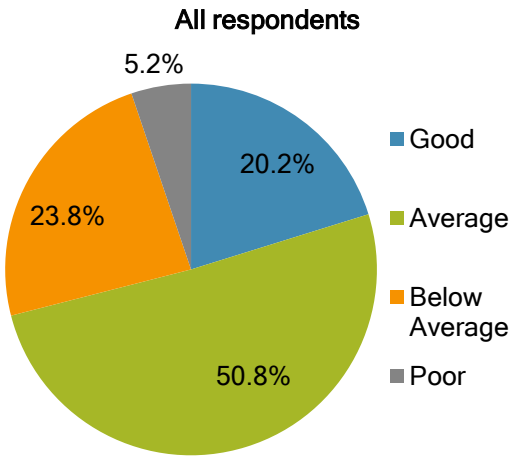
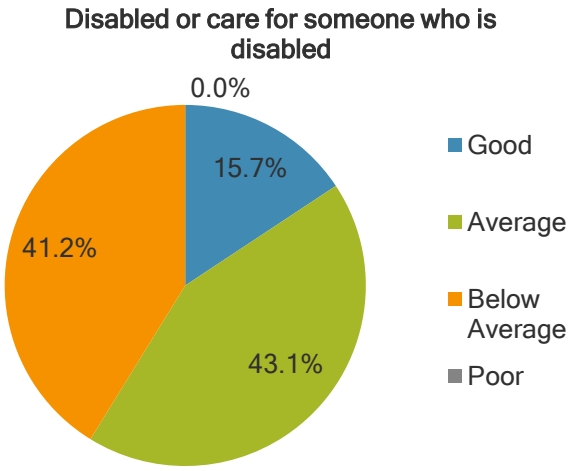




Question 13: Please list any specific curb, sidewalk, or crossing locations where you have accessibility concerns.

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)

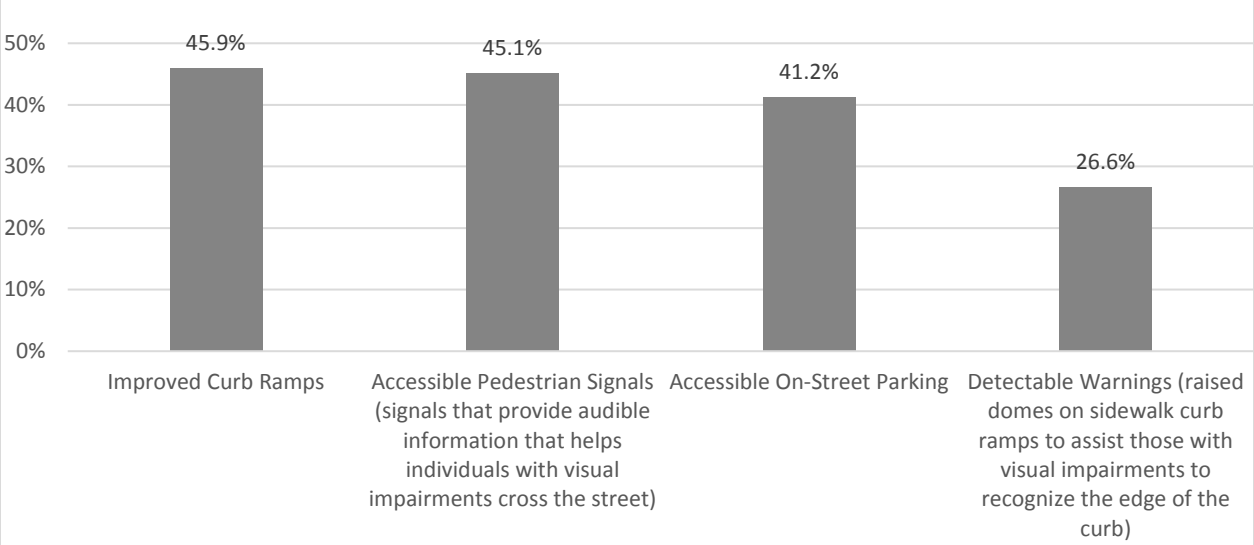
Priority Percentage of Respondents ranking priority as 1 or 2

- 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

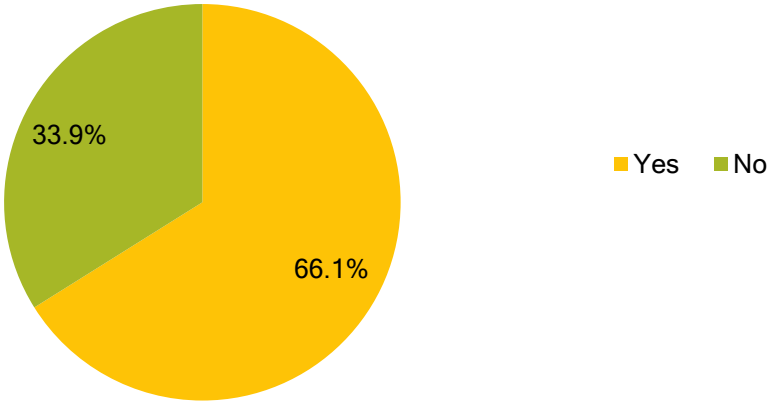
Appendix A: Public Involvement Detail Summary

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

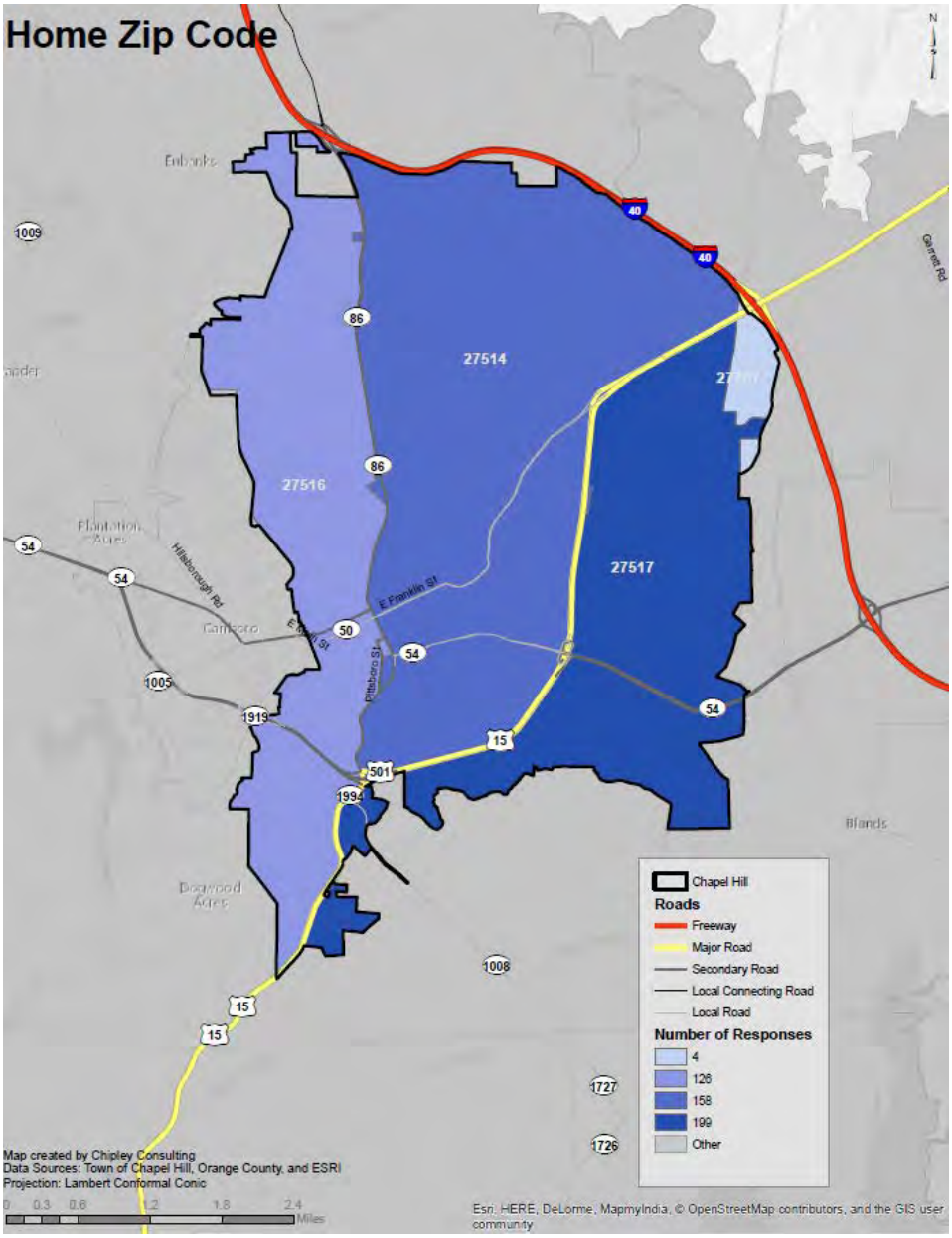
Would you use transit to go to this area if you could safely walk/ride within the district?



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?

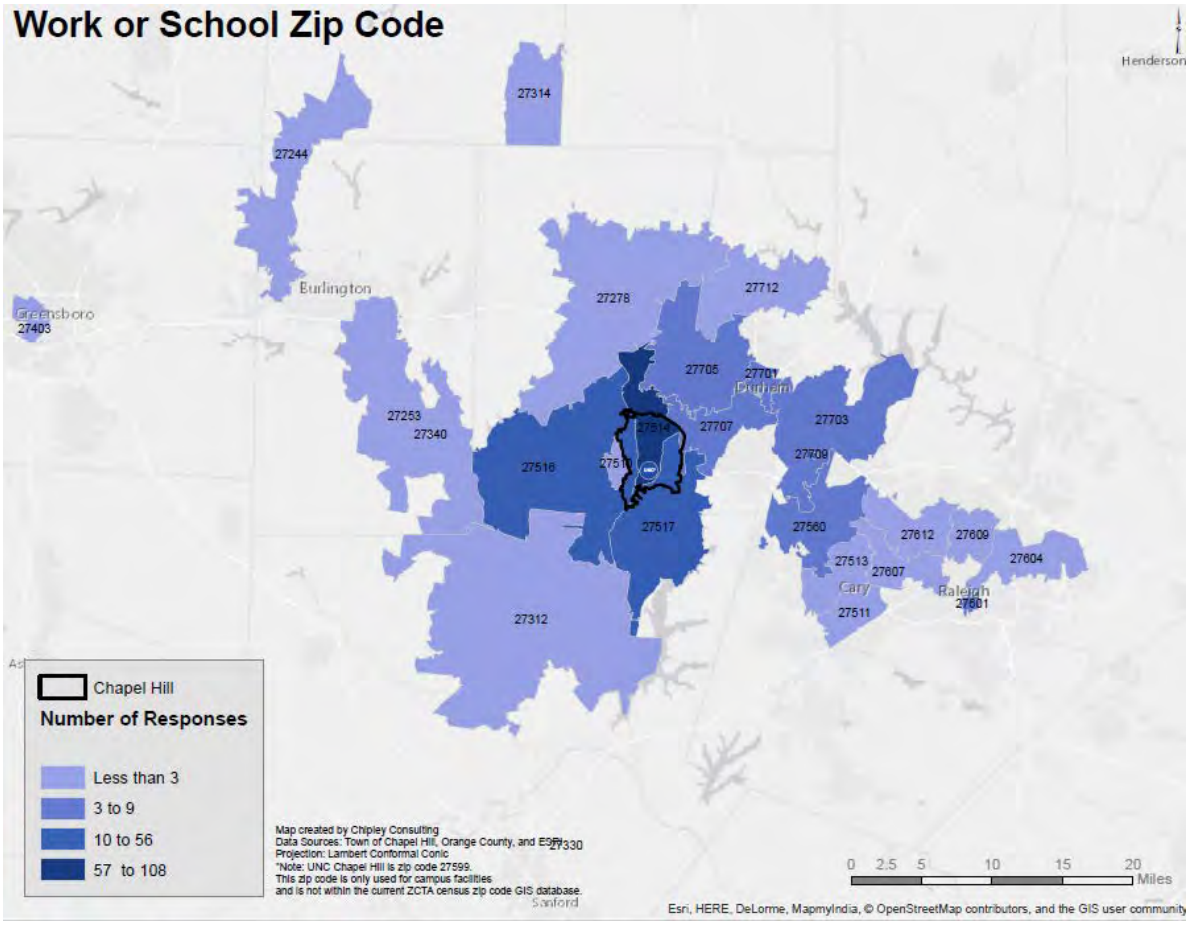


Most respondents live in one of the following zip codes, with a well-balanced proportion of responses from each area.

- 27514
- 27517
- 27518

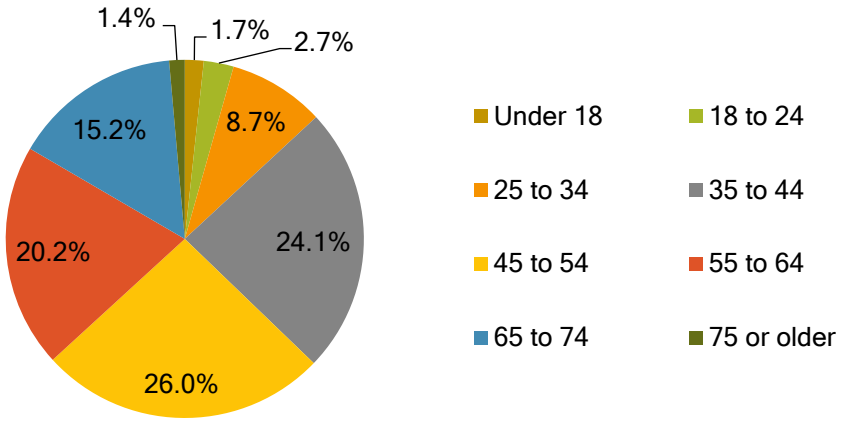
Appendix A: Public Involvement Detail Summary

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



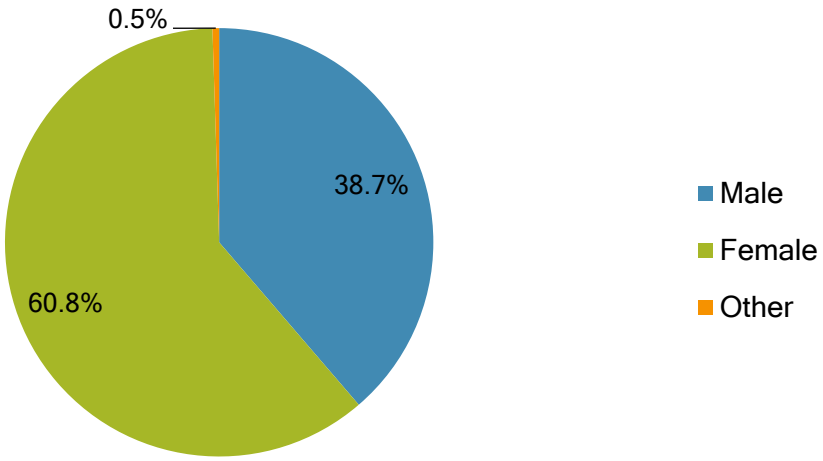
Many Chapel Hill respondents to the survey are commuting outside of the city for school or work. This is consistent with journey to work flows for the Triangle region which shows the majority of commutes to Durham and Wake County.

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.

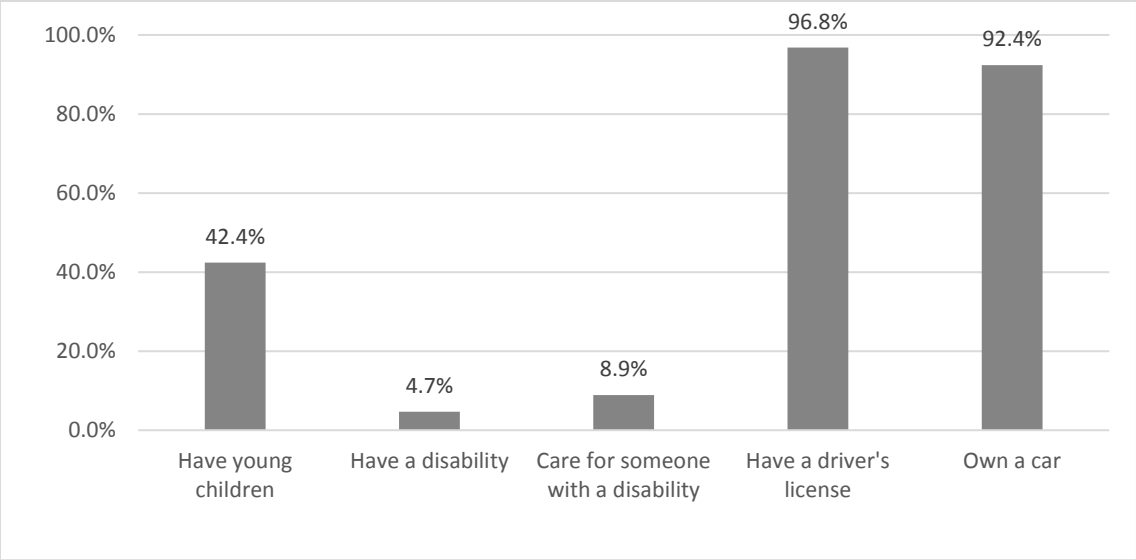
Question 19: What is your gender?



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.

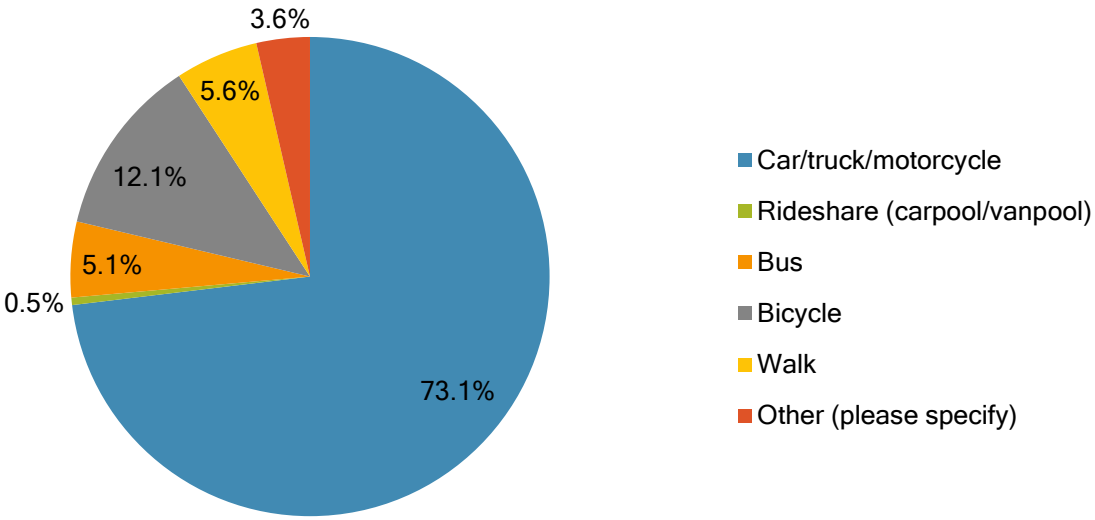
Appendix A: Public Involvement Detail Summary

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.

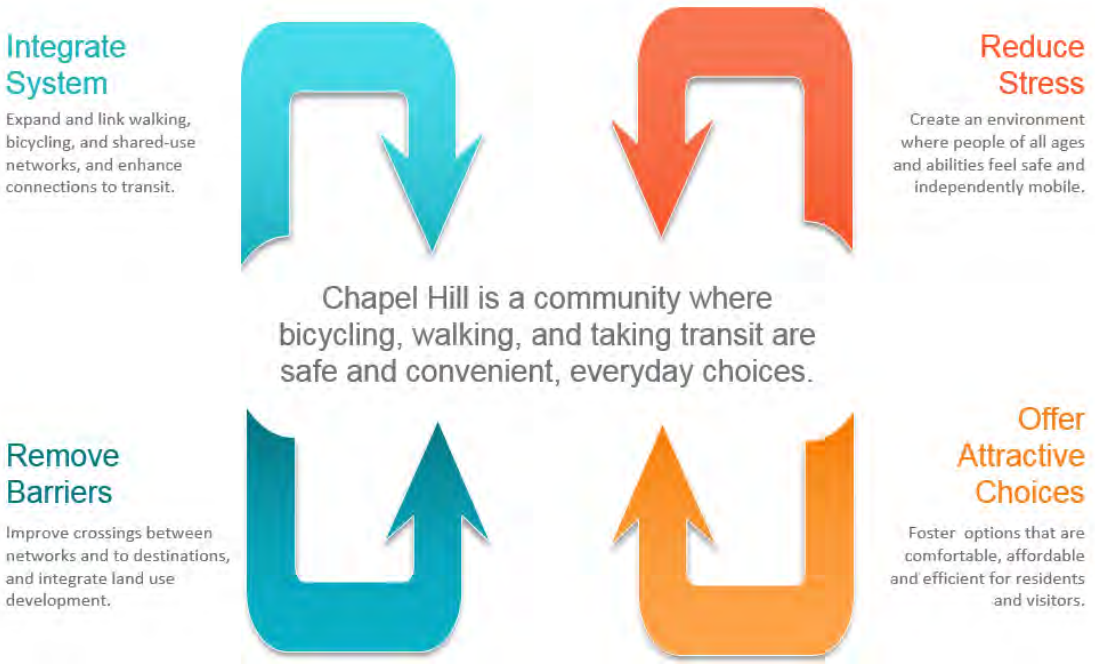
PART 4: September 9 Open House Summary

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.

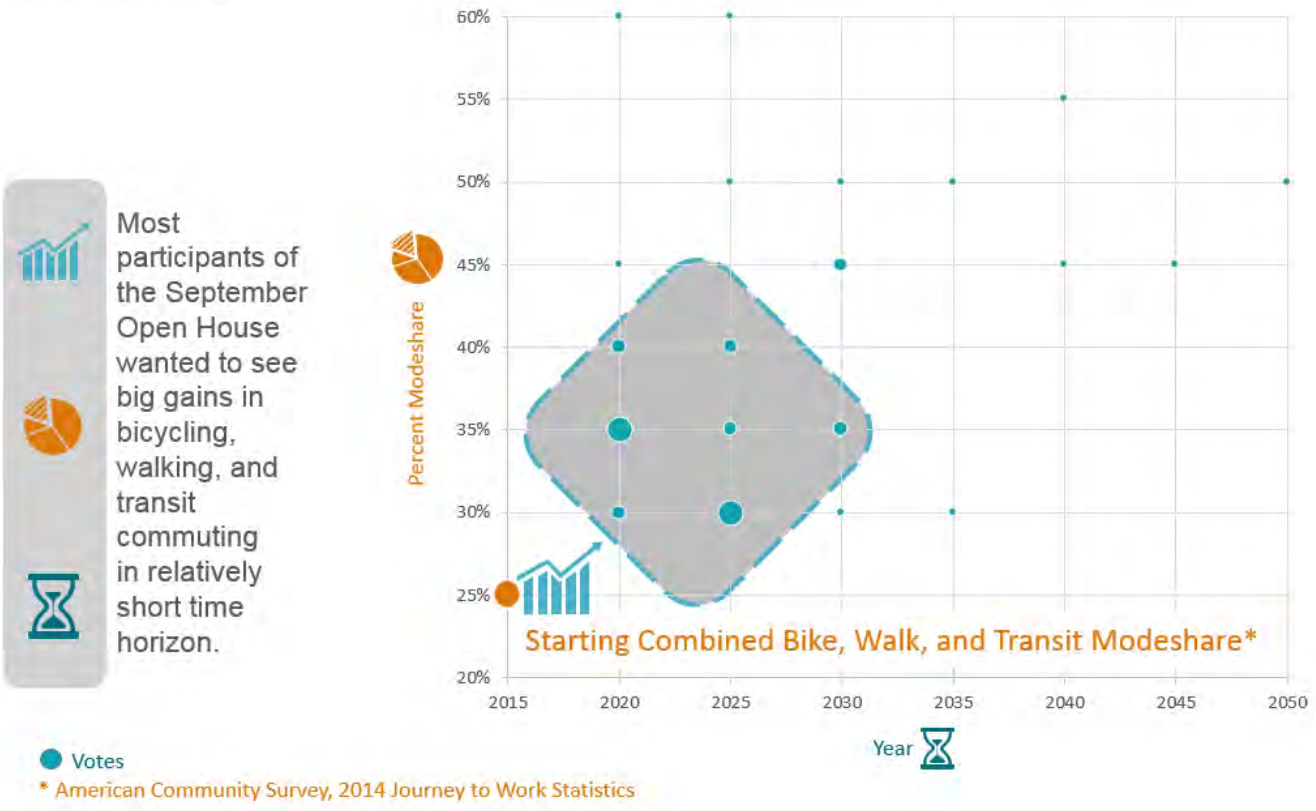
Stations at the Interactive Drop-In Session at Chapel Hill Public Library

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

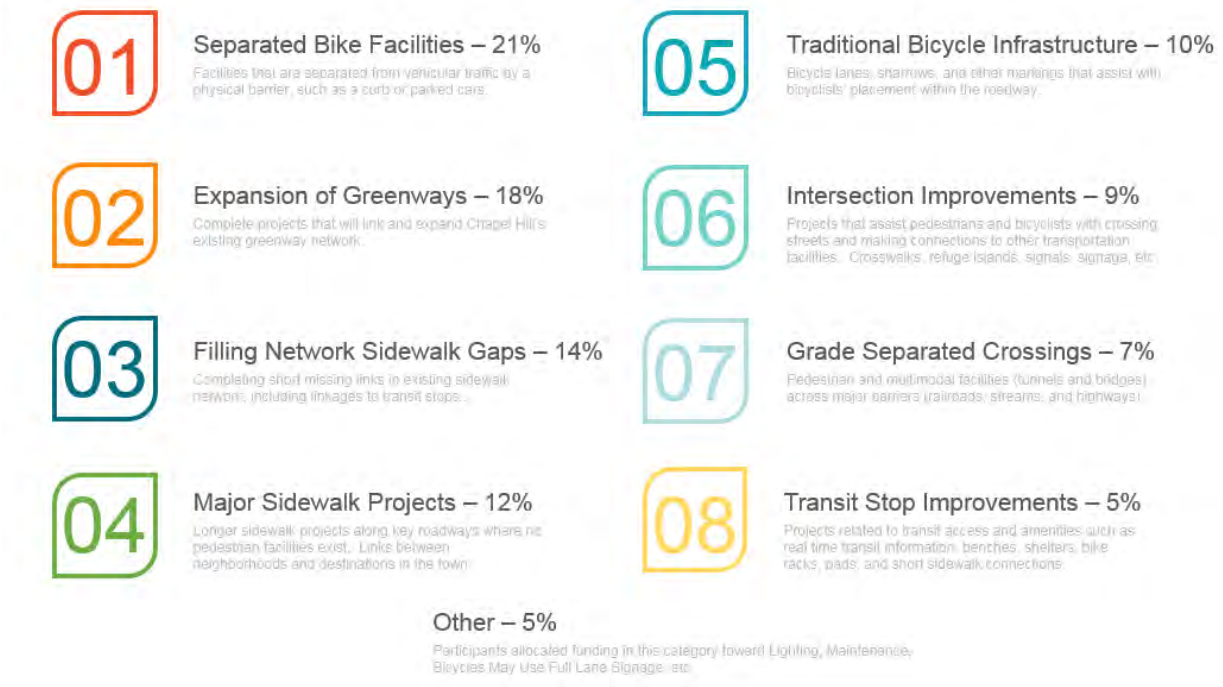


Goals Set for Future Mode Shift to Bicycling, Walking and Taking Transit

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

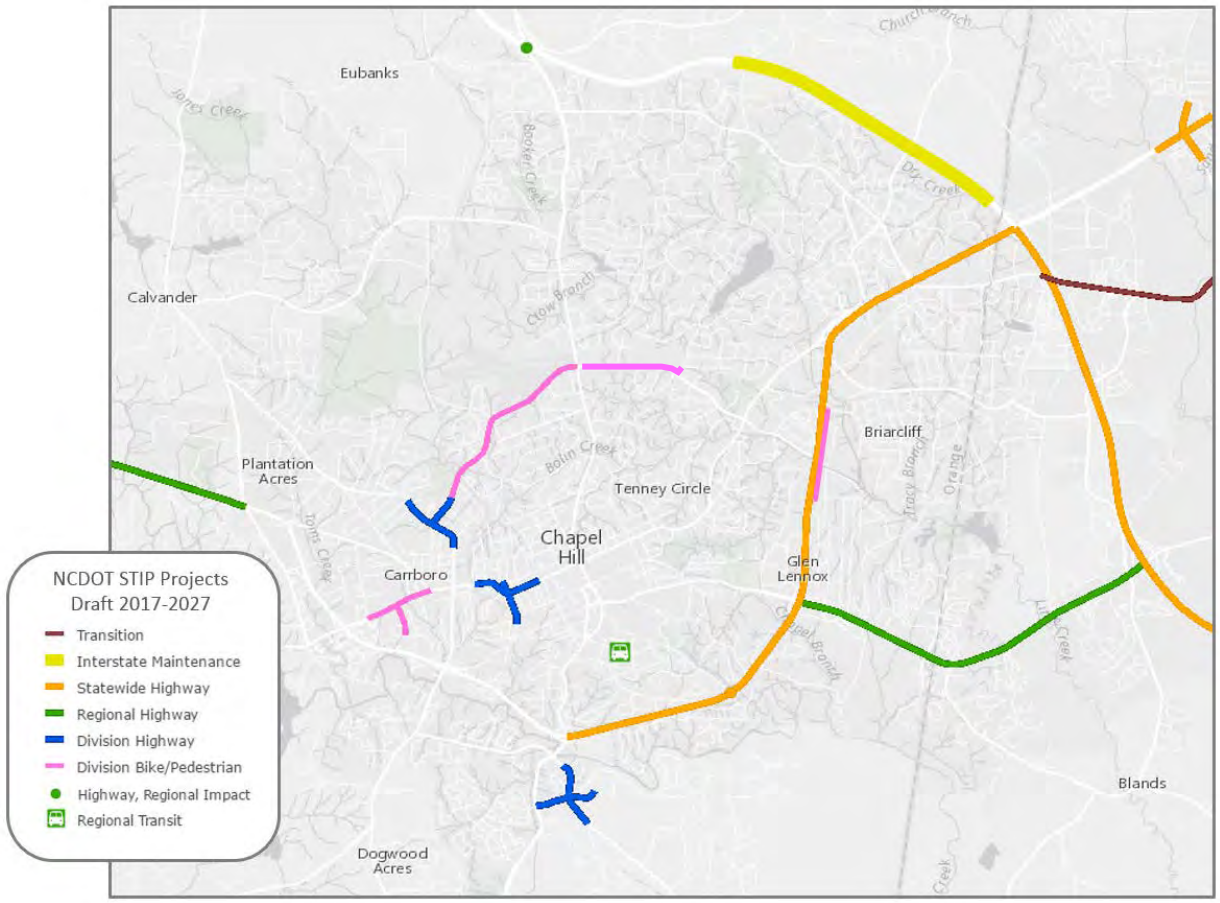
Appendix B – Planned Improvement Projects

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:

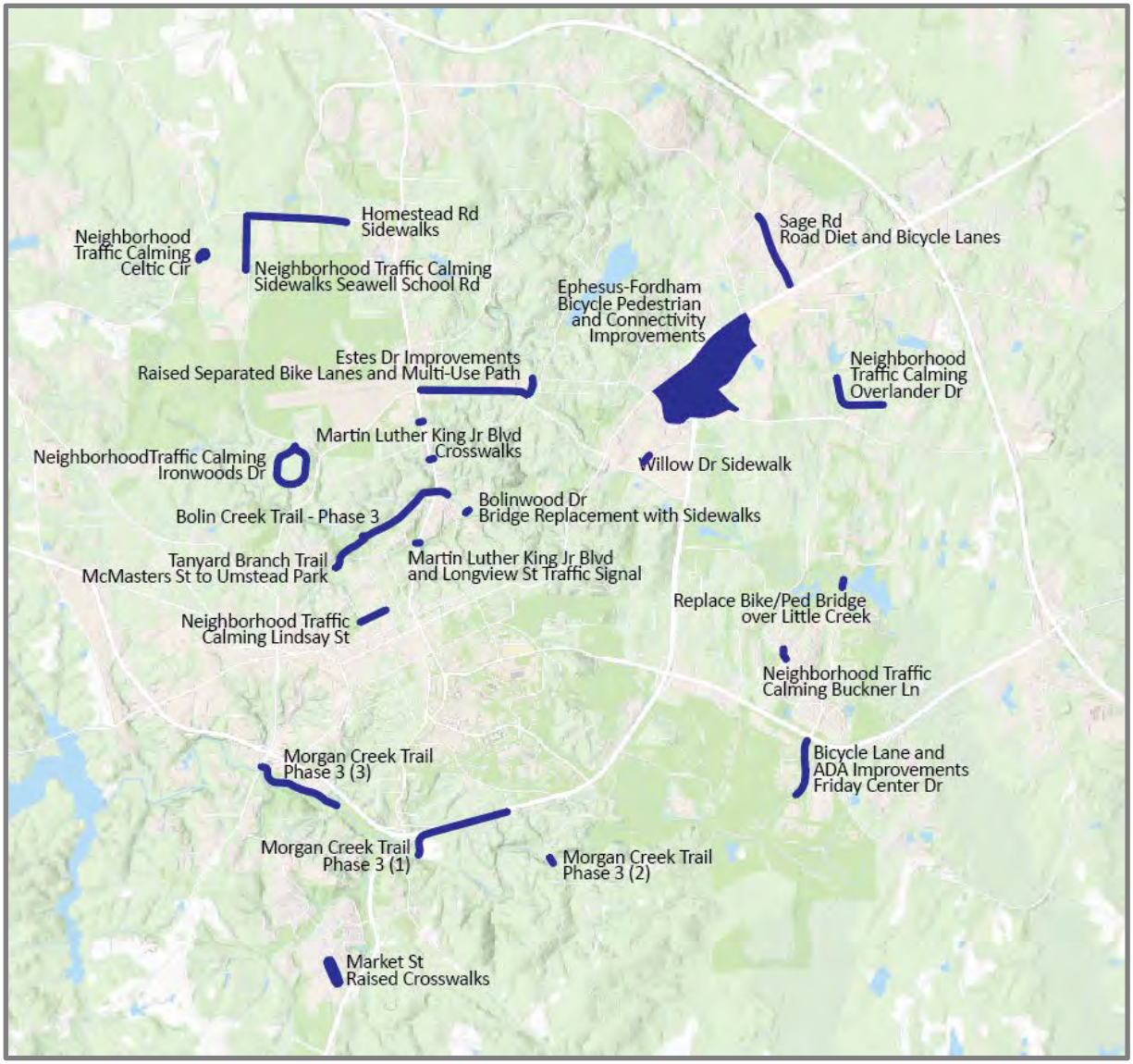
TIP	Route	ROW Year	Const. Year	Project Costs	Description
C-5179	SR 1750 (North Estes Dr)	2017	2017	$2,586,000	NC 86 (Martin Luther King, Jr. Blvd) To Caswell Drive. Construct 5' Sidewalks and 5' Bike Lanes. NC 86 (Martin Luther King, Jr. Blvd) To Elliott Rd in Chapel Hill. Construct 10' Multiuse Path.
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

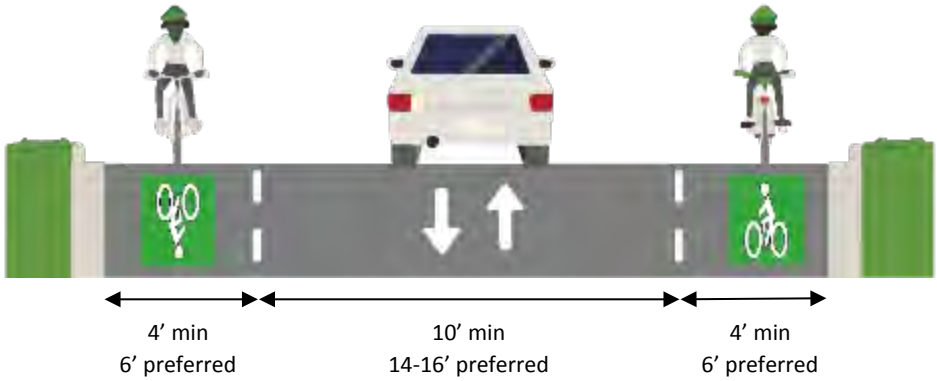
Obey Creek	
Date of Agreement	June 2015
Location	Southern side of Chapel Hill adjacent to Southern Village.
Related Studies/Documents	Traffic Impact Study (April 2014) Village at Obey Creek Design Guidelines
Relationship to Mobility Plan	Southern Circuit Priority Corridor utilizes the proposed bicycle 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

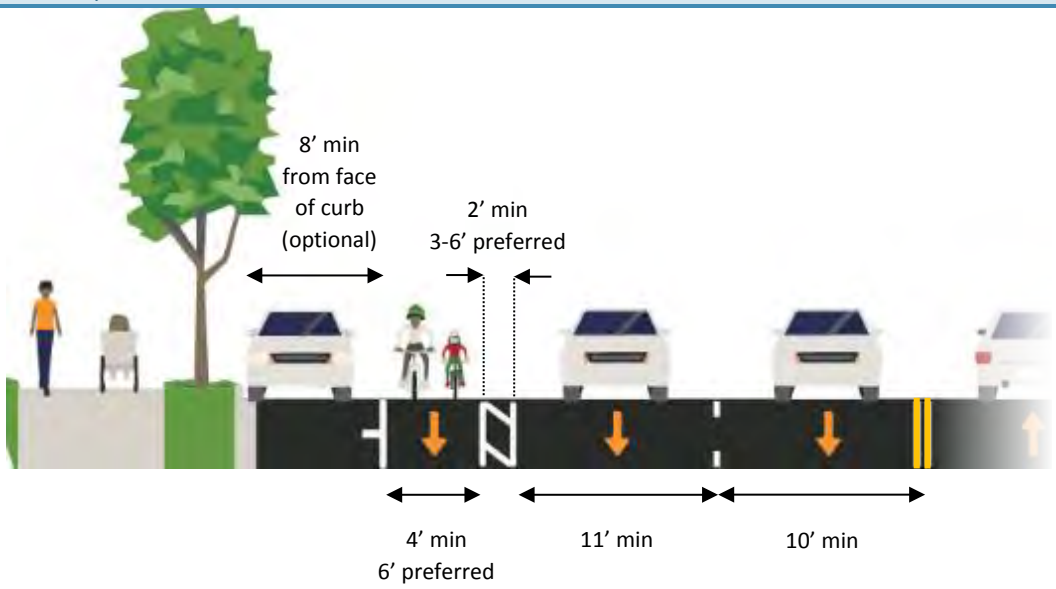
Bicycle/Pedestrian Facilities

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

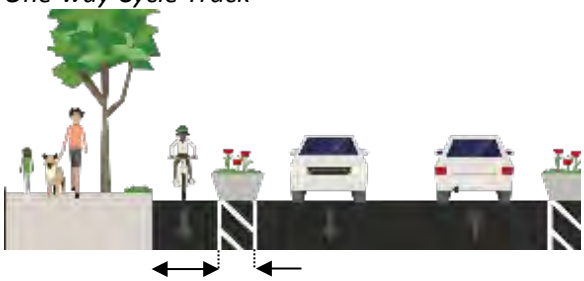


Typical Application	• Arterial street with higher traffic volumes • Posted speed limit at or above 35MPH • On-street parallel parking optional
Design Elements	• Bicycle lane 4-6 feet in width • Buffer width may vary, widths greater than 3 feet include hash mark in between the stripes. • Buffer may be 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



4’ min
6’ preferred

3’ min

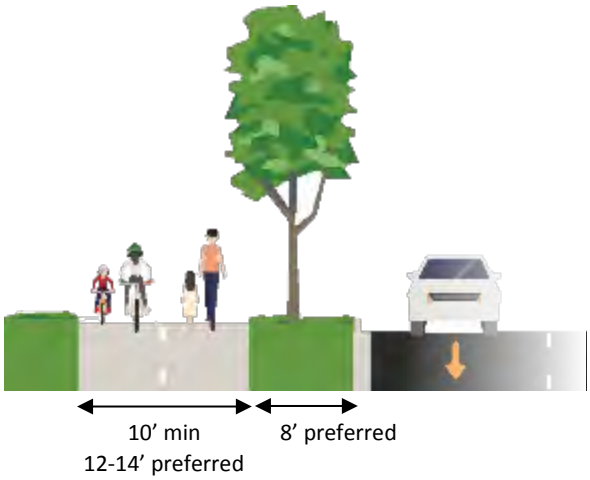
Two-way Cycle Track

8’ min
12’ preferred

3’ min

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 >	

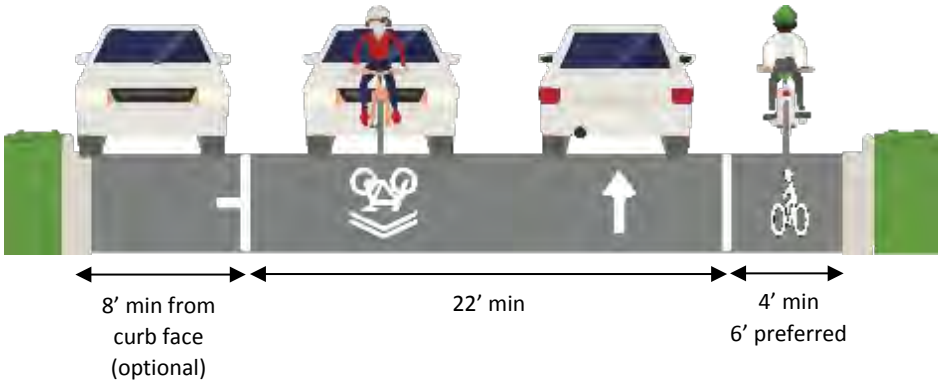
Multi-Use Trail



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 >	

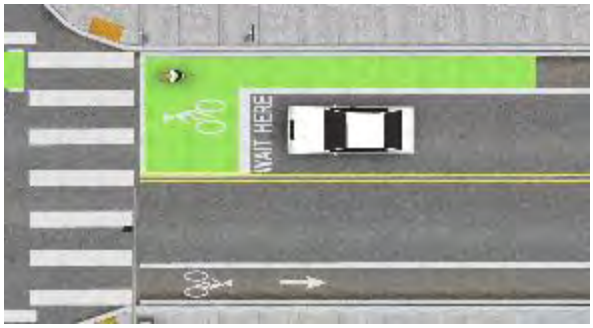
Appendix C: Facility Guidelines

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

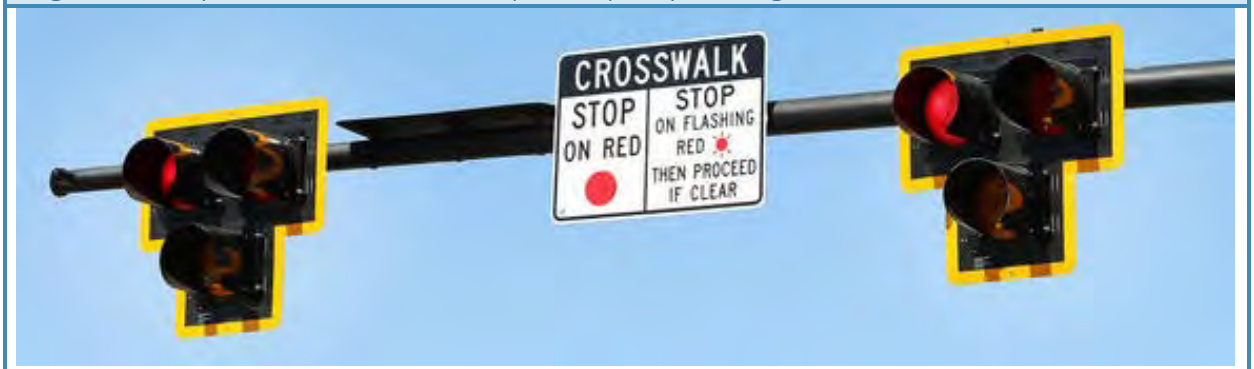
Bike Signal Faces

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

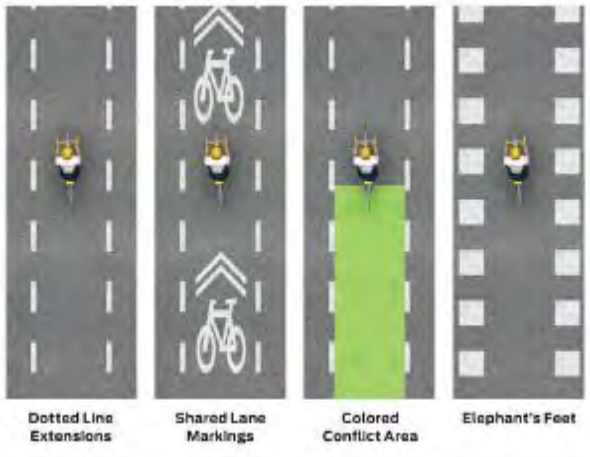


Typical Application	• Where bicycle and/or pedestrian routes intersect major streets at locations without existing signalized crossings • At mid-block crossings of major roadways with high bicycle and/or pedestrian volumes • At multi-lane locations to counteract multiple threat crashes • At key access 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).

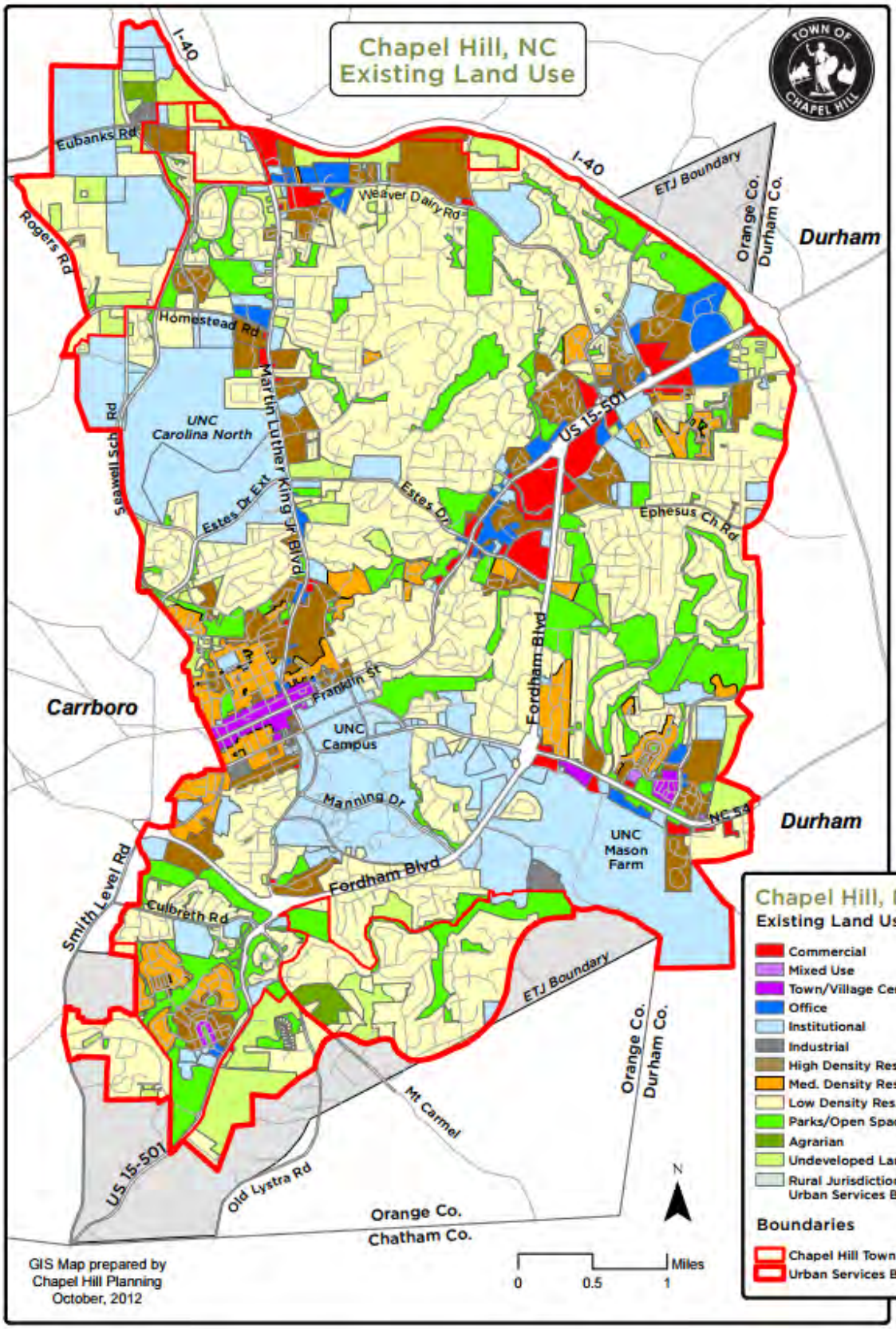


Figure 2. Existing Land Use map in Chapel Hill shows limited commercial and mixed-use development in the Town.

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.

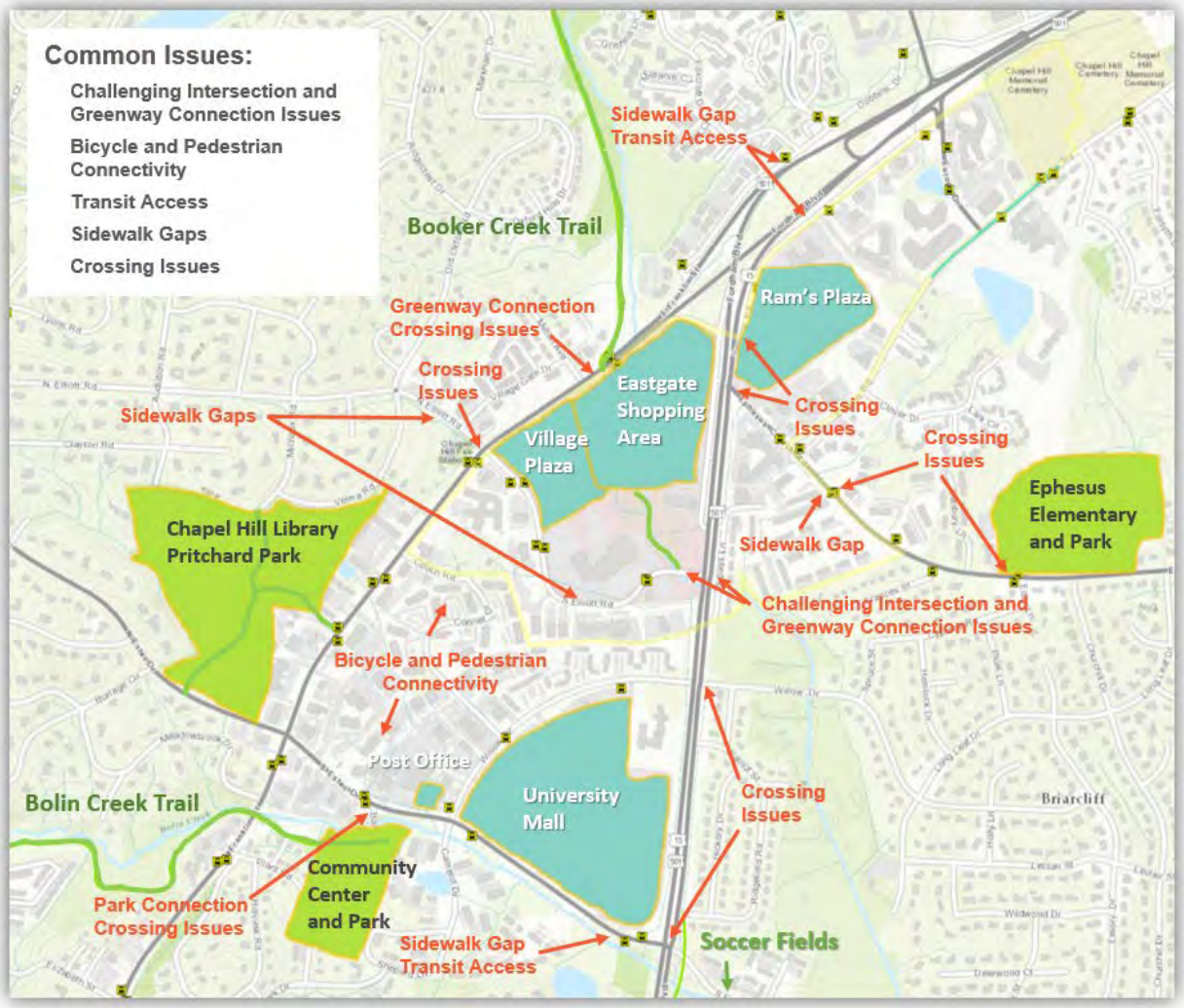


Figure 4. *The Ephesus-Fordham District is an asset-rich area with many key destinations identified by citizens during the public input process, but mobility for bicycles and pedestrians is limited.*

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

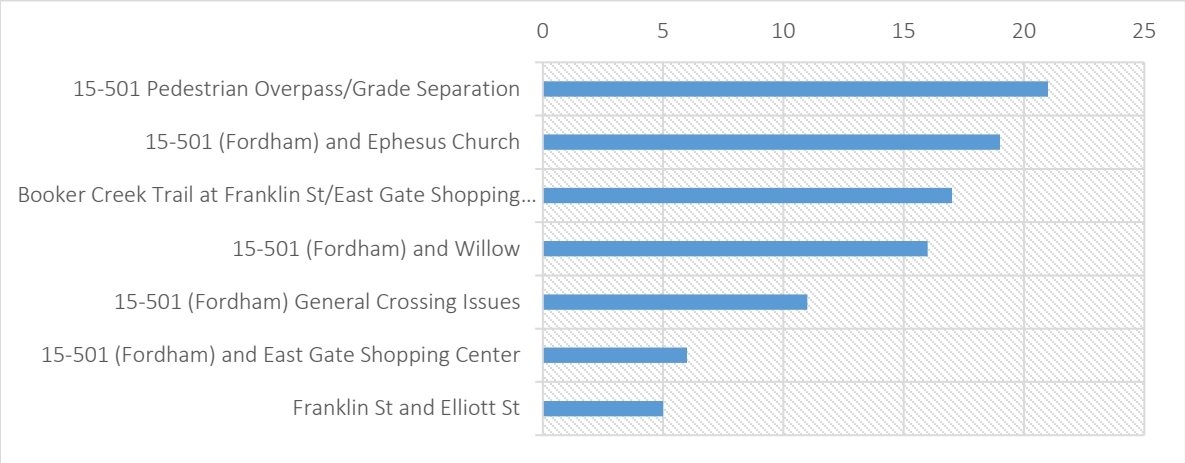


Figure 5. *Crossing issues most often identified in public input specific to the Ephesus-Fordham District*

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

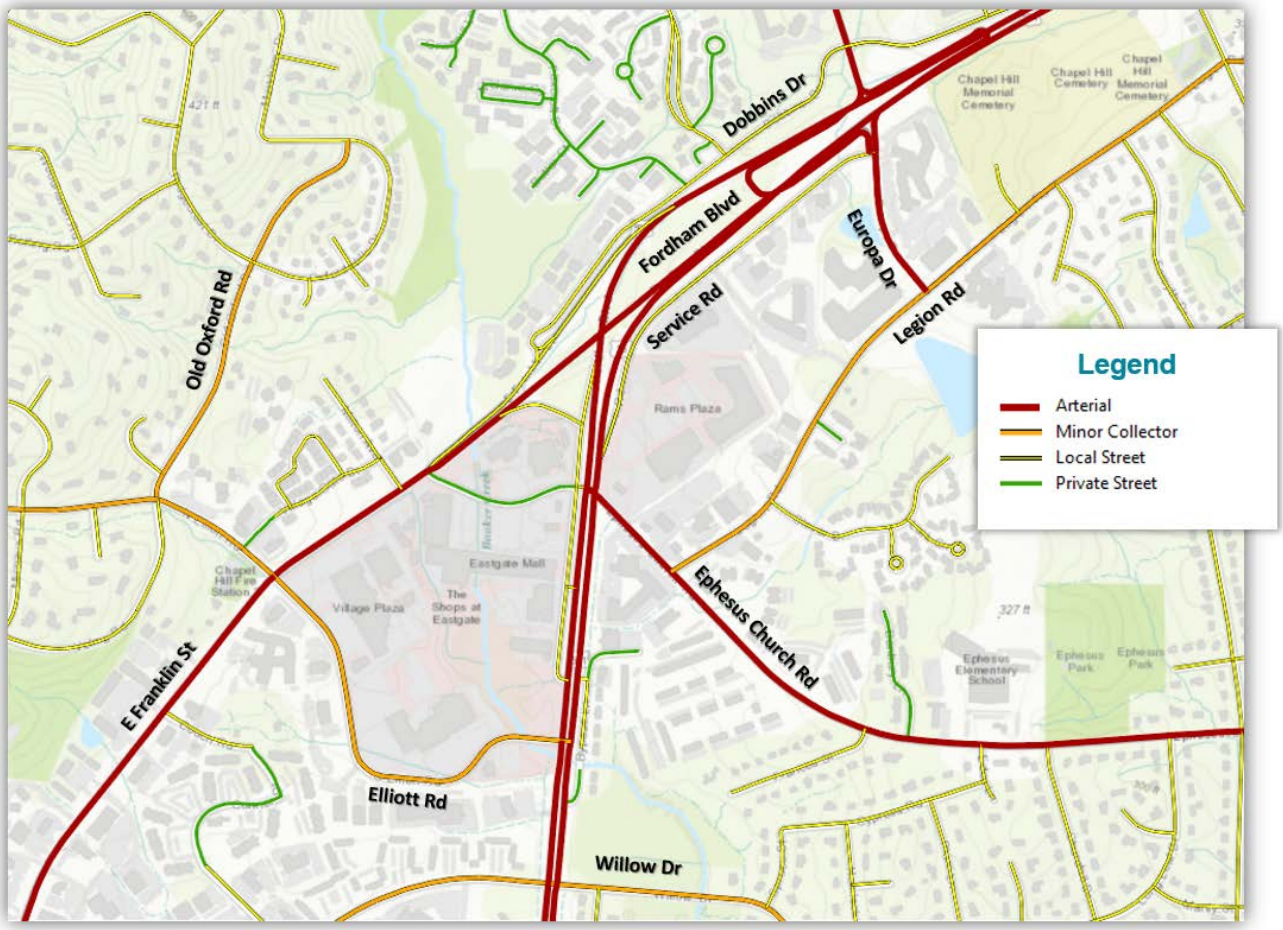


Figure 6. The existing street network borders the Ephesus-Fordham District with few local streets to provide circulation within or connections through the area.

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.

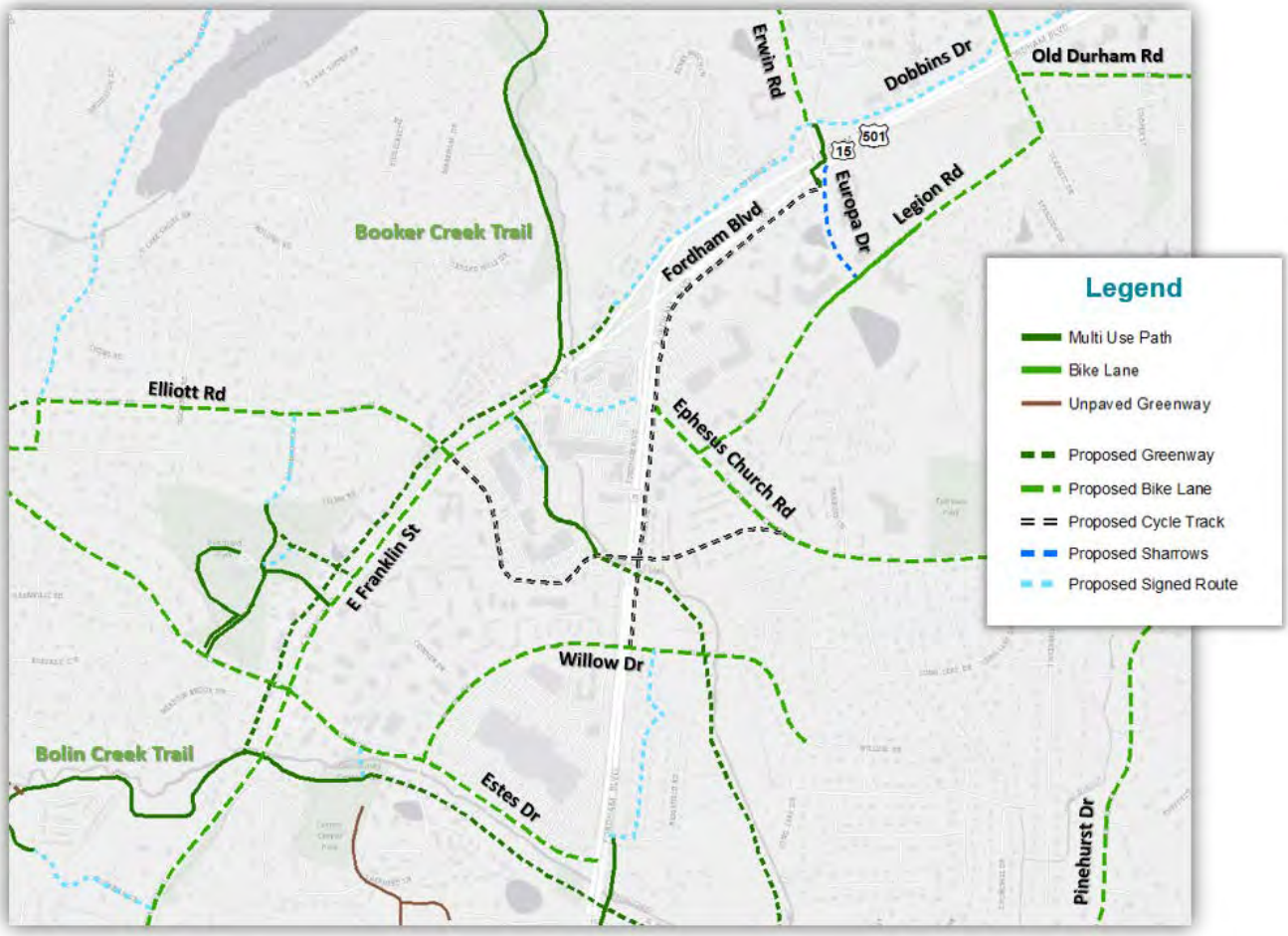


Figure 7. Existing and Planned Bicycle and Pedestrian Network Facilities in the Ephesus-Fordham District as they are laid out in the 2014 Chapel Hill Greenway Plan and the 2013 Chapel Hill Bike Plan

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.

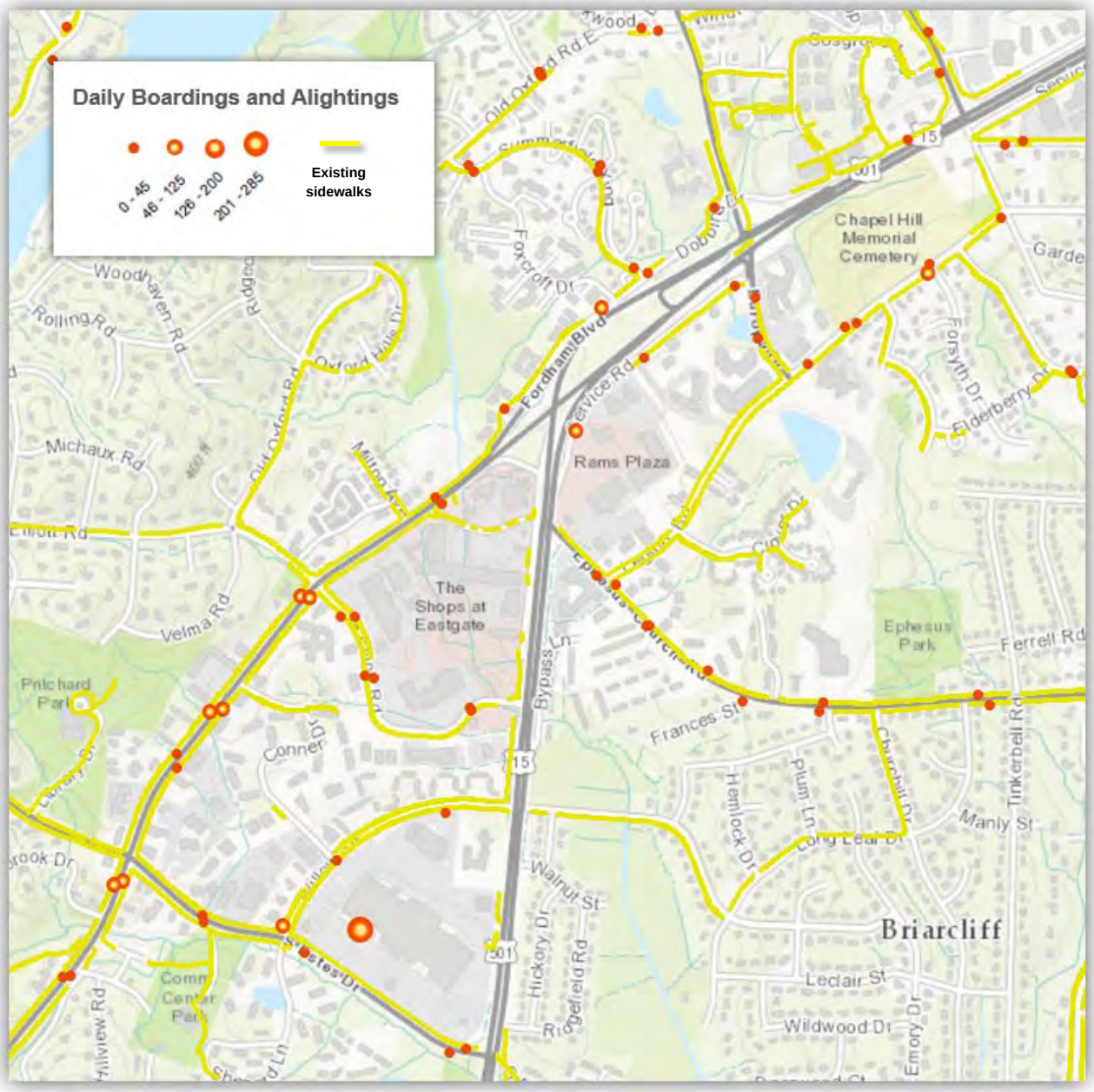


Figure 8. Existing sidewalk coverage and transit stops around the Ephesus-Fordham District showing daily boarding and alighting data from Chapel Hill Transit

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

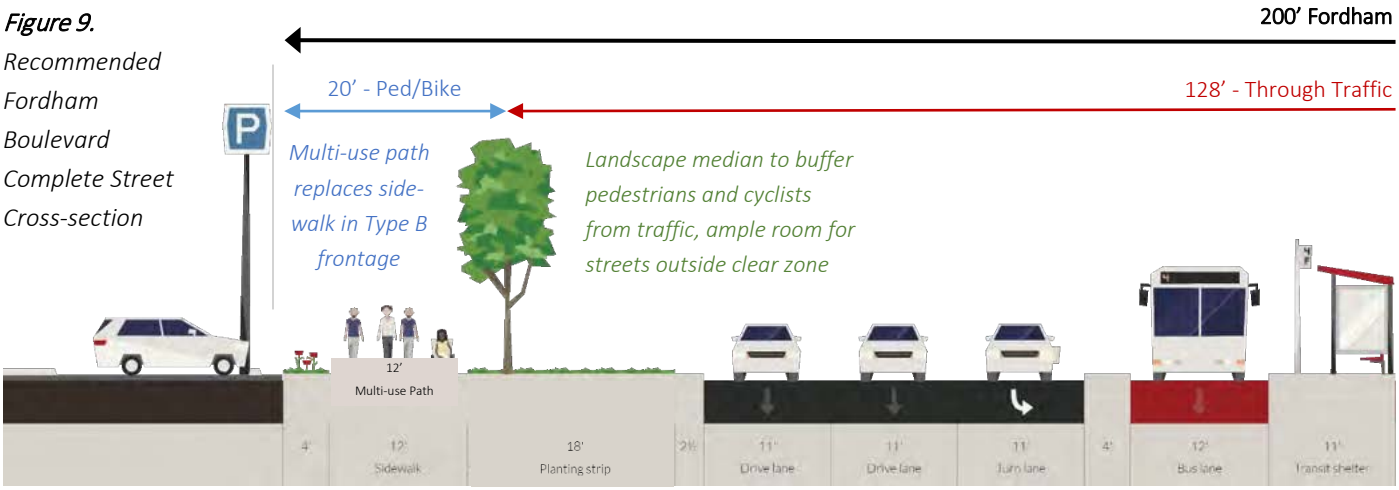


Figure 9. Recommended Fordham Boulevard Complete Street Cross-section

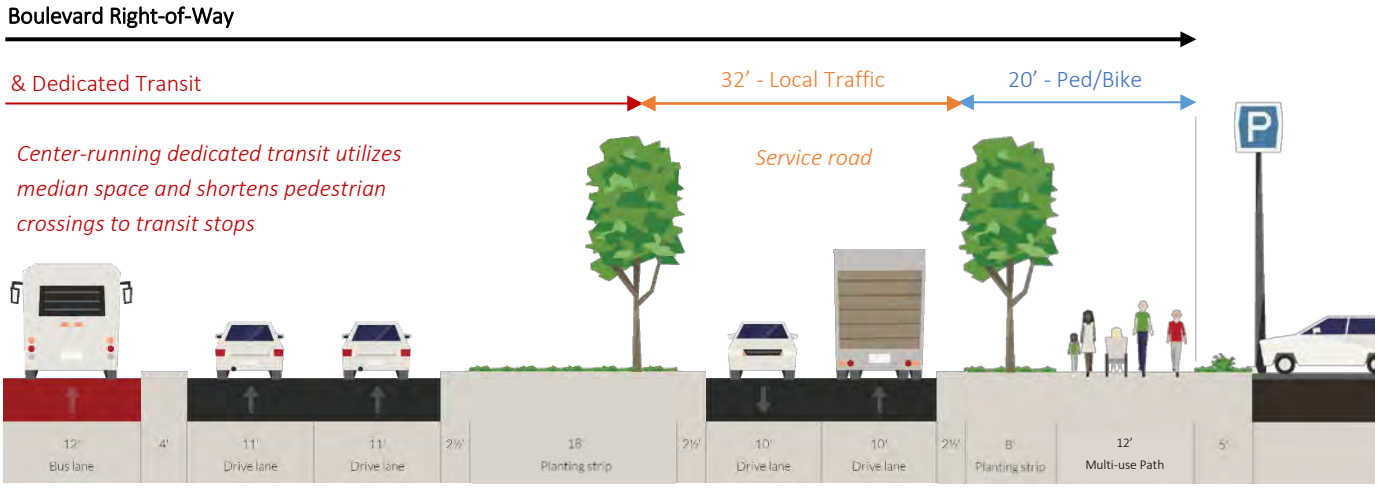
of curb). Dual left turns could be provided at locations where transit stations are not planned. Where transit is prioritized around Ephesus Church Road and Legion Road intersections in the future, vehicular priority is recommended at the Elliott Road intersection to facilitate heavy turning movements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

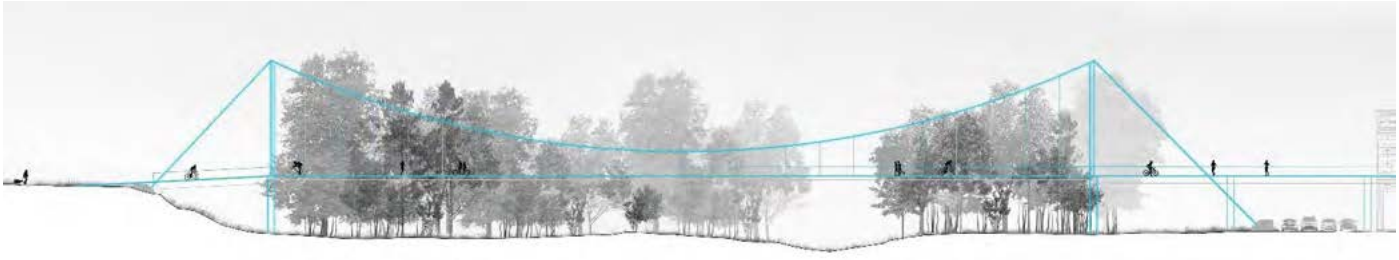
Several gaps exist in the sidewalk network that make it difficult for pedestrians to access Chapel Hill Transit at Ram's Plaza. The public input process identified gaps on the south side of Elliott Road between Franklin Street and Fordham Boulevard, on Europa Drive, along US 15-501, and on Ephesus Church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

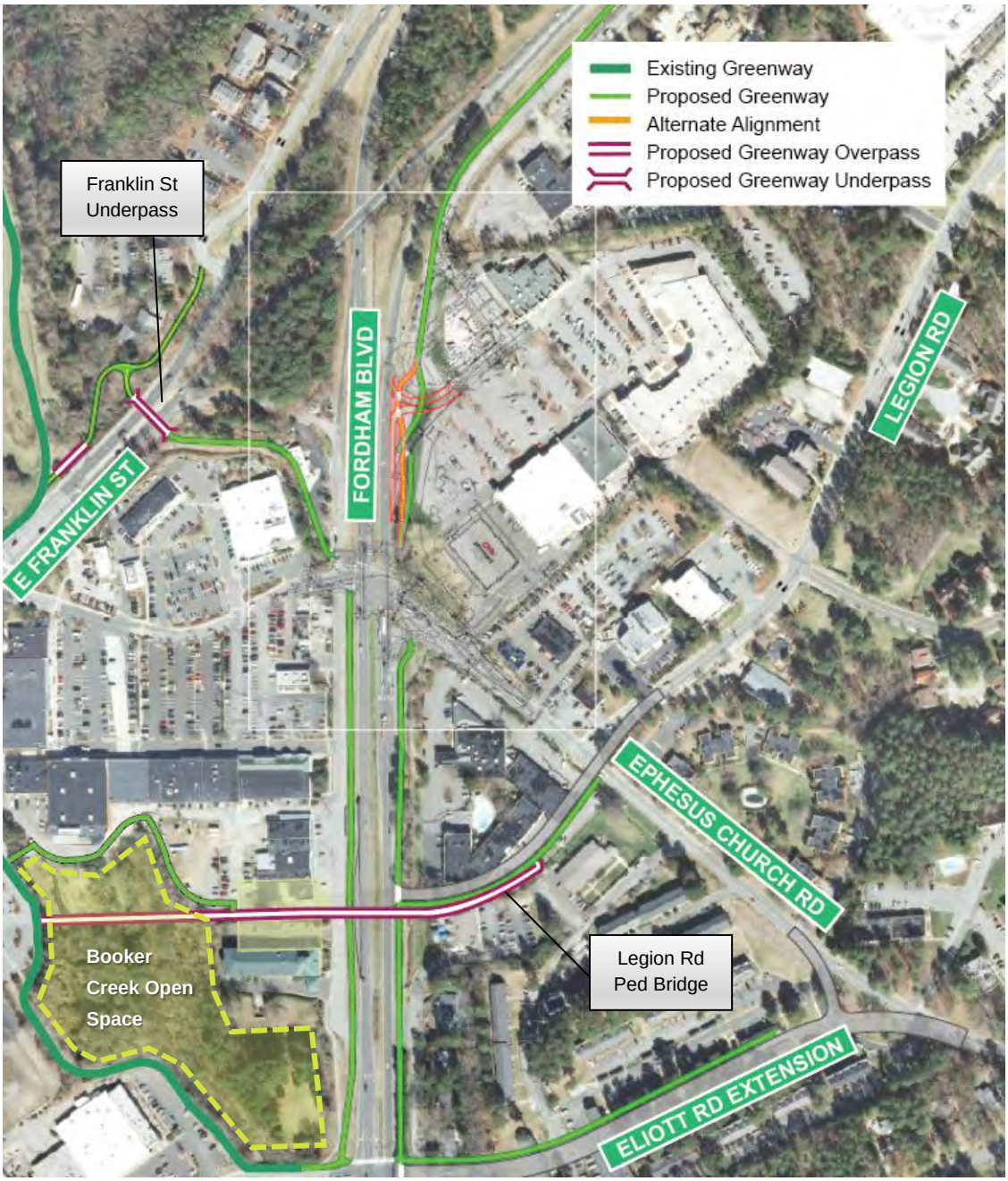


Figure 10. *Recommended multi-use bridge concept across Fordham Boulevard at Legion Road Extension, with extension over Booker Creek open space, including the design perspective below*

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.

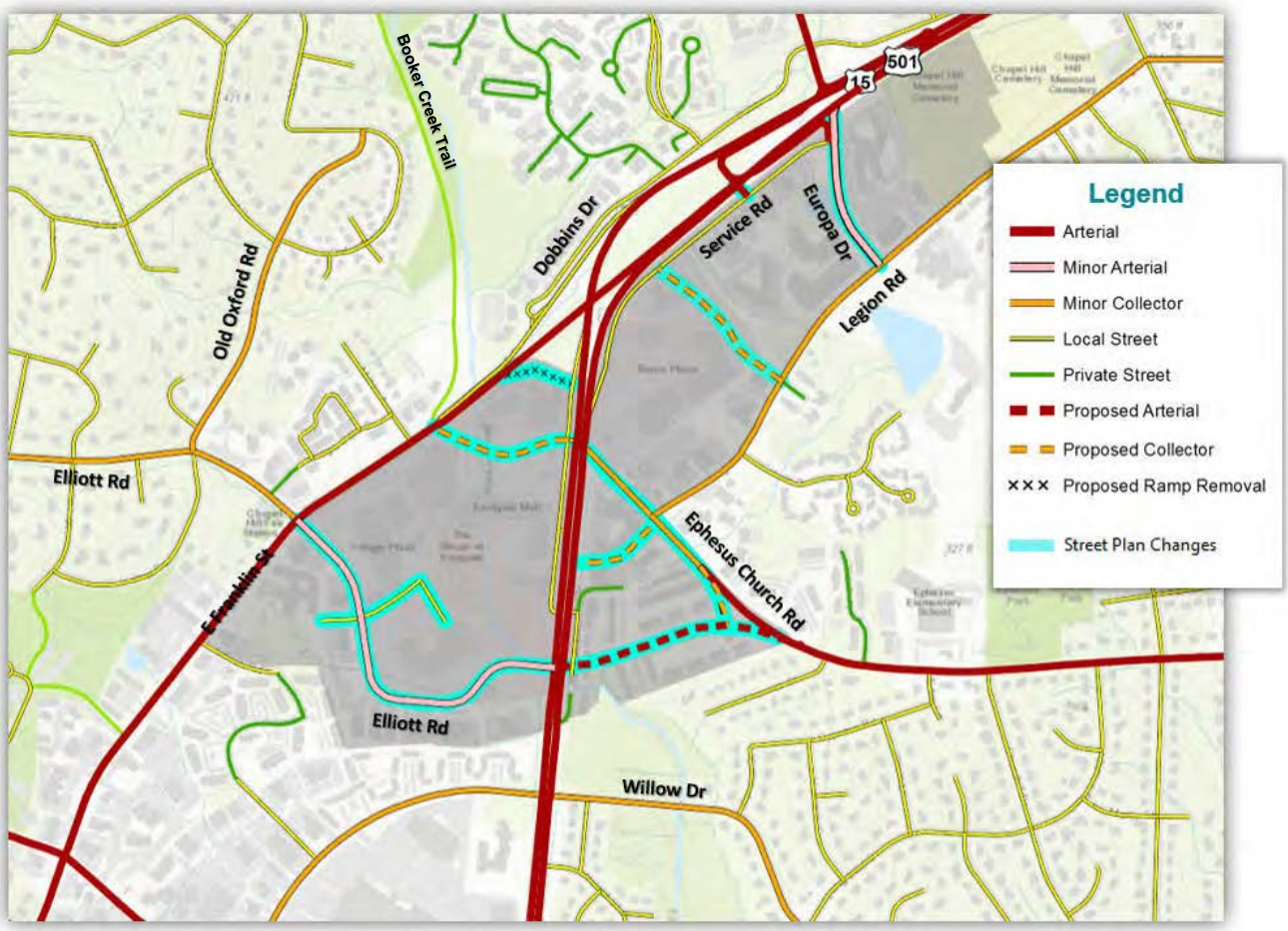


Figure 11. Existing streets and proposed changes to the street network in the Ephesus-Fordham District. New internal streets in the district (shown in grey) will occur with redevelopment according to the Block Perimeter and Regulating Plan

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.

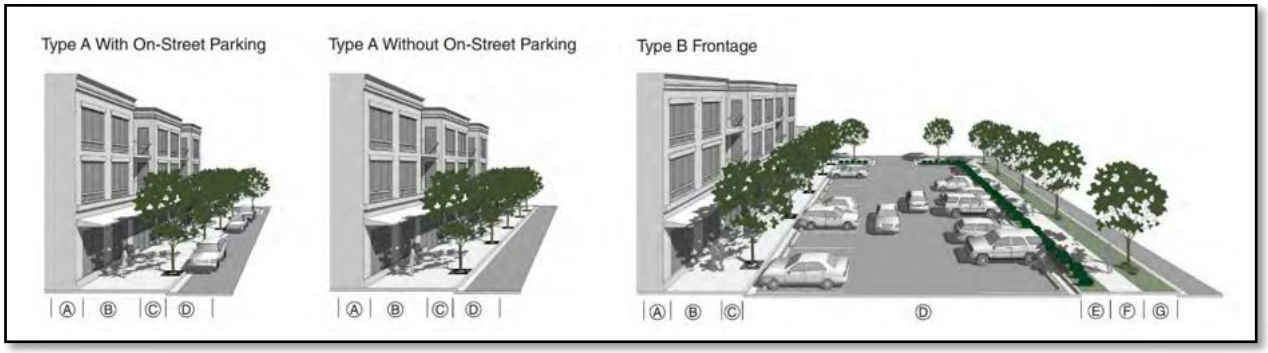
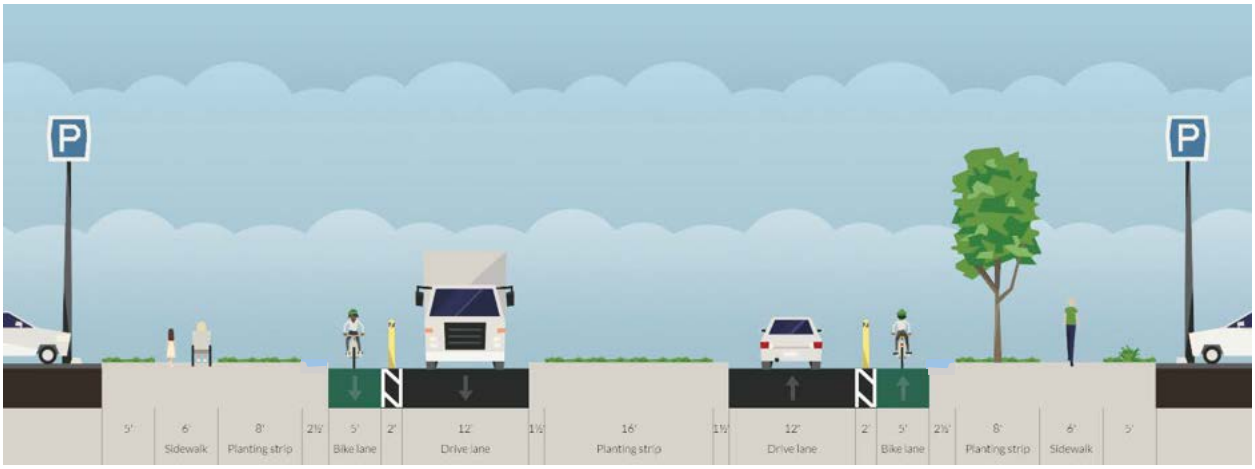


Figure 12. *Illustrations of street frontages from Ephesus-Fordham District form-based code*

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

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

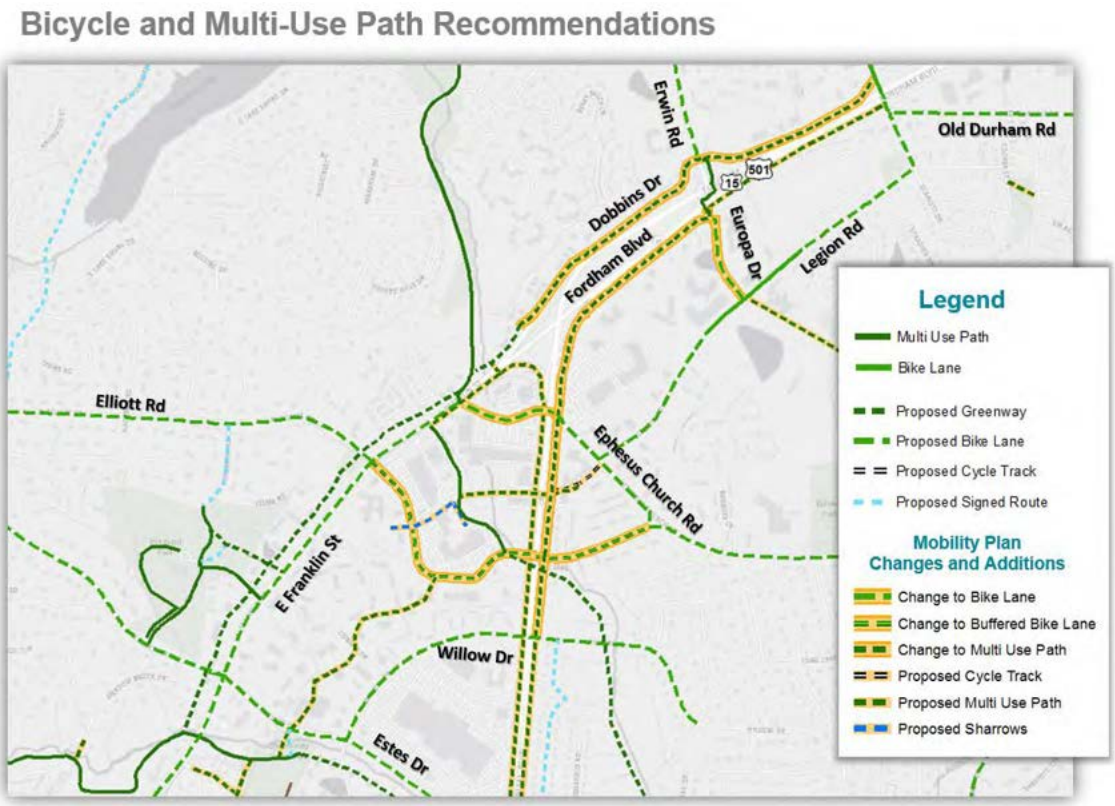
Alley – Residential or Service			SERVICE STREET
Easement	30' minimum	**Frontages**	Service – Loading areas, service entrances Residential – Garages or parking deck access
Median	None	**Travel Lanes**	Service – Two 10' unmarked lanes Residential – Two 9' unmarked lanes
Bike Facilities	None	**Planting 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

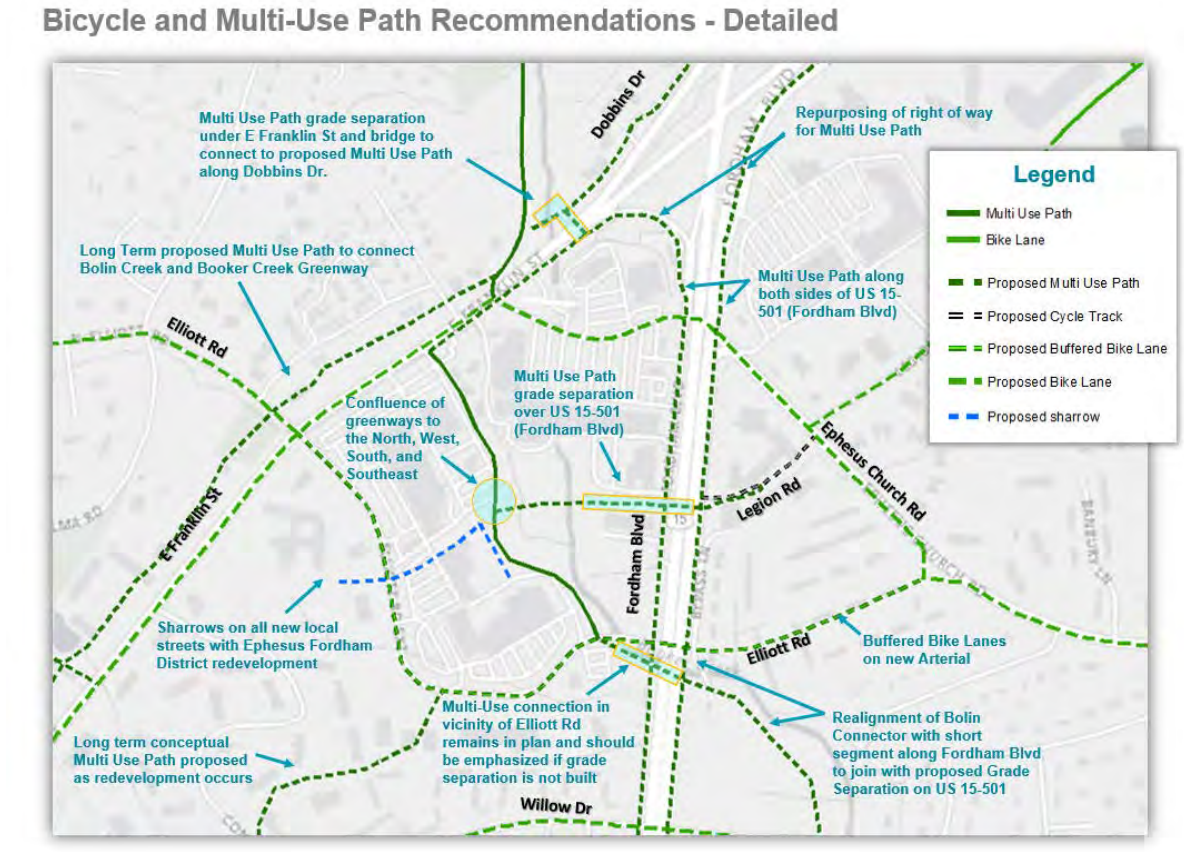
As discussed in the previous section, the newly approved block length and perimeter standards ensure a compact street network that is bikable and walkable. The addition of pedestrian pass-throughs connecting to wide sidewalks along the street frontages required in the code further increase pedestrian 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).*



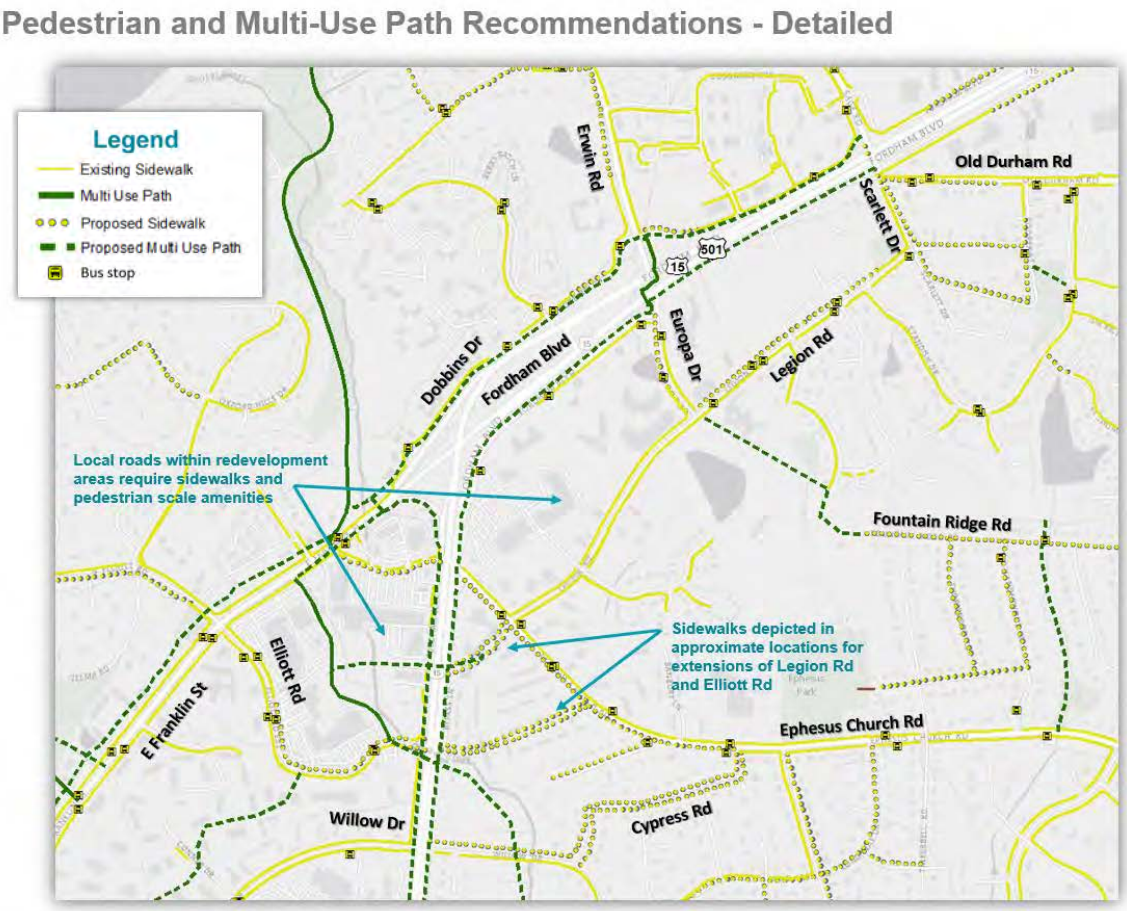


Figure 16. Recommended changes to the pedestrian network emphasize connections to transit and multi-use paths and close sidewalk gaps. Local roads and road extensions within the Ephesus-Fordham District will require sidewalks pedestrian scale amenities at the time of construction.

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

NCDOT, Office of Mobility and Safety
750 N. Greenfield Parkway
Garner, NC 27529
919.814.5000

PREPARED BY

Venture 1
940 Main Campus Drive, Suite 500
Raleigh, NC 27606
919.829.0328

12/31/2019

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NC 54 Pedestrian and Bicycle Corridor Safety Study Team

Mark Aldridge, NCDOT

Hanna Cockburn, NCDOT

Chuck Edwards, NCDOT

Brian Mayhew, NCDOT

David Phipps, NCDOT

Brian Thomas, NCDOT

Tina Moon, Town of Carrboro

Zachary Hallock, Town of Carrboro

Kumar Neppalli, Town of Chapel Hill

Jomar Pastorelle, Town of Chapel Hill

Bergen Watterson, Town of Chapel Hill

Bill Webster, Town of Chapel Hill

Donnie Rhoads, Chapel Hill Police Department

Nick Pittman, Chapel Hill Transit

Kurt Stolka, University of North Carolina at Chapel Hill

Lauren Blackburn, VHB

Joe Seymour, VHB

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.

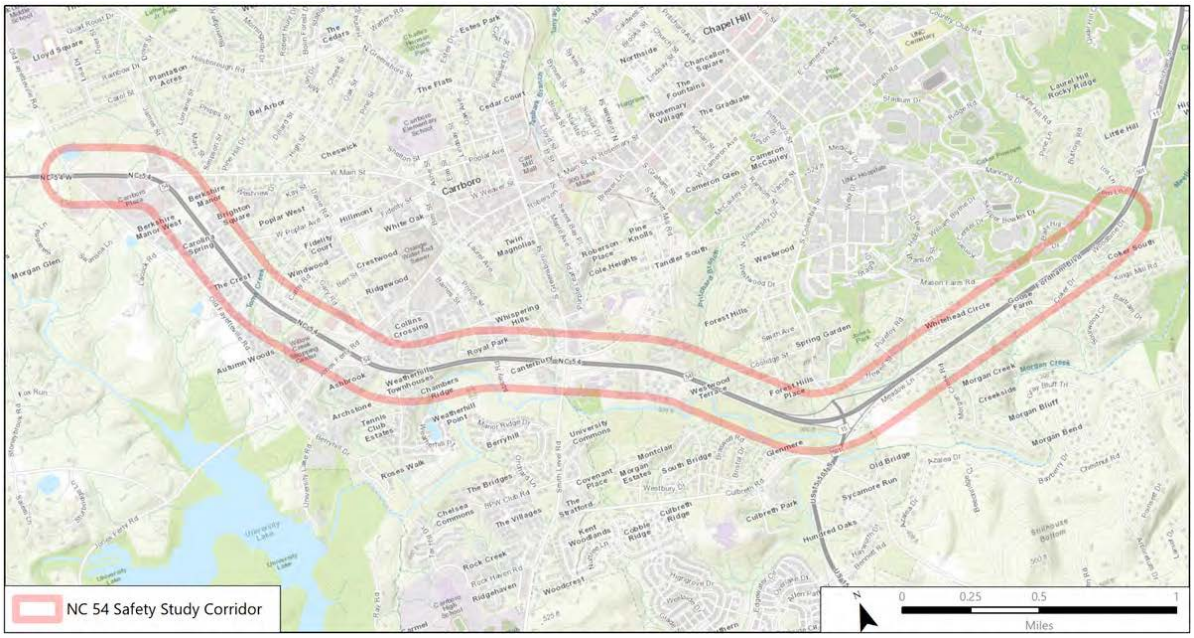


Figure 1 - NC 54 Safety Study Project Area

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).

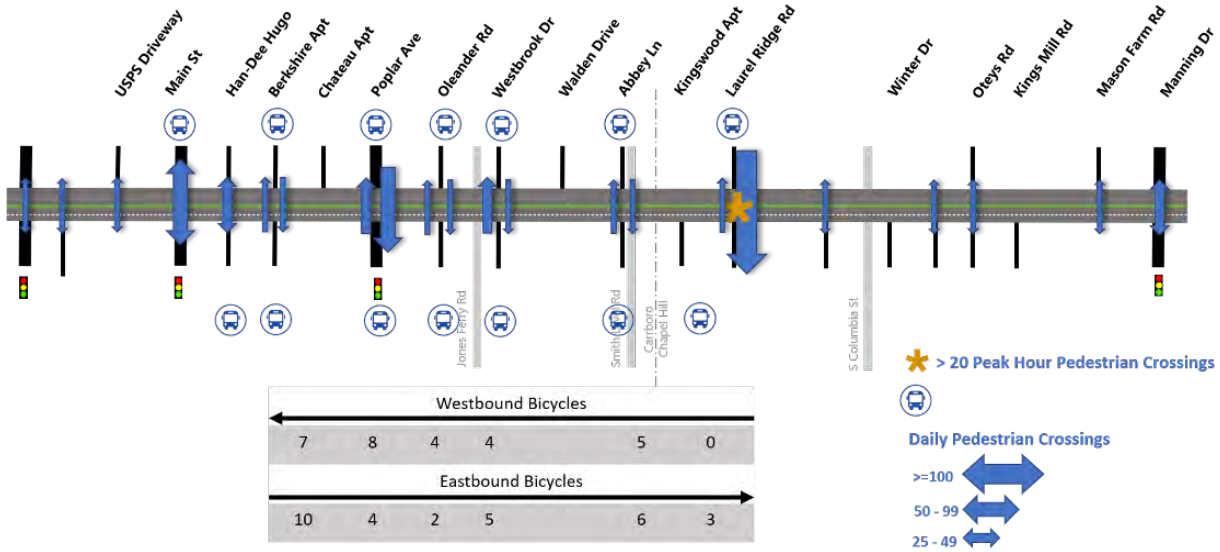


Figure 2 - Daily Pedestrian Crossings and Bicycle Volumes

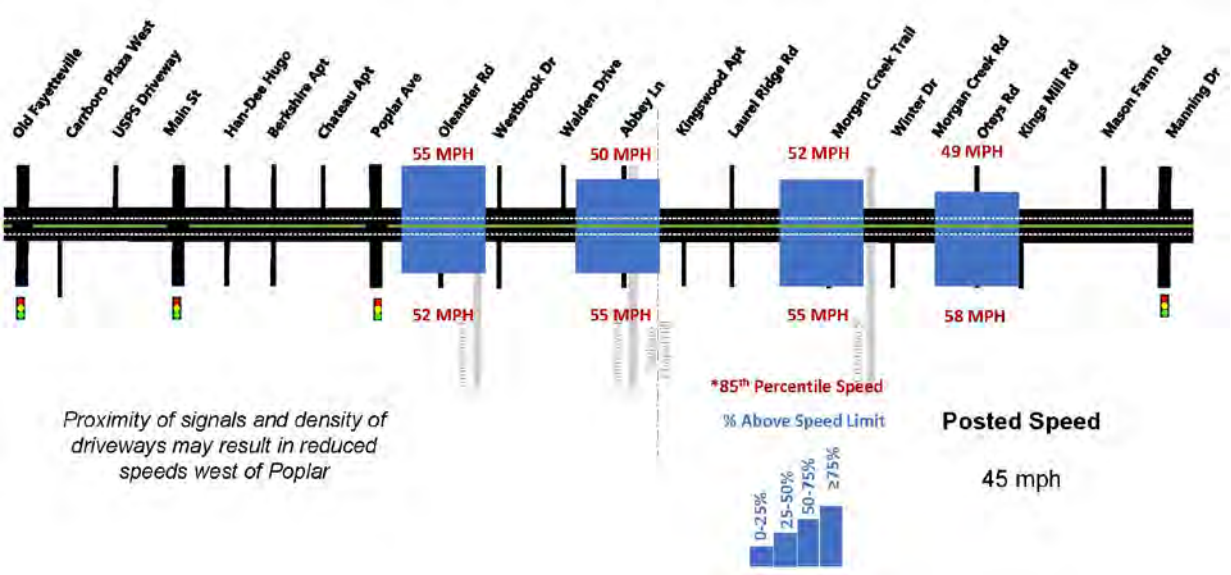


Figure 3 – Vehicle Speed – 7 Day Average

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.

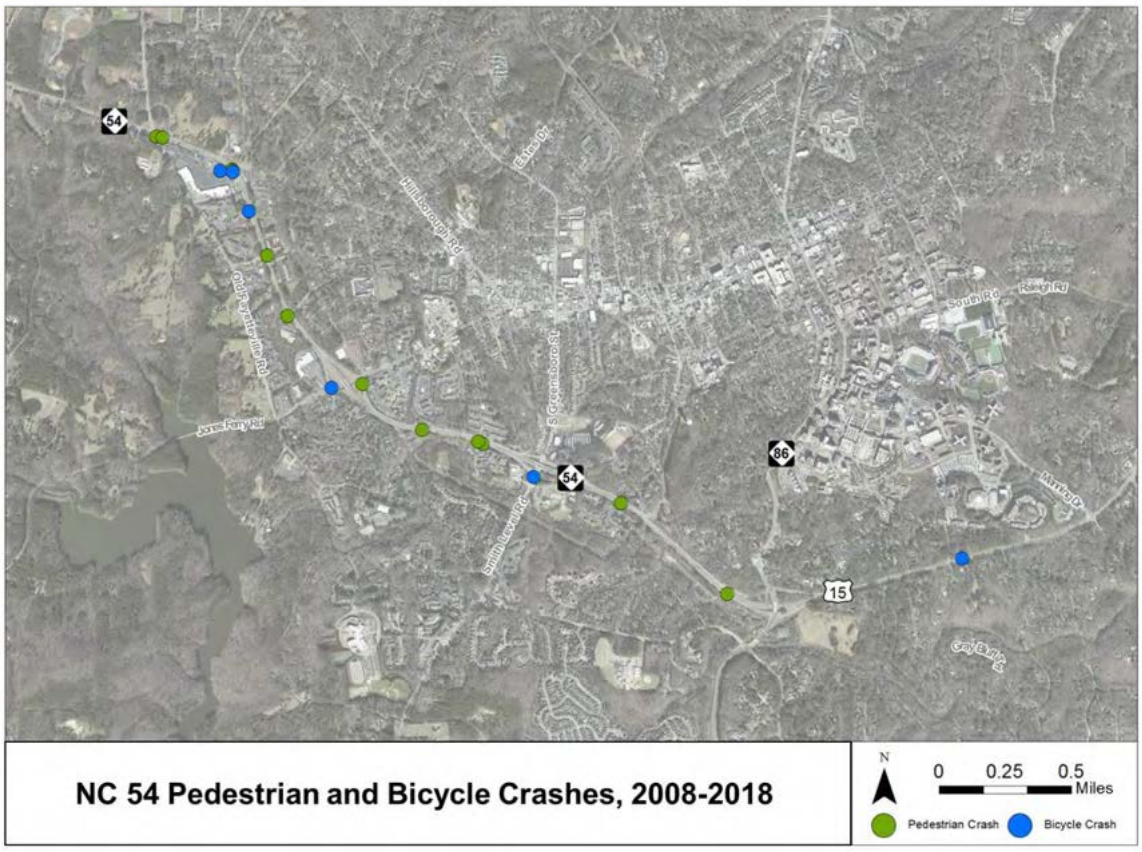


Figure 4 - NC 54 Pedestrian and Bicycle Crashes, 2008 - 2018

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

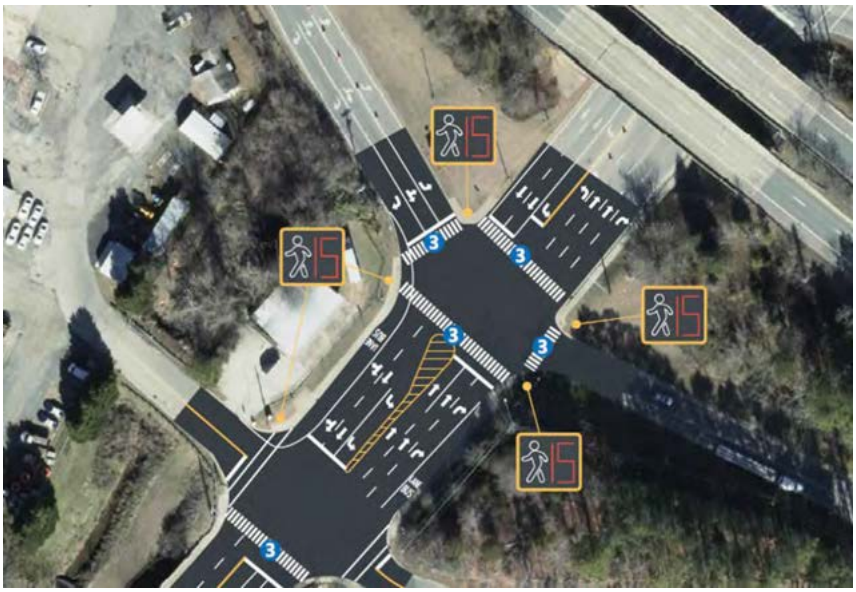


Figure 8 - Smith Level Road

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

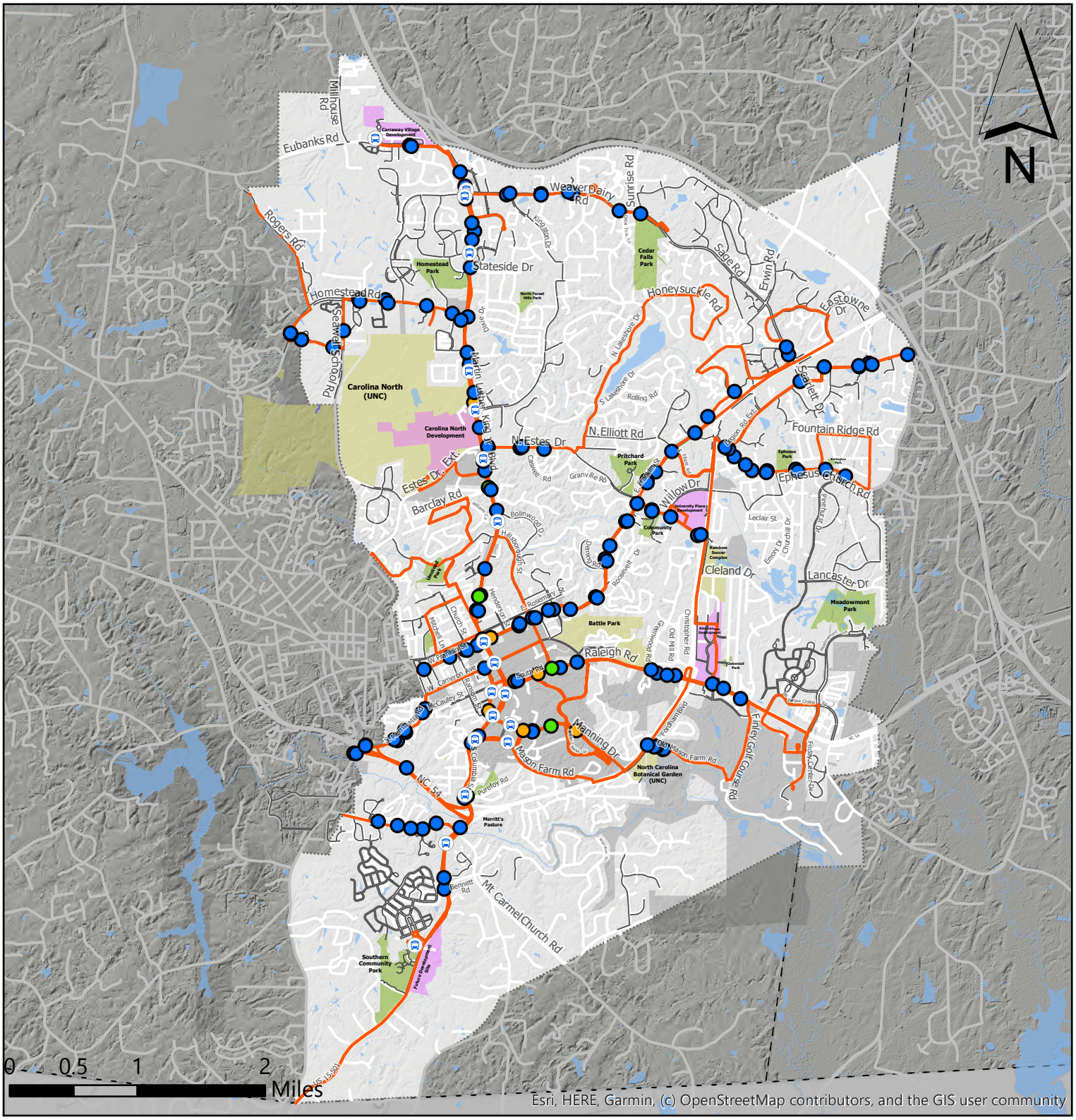
NCDOT will evaluate each of the site-specific improvements for eligibility through the Highway Safety Improvement Program (HSIP) and other implementation opportunities such as Division 7 operations and maintenance programs. Recommendations such as those shown at currently uncontrolled intersections (i.e.,Westbrook 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