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Programs and Policies

In addition to infrastructure improvements, programs and policies are key components that contribute to a safe, equitable, and connected pedestrian network. This chapter examines how Wilmington's existing programs and policies relate to this plan's goals and recommends additional ways to advance Walk Wilmington's goals.

Existing Policies and Guidelines

NCDOT Policies and Guidelines

These policies describe how pedestrian and bicycle projects are developed at NCDOT. For full policies, visit: *https://connect.ncdot.gov/projects/BikePed/Pages/Policies-Guidelines.aspx*

COMPLETE STREETS

NCDOT's Complete Streets Policy guides when and how planners and designers should design streets and roads to accommodate all users, including people walking and biking, in transportation projects. NCDOT updated the Complete Streets Policy in 2019, followed by the creation of the Integrated Mobility Division (combining bicycle, pedestrian, and transit functions).

The policy says: "**Bicycle and pedestrian and public transportation facilities that appear in a state, regional or locally adopted transportation plan will be included as part of the proposed roadway project. NCDOT will fully fund the cost of designing, acquiring right of way, and constructing the identified facilities**."

In 2022, NCDOT released an *updated methodology for Complete Streets Review*. The new methodology is intended to standardize implementation of the policy for NCDOT project managers and includes several consultation points with local governments and MPOs/RPOs throughout the project development process.

A summary of the updated process is below:

- **Step 1: Initial Screening and Data Input.** Screen planning documents such as the MTP and other adopted local and regional plans (see the *FAQ* for details about plan requirements), compile existing and future conditions data, conduct connectivity and gap analysis, review alternatives.
- **Step 2: Transportation Need Determination.** Estimate demand using NCDOT Demand Estimation Map, observed conditions, land use, and other data. Special considerations are made for areas where demand is "low" and "intermittent/none."
- **Step 3: Facility Type Selection.** Refine the demand estimation from Step 2, identify preferred facilities, and review other design elements such as transit, intersections, and crossings.
- **Step 4: Impact Assessment.** Conduct comprehensive cost analysis, evaluate schedule impacts, and review environmental risk.
- **Step 5: Final Analysis.** Evaluate cost and schedule impacts and document recommendations.

PEDESTRIAN POLICY & GUIDELINES

NCDOT policy and guidelines for planning, designing, building, maintaining and operating pedestrian facilities and accommodations.

GREENWAY ACCOMMODATIONS MEMO AND GUIDELINES

Approved in 2015, NCDOT guidelines, approaches and cost-sharing recommendations for proposed greenways underneath bridge replacements.

ADMINISTRATIVE ACTION TO INCLUDE GREENWAY PLANS

NCDOT administrative guidelines for considering greenways and greenway crossings during the highway planning process to ensure that critical corridors for future greenways are not severed by highway construction.

BRIDGE POLICY

Policy establishing design elements for new and reconstructed bridges on the state's road system, including requirements for sidewalks and bicycle facilities on bridges.

TRAFFIC ENGINEERING POLICIES, PRACTICES AND LEGAL AUTHORITY

NCDOT policies and federal design guidelines for specific pedestrian and bicycle safety accommodations.

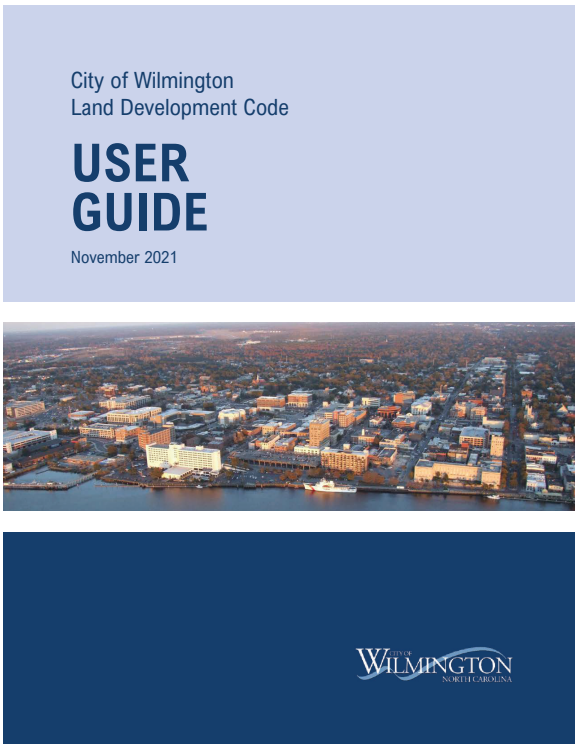
Example of a Complete Street design that accommodates many uses such as walking, biking, driving, and transit.

Wilmington Land Development Code (LDC)

The LDC is one of the City's most powerful tools for guiding future growth in ways that enhance pedestrian connectivity, safety, and equity. According to the City, the LDC "**aims to reduce sprawl, improve traffic conditions, preserve and grow our tree canopy, better manage stormwater, and develop a more convenient, compact, and connected future city with a more thoughtful land use approach.**"

The 2021 LDC update included many policies that align with the goals of this pedestrian plan, including downtown streetscape improvements, connectivity requirements for subdivisions, policies that encourage walkable density, mid-block crossing requirements, and traffic calming measures.

The following table highlights aspects of the code that relate to the goals of this pedestrian plan and recommends several changes to the code to better align with the plan vision for a safe and convenient pedestrian network for all ages and abilities, and with NCDOT's Complete Streets Policy. The table is organized into the categories: Pedestrian and Bicycle Facility Standards, Other Streetscape Standards Related to Pedestrian-Oriented Community Design, Network Connectivity, and Parking Requirements. **The recommendations in the following table are for consideration only; adoption of this plan does not obligate the City to make these changes to the LDC.**



Wilmington's Land Development Code includes policies that support walkable development.

A new residential development including sidewalks and crossing improvements along Oleander Drive.
Photo: Hawthorne Residential Partners

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TABLE 6. *Review of Wilmington's Land Development Code*

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
PEDESTRIAN AND BICYCLE FACILITY STANDARDS Note: Wilmington's Technical Standards and Specifications Manual and Standard Detail Files provide specific engineering-level guidance for designing and implementing facilities. This table references the Manual as needed but does not provide a comprehensive review of the Manual and Standard Detail Files, which are available at: https://www.wilmingtonnc.gov/departments/engineering/technical-standards-details			
Definitions of pedestrian and bicycle facilities	Article 8 - Measurements and Definitions, Division 3 - Definitions, Section 18-687: A/B/C Definitions	Bikeway: A right-of-way restricted for the exclusive use by bicycles, except for areas designated for motorized vehicles and pedestrian cross flow.	"Bikeway" is the only pedestrian or bicycle facility defined in the code. Additional terms for pedestrian facility types are used in the code but are not defined, including: greenway, pathway, path, sidewalk, walkway, and multi-use path. Consider adding definitions for these terms and standardizing their usage throughout the code (e.g., remove or combine redundant terms and replace undefined terms with defined terms). Standardizing terms will result in greater clarity for code users and enforcers, and will ultimately help develop a consistent network of bicycle and pedestrian facilities.
Bicycle and pedestrian connections	Article 6 - Subdivision Regulations, Division 2 - Improvements Required, Section 18-494: Sidewalks, walkways, and bikeways	B. Bicycle and pedestrian connections 1. Provisions shall be made in all new developments to facilitate the use of bicycle and pedestrian travel through the integration of bicycle and pedestrian paths, multiuse paths, and bicycle lanes that connect to **parks, open spaces, schools, public transit, and shopping areas**. Within new residential subdivisions, bicycle and pedestrian paths, trails, and bicycle lanes shall also connect to collector and minor arterial streets. 2. Easements or rights-of-way shall be provided for bicycle/pedestrian paths between and within developments. 3. A continuous internal bicycle/pedestrian path shall be provided from the perimeter public sidewalk, multiuse path, or other bicycle or pedestrian way, to include paved or unpaved internal paths to each of the following: a. Entrances to each building on the site, including pad site; b. Public sidewalks, walkways, and trails on adjacent properties that extend to the boundaries shared with the subject development; c. Public sidewalks along all perimeter streets adjacent to the development; d. Adjacent public park, trail, or other public or civic use; and e. Adjacent public transit station areas, transit stops, park and ride facilities, and other transit facilities (see Figure 18-494.1: Continuous internal pedestrian walkway).	The requirement only appears to apply to collector and minor arterial streets; consider specific provisions for other street types. Additionally, consider making the "adjacent to" requirements more specific or defining in terms of distance from the amenity (e.g., 0.5 miles from a public park or transit stop). Finally, consider expanding the proximity and connectivity requirements to include other types of destinations adjacent to a new development. Expanding these requirements would facilitate pedestrian travel to jobs, healthcare services, libraries or other civic buildings, and neighborhoods.

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
Sidewalks and crosswalks	Article 6 - Subdivision Regulations, Division 2 - Improvements Required, Section 18-494: Sidewalks, walkways, and bikeways	C. Sidewalk, crosswalks, and multiuse path required locations **1. Sidewalks, crosswalks, and multiuse paths shall be constructed by the developer in accordance with the facility type identified in the city's adopted plans** as follows (see figures 18-494.2: Sidewalks location and 18-495.3: Sidewalks on cul-de-sacs): a. On a minimum of one side of the right-of-way of all thoroughfares such as freeways, expressways, arterials, collector streets, or local streets that are adjacent to the property to be developed; b. On both side of the right-of-way of all thoroughfares that run through property to be developed if the developer intends to construct any portion of the thoroughfare as access to the proposed development; c. On both side of the right-of-way of all local or collector streets, extending through the property to be developed; d. On one side of a minor street when lots are proposed for only one side of the street; and e. On both sides of the right-of-way for a cul-de-sac or other turnaround per the Technical Standards and Specifications Manual, except when lots are proposed for only one side of the street. In that case, the sidewalk shall be located on the lot side of the cul-de-sac. 2. The technical review committee may exempt sidewalk installation in specific cases to avoid impacting wetlands as documented by the regulatory authority over the wetland.	Section 1 calls for sidewalks as required in adopted plans. Consider expanding to explicitly require sidewalks in certain circumstances/contexts (e.g., high-density industrial or where there is an existing gap in the network) or within 0.5 mile of a transit stop or collector street. There appears to be a discrepancy between the LDC and the Technical Standards and Specifications Manual relating to sidewalks on cul-de-sacs. Page 7-6 of the Manual says: " Sidewalks are not required on the bulb portion of cul-de-sacs." The diagram referenced in the LDC (18-495.3: Sidewalks on cul-de-sacs) shows sidewalks on the bulb of the cul-de-sac. It is recommended to update the Technical Standards and Specifications Manual to agree with the LDC, since extending the sidewalks to the bulb would create a more complete and traversible sidewalk network.

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
Mid-block crossings	Article 6 - Subdivision Regulations, Division 2 - Improvements Required, Section 18-494: Sidewalks, walkways, and bikeways	D. Mid-block pedestrian connection 1. All new streets with a length greater than 600 feet or streets extended to a length greater than 600 feet between the centerlines of the nearest pair of intersections **shall have a midblock pedestrian connection with accessible pedestrian ramps on both sides of the street.** If an internal trail system is included in the development, **a midblock crossing shall be required where the trail crosses more than 150 feet from an intersection.** 2. Mid-block pedestrian connections shall: a. Be located approximately equidistant from either intersection in the pair (see Figure 18-494.4: Mid-block pedestrian connection); b. Be located at property boundaries wherever possible; c. Be located at least 25 feet from the nearest driveway curbcut; d. Be designed at 90 degrees to the roadway centerline; e. Provide easements to accommodate all pedestrian improvements if not within a public right-of-way; f. Be designed to provide pedestrian bump-outs where onstreet parking is permitted; g. Be designed to provide bump-outs to narrow the street crossing to no more than 20 feet where street width exceeds 30 feet or implement a central island as a refuge; h. Connect at both ends to either a: i. Public sidewalk or similar pedestrian feature; or ii. Public off-street pedestrian pathway; i. Not conflict with utility structures, manhole covers, and storm sewer grates; j. Be marked and signed as required by the current edition of the Manual on Uniform Traffic Control Devices; and k. Be lit to provide positive contrast of the crossing pedestrian; 3. The mid-block crossing may be waived by the technical review committee where: a. Roadway geometry does not provide adequate sight lines; or b. The crossing would encroach on a regulated natural feature (e.g., regulated streams, wetlands, slopes exceeding American with Disabilities Act (ADA) standards, protected trees, etc.).	The requirement for mid-block crossings is a good way to increase safe crossing opportunities in future development. Consider requiring additional safety treatments such as pedestrian-activated beacons and/or median refuge islands. Refer to NCDOT's Pedestrian Crossing Guidance for treatment considerations based on roadway characteristics and traffic volumes. Multi-lane and high-speed roadways in particular may have lower yield rates and be more dangerous for pedestrians to cross. Crosswalk enhancements such as the ones described above can improve driver yielding rates and reduce crashes. **Resources:** • FHWA *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* • NCDOT *Pedestrian Crossing Guidance*

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
Pedestrian facilities required with site improvements	Article 5 - Site Development Requirements, Division 3 - Changes in Use, Section 18-359: Changes in Use	A. Changes in use with no expansion Change from one nonresidential use to another nonresidential use that does not include a building or structure expansion or more than five additional parking spaces above what is already provided shall require: **1. Installation or repair of sidewalk, including associated curb ramps compliant with the Americans with Disabilities Act (ADA), along all adjacent streets and pedestrian connections to all entrances;** 2. Screening of existing and expanded parking with a low buffer at least three feet in height; and 3. Closure or modification of any nonconforming driveways. B. Changes in use with expansion In addition to the requirements for changes in use with no expansion, changes from one nonresidential use to another nonresidential use that include a building or structure expansion greater than five percent in area, or more than five additional parking spaces shall require: 1. Compliance with the requirements of Table 18-326: Required landscaping for expansions; and 2. Bicycle parking as required based on the square footage of the building expansion or at a 1:5 ratio for new parking spaces (whichever is greater). C. Changes from residential to nonresidential use In addition to the requirements of subsections A. and B., any change from a residential use to a nonresidential use shall require: 1. Bicycle parking based on the square footage of the entire building; and 2. Full compliance with divisions 1 and 6 of this article.	This requirement helps complete gaps between existing sidewalks and creates anchors for new pedestrian connections.
Pedestrian connections within parking facilities	Article 5 - Site Development Requirements, Section 18-344: Parking Facilities Design	9. Pedestrian connectivity a. Pedestrian connections to the site and internal pedestrian circulation shall be incorporated into the design of any parking facility. Access to building entrances shall be provided in accordance with Section 18-495: Sidewalks, walkways, and bikeways. b. Pathways or crosswalks shall be distinguished from asphalt driving surfaces using durable, low-maintenance surface materials such as pavers, bricks, or scored, stamped, or colored concrete to enhance pedestrian safety and comfort as well as the attractiveness of the parking area.	Safe pedestrian circulation within parking facilities is important, but specific guidance could be provided as to best practices for placement of walkways and crossings.
Pedestrian connections within courtyards	Article 5 - Site Development Requirements, Division 8 - Alternative Lot Layouts, Section 18-435: Courtyard development	C.4.c.ii. Pedestrian connectivity shall be provided through each central courtyard open space. An **improved pedestrian path or sidewalk** from each dwelling unit to the pedestrian facilities of the central courtyard open space shall be provided.	Consider providing a definition for "improved pedestrian path" and require these facilities to be ADA-compliant (including ramps where needed) and accessible to all types of people walking.

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
District-specific standards related to sidewalks	Article 2 - Zoning Districts, Section 18-44: District-specific standards	UMX District 3. General site design a. Multimodal Transportation i. Pedestrian circulation shall be defined with paving materials and landscaping and shall connect all uses to one another and to the public sidewalk system. ii. Bicycle or pedestrian connectivity to adjacent developments is required. iii. Where no sidewalks currently exist, sidewalks shall be installed [within] the right-of-way between the property line and the back of the curb. iv. The minimum width of newly installed sidewalk shall be five feet, except where sidewalks exist on the same side of the block, in which case, the width of newly installed sidewalks shall align with the existing sidewalk width. b. When new streets are installed, the establishment or continuation of a grid street pattern shall be required. Block lengths within the grid pattern shall not exceed 400 feet between intersecting streets. CBD District 2. Sidewalks a. North of Red Cross Street, where no sidewalks currently exist, sidewalks shall be installed within the right-of-way at a minimum width of 12 feet between the property line and the back of the curb (see Figure 18-44.14: CBD sidewalks north of Red Cross Street). b. Within the CBD, where sidewalks exist on the same side of the block, the width of newly installed sidewalks, including existing sidewalk that is removed and replaced, shall align with or be greater than the existing sidewalk width.	These districts have strong pedestrian and bicycle connectivity standards that align with their intended uses.
OTHER STREETSCAPE STANDARDS RELATED TO PEDESTRIAN-ORIENTED COMMUNITY DESIGN			
Traffic calming	Article 6 - Subdivision Regulations, Division 2 - Improvements Required, Section 18-499: Traffic control devices	**C. When straight street segments exceed 400 feet, appropriate traffic calming devices, as approved by the city manager, shall be incorporated.** Such devices include, but are not limited to, roundabouts, chicanes, and curb extensions.	Traffic calming measures can reduce vehicle speeds, thereby creating a safer and more comfortable environment for people walking and biking. In addition to the devices mentioned in the LDC, speed reduction can also be achieved through medians, street trees, on-street parking, narrower lane width, speed humps/raised crosswalks, and building mass/sight lines. The NACTO Urban Street Design Guide includes considerations for selecting context-appropriate traffic calming measures. **Resources:** • NACTO *Urban Street Design Guide*

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
Lighting	Article 6 - Subdivision Regulations, Division 2 - Improvements Required, Section 18-498: Streetlights	A. Streetlights shall be installed within subdivisions in accordance with the Technical Standards and Specifications Manual. B. At the time of submittal to the technical review committee, it shall be noted on the plan whether standard or non-standard streetlights will be provided. *From Wilmington's Technical Standards and Specifications Manual, pg. 7-24:* *The "standard streetlight fixture" shall be a high-pressure sodium vapor, Type III enclosed cutoff fixture that is attached to an arm bracket to a wooden or fiberglass pole and is leased from Progress Energy Carolinas. "Nonstandard streetlight fixture" shall be a high-pressure sodium vapor, Type V or a Type III "shoebox" fixture leased from Progress Energy Carolinas.* ***These fixtures are typically mounted on top of a fourteen-foot (minimum height) post.***	A 14ft light fixture is considered pedestrian scale, but more guidance is needed on when to use different scales of lighting.
Street trees	Article 5 - Site Development Requirements, Division 1 - Landscaping, Section 18-320: Street trees	Street trees shall be planted in the right-of-way wherever a new street right-of-way is constructed, where new construction occurs along an existing street right-of-way, and where an existing principal building is expanded by 2,500 square feet or more, except for single dwelling detached, duplex, triplex, and quadraplex units. Standards for spacing, tree size, and species shall meet the requirements set forth in the Technical Standards and Specifications Manual (see Figure 18-320: Street trees).	This requirement and other requirements for preserving existing trees help create a more inviting and comfortable walking environment. In addition to their value for improving the air quality, water quality, and beauty of a community, street trees can help slow traffic and improve comfort for pedestrians. Trees add visual interest to streets and narrow the street's visual corridor, which may cause drivers to slow down. When planted in a planting strip between the sidewalk and the curb, street trees also provide a buffer between the pedestrian zone and the street.
Shade requirements	Article 5 - Site Development Requirements, Division 1 - Landscaping, Section 18-318: Shading requirements	A. Shading of impervious surface area shall be required. The requirements of this section shall apply to any of the following development activities within a multiple dwelling, commercial, and industrial zoning districts: 1. Construction of a new building or structure; and 2. Any increase in impervious surface area over 2,500 square feet within a rolling five-year period. B. For purpose of determining if a landscape plan meets the shading requirements of this section, each canopy tree of the type described shall be presumed to shade a circular area of 707 square feet. When smaller shade trees are planted, each tree shall be presumed to shade a circular area of 314 square feet. Perimeter trees shall be credited that portion of the area of the canopy that overlays the lot. C. For existing trees, shading credit shall be given for the canopy overhang existing within the interior of a lot. D. All plantings shall be in accordance with Section 18-315: Standards for landscaping. E. Trees shall be planted to shade impervious surface area as prescribed in Table 18-318: Canopy coverage requirements.	Providing shade through street trees makes walking more pleasant and comfortable for pedestrians, while providing numerous other environmental benefits to the City.

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
Accessibility/clear zones	Article 5 - Site Development Requirements, Division 5 - Signs, Section 18-390: Freestanding signs	C. Sandwich board signs Section 18-390: Sandwich board signs 4. Placement of signs a. Sandwich board signs are allowed only on the sidewalk directly in front of the associated use. b. Along streets with no parallel parking, sandwich board signs shall be placed on the sidewalk within four feet of the curb. c. Along streets with parallel parking, a two-foot step-out zone shall be provided, and sandwich board signs shall be placed on the sidewalk at least two feet from the curb but not more than four feet from the curb. d. The location of any sandwich board sign shall be at least 20 feet from any intersection and at least five feet from any crosswalk or fire hydrant. **e. No sandwich board sign may be placed where the unobstructed space for the passageway of pedestrians is reduced to less than four feet.** All attached fixed objects shall be considered obstructions, including but not limited to trees, poles, signs, hydrants, trash receptacles, and tree grates.	Keeping the pedestrian travelway clear of obstacles is important for accessibility and safety. Based on these requirements, placing a sandwich board on a street with parallel parking would require a minimum 7 foot sidewalk (assuming a sandwich board takes up 1 foot of space) and a street without parallel parking would require a minimum 5 foot sidewalk.
NETWORK CONNECTIVITY			
Block length	Article 6 - Subdivision Regulations, Division 3 - Design Standards, Section 18-523: Blocks, lots, and access	B. Block length 1. Block length standards apply to preliminary subdivision plans, final plats, and site plans submitted in accordance with this article. **2. Within the 1945 Corporate Limits and for all R-5-zoned developments, block length shall not exceed 400 feet.** 3. Unless otherwise stated elsewhere in this chapter, blocks outside the 1945 Corporate Limits shall not exceed 1,000 feet in length and through/connecting streets shall be required. 4. Block length for industrially-zoned developments shall not exceed 1,500 feet. 5. The technical review committee may allow a block to exceed the maximum length if at least one of the following standards are met. a. Approved traffic calming devices, as defined in Article 8, are provided every 400 feet. b. A civic building or open lot is included, if the lot is at least 50 feet wide and deep and a pedestrian connection that directly connects two streets on each block face is provided (see Figure 18-523.1: Pedestrian connection with civic building or open lot). c. The block is interrupted by public parkland, including greenways, that is open and accessible to the public and pedestrian access points are provided with a minimum spacing equal to one-half of the maximum block length (see Figure 18-523.2: Interrupted block). 6. The technical review committee may allow block lengths to exceed the maximum if the applicant demonstrates it is impracticable to achieve due to natural water courses or wetlands as documented by the appropriate regulatory authority.	This section does a good job of relating block length to land use density and typologies to promote connectivity and pedestrian access. Small block size is important for intersection density and interconnectivity which serve to enhance walking, bicycling, and transit-access opportunities. In more walkable areas, blocks as narrow as 200 feet can be desirable. Consider expanding the requirement for sub-400ft blocks to more areas and zones to encourage walkable development. Traffic calming on longer blocks reduces vehicle speeds, providing a safer and more comfortable experience for people walking. In areas with longer blocks (800 feet or greater), consider a requirement for a pedestrian and/or bicycle path of 6-8 feet in width, with an easement of 15-20 feet wide.

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
Cul-de-sacs	Article 6 - Subdivision Regulations, Division 2 - Improvements Required, Section 18-495: Streets	3. Design Whenever cul-de-sac streets are created, at least one 10-foot wide pedestrian access easement shall be provided between each cul-de-sac head or street turnaround and the sidewalk system of the closest adjacent street or pedestrian sidewalk or pathway (see Figure 18-495: Pedestrian connection on cul-de-sac).	Long, dead-end streets and cul-de-sacs create challenges for pedestrians, cyclists, and effective transit and other public services. Requirements for cul-de-sac connectivity, like the one in this section of the LDC, provide more connections for pedestrians and bicyclists. Designing compact and connected developments that do not use cul-de-sacs further supports the goals of Walk Wilmington as well the future growth and policy goals of the City's Comprehensive Plan. Consider limiting the creation of new cul-de-sacs unless no practical alternative exists, or limiting the length of cul-de-sacs to 250 feet or basing the maximum length on a context-based requirement related to the land use and transportation context of the area. Where cul-de-sacs are used, in addition to requiring an easement for a future connection, consider requiring developers to build the pathway or sidewalk, particularly if it will connect to an existing facility. Finally, consider language that requires easements or built connections to future networks even when there is no current sidewalk system on an adjacent street to connect into.
Public transit stations	Article 6 - Subdivision Regulations, Division 2 - Improvements Required, Section 18-496: Public transportation system	Public transportation system terminal facilities (to include turnout lanes, shelters, signs, and markings) along city-maintained streets shall be constructed, provided, and installed in accordance with the Technical Standards and Specifications Manual and acceptable traffic engineering specifications and standards. Such facilities along roadways maintained by the North Carolina Department of Transportation (NCDOT) shall be installed in accordance with NCDOT specifications and standards.	Wilmington's Technical Standards and Specifications Manual, Section VIII - Public Transportation, contains minimum design specifications and standards for terminal facilities and provides guidance for location placement of facilities. In addition to the terminal facilities themselves, the specifications should include provisions to ensure that safe, comfortable, and convenient pedestrian crossings to terminal facilities are provided. The NACTO Transit Street Design Guide details best practices for terminal facility design, with many considerations for the placement and design of transit stops on streets with different types of pedestrian and bicycle facilities, such as sidewalks, multi-use paths, bike lanes, and cycle tracks. Resources: • NACTO *Transit Street Design Guide* • FHWA *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* • NCDOT *Pedestrian Crossing Guidance*

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
Open space set-aside	Article 6 - Subdivision Regulations, Division 2 - Improvements Required, Section 18-507: Open space	B. Standards for open space areas Any area dedicated for required open space set aside shall meet the requirements of articles 2 and 8 of this chapter. Except as otherwise approved by the design adjustment committee, all park, recreation, and open space set-aside areas shall meet the following criteria: **1. Consistency with parks master plan** **If any portion of any subdivision proposed for residential development lies within an area designated on a master parks plan officially adopted by the city or by New Hanover County as a park, such area shall be included as part of the area set aside to satisfy the requirements of this section.** **2. Greenways** **If open space is a greenway, the land shall be a continuous linear lot through the subdivision of at least 30 feet in width.** 3. Access All dwelling units in the subdivision shall have free, easy, and convenient ingress and egress to and from the park, recreation, and open space areas provided within the development by means of improved streets or dedicated walkways. Rights-of-way for such access shall be shown on the preliminary plans and final plats. 4. Topography The average slope of the portion of dedicated land deemed usable for active recreation shall not exceed the average slope of the entire subdivision to be developed, and in no case shall the slope of the land dedicated be greater than 15 percent.	The current language requires open space dedication for facilities designated on a parks master plan; expand the requirement to include areas designated on bicycle/pedestrian/greenway plans and comprehensive plans as future trails and greenways. Some NC cities go further in requiring construction of greenways where they are part of an adopted plan. Consider adding requirements for greenway corridor construction in new developments where a greenway or trail is shown on an adopted plan or where a property connects to an existing or proposed greenway in an adopted plan. **Resources:** See requirements in Wake Forest, NC UDO, Section 6.8.2 Greenways: "When required by Wake Forest Open Space & Greenways Plan or the Wake Forest Transportation Plan, greenways and multi-use paths shall be provided according to the provisions [that follow in the section cited above]." http://www.wakeforestnc.gov/udo.aspx
PARKING REQUIREMENTS			
Parking quantity requirements	Article 5 - Site Development Requirements, Division 2 - Parking Standards, Section 18-340: Applicability	1. Off-street parking shall be provided for all new residential buildings and uses pursuant to Table 18-341.1: Residential parking ratios. 2. There shall be no minimum off-street parking requirement for nonresidential buildings or uses. Maximum off-street parking is established in Table 18-341.2: Nonresidential baseline parking ratios by use.	The removal of most parking minimums and introduction of parking maximums for non-residential uses supports the goal of a walkable city.

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
Parking quantity requirements	Article 5 - Site Development Requirements, Division 2 - Parking Standards, Section 18-340: Applicability	A. Parking standards 1. The maximum number of spaces for nonresidential uses shall be limited based on the ratios in Table 18-341.2: Nonresidential baseline parking ratios by use. An increase in parking over this ratio may be permitted subject to a parking analysis, per the standards of this section. 2. Outside of the 1945 Corporate Limits, **minimum off-street parking shall be applicable to residential dwelling units, group living uses, and nonresidential uses located in residential zoning districts.** **3. There shall be no minimum parking requirements** except that for nonresidential uses within 650 feet of a single-dwelling residential district that include less than 40 percent of the maximum number of parking spaces for that use, a parking analysis, per the standards of this section, shall be required to demonstrate that adequate parking would be provided. B. Off-street parking in residential districts 1. The minimum and maximum number of spaces outside of the 1945 Corporate Limits shall conform to the parking ratios listed in Table 18-341.1: Residential parking ratios. 2. If not included in Table 18-341.1: Residential parking ratios, the maximum number of spaces allowed for nonresidential uses in residential zoning districts outside of the 1945 Corporate Limits shall conform to the maximum number allowed in Table 18-341.2: Nonresidential baseline parking ratios by use, except with a parking analysis per the standards of this section. C. Residential parking exceptions Minimum parking requirements for multiple dwelling, townhouse, group homes, and dormitory, fraternity, sorority house units may be reduced by up to 15 percent from the prescribed parking ratios when the use is located within one-quarter of a mile radius of a transit stop.	The removal of many parking minimums, along with incentives for providing only the necessary amount of parking (as opposed to providing more than necessary), are policies that support the goals of this plan and will help create a more dense and walkable network.
Bicycle parking quantity	Article 5 - Site Development Requirements, Division 2 - Parking Standards, Section 18-342: Bicycle parking	A. Applicability **1. Bicycle parking shall be provided with each new multiple dwelling, mixed-use, commercial, institutional, or office development and any redevelopment with 15 or more vehicle parking spaces per the requirements in Table 18-342: Bicycle parking requirements.** 2. No bicycle parking spaces shall be required beyond 30 spaces; however, additional spaces may be installed. 3. When there is more than one principal use on a site, the required bicycle parking for the site shall be the sum of the required parking for the individual principal uses. 4. Developments in the CBD shall be exempt from required bicycle parking; however, bicycle parking spaces may be installed. 5. In the UMX district, designated on-street public bicycle parking spaces, located within 325 feet of the use, may be counted toward the minimum requirements in Table 18-342 if approved by the technical review committee.	Bicycle parking requirements can contribute to a creating a supportive culture for walking and biking by making it more convenient for people to safely store their bicycles. The current language excludes the CBD zone from the requirement. Consider language that requires some amount of bicycle parking in new development in the CBD if there is not already a sufficient amount of bicycle parking nearby.

TOPIC	SECTION	EXISTING CODE LANGUAGE	COMMENTS
Bicycle parking standards	Article 5 - Site Development Requirements, Division 2 - Parking Standards, Section 18-342: Bicycle parking	B. Design and installation requirements 1. Bicycle parking facilities shall allow for cyclists to secure their vehicle against theft. 2. Required bicycle parking facilities shall be within 100 feet of the primary entrance(s) to the principal uses, including on-street facilities, where permitted and installed in accordance with the Technical Standards and Specifications Manual. In the event of multiple entrances, bicycle parking facilities shall be dispersed for easy access to entrances. 3. Bicycle parking areas shall be installed on hard surfaces. This may include pavement or pervious pavers. If bicycle lockers are used, they shall be located within 325 feet of building entrances. Hanging spaces may be incorporated into structured parking. 4. Bicycle parking areas and pathways connecting them to the buildings they serve shall be lighted in accordance with division 9 of this article. *From Wilmington's Technical Standards and Specifications Manual, pg. 7-21:* *F. BICYCLE PARKING* *Where Bicycle Parking is provided under Section 19-43, Paragraph (f) of the City Zoning Ordinance, the following standards shall apply:* *a. Construction* *When a bicycle parking facility is adjacent to motor vehicle parking, the surface and subgrade construction shall be the same as that for the adjacent motor vehicle parking.* *b. Bicycle Parking Mechanisms* *All bicycle parking facilities should accommodate a minimum of four (4) bicycles per 150 square feet. Mechanisms for securing the bicycles in place should consist of a standard rack anchored into the subgrade.*	Bike trips often include a walking component (e.g., riding a bicycle from home, parking, and walking to a final destination, or biking to a transit stop, parking, taking a bus, and walking to a final destination). Providing convenient and secure bicycle parking can encourage these types of multimodal trips. The code mentions multiple types of secure bike storage, but could provide guidance on when different types are appropriate. For example, at residences, where bikes are likely to be stored overnight or for long periods of time, consider higher-security parking such as bike lockers. At commercial and other destinations where short-term (several hours) parking is needed, a standard bike rack can be used. Also consider requirements for styles of bike racks such as inverted "U" racks, which 1) support the bike frame at two points of contact, 2) allow users to lock the bike frame and one wheel to the rack, 3) accommodates many different bike styles (e.g., cargo bikes) and 4) do not require users to lift the bicycle. The requirement for proximity to adjacent building entrances is good, but consider a requirement that a sidewalk or clear pedestrian path connects the bicycle parking to building entrances. **Resources:** • Association of Bicycle and Pedestrian Professionals *Bicycle Parking Guidelines* • City of San Francisco *Zoning Bulletin No. 9: Bicycle Parking Requirements* for designs/layout/etc. The document includes limits on hanging racks, how to park family bikes, and various configurations. The city separates bike parking into two tiers based on length of use.

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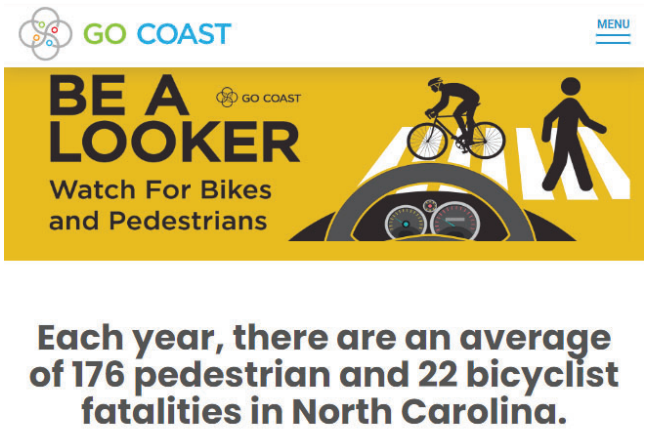
Existing Programs to Support Walking

"Be a Looker"

Lead Agency: WMPO

"Be a Looker" is a program of Go Coast, WMPO's Transportation Demand Management program. Similar to the statewide program, Watch for Me NC, "Be a Looker" educates the public on best practices and laws pertaining to bicycle and pedestrian safety and aims to foster a safe and respectful culture around walking and biking in the Wilmington area.

The original campaign ran from April to September 2019. The project website is still active and displays links to learn about pedestrian and bicycle safety, take a safety pledge, and request program materials. This program will continue to run on a regular basis.



Go Coast's Be a Looker webpage includes pedestrian and bicycle safety information.

WMPO and GoCoast published a 2019 program report detailing the campaign and its impact. The campaign included eight strategies/channels for visually communicating the program's safety messages:

1. Images on WAVE Transit shuttles
2. Digital billboards
3. Mass email
4. Local media
5. Social media
6. Community events
7. Print material
8. Website

WMPO estimated the number of impressions (people viewing the materials and receiving the message) and conducted a survey about the campaign. Digital billboards were one of the most cost effective ways of reaching a large number of people. Survey responses indicated support for the campaign and the goal of culture change, while acknowledging that changing behaviors and perceptions is a long-term process.

Watch for Me NC

Lead Agency: WMPO, local jurisdiction

Wilmington and local partners (including WFD, WPD, and Wilmington Communications Department) have participated intermittently in this statewide program aimed at reducing pedestrian and bicycle injuries and fatalities through public education and high visibility enforcement.

The program includes training for local law enforcement to conduct focused enforcement campaigns, educational outreach materials, and marketing campaigns. With WMPO as the lead agency, Wilmington participated in 2014, 2016, 2017, and 2020. Other partners have included New Hanover County; the cities of Carolina Beach, Wrightsville Beach, and Kure Beach; UNC-Wilmington and Cape Fear Community College; the local cycle club; the transit authority, Wave Transit, and the Wilmington Department of Public Safety.

The 2019 "Be a Looker" program report noted that in recent years, local law enforcement had less interest in participating in Watch for Me NC due to lack of time and resources; "Be a Looker" is modeled after Watch for Me NC and aims to address the issue of law enforcement capacity while educating community members about walking and biking safety.

Watch For Me NC educational materials include eye-catching posters and stickers.

WMPO Bicycle and Pedestrian Advisory Committee (BPAC)

Lead Agency: WMPO

The BPAC meets bi-monthly to provide guidance and feedback on bicycle and pedestrian needs in the region. This includes drafting model ordinance, identifying infrastructure needs and challenges, outreach, education, and advocacy for proposed projects. The WMPO BPAC is comprised of MPO member jurisdiction staff and citizens and is appointed by the MPO Board members.

City of Wilmington Bicycle and Pedestrian Committee

Lead Agency: City of Wilmington

This committee meets monthly and has a budget to address identified pedestrian and bicycle needs.

Program Recommendations

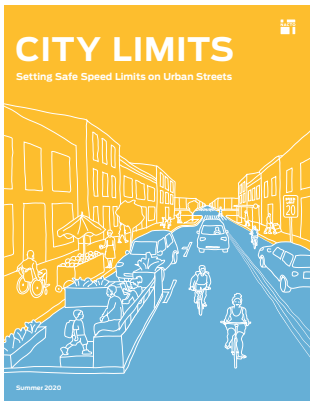
Safe Speed Study/Citywide Safe Speed Program

Conduct a Safe Speed Study to determine the safest maximum speed limits for places where people walk in Wilmington.

Lead Agency: City of Wilmington
Potential Partners: WMPO, NCDOT

Speed is a key factor in the severity and number of pedestrian crashes nationwide and in Wilmington. For example, the City and NCDOT's 2021-2022 Pedestrian Safety Study found that the highest percentage of pedestrian K/A crashes in Wilmington occurred on 40-45 mph roads (62% of fatal and 39% of serious injury crashes).

On major streets, where conditions vary widely, cities can conduct a Safe Speed Study to determine the safest maximum speed limit. NACTO City Limits provides guidelines for setting safer speed limits in urban areas. The guide uses a context-sensitive approach to set speed limits citywide or for individual corridors, based on street characteristics. The approach includes three methods, which can be combined to suit the context of the environment: 1) setting default speed limits on many streets at once, 2) designating slow zones in certain areas, and 3) setting corridor speed limits on priority streets.



NACTO City Limits guide.

In urban areas, a Safe Speed Study will most often result in a recommended maximum speed limit of 20 or 25 mph for major streets. For streets that have well-protected places for people to walk and bike, and that are in low density areas with primarily manufacturing and residential uses, cities may find that a 30 or even 35 mph speed limit is appropriate. However, these higher speed limits should be used sparingly and only in cases where safe conditions can be met.

Program Considerations: Safe speed studies could be stand-alone or folded into other studies, such as a Vision Zero Action Plan. The cost of actually lowering speeds as a result of such a study is estimated to be in the range $4,000-5,000 per mile and something crews can implement quickly versus deeper-dive design changes that cost more and take longer to implement. A citywide speed-lowering program in Seattle, for example, is estimated to cost just over $1.5M.[1] Program funding could be from CIP or outside sources such as part of an SS4A grant application.

1. https://visionzeronetwork.org/webinar-recap-cities-managing-speed-for-safety-learning-from-seattle-and-minneapolis/

Neighborhood Traffic Safety Campaign

Conduct a neighborhood safety campaign aimed at establishing community norms and culture around pedestrian safety and reducing driving behaviors that are especially dangerous to pedestrians, such as speeding and failing to yield to people in crosswalks.

Lead Agency: City of Wilmington
Potential Partners: Local law enforcement, community groups and neighborhood associations, Communications Department, Wilmington Fire Department (WFD)

Wilmington can build upon previous pedestrian safety campaigns ("Be a Looker" and Watch for Me NC) and neighborhood traffic management program by conducting a campaign that engages residents and community members. Public participation in the campaign is important for establishing agreed-upon community values and norms around walking and biking. Involving the community in campaign development can foster a sense of shared responsibility around pedestrian safety. Residents can also provide key insights into what messaging will resonate with their neighborhoods, and local perspectives on safety issues and priorities related to walking.

Highly visible campaign materials like stickers, posters, yard signs, and bus wraps can serve as visual cues to convey acceptable behaviors to visitors and residents alike. Community members can serve as ambassadors, whether in official capacities or unofficially (e.g., by displaying stickers and yard signs or sharing information with their social networks).

Wilmington can look to crash data and police crash reports to identify specific areas and behaviors to target for the campaign. Behaviors are often linked to cues from the physical environment as well as social and cultural norms; therefore, this campaign could be paired with another program or engineering project, such as a speed limit reduction or installations of new pedestrian infrastructure like PHBs or other crossing improvements. However, this may limit the ability to evaluate whether any effects were due to the campaign or other projects/programs.

The targeted behaviors of the campaign will inform the performance measures and evaluation effort. Potential measures include number of impressions, attitudes towards pedestrians, awareness of the campaign, knowledge of traffic laws relating to walking, change in self-reported behaviors, observed behaviors. Evaluation can include qualitative and quantitative measures like surveys, interviews, and observations.

Program Considerations: Campaign costs vary widely on the intensity and duration of the campaign and the degree to which existing staff time is used. The cost range for a campaign similar to the case study example on the following page is in the range of $100,000-$150,000 for a small city.

CASE STUDY:

A Community-Driven Campaign for Safer Neighborhood Streets

In 2021, Alta helped the City of Lawrence, KS, conduct a traffic safety education and outreach campaign aimed to help make neighborhood streets safer, more comfortable, and accessible to all. The campaign was part of a citywide program to manage traffic on neighborhood streets, which included a speed limit reduction on all neighborhood streets plus enforcement efforts.

The resulting "Safer Neighborhood Speeds" campaign focused on reducing three unsafe driving behaviors that community members most commonly report to the City:

- Speeding
- Driving while distracted
- Drivers failing to yield to people trying to cross the street

Community participation was key to the success of the campaign. The campaign team engaged the public, multimodal transportation commissioners, and City staff to help shape the campaign. More than 1,000 community members helped to select the campaign look and feel. Neighborhood groups, schools, and businesses helped spread awareness. Sixty community ambassadors promoted the campaign in their neighborhoods.

To evaluate the campaign's effectiveness, the City conducted pre- and post-campaign surveys to gather the public's baseline perceptions and feedback. The survey results provided insight into the campaign's reach and impact. The city also evaluated the 85th percentile speeds before and after the campaign.

The project team used surveys to evaluate the campaign's effectiveness at changing unsafe behaviors.

Community members helped select the campaign's graphics and slogan used on promotional materials.

Non-Motorized Traffic Count Program

Implement a program to count non-motorized traffic (i.e., people walking, biking, and using other small personal mobility devices) on sidewalks, bike lanes, shared lanes, and shared-use paths across the city.

Lead Agency: WMPO
Potential Partners: City of Wilmington, UNCW, Wilmington Police Department (WPD)

WMPO regularly conducts vehicle traffic counts for the MPO area, including within the City of Wilmington. To a lesser extent, WMPO collects some bicycle and pedestrian counts. A formalized non-motorized traffic count program would provide Wilmington with valuable information about when, where, and how often people walk in Wilmington. Data about pedestrian activity will help the City understand overall walking patterns, identify high-activity areas, and track changes in use of facilities seasonally and over time. Local planners can use this information to plan and prioritize projects, assess needs for improvement, and evaluate the usage (and return on investment) of completed projects. Better data on pedestrian and bicycle travel can help to determine where investments are most needed and quantify the benefits of walking and biking. Count data also makes active transportation projects more competitive for funding opportunities, including NCDOT funding.

Many types of non-motorized count programs and counter technologies exist; WMPO should choose a method that is feasible and cost-effective to implement and maintain. To understand some of the different options, refer to the 2021 study by NCDOT and the Institute for Transportation Research and Education (ITRE), *State-of-the-Art Approaches to Bicycle and Pedestrian Counters*. The report describes the state of the practice nationally for non-motorized traffic counts, including costs, benefits, and limitations of various counter technologies and considerations for managing and integrating data across other government agencies (such as state and local agencies).

Program Considerations: Costs per unit for counting equipment vary by the technology used, which also impacts count accuracy. The NCDOT/ITRE report referenced above compares over 20 different systems, their costs, and their strengths and weaknesses. Costs for some of the higher-rated counting equipment in that study ranged from $1,500-6,500/unit.

Safe Routes to Schools and Parks

Develop action plans for active transportation connections to both schools and parks in Wilmington building off the Focus Area recommendations in this pedestrian plan update.

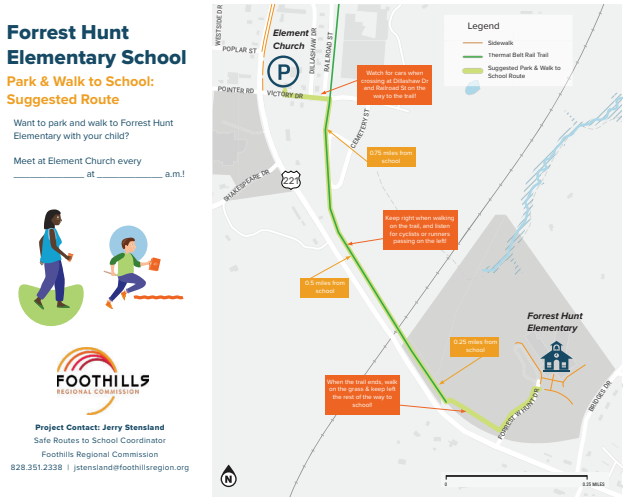
Lead Agency: City of Wilmington
Potential Partners: Local school administrators

Safe Routes to Schools and Parks enables and encourages children to walk and bike to schools and parks. These programs facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools and parks.

Both schools and parks are key local destinations with significant amounts of local travel (i.e., shorter, walkable distances). If connected by all ages and abilities pedestrian infrastructure, they have the potential to influence a shift to more active modes of transportation.

Serving as 'mini' pedestrian/bicycle plans for each school/park, these planning processes could begin by incorporating the recommendations for the network updates from this plan, and further explore opportunities and challenges for infrastructure, programming, and policy.

For schools seeking to implement Safe Routes programs, National Walk to School Day can serve as a starting point. This event is organized by the National Safe Routes to School Partnership. More information is available at www.walkbiketoschool.org.



This "Park and Walk to School" map from Forest City, NC shows the meetup point and route for a walking school bus.

Program Considerations: Program costs vary based on scope and scale of the program. For example, NCDOT's SRTS Program will use federal funds to fund projects ranging from one to three years, with funding amounts ranging from $50,000 to $500,000 per program.[1]

1. https://connect.ncdot.gov/projects/BikePed/Pages/Non-Infrastructure-Alternatives-Program.aspx

Vision Zero Policy and Action Plan

Create and adopt a Vision Zero Policy and develop an action plan as part of a formalized program to eliminate traffic deaths in Wilmington. Develop clear objectives and action items to achieve the goal. Prioritize safe street design to minimize the impact of human error on our roadways. Use education and enforcement strategies to supplement safe street design.

Lead Agency: City of Wilmington
Potential Partners: WMPO, WPD, WFD, New Hanover County Schools, community groups and neighborhood associations, and many other stakeholders

The Vision Zero philosophy rejects the notion that traffic fatalities are inevitable and proactively tries to keep people safe. Key tenets of the Vision Zero safe system approach are that design should seek to prevent crashes, and that we can always afford to take steps that save lives.

Wilmington has already been taking important steps to making its streets safer for residents and visitors, including incorporating pedestrian-friendly polices into the Land Development Code, conducting the Citywide Pedestrian Safety Study with NCDOT, and participating in traffic safety educational programs like Watch for Me NC and "Be A Looker." A Vision Zero policy and action plan will build on these efforts.

A Vision Zero policy and action plan would provide a framework for City departments and community stakeholders to work together to eliminate traffic deaths. The policy would be a long-term promise to put safe mobility at the forefront of all decisions made regarding transportation policy and projects going forward. The goal of zero deaths on the Wilmington's roads is not one that will be accomplished in a few years. It will take a continuing effort by many stakeholders, including residents, to change the nature of the roadways and the culture of mobility in Wilmington. This ongoing effort will occur over decades, and the City will need to become dedicated to making the changes necessary to achieve zero traffic deaths.

The federal Safe Streets and Roads for All (SS4A) grant program can be used to fund Vision Zero and safety action plans. See **Appendix C: Funding Resources** for more details about the program.

Program Considerations: Cost varies by the size of the community and the scope of the planning process. For example, current Safe Streets and Roads for All (SS4A) planning grants range from $200,000-$1M.

Safe Systems Prioritize People

Vision Zero follows a "safe systems" framework, which recognizes that all facets of the transportation environment work together as a system. Systemic changes are needed in order to prevent traffic-related deaths and serious injuries. This represents a paradigm shift from many traditional approaches to road safety, which depend on human road users to not make mistakes.

Key components of safe systems are safe streets and safe speeds.[1] Safe streets have physical separation of people walking and biking from people driving and use design elements that slow vehicles and improve visibility. Safe speeds refers to managing speeds in a way that protects all road users; this means prioritizing lower speeds where people walking and biking could cross paths with drivers. In all cases, safe systems should center vulnerable populations that experience a disproportionate rate of injuries and fatalities.

As a growing number of communities in the United States adopt Vision Zero policies, peer cities can look to one another for lessons learned and success stories. The ***Vision Zero Network*** compiles many resources and case studies to support communities implementing Vision Zero policies and programs, as well as those who are interested in beginning.

1. Vision Zero Network. https://visionzeronetwork.org/resources/demystifying-the-safe-system-approach/

Traditional Road Safety Practices vs. Safe System Approach

Whereas traditional road safety strives to modify human behavior and prevent all crashes, the Safe System approach also refocuses transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives.

TRADITIONAL		SAFE SYSTEM
Prevent crashes	→	Prevent deaths and serious injuries
Improve human behavior	→	Design for human mistakes/limitations
Control speeding	→	Reduce speed
Individuals are responsible	→	Share responsibility
React based on crash history	→	Proactively identify and address risks

Pedestrian Wayfinding

Create and implement a pedestrian wayfinding scheme that can be incorporated into the City's current wayfinding signage.

Lead Agency: City of Wilmington
Potential Partners: Wilmington Visitors Bureau and tourism agencies, WMPO BPAC

A pedestrian wayfinding system is similar to transit, vehicular, or bike facility wayfinding systems in that it consists of comprehensive signage and/or pavement markings to guide pedestrians to their destination along routes that are safe, comfortable and attractive. Signage can serve both wayfinding and safety purposes including:

- Helping to familiarize users with the pedestrian network, including guiding users to nearby facilities and crossings
- Helping users identify the best routes to destinations within walking distance or connections to other modes
- Helping to address mis-perceptions about time and distance
- Helping overcome a "barrier to entry" for people who are not frequent walkers

Pedestrian signage throughout Wilmington should indicate the direction of travel, and distance and travel time to destinations. The City's 2016 Comprehensive Plan briefly touches on wayfinding and recommends creating a unified wayfinding system for bicyclists, pedestrians, and vehicular travelers.

Interactive kiosk for pedestrians in downtown Fuquay-Varina, NC.

Program Considerations: Wayfinding programs for a small city could range from $50,000-$100,000 for the signage and wayfinding plan, with the costs of implementation depending on the number and types of signs installed.

Walk Friendly Community Designation

Apply to become a designated Walk Friendly Community (WFC).

Lead Agency: City of Wilmington
Potential Partners: WAVE Transit, WMPO, WFD, New Hanover County Schools, UNCW, WMPO BPAC, and others

WFC is a national program that recognizes municipalities that have made efforts to prioritize walkability in their communities. WFC communities include those that are working to improve safety, mobility, access, and comfort for people walking.

The application consists of an assessment tool that measures a community's progress in the areas of planning, education, encouragement, enforcement, engineering, and evaluation. The application process itself supports walkability by:

- Building new local partnerships
- Collecting data for future planning efforts
- Documenting all local walking-related programs, projects, and policies
- Identifying areas of needed improvement
- Providing tools to develop specific solutions before the application is submitted
- Offering feedback and further suggestions to the community after application review
- Creating momentum for future projects

To prepare, Wilmington should take the brief self-assessment and assemble a team of partners that will help with the application. These partners could include representatives from: City of Wilmington planning and development, engineering, police, and public services departments; WAVE transit; New Hanover County Schools; and advocacy and community groups.

Program Considerations: The largest costs associated with the designation are in the many program and infrastructure improvements needed to create a walk-friendly community. The actual cost of applying can be covered in existing staff time for the application process; much of the data and information in this Walk Wilmington Plan will be helpful for the process.

The application and other resources are available at: *www.walkfriendly.org*

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Implementation

Realizing the vision for Wilmington's safe, comfortable, all-ages-and-abilities pedestrian network will require ongoing efforts from City and MPO staff, elected officials, local organizations, and community groups over the coming years. This chapter outlines the immediate, mid-term, and long-term actions needed to achieve the goals in this plan.

Framework for Implementation

WILMINGTON METROPOLITAN PLANNING ORGANIZATION (WMPO)

- ★ Coordinate with partners on project development.
- ★ Support and assist the City of Wilmington with additional planning, permitting, public engagement, and implementation.
- ★ Provide funding to support the implementation of the pedestrian plan.
- ★ Pursue project opportunities, including ways to leverage funds across federal, state, local, private, and non-profit sources.

CITY OF WILMINGTON

- ★ Coordinate with local stakeholders, such as community leaders and local/regional non-profits, to involve them in project development tasks as needed.
- ★ Coordinate with WMPO and NCDOT to leverage local project funding.
- ★ Work with local landowners (and a local land trust, if necessary) to secure trail easements along planned routes.
- ★ Work with local utility operators (such as Duke Energy) and developers to dedicate right-of-way for projects such as greenways.
- ★ Work with developers to make sure new development and redevelopment projects comply with Wilmington's Land Development Code, specifically policies that promote walkability and connectivity.
- ★ Design roads that are safe for pedestrians facilitate pedestrian activity.

LOCAL LAND TRUSTS

The City of Wilmington should work with a local land trust such as NC Coastal Land Trust to help secure trail conservation easements along proposed trail/greenway corridors.

NEW HANOVER COUNTY SCHOOLS

Leaders from New Hanover County Schools should continue to stay involved in project planning by leveraging their relationships with the local community to support projects that improve walking and biking.

NON-PROFIT AND ADVOCACY PARTNERS

Non-profit and advocacy partners could include East Coast Greenway, Wilmington Downtown iNC, Port City United, and many others. These partners could lead or support in many different areas of project implementation, as they:

- ★ Promote public awareness of the benefits of investing in walkability, especially safety benefits.
- ★ Communicate the economic benefits of more walkable communities to local businesses.
- ★ Promote safe walking, bicycling, and driving behaviors.
- ★ Advocate for access to trails and the outdoors.
- ★ Coordinate volunteer trail projects and maintenance of trails.
- ★ Advocate for adoption of local and regional walking, biking, and trail plans.
- ★ Advocate for safe and sustainable active transportation.
- ★ Advocate for walkable places as a tool for economic development.

NCDOT

- ★ **NCDOT Division 3** is responsible for the construction and maintenance of pedestrian facilities on NCDOT-owned roadways in Wilmington (unless Wilmington takes responsibility through an encroachment agreement).
- ★ **NCDOT Integrated Mobility Division (IMD)** administers bicycle and pedestrian grants and provides regional technical assistance. IMD is part of the Complete Streets Technical Team, and can support partners with interpretation of the Statewide Complete Streets policy.

OTHER TRANSPORTATION AND UTILITY PARTNERS

- ★ **Utility providers**, such as Duke Energy, can be amenable to trails and walking paths through certain utility easements, as long as the facilities comply with their requirements.
- ★ **Railroad operators** should be engaged as stakeholders when projects would impact an at-grade rail crossing.

PRIVATE PARTNERSHIPS

- ★ **Higher education partners**, such as UNCW and Cape Fear Community College, can promote safe walking, biking, and driving behaviors on their campuses.
- ★ **Local and regional businesses** should help promote project funding and could possibly capitalize on increased business that results from project completion.
- ★ **Consultants** should provide guidance to WMPO, City of Wilmington, New Hanover County, and partners on project development, ROW/permitting, design, and construction.
- ★ **Developers** in Wilmington should recognize the quality of life benefits that walkable communities bring; champion the development of bicycle and pedestrian infrastructure through development partnerships; and market walkability as a key feature and selling point to prospective buyers/residents.

Implementation Action Steps

ACTION	DETAILS	LEAD	SUPPORT	TIMEFRAME
ADMINISTRATIVE ACTION STEPS				
Adopt Walk Wilmington as the City's Pedestrian Transportation Plan.	Through adoption, the Plan becomes an official planning document of the City. Adoption does not commit the City to dedication of funding, but rather shows intention to support plan implementation over time. It also signals to outside funding groups that Wilmington has undergone a successful, supported planning process, which is key to securing outside funding.	City Council	City staff, project consultants, Steering Committee	2023
Designate BPC staff time to lead implementation of Walk Wilmington.	WMPO, the Wilmington City Manager, Wilmington Police Department (WPD), Wilmington Fire Department (WFD) and City directors of Planning and Development; Engineering; Community Services; and Public Services should each identify their respective staff leads for implementing this pedestrian plan. A staff organizational chart for plan implementation should be shared among departments, so there is a known point person for each. In the future, the City may choose to create a designated position of "Pedestrian Plan Coordinator" within the BPC.	City Council and City Manager	Multiple City department directors, WMPO, WPD, and WFD	2023
Continue to convene the City of Wilmington Bicycle and Pedestrian Committee (BPC).	The BPC should continue to meet regularly and be involved in promoting projects and leading advocacy efforts around walkability.	BPC	N/A	2023
Create a Bicycle and Pedestrian Task Force to evaluate methods to reduce walking and biking conflicts and prioritize projects in priority areas.	The task force composition is to be determined by the City and WMPO, but could be made up of a combination of City, WMPO, NCDOT, and possibly BPAC representatives. Task force should meet quarterly.	BPC	WMPO	2024 onward
Communicate this plan's priority projects to potential implementation partners.	The purpose of this step is to network with potential project partners, and to build support for implementing the top projects. Possible groups to receive a presentation/coordination meeting include: WMPO, NCDOT Division 3, New Hanover County, and neighboring jurisdictions.	BPC	N/A	Ongoing

ACTION	DETAILS	LEAD	SUPPORT	TIMEFRAME
Begin annual Walk Wilmington meeting.	Coordination between key project partners will provide a level of accountability, and ensure that recommendations are implemented. Key project partners should meet on an annual basis to discuss and evaluate the implementation of this Plan. A brief progress benchmark memo should be a product of these meetings, and participants should reconfirm the plan's goals each year. The meetings could also occasionally feature special training sessions, or include on-site tours of recently completed projects and upcoming priority project corridors.	BPC	City department leads, WMPO, NCDOT Division 3 highway staff and planning engineer	2023 onward
Track plan progress and share updates.	Track progress towards plan goals using the performance measures in this plan. Progress should be shared with City Council and key partners at least annually (such as at the annual meeting described in a previous step). Progress and updates should also be shown on a public-facing website for transparency and accountability.	BPC	N/A	Ongoing
Update Walk Wilmington.	This plan should be updated by 2028 (about five years from adoption). If many projects and programs have been completed by then, a new set of priorities should be established. If not, a new implementation strategy should be established, potentially reassigning project priorities.	City Council, BPC, City Manager and staff	WMPO	2028
INFRASTRUCTURE AND FUNDING ACTION STEPS				
Ensure that projects are incorporated in NCDOT's prioritization process.	The City of Wilmington, WMPO, and NCDOT Division 3 should coordinate to fund recommendations from this plan over time. Use the plan cut-sheets and recommendation maps to communicate project details and to submit projects for funding. Projects that have secured public right-of-way and design completed (or at least underway) will be more competitive. The state should be prepared to incorporate the recommendations of the plan info projects in the STIP.	BPC	WMPO, NCDOT Division 3	2023 onward
Seek multiple funding sources and facility development options.	It will be necessary to consider many different sources of funding that together will support plan implementation. Funding sources can be used for a variety of activities, including: programs, planning, design, implementation, and maintenance. The appendix outlines the most likely sources of funding from the federal, state, and local government levels as well as from the private and non-profit sectors.	BPC, City Council	N/A	2023 onward

ACTION	DETAILS	LEAD	SUPPORT	TIMEFRAME
Develop a long-term funding strategy.	To allow continued development of the project recommendations, capital funds for pedestrian and trail facility construction should be set aside every year. Funding for an ongoing maintenance program should also be included in the City's operating budget. Consider incorporating Walk Wilmington recommendations into a multi-year bond package for the City, along with other initiatives, such as with projects related to parks, recreation, and transportation improvements. Pursue large-scale Federal funding for complete networks of recommendations (Priority Focus Areas from this plan), such as the Safe Streets and Roads for All (SS4A) Infrastructure Grant.	BPC, City department leads	City Council	2023 onward
Begin priority projects.	Dedicate funding, seek proposals, and hire a contractor for a site survey, construction documents, and permitting. Confirm that the project can be designed completely within existing public right-of-way, and secure easements if needed. When design is complete, select a phase of the project to be constructed first, based on costs and funding available at that stage. Send the project out to bid, select a contractor, and begin work.	BPC	City Council, City department leads, consultants, contractors	2024 onward
PROGRAM AND POLICY ACTION STEPS				
Ensure that Walk Wilmington recommendations are implemented as part of new development.	Update the LDC using the recommendations in Chapter 4: Programs and Policies. Update other City documents and maps with plan recommendations to make sure planned projects and improvements can be constructed as new development or redevelopment occurs.	BPC	Designated staff from Planning and Development Department	2023
Update the Technical Standards and Specifications Manual and Standard Detail Files.	The LDC review pointed out several areas where the Technical Standards and Specifications Manual conflicts with the recent LDC updates, or does not provide guidance on some areas. Wilmington should update the specifications to align with LDC policies and industry best practices for pedestrian facility design.	BPC	Designated staff from Engineering Department	2023
Develop an Access to Transit Plan for WAVE Transit.	Conduct a study to identify needed improvements to WAVE Transit service, access, and stops. Develop a plan and process that prioritizes improvements based on relevant factors such as ridership, equity, connectivity to jobs and destinations, and safety.	WAVE, WMPO	City of Wilmington staff, consultants	2023

ACTION	DETAILS	LEAD	SUPPORT	TIMEFRAME
Interagency coordination on street trees.	The Tree Maintenance Section of Wilmington's Community Services department is responsible for maintaining the city's urban forest, including more than 30,000 street trees on City-owned and NCDOT roadways. BPC staff should coordinate with tree maintenance staff to assess and fulfill needs for street trees in priority focus areas of this plan.	BPC	Wilmington Community Services	2023 onward
Invest in staff training opportunities related to pedestrian infrastructure.	Consider trainings from the National Association of City Transportation Officials (NACTO) on the Urban Street Design Guide. These trainings can be customized for City staff, helping to ensure that as new facilities are designed and constructed, they are up to world-class standards for safety and functionality. If Wilmington hosts the workshop, they could strategically invite NCDOT division staff, WMPO staff, and others who would be partners in implementation. Cost sharing for the training could come from participation of staff from neighboring municipalities. More info: https://nacto.org/training-and-workshops/	City Manager and Department Heads	BPC, Engineering Division	Training would be most beneficial before design phase of major projects
Maintain pedestrian and greenway facilities.	The City of Wilmington should define a maintenance plan, budget, and schedule for existing and future pedestrian and trail facilities, working with NCDOT where necessary. See maintenance program recommendations in this chapter for more on this topic.	Dedicated staff from Parks and Recreation and Public Services	BPC, NCDOT	2023 onward
Continue current efforts to promote walkability and pedestrian safety.	As a separate effort, the City is working with NCDOT to conduct a citywide pedestrian safety study, which will result in a better understanding of Wilmington's challenges and needs related to pedestrian safety. The City, WMPO, and partners including WPD and UNCW also participate in educational efforts including "Be a Looker."	City of Wilmington	WMPO, NCDOT	2023 onward
Launch new programs.	These groups should coordinate to launch new programs, as described in Chapter 4, such as launching a safety campaign, implementing a non-motorized count program, conducting safe speed studies, applying for Walk Friendly Community designation, and pursuing some form of wayfinding program. Walk Wilmington committee members could also be called upon for program involvement.	BPC	NCDOT, WMPO, WFD, UNCW, City Engineering Department, New Hanover County Schools, and others	2023 onward
Conduct communications and outreach campaigns related to walking.	BPC should publicly announce their successes as progress is made. This could be achieved partly through social media, and by establishing a page on the City website dedicated to bike/ped education and project updates. Also, BPC should provide regular (annual) reports to the City Council on implementation progress.	BPC	City website and social media managers, WMPO, local media	2023 onward

Performance Measures

Performance measures allow the City of Wilmington staff to measure and track progress toward achieving the plan goals and objectives, determine if the methods being used to achieve goals are working, and report about progress to the community.

Performance measures may include any metric that can be compared year to year and that illustrates progress toward completing an action item or objective. This plan suggests performance measures that can help track progress relevant to specific plan goals and their accompanying objectives, which are shown in Table 7.

Measuring progress toward Walk Wilmington's goals is a meaningful way to show that the City is working to implement this plan and improving walkability for the residents of Wilmington. Table 8 describes performance measures that could be tracked using existing data sources. Table 9 presents additional performance measures that would require an investment in additional data collection and/or management. Progress on the chosen performance measures should be reported periodically by the City in a publicly accessible place, such as a dedicated page on the City website.

TABLE 7. *Plan Goals and Objectives*

GOAL	OBJECTIVE
Increase Safety	Reduce overall pedestrian crashes and improve safety for all users of the roadway network. Promote adherence to traffic laws through education and awareness campaigns.
Promote Equity	Prioritize investment in areas with a history of underinvestment in pedestrian infrastructure and with historically under-served populations such as people with disabilities, people of color, and low-income households.
Enhance Connectivity, Mobility, and Accessibility	Fill gaps in the pedestrian network, improve connections to destinations and essential services, and ensure accessibility for people of all ages and abilities.
Enhance Health	Improve the health of residents and the environment by getting more people walking for their transportation, recreation, and daily needs through policies, programs, and projects.
Improve Livability and Protect the Environment	Make walking an inviting, attractive, and enjoyable experience through sound design and pedestrian-friendly policies. Reduce congestion and emissions through a reduction in vehicle miles traveled (VMT).
Create a Positive Economic Impact	Continue to attract investment and tourism by enhancing walkability throughout Wilmington and providing more spaces to create positive economic returns. Establish a strategic prioritization process to fund improvements and maintenance.

● = *Key plan goal*

TABLE 8. *Walk Wilmington Performance Measures with Readily Available Data*

PRIMARY GOAL(S)	PERFORMANCE MEASURE	DESIRED TARGET OR TREND	DATA SOURCES
	Pedestrian crashes of all injury types.	Decrease in annual number and per capita rate of pedestrian crashes of all injury types. Decrease in annual number and per capita rate of pedestrian injuries and fatalities. Decrease in proportion of pedestrian crashes that result in fatalities and serious injuries.	• Crash data (WPD and/or State) • Population data (US Census) • Pedestrian count data if calculating crash rates relative to walking rates (City of Wilmington/WMPO)
	Population served by walking, biking, and transit.	Increase in percent of population within a specified distance of a transit stop, sidewalk, trail, and/or bike facility. Prioritization of projects that would increase this percentage in areas with higher Transportation Disadvantage.	• Pedestrian infrastructure inventory data (WMPO) • Transit route data (WAVE Transit, WMPO) • Population and demographic data (US Census) • Transportation Disadvantage data (NCDOT)
	Number/density of destinations accessible via the pedestrian network.	Increase in number of destinations accessible via the walking network within 0.5 miles of a given point in the network. Destinations should be defined by the City and could include parks, trails, schools, grocery stores, employment centers, and/or transit stops. Prioritization of projects in areas with high potential numbers of destinations that are currently not connected to the pedestrian network.	• Local parcel data (City of Wilmington) • GIS data for locations of destinations (City of Wilmington/ WMPO) • Pedestrian infrastructure inventory data (WMPO) • Employment data (US Bureau of Labor Statistics)
	Percent of commuters walking, biking, and taking transit to work.	Increase in percent of commuters walking/biking/ taking transit to work.	• Travel survey data (American Community Survey, WMPO)

TABLE 9. *Additional Performance Measures Requiring Investment in Data Management*

RELEVANT GOAL(S)	PERFORMANCE MEASURE	DESIRED TARGET OR TREND	DATA NEEDS
	Traffic safety education efforts.	Safety education efforts or campaigns may use a variety of specific performance measures, some of which are described in Chapter 4: Programs and Policies.	Data to track specific campaigns could include number of campaign impressions, before-after observations of driver behavior, and/or surveys.
	Quality and condition of pedestrian network.	Increase in percentage of the network that exceeds a quality/condition threshold determined by the City. Prioritization of projects based on facilities in need of maintenance, especially in areas with greatest Transportation Disadvantage.	Would require regular citywide data collection on facility condition. This could be accomplished through a combination of public works/maintenance staff reviews and user reporting on an app. A "condition" field could be added to the existing Pedestrian infrastructure inventory data (WMPO), Transportation Disadvantage data (NCDOT)
	Number of jobs that can be accessed within 15 minutes using walking, biking, and/or transit.	Increase in number of jobs that can be accessed via walking/biking/transit within 15 minutes. Increase investment in proximity to walkable infrastructure.	Local parcel data, walk/bikeshed data, GIS data on pedestrian network (Wilmington/WMPO), transit route data (WAVE/WMPO) employment data (US Bureau of Labor Statistics).
	Total number and percent of pedestrian network elements that meet ADA accessibility standards (e.g., percent of all crossings, sidewalks, signals, bus stops, and on-street parking spots that are accessible).	Increase in total number and percent of pedestrian network elements that meet accessibility standards. Prioritization of projects that increase accessibility.	Would require assessing ADA compliance across the existing pedestrian network and adding ADA compliance element to WMPO's existing Pedestrian infrastructure inventory data.
	Annual count of greenway users.	Increase in greenway users.	Would require annual greenway count data (City of Wilmington, WMPO).
	Amount of land acquired/preserved (including easements granted) for trails, greenways, and parks.	Increase in land acquired for planned trails, greenways, and parks.	Parcel data from City of Wilmington and coordination with planners for updates.
	Percentage of residents/visitors who are satisfied with walking conditions in Wilmington.	Increase in percentage of residents satisfied with walking conditions.	Surveys (City of Wilmington).
	Job creation related to improving walkability.	Increase in temporary jobs related to project construction and permanent jobs due to employers relocating to the area.	Analysis of local employment data (City of Wilmington, US Census, US Bureau of Labor Statistics).

Maintenance Best Practices

Cities around the country grapple with extensive and growing needs for sidewalk maintenance and limited resources. The following practices can serve as a model for a systematic approach to pedestrian infrastructure maintenance in Wilmington.

Categorize Repairs by Cost and Longevity

The FHWA's A Guide for Maintaining Pedestrian Facilities for Enhanced Safety (FHWA Guide) categorizes sidewalk repair into three types:

- **Temporary Maintenance:** Alleviate hazards in the short-term. Examples include wedging and patching.
- **Short-Term Maintenance (repairs):** Address hazards with medium-term fixes designed to last 1–5 years. Approaches include patching, wedging, grinding and horizontal cutting, mud-jacking, and overlays.
- **Long-Term Maintenance (replacement):** Replacement is the primary long-term form of maintenance. In some cases, short-term maintenance techniques can last as long as ten years and are therefore considered part of this category.

The use of temporary and short-term measures allows cities to respond to resident complaints without allocating the bulk of available resources in a reactive manner. Staff can instead focus sidewalk replacement projects on a comprehensive prioritization of needs that is grouped geographically for efficiency. For more details on the various types of repair, see the FHWA Guide.

Implement Low-Cost Inventory Strategies

Periodic sidewalk inventories can be built into City budgets using low-cost alternatives to full-time staff. These include local volunteers, student interns, or technology tools. The FHWA Guide describes a case study in Hoboken, NJ, where staff used a mix of volunteers and a smartphone application to review and digitize sidewalk conditions annually. Similarly, students at Georgia Tech developed a crowdsourcing app called SidewalkScout to collect and publish sidewalk conditions efficiently. The ArcGIS Collector App has a configuration called Sidewalk Inventory as part of their Solutions for Local Government, which is another tool that can be quickly deployed and tied back to a City's database on infrastructure.

While some cities review all sidewalks annually, this is generally only achievable in smaller towns and small cities without sprawling street and sidewalk networks. As an alternative, many cities break cities into zones and inspect one zone each year. This can be tied to grouping repairs by zone, which is a recommended practice in the following section.

Establish Revenue Sources and Develop Monetary Plan

Reviewing sidewalk maintenance practices from other cities shows a wide variety of funding approaches. In many cities, property owners are partially or fully responsible for the cost of sidewalk maintenance. In general, however, cities that relied on property owners to repair sidewalks and did not have a local funding source reported extensive backlogs in their maintenance needs.

Charlotte, NC and Austin, TX are two locations where the City government maintains sidewalks in the public right-of-way. Charlotte uses voter-approved bond measures every two years to fund the majority of new sidewalk construction and maintenance, while supplementing with state grants and the general fund. At the time of review, they were spending approximately $2 million annually on sidewalk maintenance and $8 million on new sidewalks. Austin also uses voter-approved bond measures for their sidewalk program, but their primary funding source is a Transportation User Fee (a.k.a. Street Fee) that is included in every residential customer's electric bill. At the time of view, they were generating $40-50 million a year from the fee, which was used for a variety of transportation needs, and spending more than $10 million annually on sidewalks.

Understand Liability Issues

A reactive approach to maintenance can open cities to legal liability. For example, in Atlanta, GA, sidewalk maintenance is the responsibility of the property owner. When complaints are reported, the City sends a crew to repair the sidewalk and bills the property owner or assesses the cost through the property tax bill. Atlanta paid out over $4 million to two injured pedestrians based on lawsuits in 2011 and 2012. Los Angeles, CA adopted Safe Sidewalks LA in 2016, which is a 30-year $1.6 billion program to improve sidewalk accessibility. This was undertaken following a historic 2015 settlement in the class action case of Willitis v. City of Los Angeles, which was intended to improve access for persons with mobility disabilities. The FHWA guide found that a documented, clear approach to deal with sidewalk maintenance with the resources a City has available, including through enforcement of private responsibilities, can help reduce a City's liability.

Group Replacement Projects by Zone

Breaking down the sidewalk network by zone is an efficient strategy for sidewalk replacement, along with an inventory of conditions. The City of Minneapolis organizes inventory and repair by ten geographic zones, and allocates resources into one zone each year (FHWA Guide). This approach reduces mobilization costs, while still allowing for prioritization of needs within each zone. Rochester, MN varies the frequency of inspection based on localized user needs. Areas around the Mayo Clinic are inspected monthly, downtown is inspected annually, and the remainder of the sidewalk network, which is primarily in residential areas, is completed less frequently (FHWA Guide).

Establish a System of Maintenance Prioritization

While the majority of communities complete sidewalk repairs in response to complaints, the most successful programs also establish a scoring system to prioritize repairs in parallel. This allows the City to proactively consider where sidewalk repairs most align with established goals based on factors like equity and to use limited resources where they will serve key demographics like children and people with disabilities.

As part of Safe Sidewalks LA, the City of Los Angeles established a prioritization matrix that includes needs (areas around hospitals, assisted living facilities, transit corridors, and the high injury network), relative damage, and cost effectiveness. The City of Memphis' 2014 Pedestrian and School Safety Action Plan established a prioritization scoring for sidewalk and intersection projects and repairs based on school access, safety, equity, connectivity, activity centers, transit access, and stakeholder input. A set of pilot projects were selected based on the results, and the City has successfully obtained federal grants to implement many of the pilot projects identified in the plan.

Conclusion

Implementing the recommendations in this plan will take time, patience, and consistent hard work from the City of Wilmington and its many partners to complete.

The Appendix that follows serves as a supplementary resource to assist the City and its partners in these efforts. It includes design guidance, an overview of funding resources, a summary of public engagement to date, and a summary of previous planning documents that supported this plan.

A Living Document

Overall, this plan is meant to serve the City of Wilmington and its partners as a living document, not only to be referenced during implementation, but also periodically updated to reflect the ever-changing opportunities, constraints, and progress on the ground. For up-to-date information on proposed projects, contact:

Abby Lorenzo, Deputy Director, WMPO
(910) 341-7890 | abby.lorenzo@wilmingtonnc.gov

Bryan Lopez, Regional Planning Manager
NCDOT-Integrated Mobility Division
(919) 707-2606 | balopez@ncdot.gov

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Appendix A

Public Engagement

Overview

Throughout the Walk Wilmington planning process, the project team prioritized soliciting robust public input and feedback to ensure that the final plan aligned closely with the vision that Wilmington residents have for their city.

Steering Committee Meetings

Four steering committee meetings were held throughout the planning process, in March, May, September, and December of 2022. The project steering committee helped determine the plan's overall vision and goals, assisted with public outreach, and provided feedback to the project team during every step of the plan's development. The committee was made up of a diverse group of Wilmington residents, representing the City and the WMPO as well as public safety agencies, nonprofits, New Hanover County Schools, and other neighborhood and business associations.

Steering Committee members:

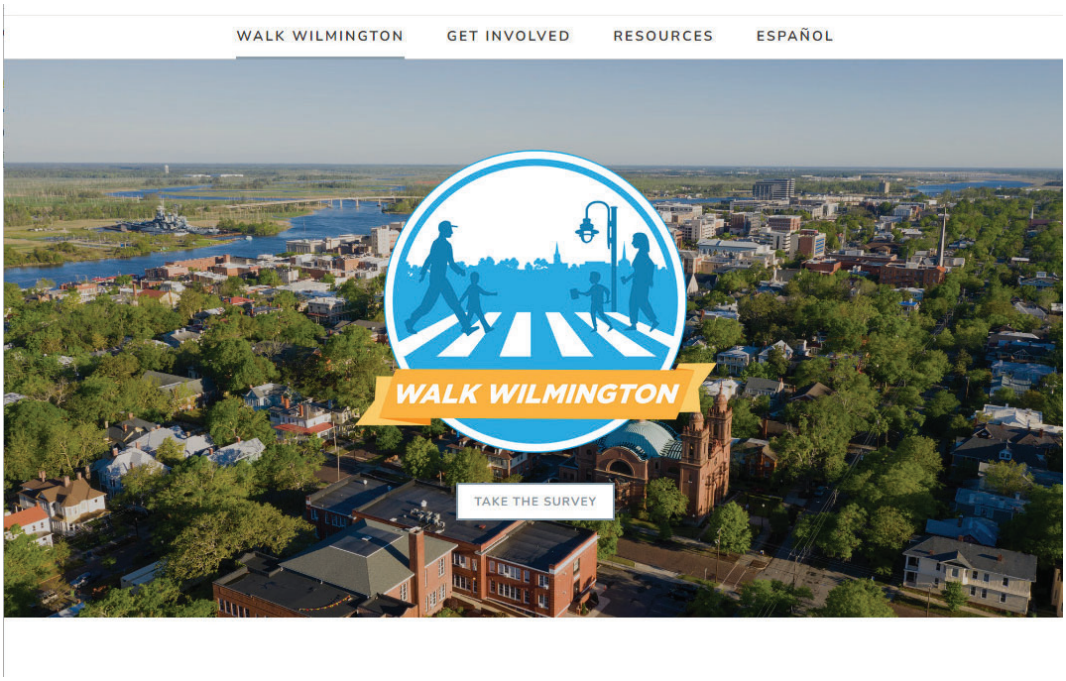
- Karin Mills, WMPO Bicycle and Pedestrian Advisory Committee
- Liz Carbone, Good Shepherd Center
- Gloria Gardner, Disability Resource Center
- Eddie Anderson/Leanne Laurence, New Hanover County Schools
- Holly Childs, Wilmington Downtown Inc.
- Drew Davey, UNCW
- Adrienne Cox, NCDOT Division 3
- Deborah Porterfield, WMPO GoCoast
- Lt. Alanna Williams/Will Richards, WPD
- Wendy Giannini-King, WFD
- Amber Smith, NHC Senior Center
- Elizabeth Forte, Novant Health
- Dave Spertrino, developer
- Sonya Green, Interfaith Community
- Marie Parker, Wave Transit
- Kim Huffman, CVB
- Christina Haley, Wilmington Downtown, Inc.
- TBD, Cape Fear Collective
- Rhonda Bellamy, Phillip Brown, citizens

Representing the City of Wilmington:

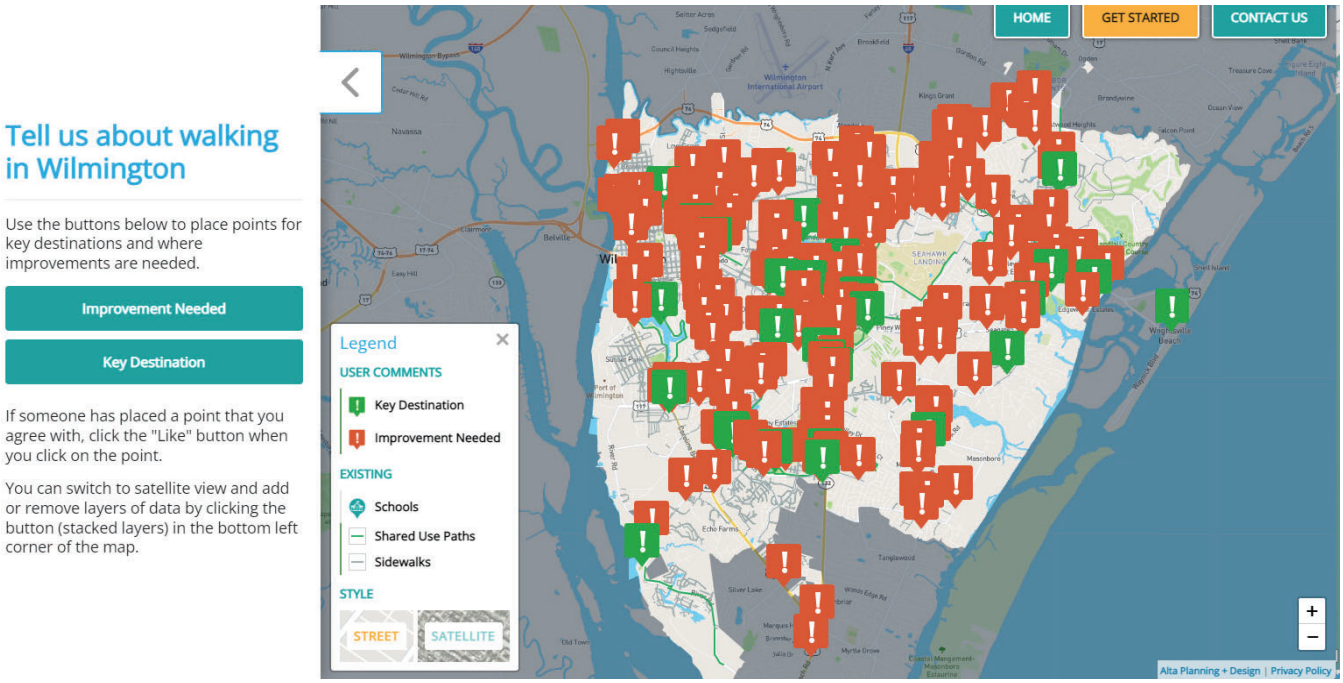
- Doug Lewis, Community Services
- Ron Satterfield, Long-Range Planning
- Denise Freund, Engineering
- Jason Pace, Engineering
- Denys Vielkanowitz, Traffic Engineering
- Joe Conway, Diversity, Equity, and Inclusion

Project Website

The project team created a website, *walkwilmington.com*, where Wilmington residents could access all information related to the plan in one location. The website provided information on the project purpose, the anticipated project timeline, links to related WMPO and City of Wilmington



Homepage of the Walk Wilmington project website.



Screenshot of the online input map, with over 200 points marked by residents.

policies and planning efforts, as well as links to access the online survey form and the online input map. The website also had a page in Spanish with a condensed version of all of the above information, plus a link to the Spanish version of the survey.

Online Input Map

The online input map was accessible via the project website from June through October 2022. Participants were able to mark locations and add comments on a map of Wilmington where walking improvements were needed, or where there were key destinations in the community that should be connected by walking routes. Users were also able to "like" or "dislike" others' comments. Over 200 points were placed on the online map (see left), and comment clusters helped provide valuable input as the planning team created project recommendations.

In-Person Outreach

Representatives from the project team traveled to Wilmington for three days of in-person outreach during summer 2022. The main purpose of the in-person outreach was to increase visibility of the project and to encourage survey completion. Locations for in-person outreach were chosen based on the goal of reaching target populations that are most likely to be pedestrians out of necessity (including transit riders, the elderly, low-income populations, and people of color). At most locations (except where context made it infeasible), the team's approach was to set up

Front and back of the project information cards distributed during in-person outreach. The QR code was linked to the survey.

a table with a large map, paper copies of the survey, and stacks of project information cards (see above). WMPO staff assisted at most of the tabling events, and the WMPO team also held separate tabling events at farmers markets during summer 2022, helping to distribute project information cards and collect survey responses.

Alta-led outreach events:

June 22, 2022

- Padgett Station, 10:00 - 11:45 a.m.
- Good Shepherd Center Grocery Giveaway, 12:00 - 1:00 p.m.
- Robert R. Taylor Senior Homes, 2:00 - 3:00 p.m.

July 20, 2022

- Mt. Zion AME Church, 1:00 - 1:45 p.m.
- NHC Library Main Branch, 2:00 - 4:00 p.m.
- Forden Station, 5:00 - 7:00 p.m.

July 21, 2022

- Padgett Station, 8:00 - 10:00 a.m.
- Good Shepherd Center, 10:00 - 11:00 a.m.
- NHC Senior Resource Center (College Rd), 11:00 - 12:00 p.m.

The team also distributed stacks of project information cards to local businesses such as coffee shops, breweries, restaurants, markets, and thrift stores, and also left cards on the campuses of Cape Fear Community College and UNC Wilmington.

Tabling setup at Padgett Station, above; placard publicizing the survey on the WAVE buses, below.

Filling out surveys at the Senior Resource Center.

WAVE Bus Ads

The ad shown on the previous page was printed and put on every bus in the WAVE transit fleet, where it ran from early August to early September 2022.

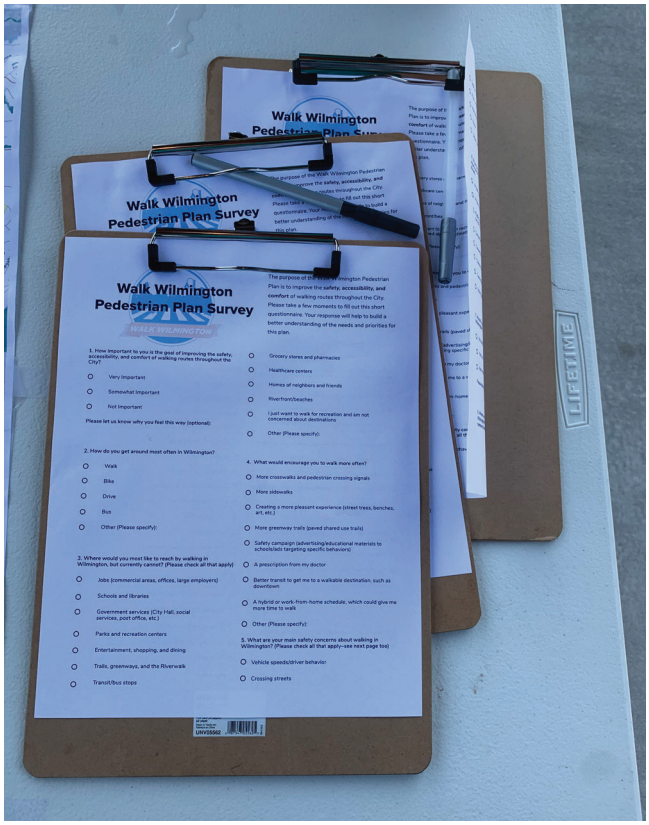
Survey

The Walk Wilmington pedestrian plan survey consisted of nine questions related to current conditions for walking in Wilmington, as well as suggested areas for improvement. There were an additional six demographic questions, which were optional.

The survey was available online on SurveyMonkey from June 15 - September 7, 2022, along with several opportunities for in-person completion of paper survey forms, as described above. The paper surveys were input manually into SurveyMonkey, for a total of 1,038 surveys completed.

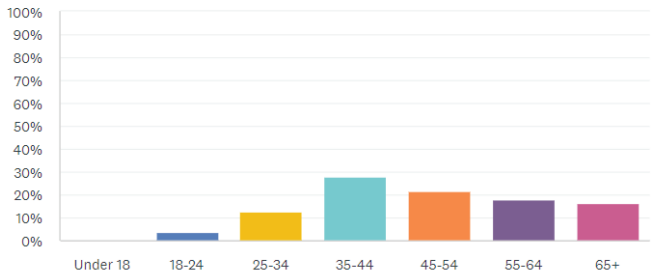
Respondent Demographics

As is common with online surveys, respondents to the Walk Wilmington comment form largely identified as White/ Caucasian (88% of respondents) and had higher incomes (23% of respondents reported household incomes above $150,000) relative to the rest of the city's population. This is the reason that survey answers were filtered by race/ethnicity and income during the prioritization process.



Paper copies of the survey used during in-person outreach.

Additionally, approximately 68% of respondents who provided their gender indicated that they were female, while 32% were male. The age of respondents was clustered around the middle, with the largest group of respondents (nearly 28%) indicating that they were between 35 and 44 years of age (see chart below). Analysis of the more directly pedestrian plan-related questions appears in the following pages.

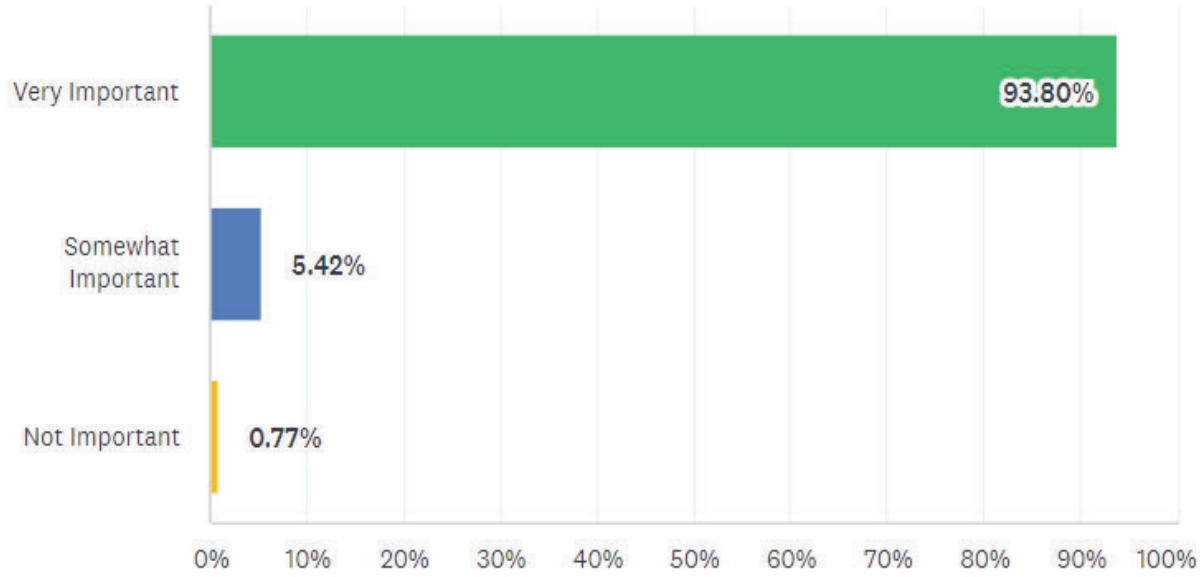


Age distribution of survey respondents.

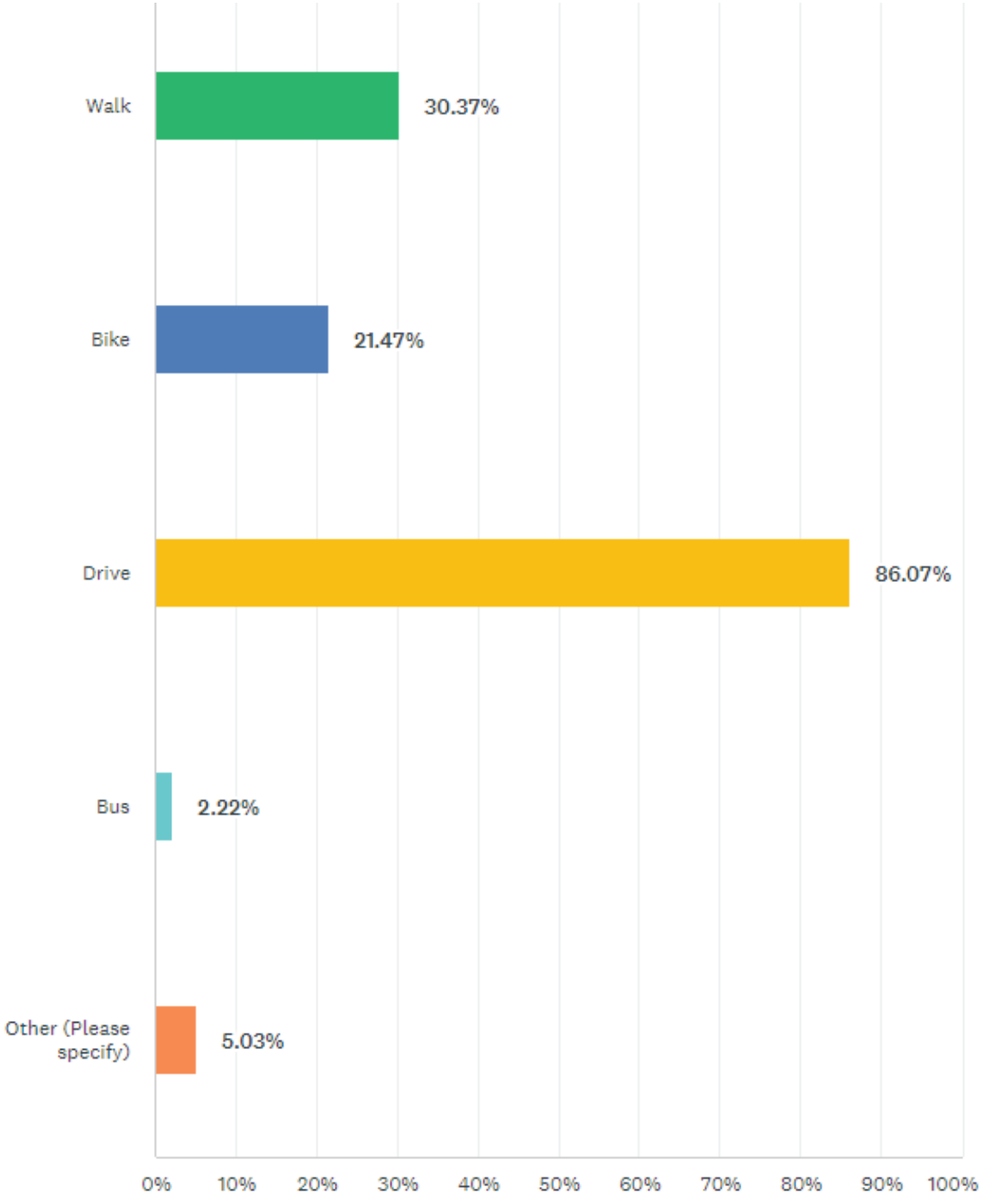
Main Survey Questions

Q1. *"How important to you is the goal of improving the safety, accessibility, and comfort of walking routes throughout the City?"*

1,033 Responses

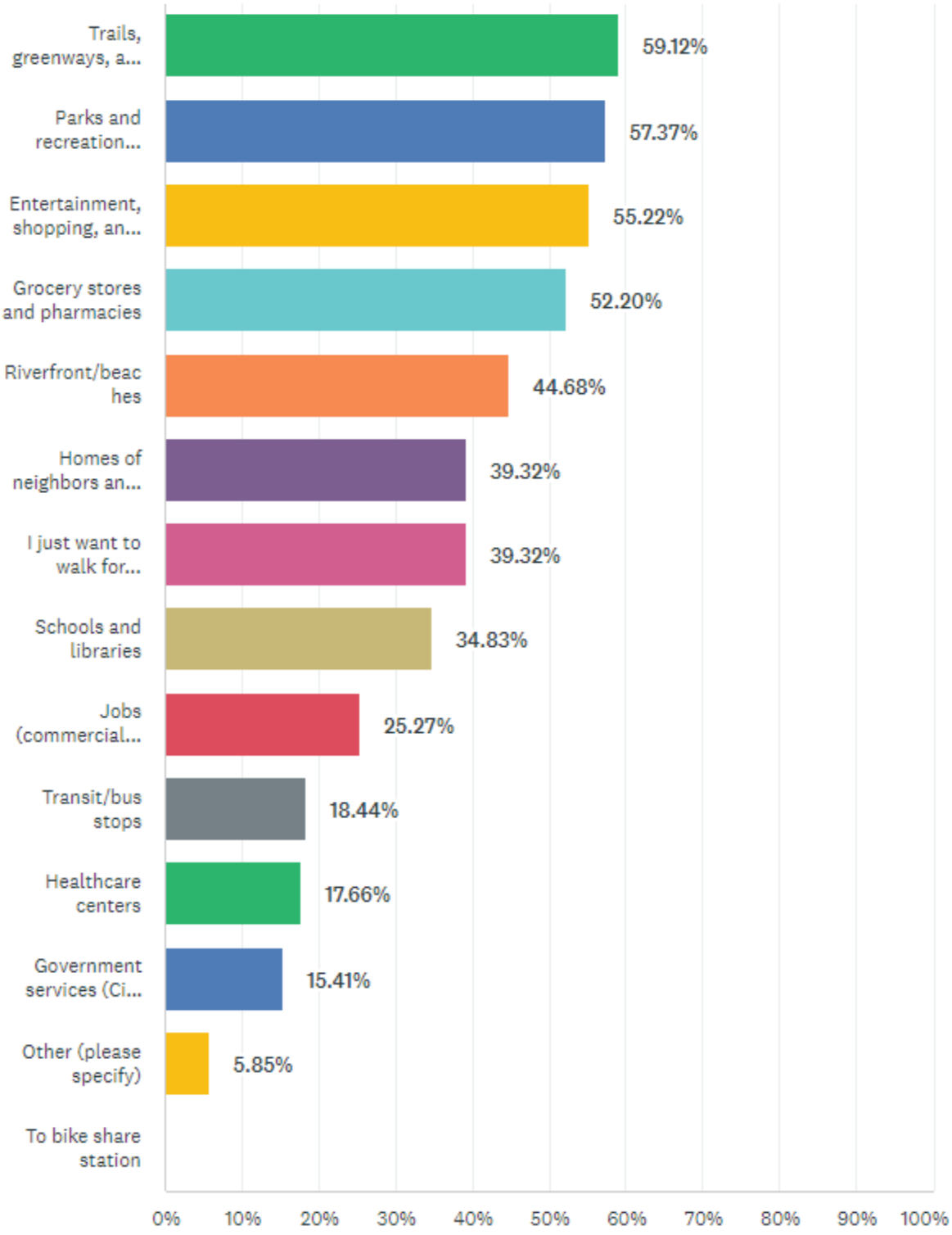


Q2. *"How do you get around most often in Wilmington?"* 1,034 Responses

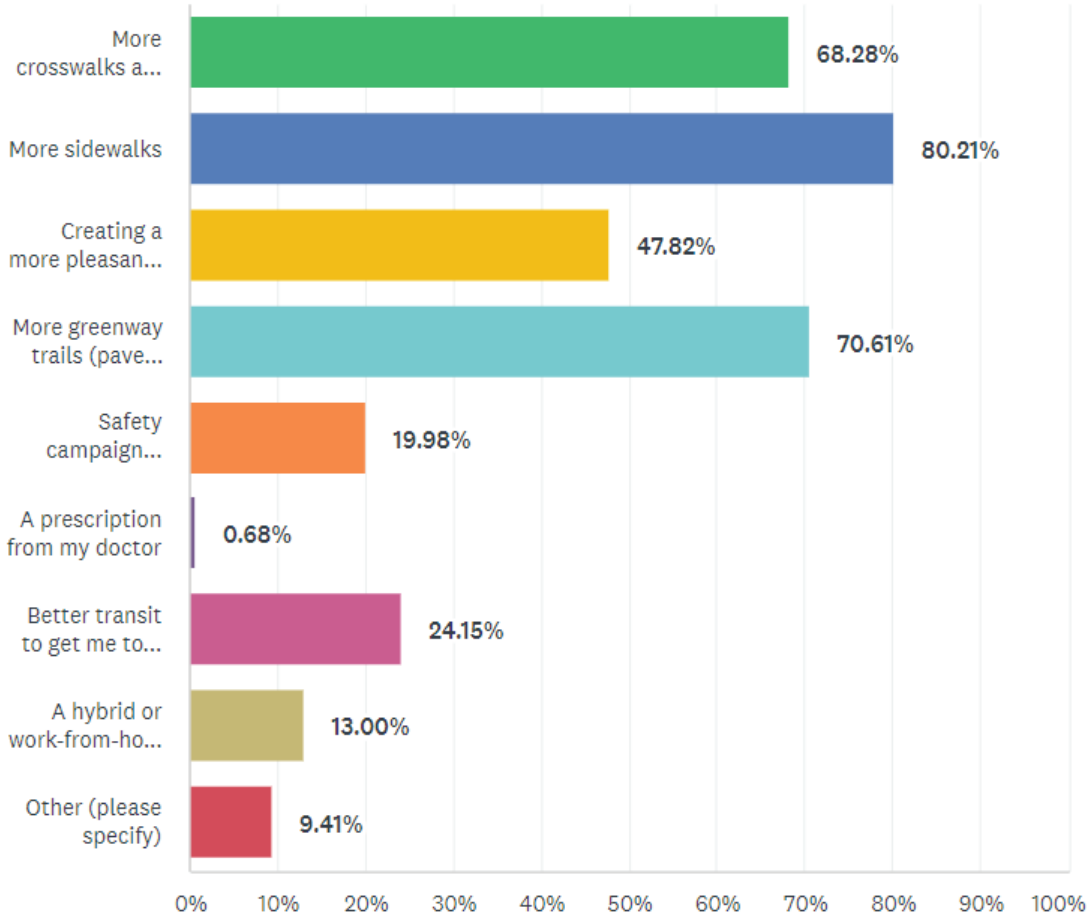


"Other" responses include wheelchair/motorized chair, multiple modes, motorcycle, or asking friends & family to drive them.

Q3. *"Where would you most like to reach by walking in Wilmington, but currently cannot (Please check all that apply)?"* 1,025 Responses



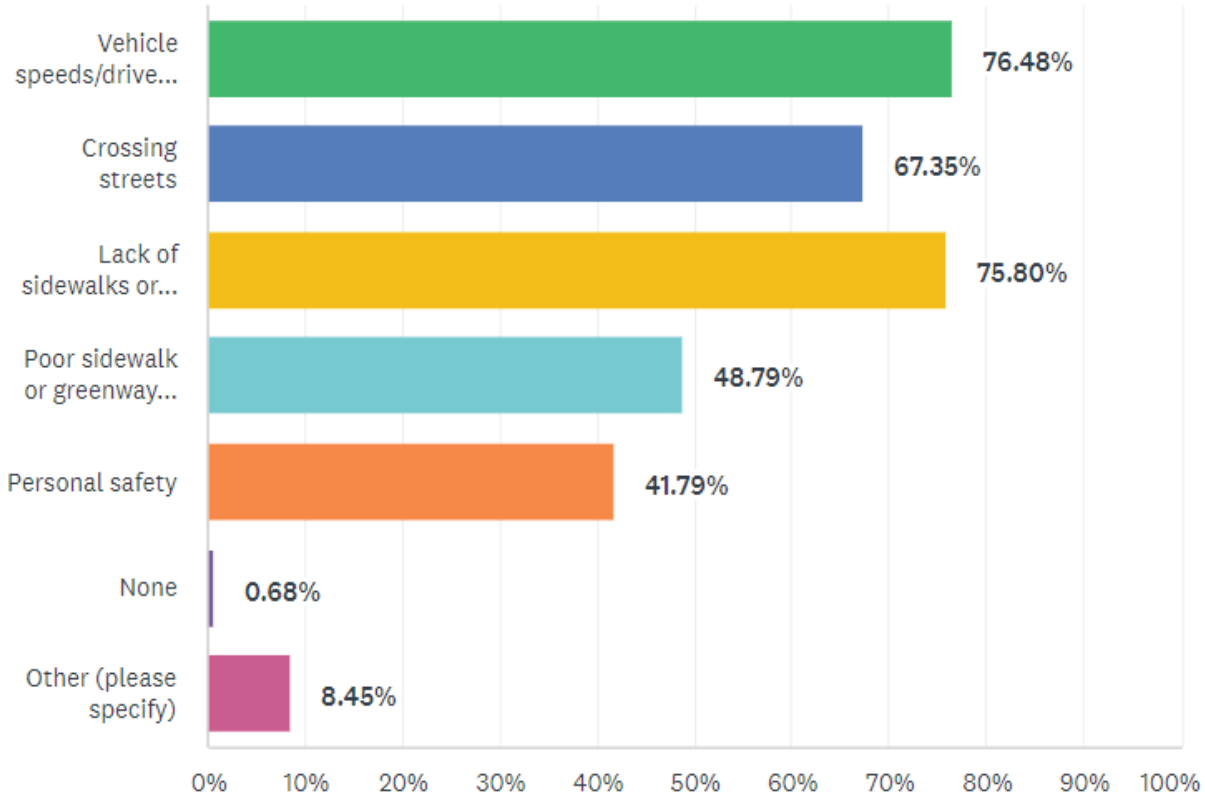
Q4. *"What would encourage you to walk more often (Please check all that apply)?"* 1,031 Responses



ANSWER CHOICES		RESPONSES	
More crosswalks and pedestrian crossing signals		68.28%	704
More sidewalks		80.21%	827
Creating a more pleasant experience (street trees, benches, art, etc.)		47.82%	493
More greenway trails (paved shared use trails)		70.61%	728
Safety campaign (advertising/educational materials to schools/ads targeting specific behaviors)		19.98%	206
A prescription from my doctor		0.68%	7
Better transit to get me to a walkable destination, such as downtown		24.15%	249
A hybrid or work-from-home schedule, which could give me more time to walk		13.00%	134
Other (please specify)	Responses	9.41%	97
Total Respondents: 1,031			

"Other" responses include: better enforcement of traffic laws, better connections to existing greenways, pedestrian bridges/underpasses, share trees and artwork, better signage/ wayfinding and publicity about where walking routes are.

Q5. *"What are your main safety concerns about walking in Wilmington (Please check all that apply)?"* 1,029 Responses

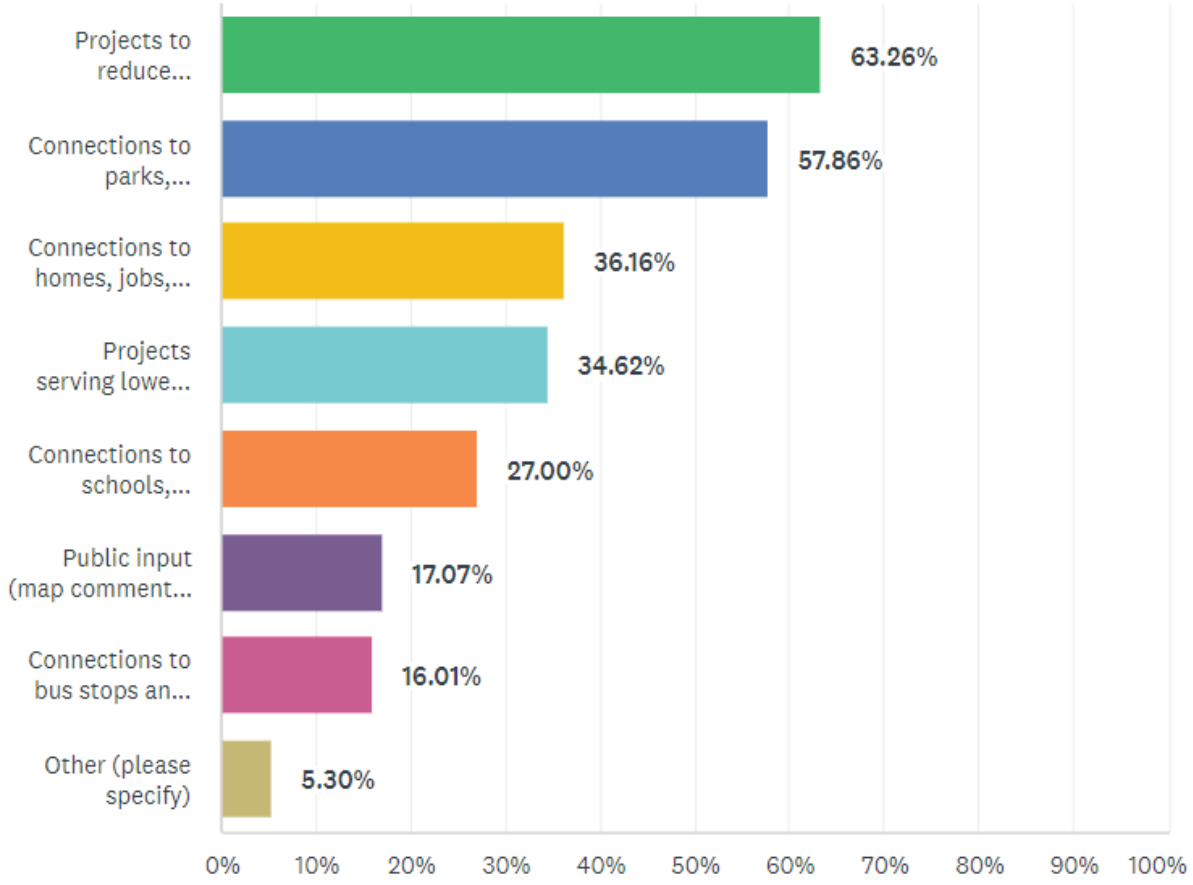


ANSWER CHOICES		RESPONSES	
Vehicle speeds/driver behavior		76.48%	787
Crossing streets		67.35%	693
Lack of sidewalks or greenways		75.80%	780
Poor sidewalk or greenway conditions		48.79%	502
Personal safety		41.79%	430
None		0.68%	7
Other (please specify)	Responses	8.45%	87

"Other" responses include: concerns about lighting at night, personal safety concerns, tree roots pushing up sidewalks, need for more family-oriented spaces downtown to walk to, dangerous drivers, lack of enforcement of speed limits/other traffic laws.

Q6. *"What factors are most important to you in prioritizing improvements for walking in Wilmington (Please select up to three)?"*

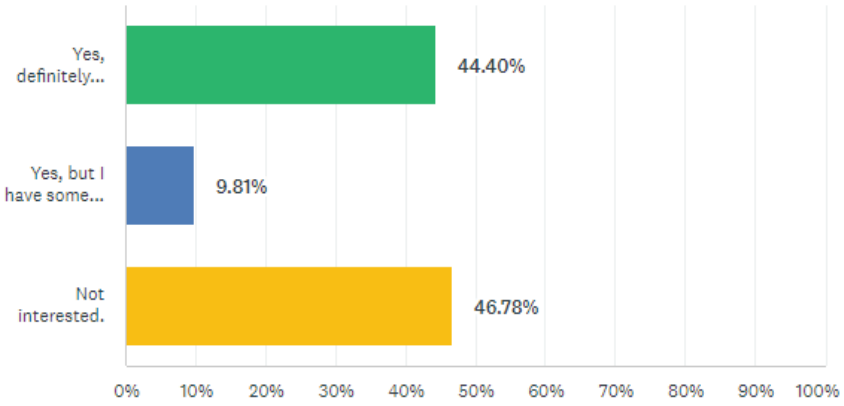
1,037 Responses



ANSWER CHOICES		RESPONSES	
Projects to reduce pedestrian injuries and fatalities		63.26%	656
Connections to parks, greenways, and recreation centers		57.86%	600
Connections to homes, jobs, and entertainment		36.16%	375
Projects serving lower income areas		34.62%	359
Connections to schools, libraries, colleges, and universities		27.00%	280
Public input (map comments, stakeholder interviews, surveys, past plans)		17.07%	177
Connections to bus stops and routes		16.01%	166
Other (please specify)	Responses	5.30%	55
Total Respondents: 1,037			

"Other" responses include: connections to Pender & Brunswick counties, connections to the beaches, connections to UNCW, all of the above.

Q7. *"Would you be interested in using a bike share service in Wilmington?"* 1,009 Responses



ANSWER CHOICES	RESPONSES	
Yes, definitely interested.	44.40%	448
Yes, but I have some concerns (please use comment box below to share).	9.81%	99
Not interested.	46.78%	472
Total Respondents: 1,009		

Concerns include: bikeshare bikes left in roadways/on sidewalks in other cities–people largely prefer bikeshare bikes that are docked at specific stations, cost to the city, safety concerns for tourists/inexperienced cyclists biking sharing the roads with cars, general lack of bike infrastructure, which should be the priority.

Q8. *"Where are improvements most needed for walking in Wilmington? Please include street names, intersections, or names of destinations."* 773 Responses - Contact the WMPO for a copy of the full results.

Common responses include: Middle Sound Loop, Greenville Loop, Shipyard, Market St, Carolina Beach Rd, Wrightsville Ave, Mayfaire, UNCW, River Rd, Eastwood Rd, Oleander, downtown, Monkey Junction, Greenfield Lake, Military Cutoff Rd, Kerr Rd, 17th St, Masonboro Loop, 3rd St.

Q9. *"Are there other comments you would like to share about walking in Wilmington and how to improve it?"* 1,009 Responses - Contact the WMPO for a copy of the full results.

Selected comments:

"Walking and biking access should be required for all new development in the greater Wilmington area. The City and County need to develop a greater degree of cooperation."

"Better signage, or an app or something to easily navigate accessible routes. improve connectivity between existing routes. focus on destinations and improve connectivity between destinations"

"As a person who walks with a cane, it would be nice to walk on smooth well kept sidewalks when I am required to walk on them."

"Sidewalks are just so all over the place and so inconsistently implemented and maintained, and crosswalks so unsafe (left turning drivers are the WORST) I don't feel safe walking the city."

"If the plan is to provide a city that has a walks of life residing and visiting here, then make sure the plan is highly inclusive for all. Not just those who have the $$$ and status."

"Traffic is never going to get better, and we are running out of space to build roads, so if we want to improve traffic in town we need to focus on building a better public walking/biking infrastructure."

"I walk for leisure and for exercise, as a women my biggest priority is safety. But for people who again walk as their means of transportation, then those areas need to be well lit as it gets darker especially when in the Fall it gets darker earlier."

"Yes, this isn't happening in a vacuum. Cyclists need to be considered too. It's my position that all main roads should contain walkable, cycleable, and drivable terrain. Walk or bike up and down Market, College, and Oleander and let me know how that goes. It's going to go bad. That's how it's going to go."

"I wish there were more walking/biking trails connecting parks, and that they didn't need to cross the roads (have more overpasses, underpasses, etc). Needs to be a connection for cross city trail to greenfield lake and Maides park, and pedestrian overpasses on market and college. Would love Kerr to become like a University Boulivard for students to be able to walk, shop, go to restaurants, etc. If there is a volunteer" committee for this, I'd love to be part of it."

Outreach to Community Organizations

The project team enlisted the help of representatives from the City of Wilmington and the Good Shepherd Center to put together a list of local organizations that serve target communities and could help with outreach to these groups. After the list was created, the project team reached out these organizations via an email message that included an introduction to the project purpose, the link to the project website, and a PDF of the flyer in both English and Spanish.

Organizations/agencies contacted:

- Wilmington Arts Council
- Frankie's Market
- Arts Council
- Mother Hubbard's Cupboard
- Wilmington Housing Authority
- Good Shepherd Center Grocery Giveaway
- Disability Resource Center
- Harrelson Center
- Nourish NC
- Cape Fear COG Continuum of Care
- Public Health Dept
- Voyage
- St Jude's MCC
- New Hanover County Schools
- Farmers Market
- Port City United
- UNCW Latino Alliance
- Basilica of St. Mary
- UNCW Catholic Ministry
- Community Relations Advisory Committee
- Wilmington Downtown Inc.
- UNCW
- CFCC
- LGBTQ Center of the Cape Fear Coast
- Northside Food Co-Op
- Cape Fear Food Council
- Wilmington Ministerial Alliance
- New Hanover Public Library
- meals on wheels
- Senior Resource Center
- NHC-NAACP
- Cape Fear Latinos
- Cape Fear Habitat for Humanity
- Vigilant Hope
- The Help Hub at the Harrelson Center
- One Christian Network
- Food Bank of Eastern and Central NC
- First Fruit Ministries
- Poplar Grove Plantation
- The A.C.T.S. Movement
- Foster Pantry
- Wrightsboro United Methodist Church
- Feast Down East
- Brigade Boys and Girls Club
- StepUp Wilmington

- Dreams Center for Arts Education
- Cape Fear Literacy Council
- Cameron Art Museum
- Wilma
- Sea level Vegan Diner
- the lower case leaders
- Mics Wide Open
- Cape Fear Volunteer Center
- YWCA Lower Cape Fear
- WRAAP (Wilmington's Residential Adolescent Achievement Place)
- Communities in Schools Cape Fear
- Smart Start New Hanover County
- NC Cooperative Extension
- Bargain Box of Wilmington

Public Workshops and Draft Plan Comments

The project team provided opportunities for the public to review and comment on the draft plan. Alta and WMPO hosted two in-person public open house events to solicit feedback on the draft plan:

- Jan 31, 2023, Halyburton Park, 5:00 - 7:00 p.m.
- Feb 1, 2023, MLK Center, 5:00 - 7:00 p.m.

Additionally, the draft plan was posted to the project website, along with an online form to submit comments. The public comment period for the draft plan was January 20th through February 20th, 2023. In total, 183 draft plan comments were received online and at the in-person events.

Participants at a public open house event provided feedback on the plan at MLK Center on February 1, 2023.

\ B \

Appendix B

Design Resources

Overview

This toolbox presents guidance for local agency staff, elected officials and community advocates to create a more walkable and bicycle-friendly community for people of all ages and abilities. Planners and project designers should refer to these guidelines in developing the infrastructure projects recommended by this plan, but they should not be used as the sole reference for any detailed engineering design.

As a starting point, the following list of resources are from the NCDOT website for "Bicycle & Pedestrian Project Development & Design Guidance," located here (resources listed are linked through this page; Last retrieved in December 2021):

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

North Carolina Guidelines

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT)

- WalkBikeNC: Statewide Pedestrian & Bicycle Plan
- Glossary of North Carolina Terminology for Active Transportation
- NCDOT Complete Streets: This policy directs the department to consider and incorporate several modes of transportation when building new projects or making improvements to existing infrastructure. The link below is a landing page with resources such as the Complete Streets policy, the Implementation Guide, Evaluation Methodology, Flowchart, FAQs, and more. https://connect.ncdot.gov/projects/BikePed/Pages/Complete-Streets.aspx
- Evaluating Temporary Accommodations for Pedestrians
- NC Local Programs Handbook
- Traditional Neighborhood Development Guidelines

GREENWAY CONSTRUCTION STANDARDS

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

National Guidelines

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

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

RAILS-TO-TRAILS CONSERVANCY

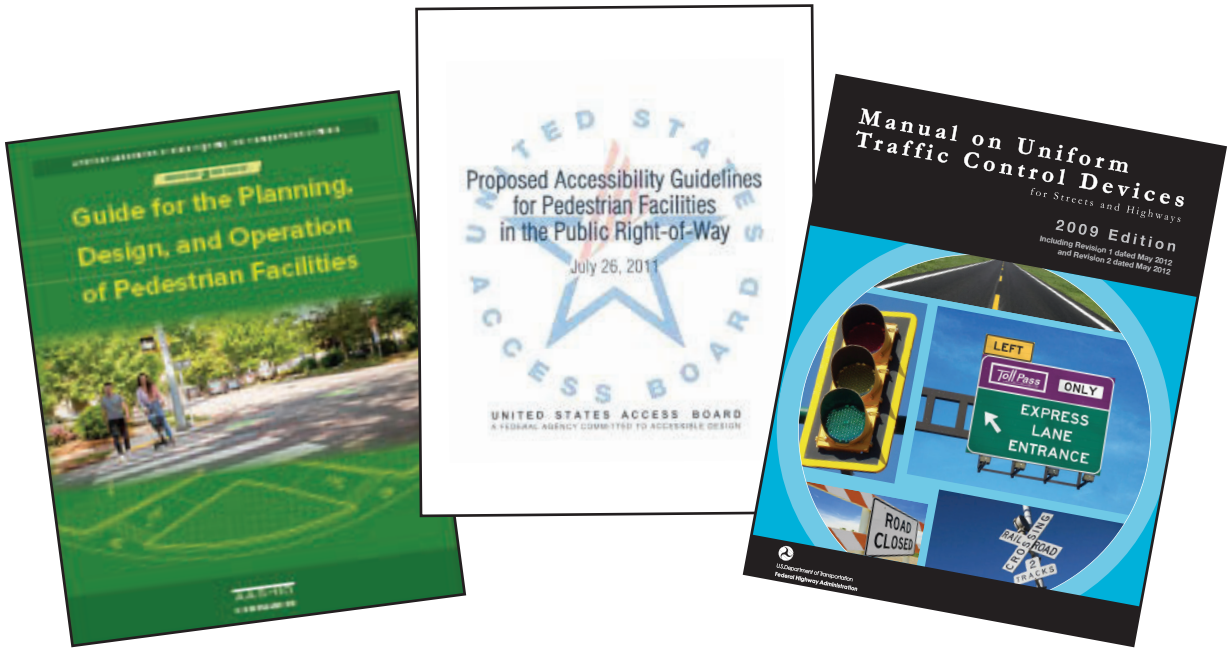
- General Design Guidance: *https://www.railstotrails.org/build-trails/trail-building-toolbox/*
- Rails-with-Trails: *https://www.railstotrails.org/resource-library/resources/americas-rails-with-trails/*

THE FEDERAL HIGHWAY ADMINISTRATION (FHWA)

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

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)

- Part 4E: Pedestrian Control Features
- Part 7: Traffic Controls for School Areas



NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS (NACTO)

- Urban Street Design Guide
- City Limits: Setting Safe Speed Limits on Urban Streets

SAFE ROUTES TO SCHOOL (SRTS) NON-INFRASTRUCTURE

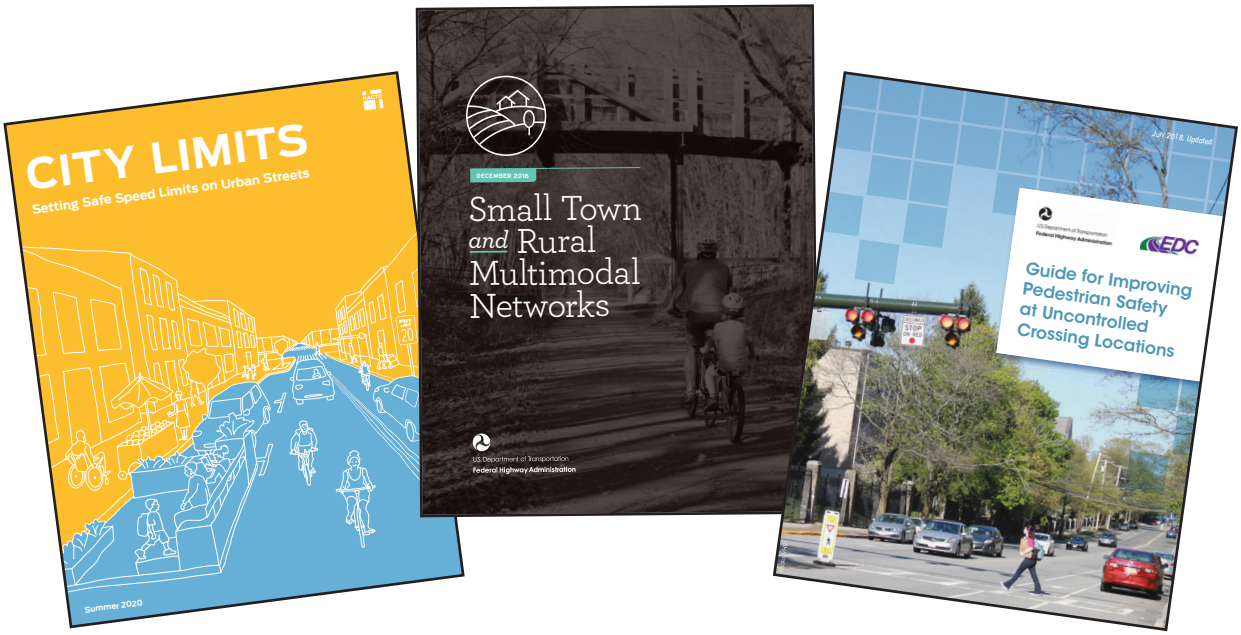
- National Center for Safe Routes to School
- National Partnership for Safe Routes to School

US ACCESS BOARD

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

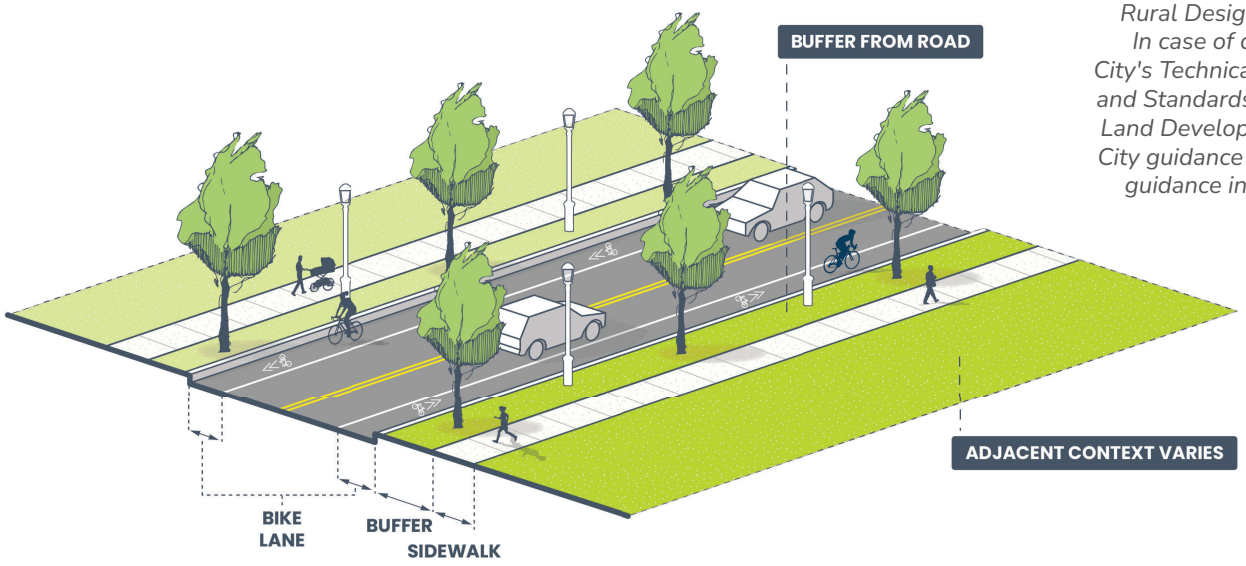
ADDITIONAL FHWA RESOURCES

- Achieving Multimodal Networks (2016): https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_networks/
- Small Town and Rural Multimodal Networks Design Guide (2016): https://ruraldesignguide.com/
- Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (2018): https://safety.fhwa.dot.gov/ped_bike/step/docs/STEP_Guide_for_Improving_Ped_Safety_at_Unsig_Loc_3-2018_07_17-508compliant.pdf



Sidewalks

Design guidelines are based on NACTO Design Guides and the Small Town and Rural Design Guide (2016). In case of conflict with the City's Technical Specifications and Standards Manual and/or Land Development Code, the City guidance supersedes the guidance in this appendix."



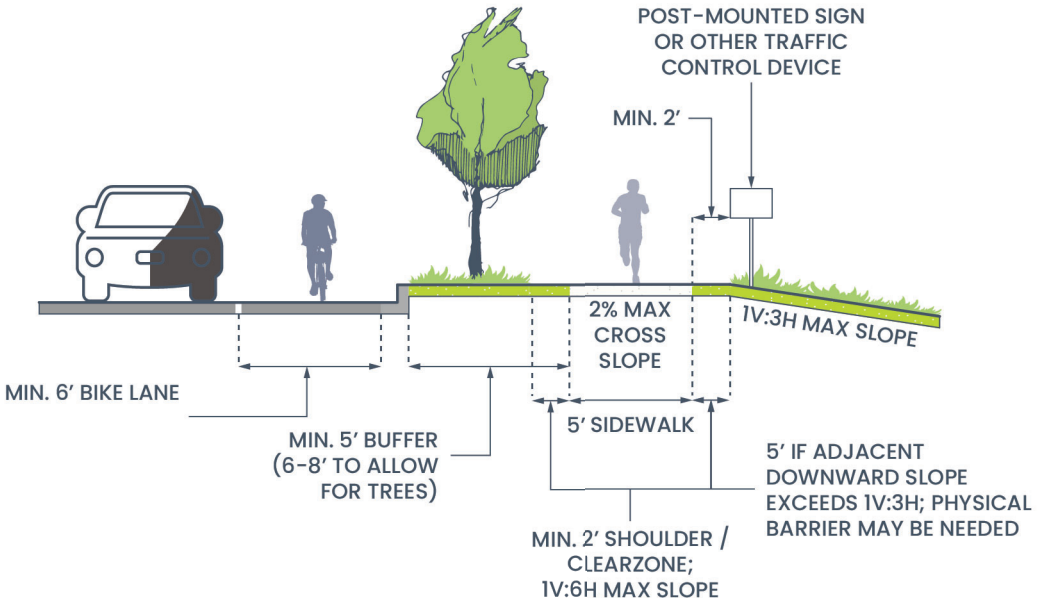
Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel separated from vehicle traffic. Providing adequate and accessible facilities can lead to increased numbers of people walking, improved safety, and the creation of social space.

Typical Applications

Sidewalks should be provided on both sides of urban commercial streets, and should be required in areas of moderate residential density. (1-4 dwelling units per acre).

When retrofitting gaps in the sidewalk network, locations near transit stops, schools, parks, public buildings, and other areas with high concentrations of pedestrians should be the highest priority.

In some suburban areas, no curb and gutter is necessary to establish a sidewalk. Instead, the sidewalk should feature a wide furnishing zone, which may be configured as an open ditch for stormwater catchment and infiltration. Ditches can be retrofitted into bioswales or rain-gardens for filtration and water purification.



Design Guidelines

WIDTH

It is important to provide adequate width along a sidewalk corridor. A pedestrian through zone width of 6’ enables two pedestrians (including wheelchair users) to walk side-by-side, or to pass each other comfortably.

In areas of high demand, sidewalks should contain adequate width to accommodate the high volumes and different walking speeds of pedestrians.

BUFFER

Appropriate placement of street trees in the furnishing zone (minimum width 4’) helps buffer pedestrians from the travel lane and increases facility comfort.

OTHER DESIGN CRITERIA

At a minimum, the Americans with Disabilities Act requires a 3’ clear width in the pedestrian zone plus 5’ passing areas every 200’.

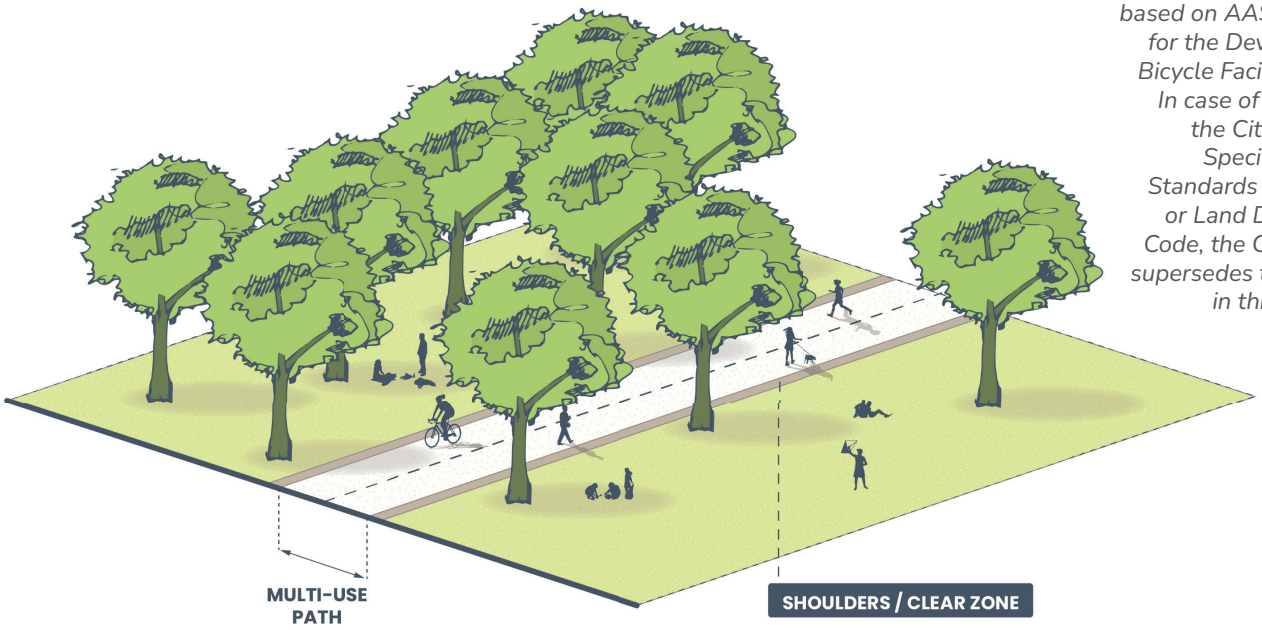
The clear width may be reduced to a minimum of 32 inches for short, constrained segments of up to 24 inches long, provided that constrained segments are separated by regular clear width segments that are a minimum of 48 inches long and 36 inches wide.

Providing a 6’ clear width across the full corridor for all new sidewalks (and 12’ or greater in downtown and pedestrian-priority areas) meets requirements for passing and maneuverability.

Existing deficient-width sidewalks are to be retrofitted to meet citywide standards.

Shared-Use Path (or Greenway)

Design guidelines are based on AASHTO, Guide for the Development of Bicycle Facilities (2012). In case of conflict with the City's Technical Specifications and Standards Manual and/ or Land Development Code, the City guidance supersedes the guidance in this appendix."



A shared-use path (SUP), labeled in the graphic above as a multi-use path, provides a travel area separate from motorized traffic for cyclists, pedestrians, skaters, wheelchair users, joggers, and other users. SUPs are desirable for cyclists of all skill levels preferring separation from traffic. These off-road travelways generally provide routes and connections not provided by existing roadways. Most SUPs are designed for two-way travel of multiple user types. Designs vary depending on factors such as the grade of the land, size and amount of vegetation present, and proximity to waterways, structures, and other elements.

Typical Application

SUPs are typically located in independent rights-of-way, separate from roadways.

Refer to guidance on sidepaths for information on SUPs adjacent to roadways.

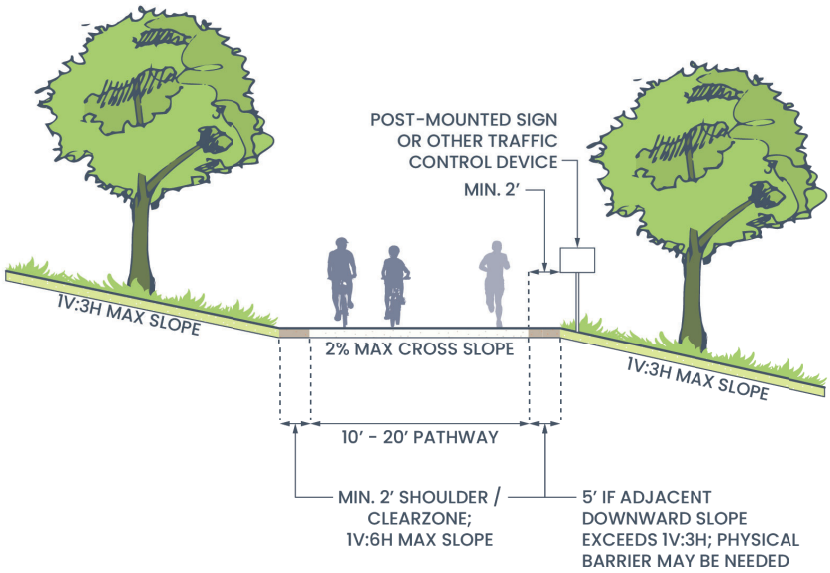
REAL WORLD EXAMPLES

Gary Shell Cross City Trail
Wilmington, NC

Island Greenway
Carolina Beach, NC

South Tar River Greenway
Greenville, NC

Source: Visit Greenville NC



Design Guidelines

WIDTH

A demand analysis, combined with the use of FHWA's SUPLOS Calculator, should be conducted to determine appropriate widths. 10-12' is a typical default SUP width, and 8' width is acceptable only in constrained conditions and for short distances (AASHTO Bike Guide Section 5.2.1).

SHOULDER / CLEAR ZONE

Minimum 2' graded area (maximum 1V:6H slope) should be provided for clearance from landscaping or other vertical elements such as fences, light poles, sign posts, etc.; recommend aggregate or turf grass to prevent weeds from spilling onto trail.

VERTICAL CLEARANCE

8' minimum, 10' typical.

SLOPE

Trail slopes should be designed at 5% (greater slope is permitted, but should be limited, see AASHTO); SUP cross slope should not exceed 2%.

PHYSICAL BARRIER

If the land beyond the shoulder/clear zone has a slope exceeding 3:1, a physical barrier may need to be added.

OTHER DESIGN CRITERIA

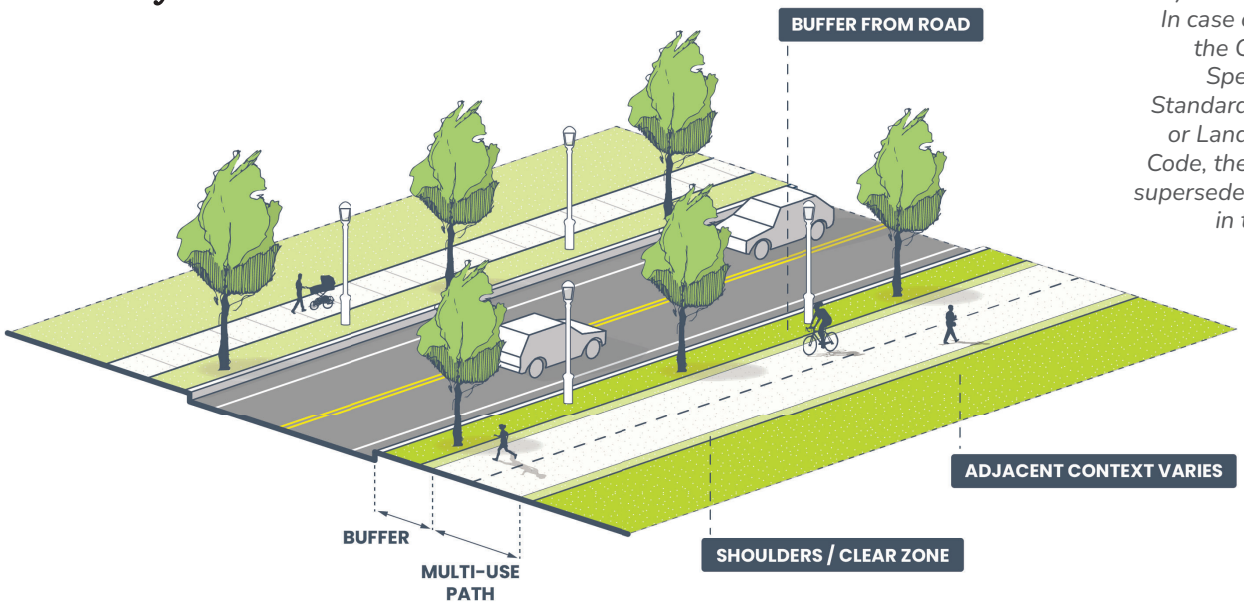
With the great variety of users on open space trails, amenities such as benches, trash and recycling receptacles, bike racks, and appropriate lighting should be included along trails.

Trail design should comply with all AASHTO requirements for SUPs related to design speed, sight distances, stopping distances, and grades.

Shared-Use Path (or Greenway)

Design guidelines are based on AASHTO, Guide for the Development of Bicycle Facilities (2012). In case of conflict with the City's Technical Specifications and Standards Manual and/ or Land Development Code, the City guidance supersedes the guidance in this appendix."

Roadway Corridor



Shared-use paths which are located alongside roadway corridors, also known as sidepaths, serve as both recreational and utilitarian routes. While this placement poses unique SUP challenges, such as driveway crossings and close proximity to moving vehicles, these trails create direct and important routes through the community.

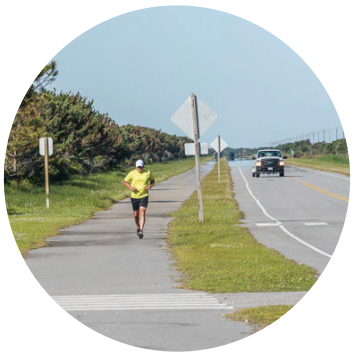
Typical Application

When SUPs run alongside a roadway corridor, standard shared use path characteristics should be maintained in order to reinforce the continuity of the SUP and create a distinction between sidewalks and other nearby facilities. Buffer space of at least 5' between the roadway and SUP can include smaller vegetation, light and utility poles, and other physical barriers. A buffer must be at least 8' wide to accommodate trees.

REAL WORLD EXAMPLES

Gary Shell Cross City Trail
Wilmington, NC

Source: Wilmington and Beaches

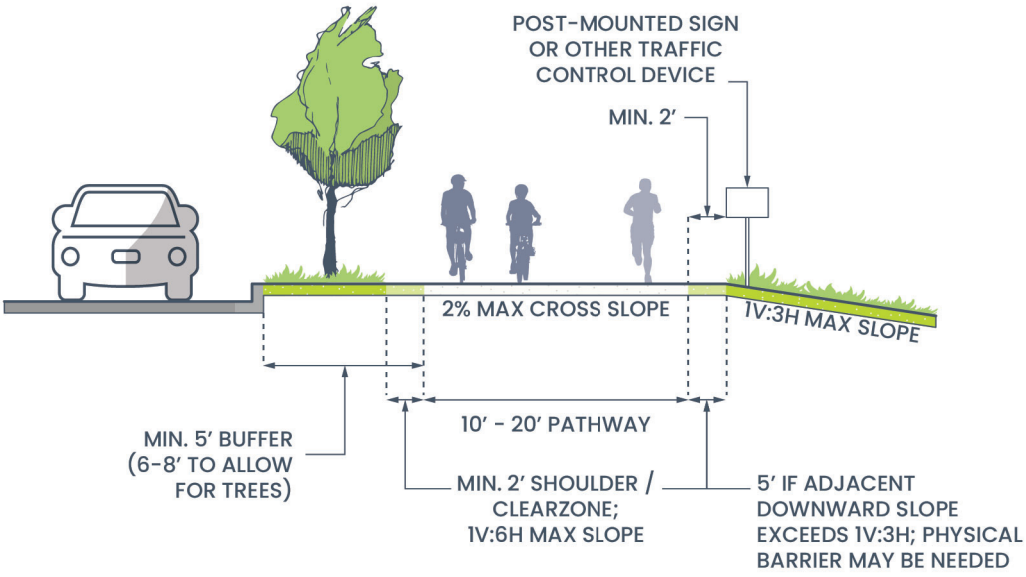


Highway 12 Sidepath
Ocracoke Island, NC

Source: OuterBanks.com

Emerald Path
Emerald Isle, NC

Source: Town of Emerald Isle



Design Guidelines

WIDTH

A demand analysis, combined with the use of FHWA's SUPLOS Calculator, should be conducted to determine appropriate widths. 10-12' is a typical default SUP width, and 8' width is acceptable only in constrained conditions and for short distances (AASHTO Bike Guide Section 5.2.1).

BUFFER

A wide separation should be provided between the trail and adjacent roadway. The buffer is measured from the face of curb (if present) or the edge of the paved roadway, and should not be less than 8'. Paved shoulders do not count towards the overall buffer width. Greater separation is desirable along high-speed roadways. In either case, if proper separation is not achievable, a physical barrier or railing should be provided.

SHOULDER / CLEAR ZONE

Minimum 2' graded area (maximum 1V:6H slope) should be provided for clearance from landscaping or other vertical elements such as streetscape amenities, light poles, sign posts, etc.; recommend aggregate or turf grass to prevent weeds from spilling onto trail.

VERTICAL CLEARANCE

8' minimum, 10' typical.

SLOPE

SUP slopes should be designed at 5% (greater slope is permitted, but should be limited, see AASHTO); SUP cross slope should not exceed 2%.

OTHER DESIGN CRITERIA

Trail design should comply with all AASHTO requirements for shared use paths related to design speed, sight distances, stopping distances, and grades. See AASHTO p. 5-8 for roadway corridor conflict considerations.

SIGNAGE

Wayfinding or other informational signage, if located within buffer between roadway and trail, should be mounted at 7' from trail to bottom of sign and 2' from the side of the SUP (see MUTCD).

Street Trees

Street trees contribute to attractive and comfortable places to walk. Healthy trees can provide ample shade to cool a hot urban environment. For more information on Wilmington's street tree policies and maintenance, refer to the City's **2022 Parks, Recreation & Open Space Comprehensive Plan.**

Typical Application

Urban street trees are typically located within paved sidewalks (in tree wells or planters), in parking lots, or in continuous planting strips parallel to a roadway or walkway.

Design Guidelines

TREE SPACE DESIGN

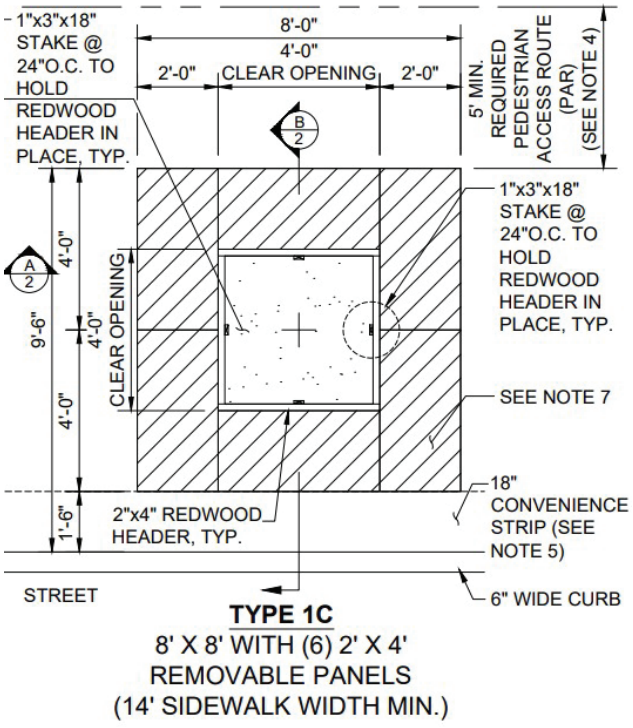
A preferred design detail for a city standard tree well detail is one that goes beyond a typical 4'x4' dimension with the goal of providing as much rootable soil as possible and a larger area of open soil for gas exchange and stormwater infiltration.

Studies have shown that trees grown in large volumes of rootable soil grow faster, develop larger canopies, and outlive those grown in smaller volumes of compacted soil. For example, the approximate recommended soil volume for a 30-foot canopy street tree is 1,000-1,500 cubic feet.

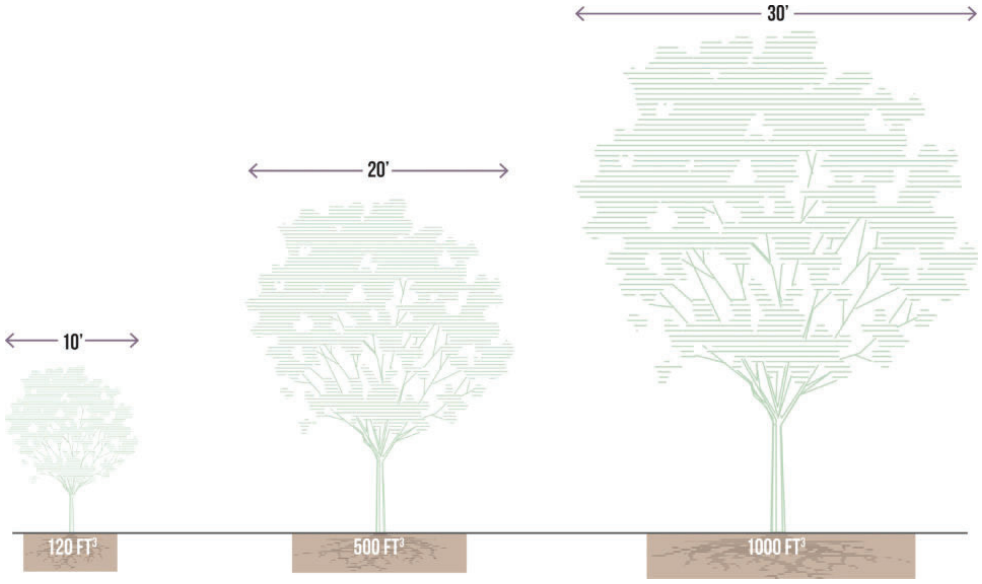
When grates are used, avoid small openings that cause "girdling" or constriction of the tree's natural trunk flare, which is vital to tree health (trunk flare is typically two to three times the expected trunk diameter at maturity). The tree space design should also allow for easy inspection of the soil and irrigation system to promptly diagnose and address any issues affecting tree health.

TREE SPACING

Trees should be spaced to account for maturity; two-thirds of mature canopy width between trees is ideal, with regular pruning once trees are mature.



Example tree well detail for a large tree (Source: Los Angeles Bureau of Engineering)



Larger trees that provide the greatest shade and cooling benefits require greater volumes of uncompacted soil space to allow roots to grow. For example, a tree with a 30-foot wide canopy needs approximately 1,000 cubic feet of root space to thrive. (Source: NACTO)

IRRIGATION

Many street trees are non-irrigated, relying instead on moisture from precipitation and urban runoff to meet their water needs. Prolonged drought and heat stress can be detrimental to trees and may necessitate tree removal.

When new street trees are planted, an 'establishment' period is typically put into place where the trees will receive supplemental water for a period of time, typically 1 to 3 years.

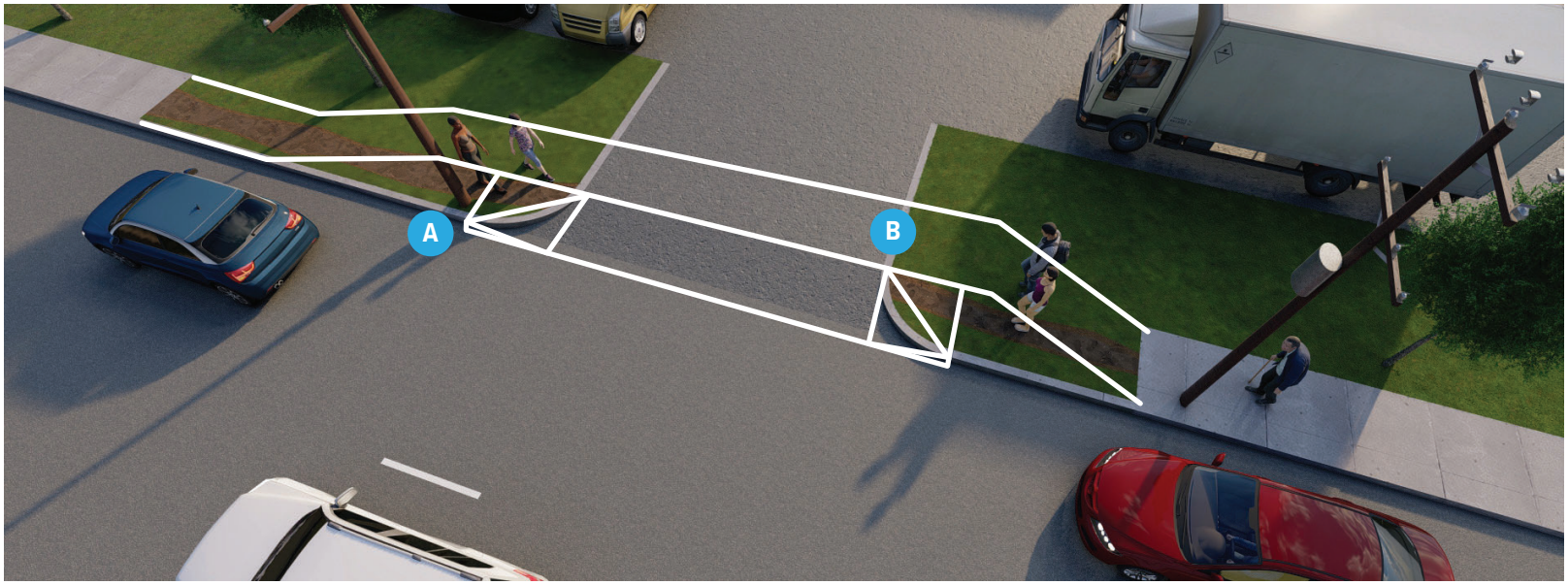
Street trees may be permanently irrigated using a variety of methodologies with the most typical configurations being surface bubblers, root watering systems, and subsurface drip irrigation.

MAINTENANCE

Routine maintenance includes removing leaf litter, replenishing mulch, applying fertilizer, and irrigation. Periodic maintenance includes tree pruning, pest inspection/extermination, and removing dead branches.

OTHER CONSIDERATIONS

Tree species should be selected carefully to match the location's conditions and constraints. Consider whether the desired tree species is appropriate for the spatial context (above and below ground), solar orientation and expected sunlight year-round, and projected future increases in extreme weather conditions (eg, heat, drought).



Sidewalk Infill and Improvements

Due to historic development patterns, sidewalks may be missing or underbuilt for limited segments along an otherwise continuous corridor, or may be provided on only one side of the street where demand exists for access on both sides. Sidewalk infill and improvement strategies should identify and prioritize gaps in order to provide complete, accessible facilities. Providing a sidewalk along a roadway can reduce pedestrian crashes by 88%[1].

Typical Application

- Missing segments in an otherwise complete corridor
- Missing on one side of a corridor
- Where sidewalks are completely absent from the roadway
- The AASHTO Guide for the Development of Pedestrian Facilities states "Wherever there is developed frontage along a road or street, there will be people walking for exercise, visiting neighbors, accessing bus stops, or walking for pure enjoyment. Sidewalk or pathways are needed to safely accommodate these activities." (2004, p.25)

Design Features

- Sidewalk width will vary depending on the available public right-of-way between the curb line and private property line.
- Generally, sidewalk infill projects do not change the configuration of the roadway travel area.
- When filling gaps in a corridor, sidewalk segments should provide adequate width and landscaped buffer. A buffer zone of four to six feet is desirable to separate pedestrians from the street.

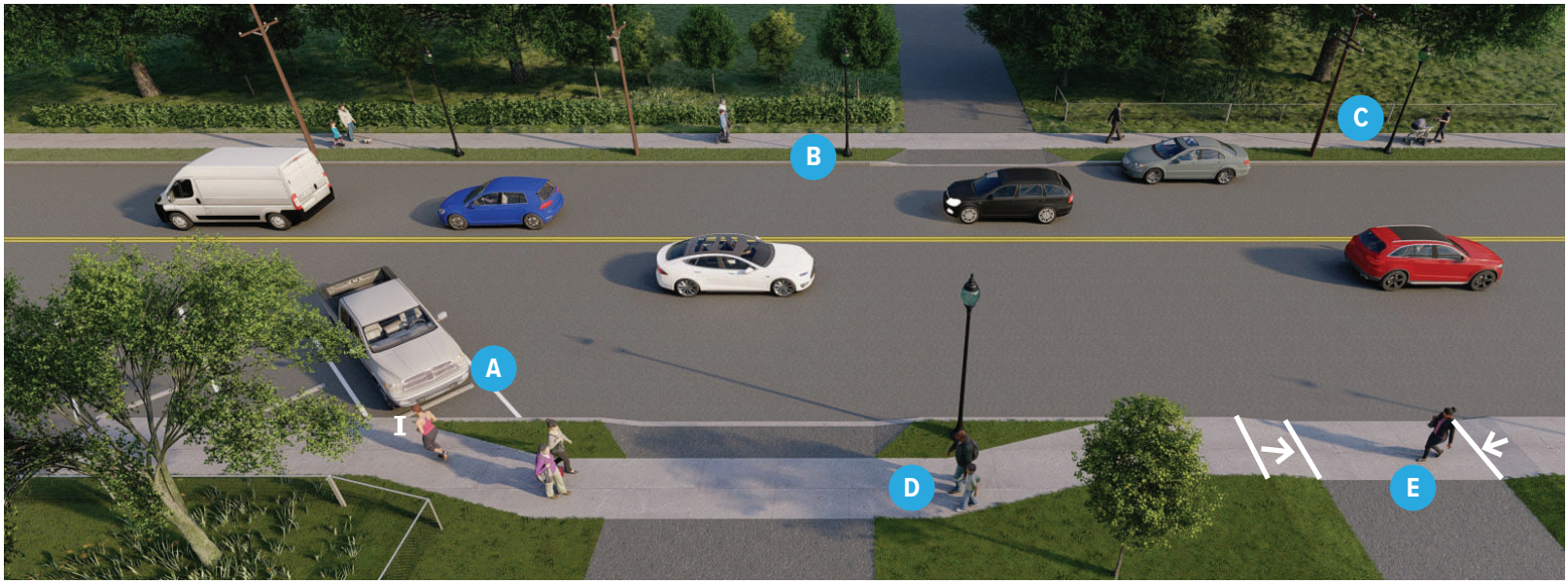
A Infill sidewalks may need to transition at the ends of the segments to connect to existing sidewalk alignment and design.

B New and reconstructed sidewalks must meet accessibility guidelines. This includes the design of curb ramps and driveway curb cuts.

Planning-Level Cost Estimate

- Varies significantly dependent on project specifications

[1] http://www.cmfclearinghouse.org/index.cfm



Sidewalk Obstructions and Driveways

Obstructions to pedestrian travel in the sidewalk corridor typically include driveway ramps, curb ramps, sign posts, utility and signal cabinets, pull boxes and poles, mailboxes, fire hydrants and street furniture. Driveways and entrances to parking structures can also be challenging due to the restricted visibility of exiting motorists.

Typical Application

- Limiting the number and width of access points reduces the need for special provisions.
- Obstructions such as utility boxes, pull boxes and traffic signal cabinetry should be placed in the furnishing or utility zone between the sidewalk and the roadway, or behind the sidewalk. They should be set back from driveway entrances to increase visibility of pedestrians.

Design Features

A When sidewalks abut angled on-street parking, increase the width of the sidewalk by 3' to account for vehicle overhang.

B Planter strips allow sidewalks to remain level, with the driveway grade change occurring within the planter strip. The furnishing or utility zone also serves as the extended area where driveway grade changes should occur. This ensures a continuous elevation along the pedestrian through zone.

C When sidewalks abut hedges, fences, or buildings, an additional two feet of lateral clearance should be added to provide appropriate shy distance.

D Where constraints preclude a planter strip, or where the planter strip is narrow, wrapping the sidewalk around the driveway allows the sidewalk to still remain level.

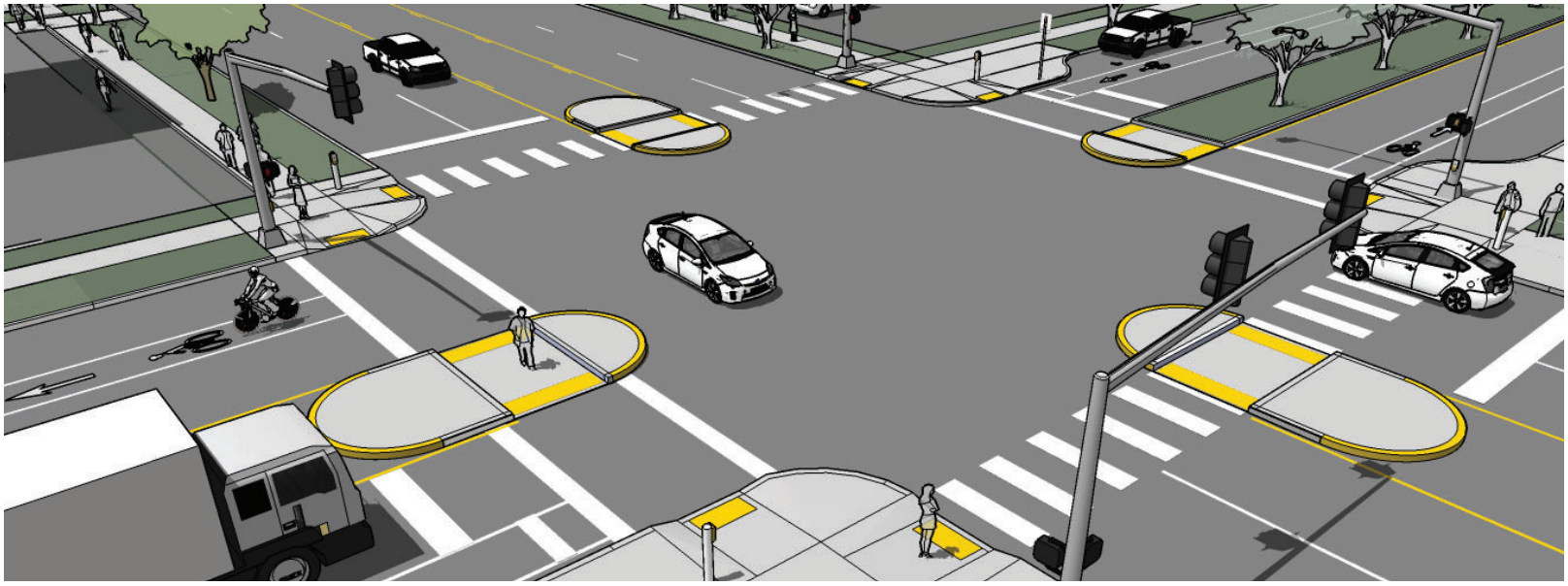
E Driveways are a common sidewalk obstruction, especially for wheelchair and other mobility assisted device users. When constraints only allow curb-tight sidewalks, lowering the entire sidewalk at the driveway approach keeps the cross-slope at a constant grade. However, this may be uncomfortable for pedestrians and could create drainage problems behind the sidewalk. Frequent driveways in this configuration create a "roller coaster" effect forcing pedestrians to constantly be climbing or descending.

Further Considerations

Pedestrians easements may allow for the installation of sidewalks outside of the available right-of-way.

Planning-Level Cost Estimate

- Varies significantly dependent on project specifications



Marked Crosswalks

Marked crosswalks support walkability by signaling to motorists that they must yield to pedestrians and encouraging pedestrians to cross at designated locations. Depending on context, crosswalks may need to be implemented in conjunction with other visibility and safety measures.

Typical Application

All crosswalks should be marked at signalized intersections. At stop- or yield-controlled intersections and mid-block locations, an engineering study should be performed prior to installation, considering: **number of lanes, presence of a median, distance from adjacent signalized intersections, pedestrian volumes and delays, average daily traffic (ADT), posted speed limit or 85th-percentile speed, geometry of the location, possible consolidation of multiple crossing points, availability of street lighting, and other appropriate factors.**[1]

Design Features

- The crosswalk should be located to align as closely as possible with the through pedestrian zone of the sidewalk corridor.
- Users should not have to leave the crosswalk or reorient themselves from the crosswalk when accessing the curb ramp onto the sidewalk.
- Several marking types are acceptable, depending on the context and intersection type. Further guidance is provided in the MUTCD, Section 3B.18: Crosswalk Markings.

Further Considerations

- Pedestrians are sensitive to out-of-direction travel, and reasonable accommodations should be made to make crossings convenient at locations with adequate visibility.
- At roadways that meet certain geometric and ADT criteria, new mid-block marked crosswalks should not be installed without other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence.[2]
- Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. Thermoplastic markings offer increased durability over conventional paint.

Planning-Level Cost Estimate

- Varies significantly dependent on project specifications

[1,2] Manual on Uniform Traffic Control Devices, Part 3: https://mutcd.fhwa.dot.gov/pdfs/2009r1r2r3/part3.pdf

Raised Crosswalks

Typically limited to 2 and 3-lane roadways (30mph max), raised crosswalks slow vehicles and have a studied crash reduction factor of 45%[1].

Raised crosswalks create a special emphasis on crossing pedestrians and should be used on a limited basis. Schools and Neighborhood Greenways are good candidate locations. Some raised crossings can eliminate the need for grade changes over the pedestrian path of travel and improve comfort for users.

Typical Application

- Use detectable warnings at the curb edges to alert vision-impaired pedestrians that they are entering the roadway.
- Approaches to the raised crosswalk may be designed to be similar to speed humps.
- Drainage improvements may be required depending on the grade of the roadway.

Design Features

A. A tactile warning device should be used at the curb edge.

B. No grade change with sidewalk level is preferred.

Further Considerations

Like a speed hump, raised crosswalks have a traffic slowing effect which may be unsuitable on high-speed streets, designated transit or freight routes, and in locations that would reduce access for emergency responders. The noise of vehicles traveling over raised crosswalks may be of concern to nearby residents and businesses.

Planning-Level Cost Estimate

- $300-400 per linear foot of crossing width utilizing concrete construction. Does not include bulb-outs as depicted in graphic.

[1] http://www.cmfclearinghouse.org/index.cfm

Pedestrian Hybrid Beacon

Hybrid beacons or High-Intensity Activated Crosswalks (HAWK) are used to improve non-motorized crossings of major streets. A hybrid beacon consists of a signal head with two red lenses over a single yellow lens on the major street, and a pedestrian signal head for the crosswalk. Hybrid beacons are only used at marked mid-block crossings or unsignalized intersections. They are activated with a pedestrian pushbutton at each end. If a median refuge island is used at the crossing, another pedestrian pushbutton can be located on the island to create a two-stage crossing.

Typical Application

- Suitable for arterial streets where posted speeds are 30-45 mph and multiple travel lanes. In some cases, PHBs are also being implemented along 2-lane roadways.
- Where off-street pedestrian/bicycle facilities intersect major streets without signalized intersections.
- At intersections or midblock crossings where there are high pedestrian volumes.

Design Features

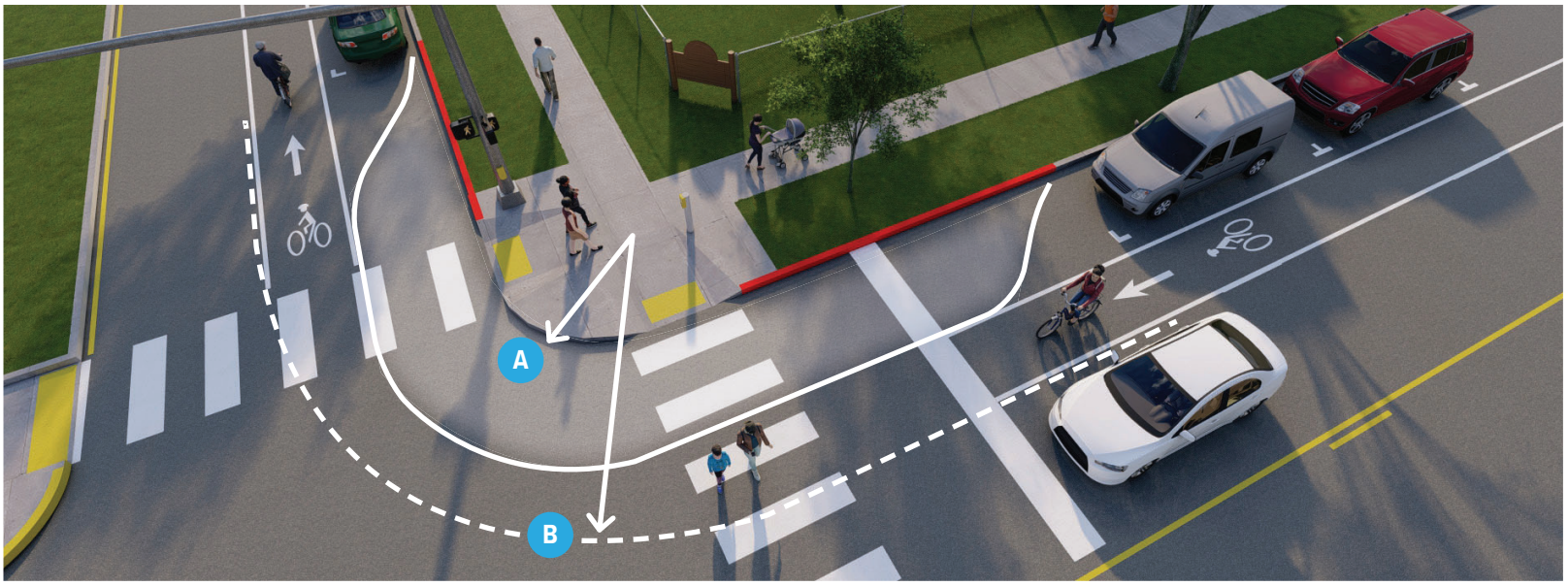
- Hybrid beacons may be installed without meeting traffic signal control warrants based on engineering judgment if roadway speed and volumes are excessive for comfortable pedestrian crossings.
- If installed within a signal system, signal engineers should evaluate the need for the hybrid beacon to be coordinated with other signals. To maximize pedestrian compliance, the PHBs should activate on demand.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.
- Crossings with a median refuge and no more than two lanes in each direction may utilize side mounted beacons for reduced cost and complexity.

Further Considerations

- Hybrid beacons are normally activated by push buttons, but may also be triggered by infrared, microwave, or video detectors. If not on-demand, the maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street, but a much shorter delay is strongly preferred.
- Each crossing, regardless of traffic speed or volume, requires review to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety.
- The installation of hybrid beacons should also include public education and enforcement campaigns to ensure proper use and compliance.

Planning-Level Cost Estimate

- $75,000-$150,000 depending on complexity and overhead vs side mounted configuration.



Corner Radii and Bulb-Outs

The size of a curb's radius can have a significant impact on pedestrian comfort and safety. A smaller curb radius provides more pedestrian area at the corner, allows more flexibility in the placement of curb ramps, results in a shorter crossing distance and requires vehicles to slow more on the intersection approach. During the design phase, the chosen radius should be the smallest possible for the circumstances and consider the effective radius in any design vehicle turning calculations.

Typical Application

The curb radius may be as small as 3 ft where there are no turning movements, or 5 ft where there are turning movements and adequate street width. On-street parking and bike lanes create a larger effective turning radius and can therefore allow a smaller physical curb radius.

Design Features

Corners have two critical dimensions which must be considered together.

- **A** The physical radius controls the pedestrian experience.
- **B** The effective radius is the widest turning arc that a vehicle can take through the corner and is larger than the physical radius. The effective radius should be considered when studying design vehicle accommodation.

Further Considerations

Several factors govern the choice of curb radius in any given location. These include the desired pedestrian area of the corner, traffic turning movements, street classifications, design vehicle turning radius, intersection geometry, and whether there is on-street parking or a bike lane (or both) between the travel lane and the curb. This is a complex topic and many strategies can be employed to balance the trade-offs between accommodating large vehicles and maximizing pedestrian safety. Truck aprons, mountable corners, and wider turning into multiple receiving lanes can help keep turning speeds low for the vast majority of vehicles.

For more information on corner design, including policy support, recommendations, case studies and more, see *Corner Design for All Users: A review of geometric design practices to improve safety for pedestrians and bicyclists at intersection corners*.

Pedestrians at Signalized Intersections

Typical Application

PEDESTRIAN SIGNAL HEADS

Pedestrian signal heads indicate to pedestrians when to cross at a signalized crosswalk. Pedestrian signal indications are recommended at all traffic signals except where pedestrian crossing is prohibited by signage.

Countdown pedestrian signals should be retrofitted at existing signals with older style pedestrian signals and on any new installation. Countdown signals have a crash reduction factor of between 25 and 52% in varied studies[1].

SIGNAL TIMING AND THE PEDESTRIAN PHASE

Adequate pedestrian crossing time is a critical element of the walking environment at signalized intersections. The length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street. The MUTCD recommends a walking speed of 3.5 ft per second.

At crossings where older pedestrians or pedestrians with disabilities are expected, crossing speeds as low as 3 ft per second should be assumed. Special pedestrian phases can be used to provide greater visibility or more crossing time for pedestrians at certain intersections (See *Pedestrian Traffic Signal Enhancements)*.

Large pedestrian crossing distances can be broken up with median refuge islands. A pedestrian pushbutton can be provided on the median to create a two-stage pedestrian crossing if the pedestrian phase is actuated. This ensures that pedestrians are not stranded on the median, and is especially applicable on large, multi-lane roadways with high vehicle volumes, where providing sufficient pedestrian crossing time for a single stage crossing may be an issue.

A Consider the use of a Leading Pedestrian Interval (LPI) to provide additional traffic-protected crossing time to pedestrians. See *Pedestrian Traffic Signal Enhancements* for additional detail.

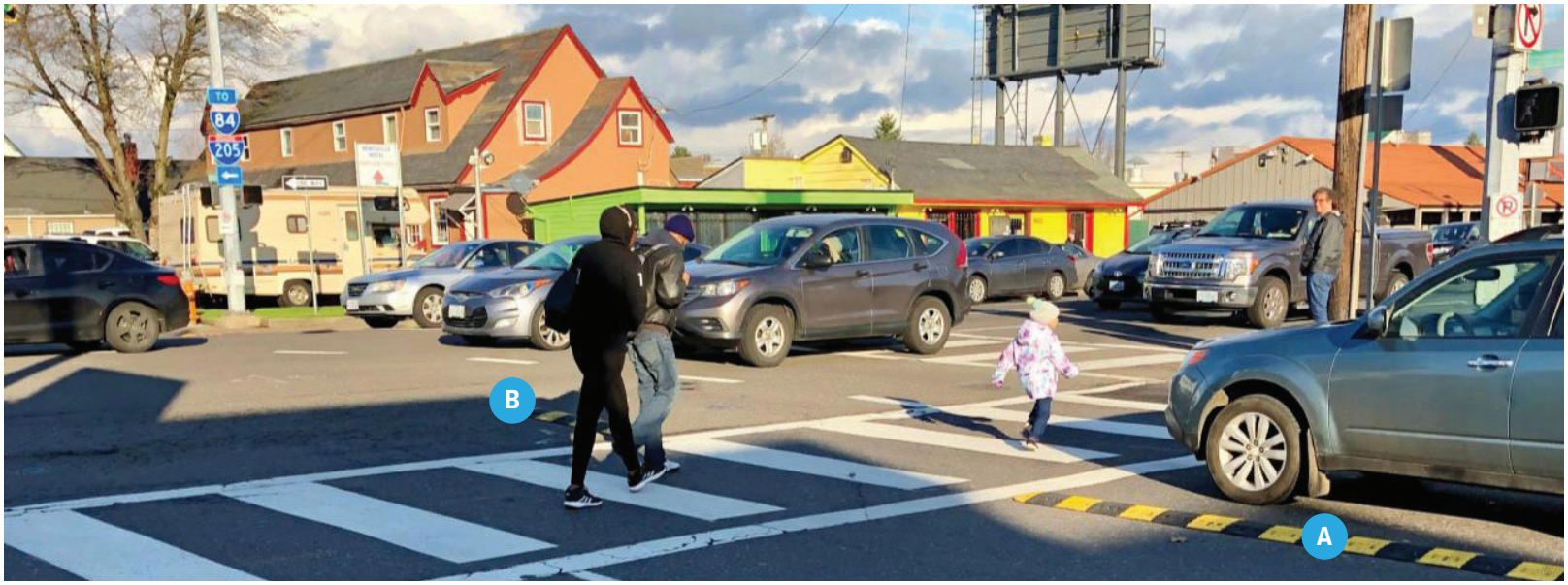
B Accessible Pedestrian Signals (APS) provide crossing assistance to pedestrians with vision impairment at signalized intersections

Further Considerations

Pushbuttons should be located so that someone in a wheelchair can reach the button from a level area of the sidewalk without deviating significantly from the natural line of travel into the crosswalk. Pushbuttons should be marked (for example, with arrows) so that it is clear which signal is affected.

In areas with very heavy pedestrian traffic, consider an all-pedestrian signal phase to give pedestrians free passage in the intersection when all motor vehicle traffic movements are stopped. This may provide operational benefits as turning movements are then unimpeded.

[1] http://www.cmfclearinghouse.org/index.cfm



Hardened centerline treatment at intersection. Source: Portland Bureau of Transportation

Hardened Centerlines

Hardened centerlines use prefabricated rubber speed bumps to deter vehicles from crossing the centerline when making left turns. Similar to curb extensions, this treatment can reduce the radius and speed of car turning movements, but maintains existing large vehicle turning movements when needed.

The cities of New York and Portland have pilot tested this treatment to reduce left-turn crashes as part of their Vision Zero programs and reported positive results. In Portland, for example, hardened centerlines with rubber speed bumps nearly eliminated sharp turns in which drivers cross the centerline (reductions ranging from 82-100%), slowed turning speeds an average of 12%, and were more durable and less expensive than a similarly-effective treatment using flexible delineator posts.[1]

Typical Application

Hardened centerlines are used at intersections to guide left-turning vehicles, reduce turning speeds, and deter turning movements that cut across the centerline.

Design Features

- **A** Flexible rubber speed bumps parallel to the centerline reduce the effective turning radius.
- **B** "Nose" extends no more than 6ft into the intersection and reduces the effective turning radius even further.[2]

Further Considerations

- The configuration varies slightly depending on whether the intersecting roadways are one-way or two-way. The treatment can be used for multiple left turn approaches at the same intersection.
- Installation can typically be completed by a municipality's public works/transportation staff.

Planning-Level Cost Estimate

- A hardened centerline kit (consisting of rubber curbs and hardware for installation at one left turn) can cost less than $1,000.

[1] Portland Bureau of Transportation, *Left Turn Calming webpage*; [2] NYC DOT: *Turn Calming Program webpage*