WEST METRO

BIKE AND PEDESTRIAN MASTER PLAN

DECEMBER 2017

ACKNOWLEDGMENTS

West Metro Bike and Pedestrian Master Plan

December 2017

Central Midlands Council of Governments

Reginald Simmons, Director of Transportation

City of Cayce

Rachelle Moody, Special Projects/Grants Manager

Carroll Williamson, AICP, Planning and Development Director

City of West Columbia

Tara Greenwood, Director of Grants and Special Projects

Wayne Shuler, AICP, Director of Planning and Zoning

Town of Springdale

John Rabon, Special Projects Coordinator

Consultant Team

Toole Design Group

Ernie Boughman, AICP, Regional Director

Jared Draper, AICP, Project Planner

Blake Loudermilk, PE, Senior Engineer

Chris Lambka, PLA, Landscape Architect

Rachael Thompson Panik, Planner

The LandPlan Group South

Charles Howell, RLA, Principal

The Boudreaux Group

Irene Dumas Tyson, AICP, Director of Planning

Wendel

Ronald Reekes, Project Manager

CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

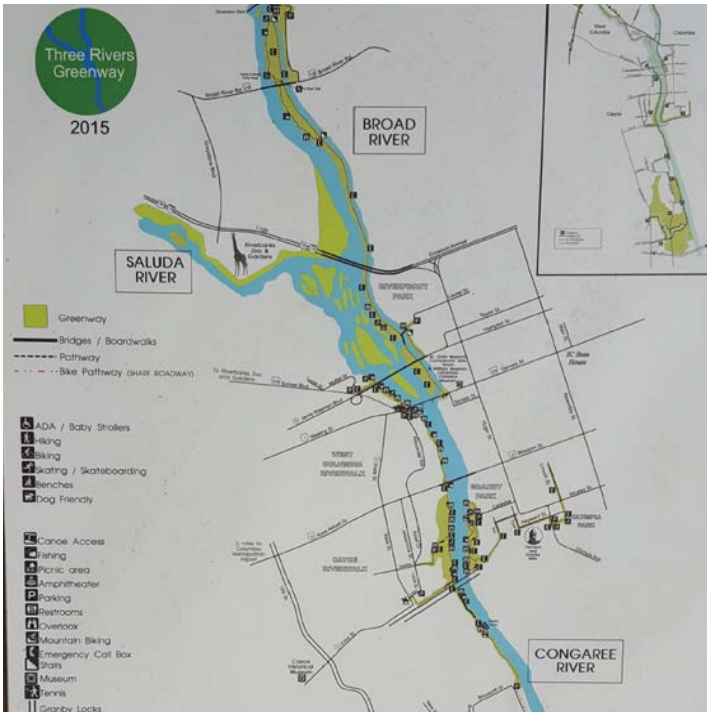
1. Introduction

The West Metro area, comprised of the communities of Cayce, West Columbia, and Springdale, has established itself as a vibrant and dynamic location within the Central Midlands region of South Carolina. The proximity of these municipalities to one another and Columbia, provides opportunities for reaching destinations on foot and by bike. Combine this with a diverse mix of outdoor and recreational amenities, including the Three Rivers Greenway, and the West Metro area is quickly becoming an active living destination. Building on that growing reputation and positioning for the future, the Central Midlands Council of Governments (CMCOG), in cooperation with the City of Cayce, City of West Columbia, and Town of Springdale, has completed the West Metro Bike and Pedestrian Master Plan.

The West Metro Bike and Pedestrian Master Plan identifies a clear strategy for near- and long-term active transportation projects within the municipalities of Cayce, West Columbia, and Springdale. These projects will advance a safer, more connected network of bicycle and pedestrian infrastructure. The recommended network connects key destinations to encourage active transportation throughout the three communities and surrounding jurisdictions.

The development of the Plan focused on safety, connectivity, and accessibility for residents throughout the West Metro region. Recommendations build upon the previous and ongoing work from all three communities. Additionally, pulbic input was essential to the planning process and crucial to developing a regional network that will attract more users and connect those users to desireable destinations.

The West Metro study area consists of three adjacent municipalities: Cayce, West Columbia, and Springdale. The entirety of the study area is within the Metropolitan Planning Organization boundary of the Columbia Area Transportation Study, which is housed within CMCOG. Most of the study area is within Lexington County, except for a portion of the City of Cayce that is in Richland County on the east side of the Congaree River. Figure 1.1-1 shows the West Metro study area along with major roadways, transit routes/stops, existing bike facilities, existing greenways, and previously proposed greenways.



Existing trail system

The West Metro Bike and Pedestrian Master Plan took a comprehensive approach to bicycle and pedestrian infrastructure, route connectivity, accessibility, and policies and programs. Through the implementation of this plan, the West Metro area will become a region where:

- **A 43-mile, low-stress network of bicycle and pedestrian facilities exists;**
- **Amenities, destinations, and neighborhoods are accessible through multiple modes of transportation;**
- **All ages, abilities, genders, and income levels are comfortable walking and biking throughout the area;**
- **Bicycle ridership will increase annually;**
- **Residents are regularly engaged about walking and biking in the West Metro area through programming and events;**
- **Future development embraces a walking and biking culture;**
- **Active transportation planning efforts are led by an advisory committee made up of stakeholders from all three communities;**
- **School-age children can safely walk and bike to schools within the West Metro area; and**
- **Transit can be accessed safely and conviently by walking or biking.**

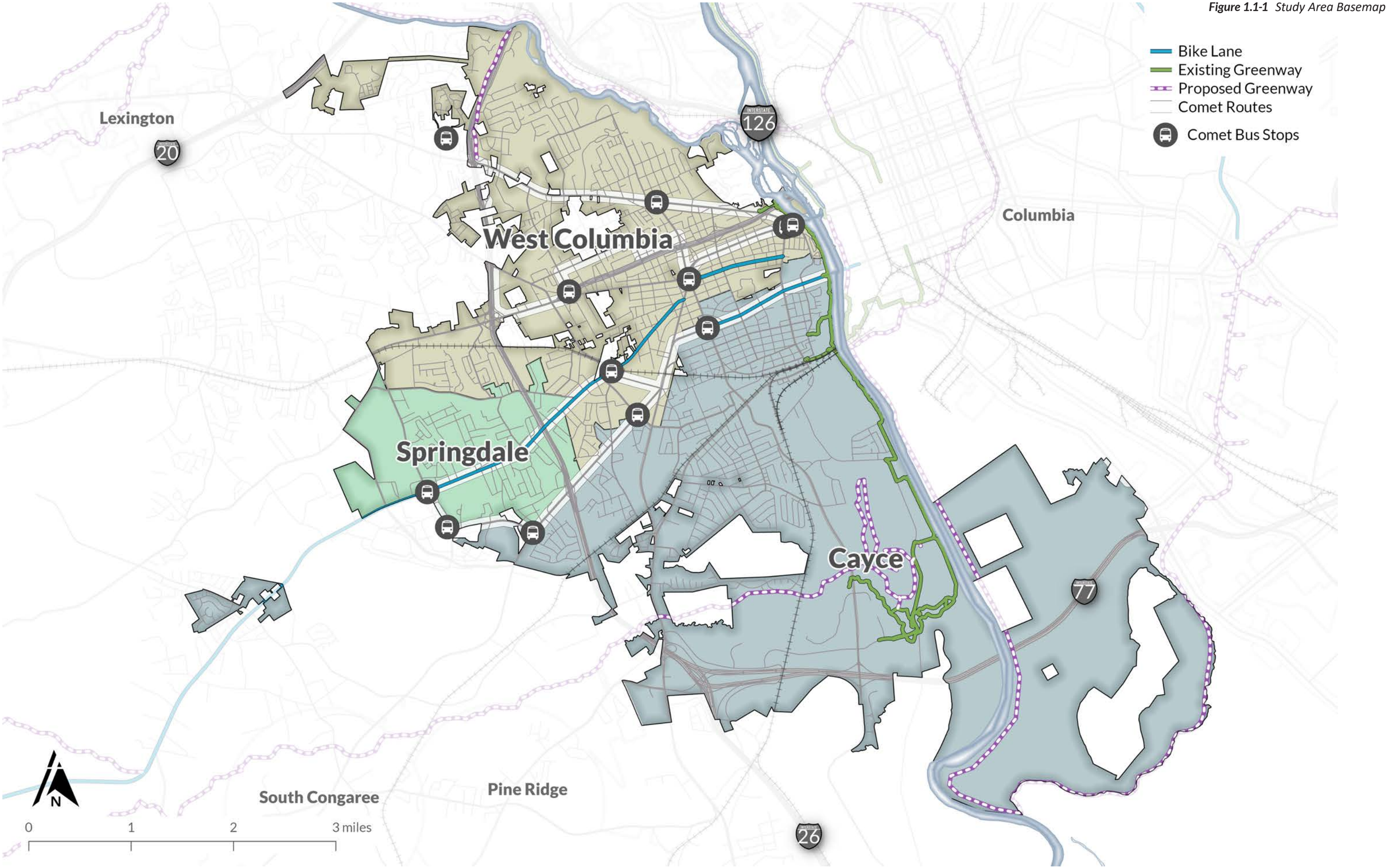
1.1 Goals and Objectives

To guide the planning process, goals and objectives were developed based upon input from the municipal staff of Cayce, West Columbia, and Springdale, stakeholder commments, and public input. Key themes of previous planning documents (see Section 1.2) were also considered in order to ensure that goals and objectives aligned with community initiatives and vision. The goals and objectives presented in Table 1.1-1 set the stage for recommendations, including how projects are prioritized and phased for implementation.

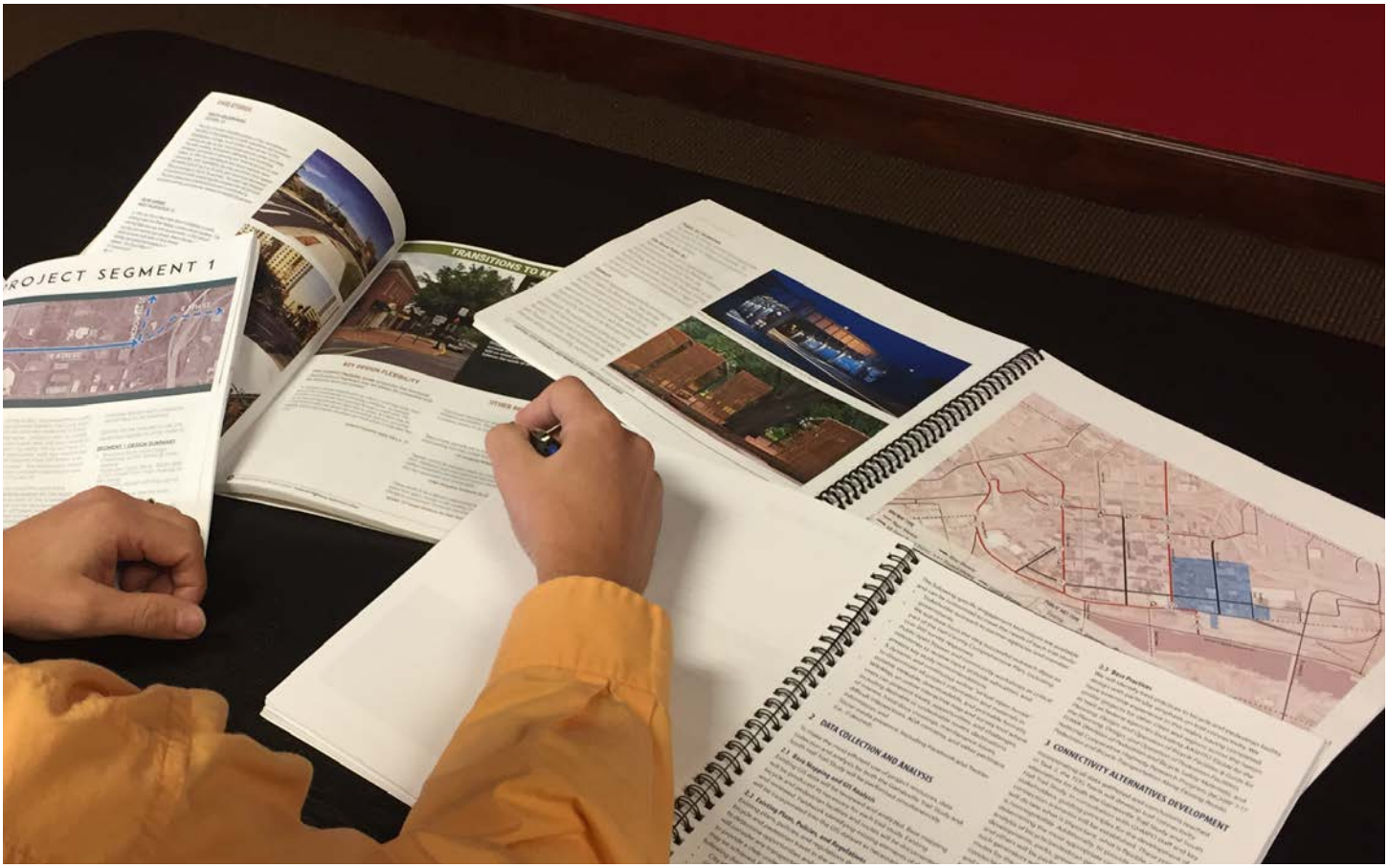
Table 1.1-1 *Goals and Objectives*

Goal		Objectives
Connectivity	Complete a connected and accessible network of low-stress bike and pedestrian facilities.	• Build and maintain bike and pedestrian facilities that form a continuous, comfortable network with seamless connections to transit, schools, parks, neighborhoods, and other community destinations. • Provide on-street and adjacent-to-street bike and pedestrian connections to existing and planned greenway access locations.
Safety	Improve safety for all modes of transportation	• Identify key intersections for safety improvements for cyclists and pedestrians. • Increase separation for cyclists and pedestrians from vehicular travel lanes along corridors with speed limits greater than 35 miles per hour (mph). • Enforce existing laws, including laws that pertain to vehicular speeds and driver behavior (e.g., distracted driving), yielding of right-of-way, and pedestrian and bicyclist behavior.
Increase Users	Provide a comfortable network that encourages biking and walking by users of all ages and abilities.	• Attract new users by creating a comfortable and connected regional network for biking and walking. • Implement a program for counting cyclists and pedestrians, specifically before and after new infrastructure is constructed. • Host open streets events to showcase new bike and pedestrian facility types and educate the community on benefits.
Community-wide Access	Provide equitable access to bike and pedestrian facilities and cultivate an environment of respect for all modes of transportation.	• Create a West Metro Bicycle and Pedestrian Advisory Committee (BPAC) to be a champion for bike and pedestrian infrastructure in the West Metro area. • Implement comfortable bike and pedestrian facilities to ensure access is provided in all parts of the West Metro region. • Implement pilot programs and initiatives that promote education for all modes of transportation about the rules of the road and respect for all users.

Figure 1.1-1 *Study Area Basemap*



THIS PAGE INTENTIONALLY LEFT BLANK



1.2 Existing Plans, Policies, and Programs Review

To contextualize the West Metro Bike and Pedestrian Master Plan, the project team conducted a review of prior planning efforts and local government regulations pertaining to biking and walking in the study area. The detailed review is included in Appendix A. Key themes were identified from the plan review and are presented below. Table 1.2-1 provides a summary of which plans reflect each theme.

Prior Planning Key Themes

- Active Transportation Connectivity: Connecting planned and existing bike lanes, trails, and paths to create a cohesive network that can be utilized for transportation and recreation
- Gateways: Creating attractive and multimodal entrances to downtown areas
- Beautification and Place: Encouraging a sense of "place" within the three communities by updating landscaping and streetscaping that attracts visitors and new residents
- Redevelop and Revitalize: Using economic tools, beautification, and multimodal travel to reinvigorate existing communities
- Safety: Creating active transportation facilities that are safe for all ages and abilities
- Transit Linkages: Coordinating transit and active transportation planning so that convenient and effective linkages are accessible to the three communities

Table 1.2-1 Prior Planning Key Themes

Existing Plan	Active Transportation Connectivity	Gateways	Beautification & Place	Redevelop & Revitalize	Safety	Transit Linkages
Springdale Master Plan Charrette	X	x	x	x		
Moving the Midlands: 2040 Long Range Transportation Plan	x				x	x
Knox Abbott Drive Master Plan		x	x		x	
Springdale Comprehensive Plan	x		x	x	x	
West Columbia Gateway Overlay District Redevelopment Plan	x	x	x	x	x	
City of West Columbia Comprehensive Plan			x		x	x
West Columbia Beautification Plan	x		x			
Central Midlands Bicycle and Pedestrian Regional Pathways Plan	x				x	
Cayce Comprehensive Plan Overview	x			x		x
Cayce Master Plan Charrette	x		x	x		
CMCOG Model Policy Guidelines	x				x	

1.3 Public Participation Summary

Listening to the public's thoughts on biking and walking in the West Metro area was crucial in forming the recommended network, building the project's momentum, and attracting new users once the Plan is implemented. Engagement occurred in a variety of ways, encouraging a broad cross-section of the public and key stakeholders to participate, ensuring that the West Metro Bike and Pedestrian Master Plan will comprehensively address citizens' needs and remove barriers that impact network recommendations. Detailed documentation of each engagement effort is included in Appendix B, but key methods and emerging themes are summarized here.

Steering Committee

A project steering committee was formed to guide the overall process and development of the Plan. The steering committee was comprised of key staff from Cayce, West Columbia, and Springdale, along with CMCOG representatives. The steering committee met at key project milestones, during which feedback was solicited on other public participation efforts, study methods, and draft network recommendations.

Pop-Up Events

Informing the public about the planning process was a critical step in gaining valuable feedback to help shape the Plan that will guide improvements within the bike and pedestrian environment throughout the West Metro area. To reach a diverse and large number of the public within all three communities, the Project Team used informal "pop-up" events to distribute informational materials, promote the planning process, and receive valuable feedback. A pop-up style strategy engages the community at events that are already well-attended. Postcards with project information and the link to the online interactive Wikimap were distributed at all pop-up events. On April 8, 2017, the Project Team conducted pop-up events at the following community gatherings to solicit input and discuss opportunities to enhance biking and walking in the West Metro area:

- Easter in Springdale
- Cayce Festival of the Arts
- Rhythm on the River in West Columbia

A pop-up event was held at West Columbia's Rhythm on the River

All three events provided interactive activities, allowing the public to provide input in a quick, streamlined manner. These activities asked participants about barriers to walking and biking in the West Metro area. Over 26% of participants said that "lack of safe bicycle and pedestrian facilities" is what prevented them from biking or walking more often, and 30% stated that "dangerous intersections" were the greatest deterrent. A more detailed description of each event can be found in Appendix B.

Festival of the Arts in Cayce

Council Outreach

On May 2, 2017, the Project Team presented an overview of the planning process and provided a project update for the West Metro Bike and Pedestrian Master Plan to elected officials of all three communities. These presentations were conducted concurrently by the Project Team, along with providing the opportunity for feedback through interactive activities that asked participants their preference for the type of bike and pedestrian infrastructure they would like to see implemented within each community. Based upon feedback from all three communities, 25% of participants would like to see shared-use paths as a facility type for bikes and pedestrians within the West Metro area. Median refuges received 21% of the responses, which emphasized the need for safe pedestrian crossings within the region.

Project update meeting for Council

Wikimap

An online interactive map, or WikiMap, was created to collect public input about existing bike and pedestrian conditions, barriers to walking and biking, unsafe intersections, key destinations, desireable walking and biking routes, and potential locations of future bike share stations. The map was opened for input in April 2017, coinciding with the pop-up events in each community, and closed mid-June. The WikiMap was promoted to the community through a variety of means, including links from websites, postcards distributed during pop-up events, and during Council presentations. WikiMap input was integrated into the broader public input and helped to develop draft recommendations.

A total of 94 people participated in the WikiMap, contributing 97 individual comments. The participants of the Wikimap provided key information for developing the draft recommendations along with demographic information of each participant. Figures 1.3-1 to 1.3-4 present key information collected through this online engagement tool.

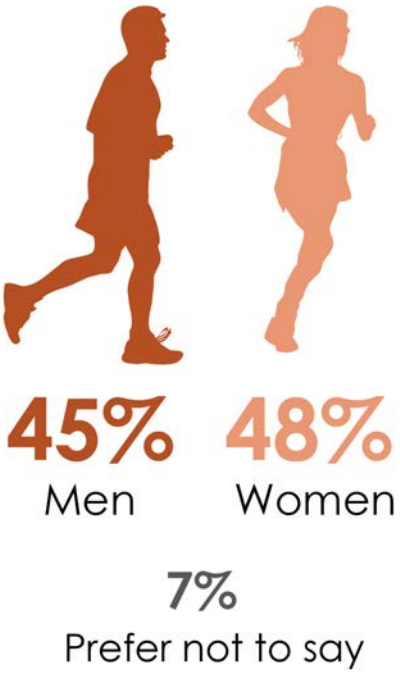


Figure 1.3-1 *Wikimap Participants Gender*

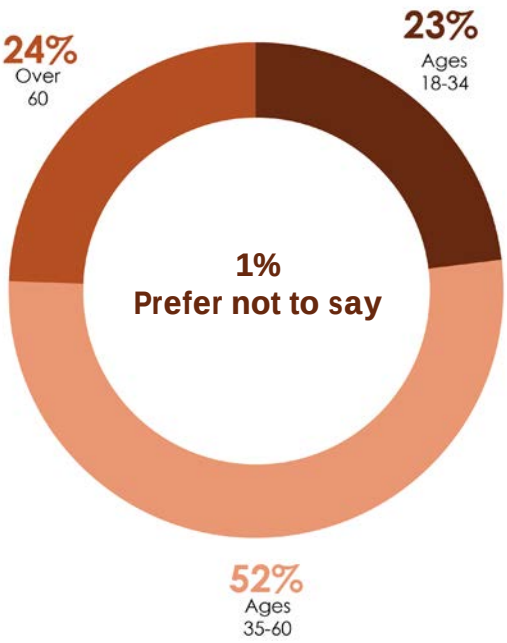


Figure 1.3-2 *Wikimap Participants Age*

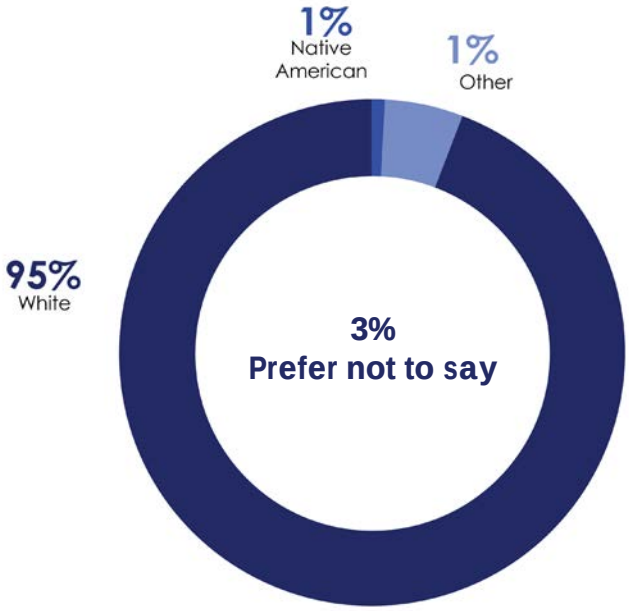


Figure 1.3-3 *Wikimap Participants Demographics*

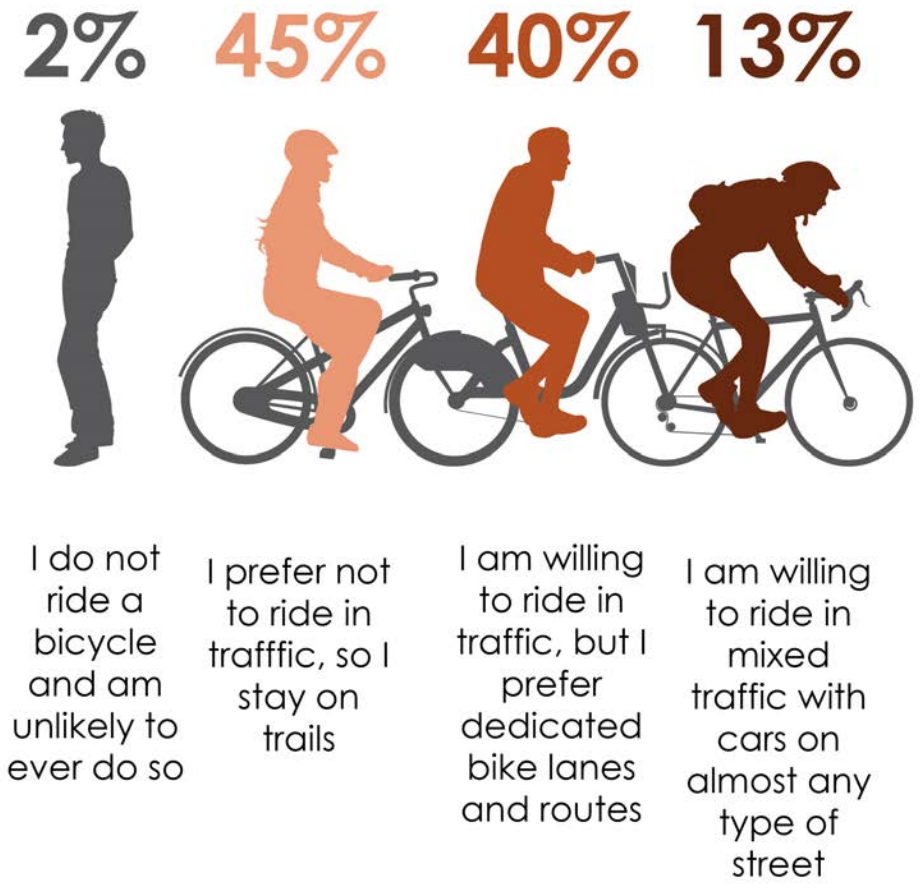


Figure 1.3-4 *Wikimap Types of Cyclists*

Stakeholder Engagement

The project team conducted interviews with various stakeholders throughout the planning process. Conversations with stakeholders allowed community members to provide insight that may be missed during the standard public meeting process. There were 26 stakeholders from a variety of organizations that provided feedback for the West Metro Bike and Pedestrian Master Plan. Participants were asked to describe current conditions, major opportunities and barriers, desired outcomes and actions, and key destinations to connect with respect to bicycling and walking in the study area. Repeated topic areas are presented below.

STAKEHOLDER INTERVIEW HIGHLIGHTS

Current Condition

- High speed limits make cyclists feel unsafe
- Poor maintenance for existing on-street bike lanes

Opportunities

- Increase tourism and economic benefits
- Overall improvement for connectivity
- Community health benefit

Barriers

- Education for drivers and cyclists
- Distracted driving
- Lack of maintenance
- High speed limits and traffic volumes

Desired Outcomes

- Paths to key destinations (parks, schools, businesses)
- Well-defined bike routes
- Connectivity throughout West Metro

Desired Actions

- Develop a vision for a bike and pedestrian network
- Enforce existing laws
- Signage for safety and wayfinding
- Improve comfort for all users

Destinations to Connect

- Riverwalk/Timmerman Trail
- 12th Street

NETWORK DEVELOPMENT

2. Network Development

Based on national research, approximately 51% people might use a bike more often if the appropriate infrastructure was implemented. This group of potential users is categorized as the "Interested but Concerned," as presented in Figure 2.0-1 below.

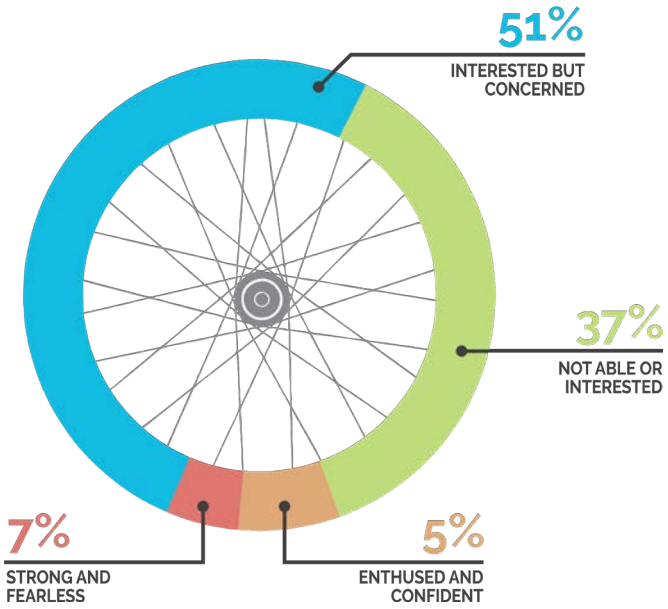


Figure 2.0-1 *Bicyclist User Types (Source: Dill & McNeil, 2015)*

Balancing input received from the public, stakeholders, and the steering commitee with technical analyses was critical to crafting a network of improvements to attract the "Interested but Concerned" within the region. The following sections present the technical approach used to develop the overall draft network.

2.1 Demand Analysis

The purpose of the demand analysis is to highlight places within Cayce, West Columbia, and Springdale that are either: 1) currently hubs for bicycle and pedestrian activity; or 2) may be hubs of activity in the future. These places create demand for high quality infrastructure to support existing users and attract users in the future. Places that are already "hotspots" of active transportation can serve as nodes of a network of bicycle and pedestrian infrastructure. The activity centers in the West Metro area were used to inform and prioritize network recommendations.

Process and Outcomes

The demand analysis created for the West Metro study area identifies existing and potential demand for bicycle and pedestrian activity. The demand analysis map, or heatmap, presented in Figure 2.1-1 illustrates these locations by considering multiple weighted demand criteria, including but not limited to existing active transportation infrastructure, the locations of schools and parks, and a variety of zoning categories; these criteria are presented in Table 2.1-1. Each criteria and its weight was chosen based on its likelihood to generate biking and/or walking trips. Together, these inputs provide a picture of locations where bike and pedestrian infrastructure will most likely be successful.

Table 2.1-1 *Demand Criteria*

Input	Weight	Rationale
Comet Routes/Stops	7	Transit ridership generates demand for bike and pedestrian facilities
Existing/Future Schools	20	Students may be frequent users of active transportation to commute to school if safe facilities are provided
Existing Active Transportation Infrastructure	25	Existing infrastructure indicates a certain level of bike and pedestrian activity currently exists
Parks	15	Parks are existing locations of pedestrian activity and destinations for bicyclists and pedestrians
Commercial Properties	3	Commercial zoning districts are often destinations for bike and pedestrian trips
High Density Residential Development (Multi-family)	10	Dense residential zoning districts likely provide a safe and comfortable biking and walking environment
Critical Corridors	20	• Knox Abbott Drive • State Street • Platt Springs Road • Meeting Street • Sunset Boulevard • 12th Street • Airport Boulevard • US 1

2.2 Level of Comfort Analysis

Bicyclists have varying levels of tolerance for the stress created by volume, speed, and proximity of adjacent traffic. Their tolerance may vary by time of day or trip purpose, and it may change over time and with bicycling experience. To quantify a cyclist's comfort, a Level of Comfort (LOC) analysis was performed for the West Metro area. The LOC analysis is based on a concept developed in the Mineta Report that assigns a score to a given segment of street or bicycle infrastructure based on its characteristics, such as the level of separation from traffic, road speeds, traffic volumes, and safe crossings on major roadways.

This analysis was customized for the West Metro area, and it is intended to inform the West Metro Bike and Pedestrian Master Plan as a baseline understanding of existing roadway comfort. As noted in the goals, the network should be planned to serve the "Interested but Concerned" rider. The LOC analysis informs the type of infrastructure improvements needed to improve rider comfort to attract these riders.

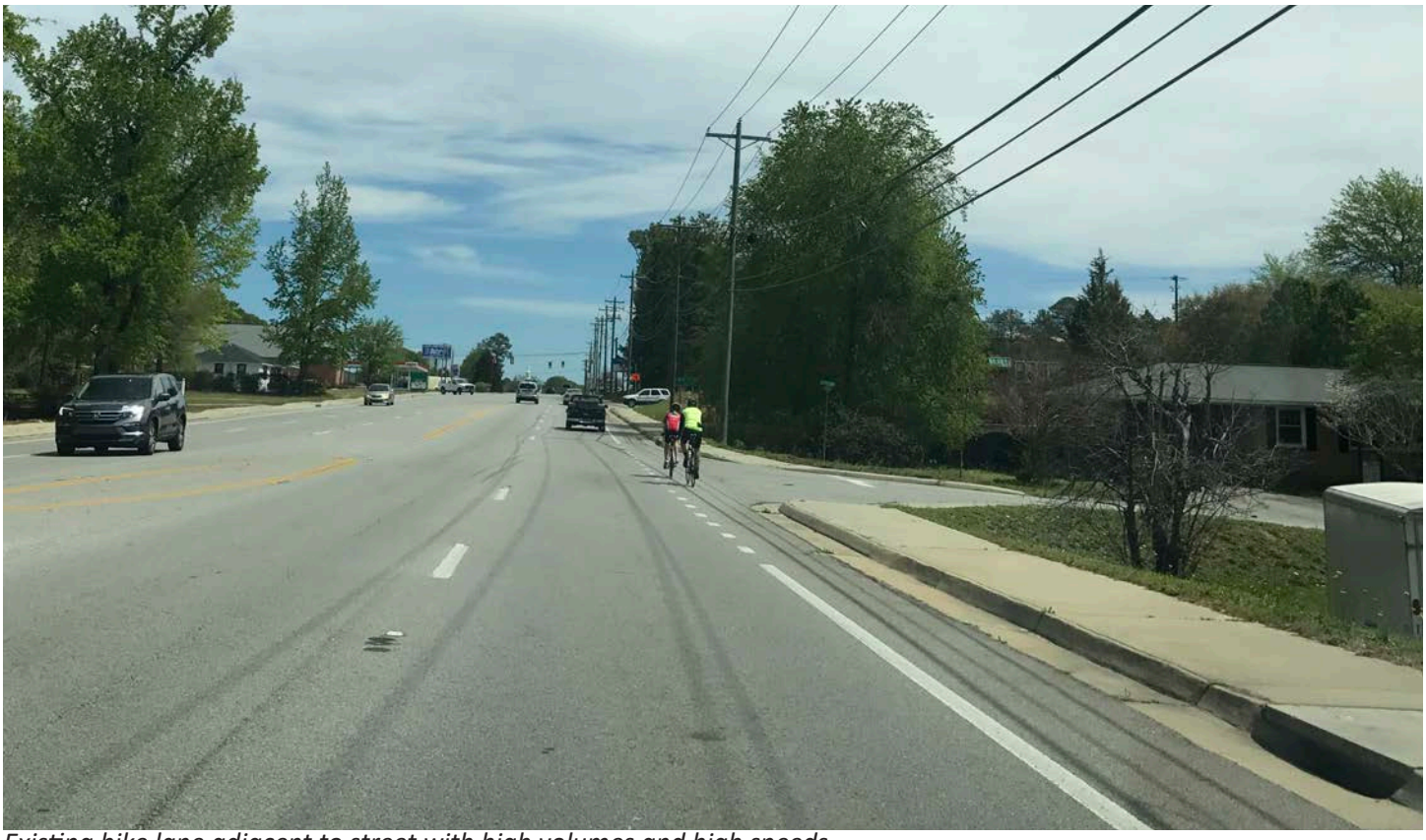
While it may not reflect the experience of every individual bicyclist, the LOC ratings reflect a "worst case scenario" so that the assigned LOC score is a conservative estimate, which is appropriate for infrastructure's long-term nature.

Process and Outcomes

The overall LOC map presented in Figure 2.2-1 illustrates all five of the LOC scores for the West Metro study area. Additionally, the analysis extends beyond the study area limits because it is important to understand the LOC of streets entering and exiting the study area to provide a clear and accurate depiction of the existing conditions for regional bikeability.

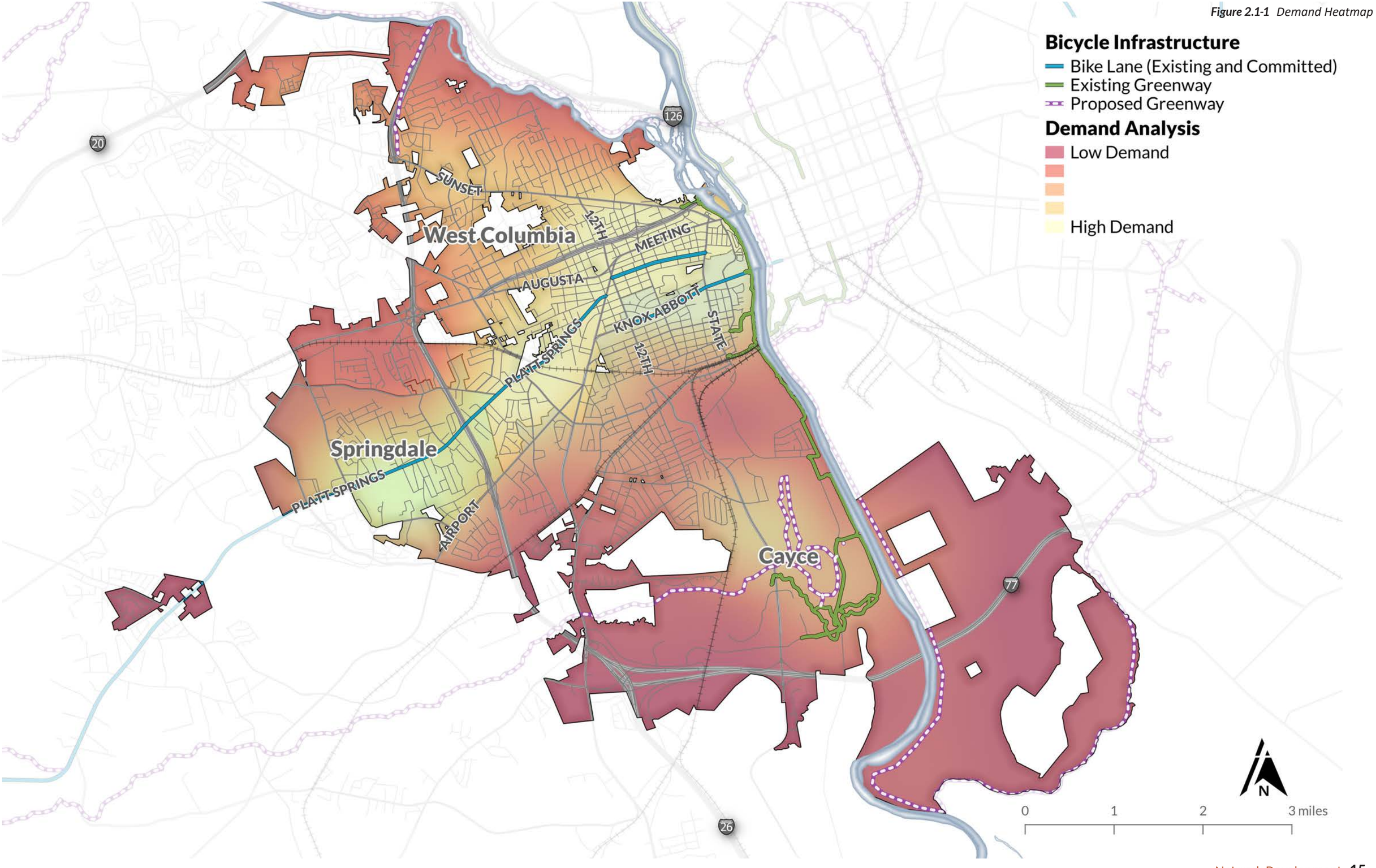
LOW-STRESS ISLANDS

During planning and implementation, it is important to determine where "low-stress islands" exist. Low-stress islands are created when streets within a neighborhood are connected, but there is no way to reach an adjacent neighborhood without crossing a high stress street (LTS 3 and 4 streets). These islands detract from overall connectivity and cohesion within the West Metro area. Crossings at key locations should be identified and prioritized for improvement.



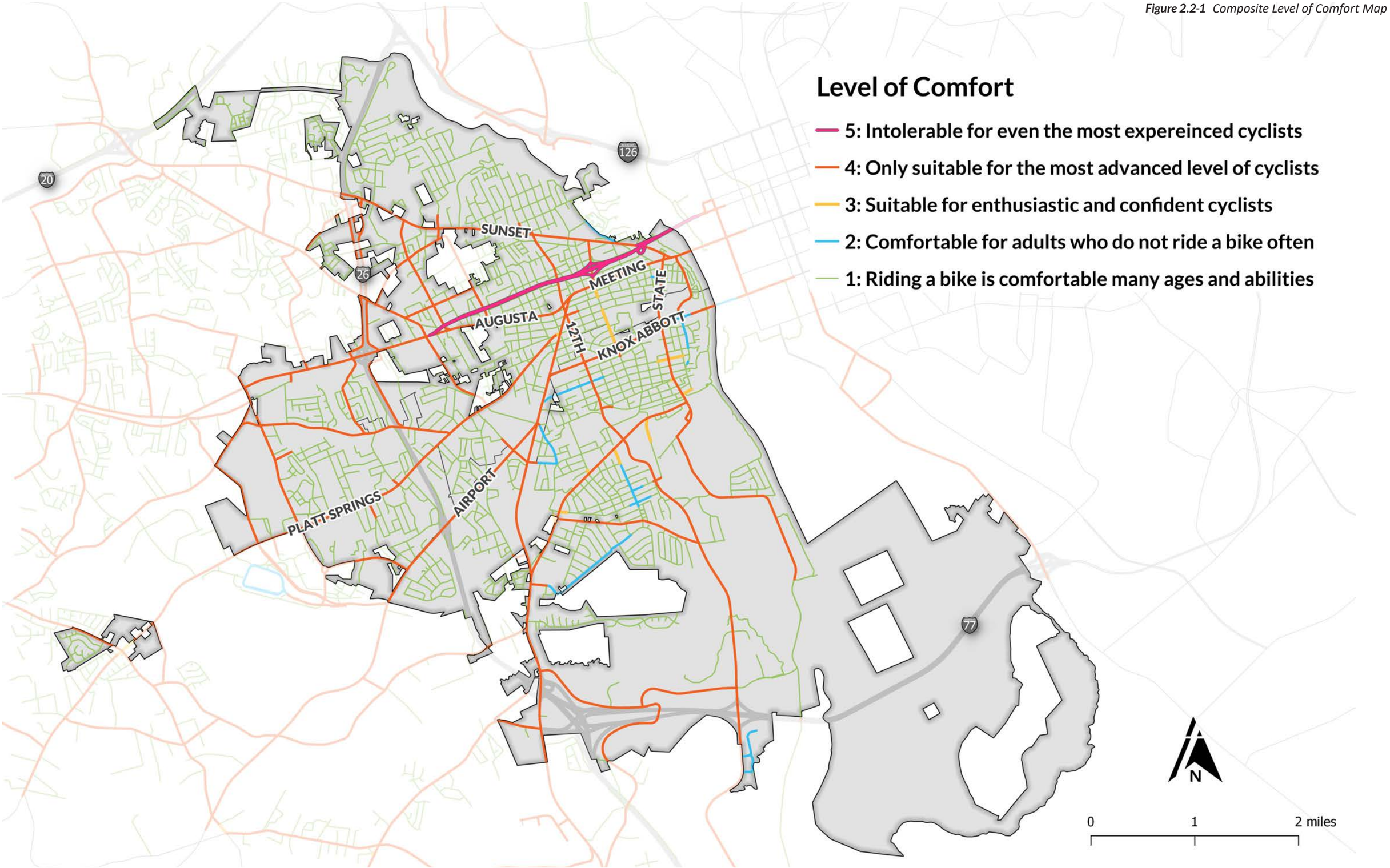
Existing bike lane adjacent to street with high volumes and high speeds

Figure 2.1-1 *Demand Heatmap*



THIS PAGE INTENTIONALLY LEFT BLANK

Figure 2.2-1 *Composite Level of Comfort Map*



THIS PAGE INTENTIONALLY LEFT BLANK

The following pages illustrate each LOC score separately along with a short description and examples of streets that fall into each respective scoring category. An exhaustive list of all the factors considered in the LOC analysis is included in Appendix C.

LOC 1 is assigned to areas where riding a bike is comfortable for a wide range of ages and abilities. Off-street bike facilities, such as multiuse paths, trails, and greenways, are included in this category. Roads within this category are characterized by slower speeds (<35 mph), lower Annual Average Daily Traffic (AADT), and one or two adjacent travel lanes.

Representative LOC 1 Facilities:

- Three Rivers Greenway
- Neighborhood streets

Three Rivers Greenway is an example of a LOC 1 facility

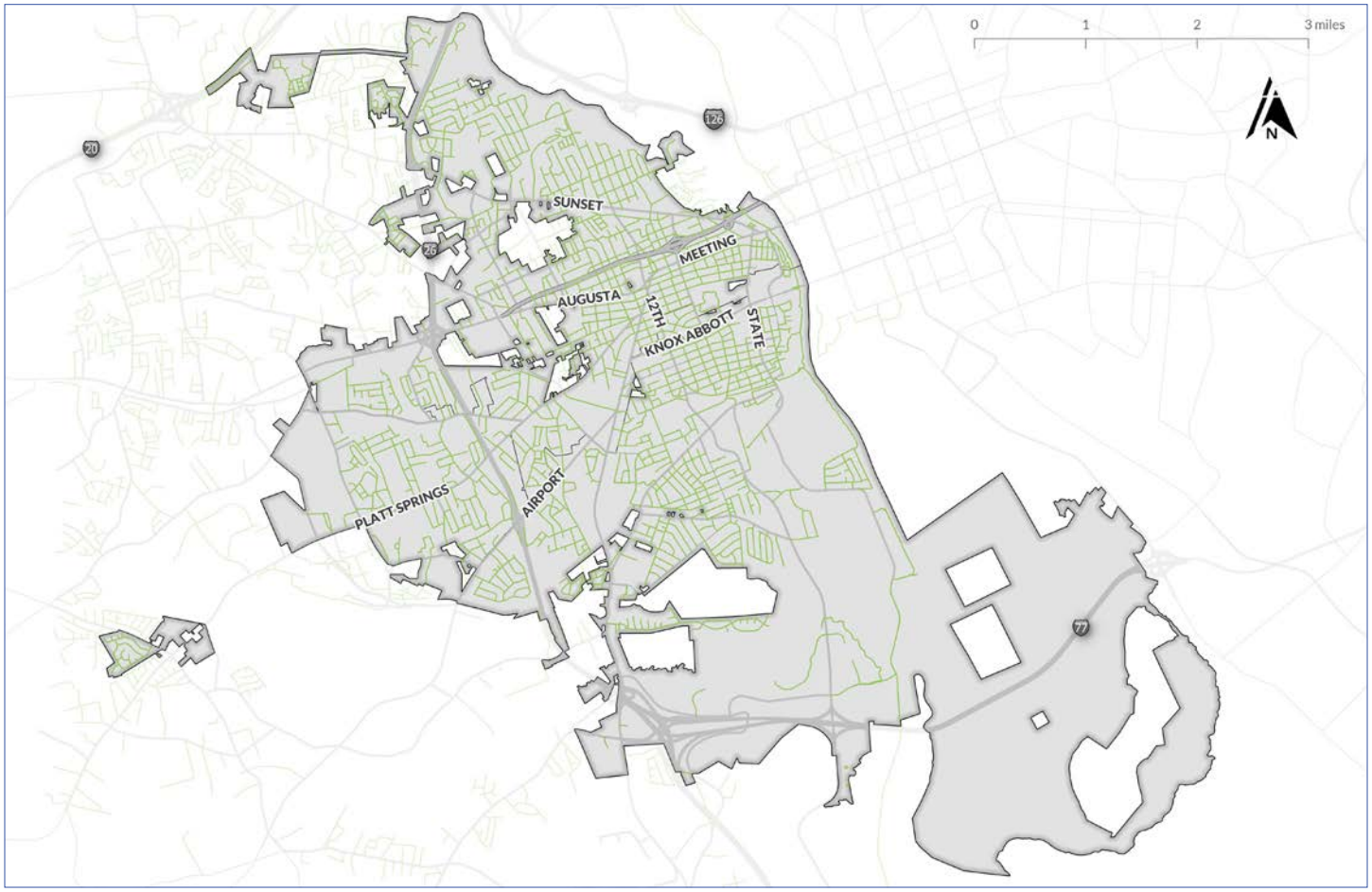


Figure 2.2-2 *LOC 1 Facilities*

LOC 2 is assigned to roads that may be comfortable for adults that don't ride a bike often. Roads within this category are characterized by designated bike lanes, moderate speeds (30-45 mph), one or more adjacent travel lanes, and moderate traffic volumes (2,000-4,000 vehicles daily).

Representative LOC 2 Facilities:

- North Eden Drive
- Julius Felder Street
- Axtell Drive

Slow speeds and wide travel lanes provide a more comfortable bike and pedestrian environment

Figure 2.2-3 *LOC 2 Facilities*

LOC 3 is assigned to areas well suited for enthusiastic cyclists that are confident in their abilities and comfortable riding in mixed traffic. Roads within this category are characterized by designated bike lanes, moderately high speeds (35-45 mph), one or more adjacent travel lanes, and higher traffic volumes (4,000-8,000 vehicles daily). Within the West Metro area, there are very few examples of streets with a current LOC 3 score, and, in all cases, they are short segments providing little connectivity.

Representative LOC 3 Facilities:

- 9th Street
- Foreman Street
- Lafayette Avenue

Streets with increase speeds and a lack of bike facilities decrease comfort for bike users

Figure 2.2-4 *LOC 3 Facilities*

LOC 4 are streets that are not comfortable for bicycle travel and may only be suitable for the most advanced level of cyclist, the strong and fearless, in rare circumstances. Roads within this category are characterized by high speeds, one or more adjacent travel lanes, and high traffic volumes (>8,000 vehicles daily).

Representative LOC 4 Facilities:

- Knox Abbott Drive
- Sunset Boulevard
- Platt Springs Road

Multiple travel lanes and high speeds create uncomfortable conditions for bikes and pedestrians

Figure 2.2-5 *LOC 4 Facilities*

LOC 5 is a category that is intolerable for even the most experienced adult cyclists. Roads within this category are characterized by very high speeds (55+ mph), multiple adjacent travel lanes, and limited access.

Representative LOC 5 Facilities:

- Jarvis Klapman Boulevard

High speeds and volumes along Jarvis Klapman Boulevard create dangerous conditions for cyclists

Figure 2.2-6 *LOC 5 Facilities*

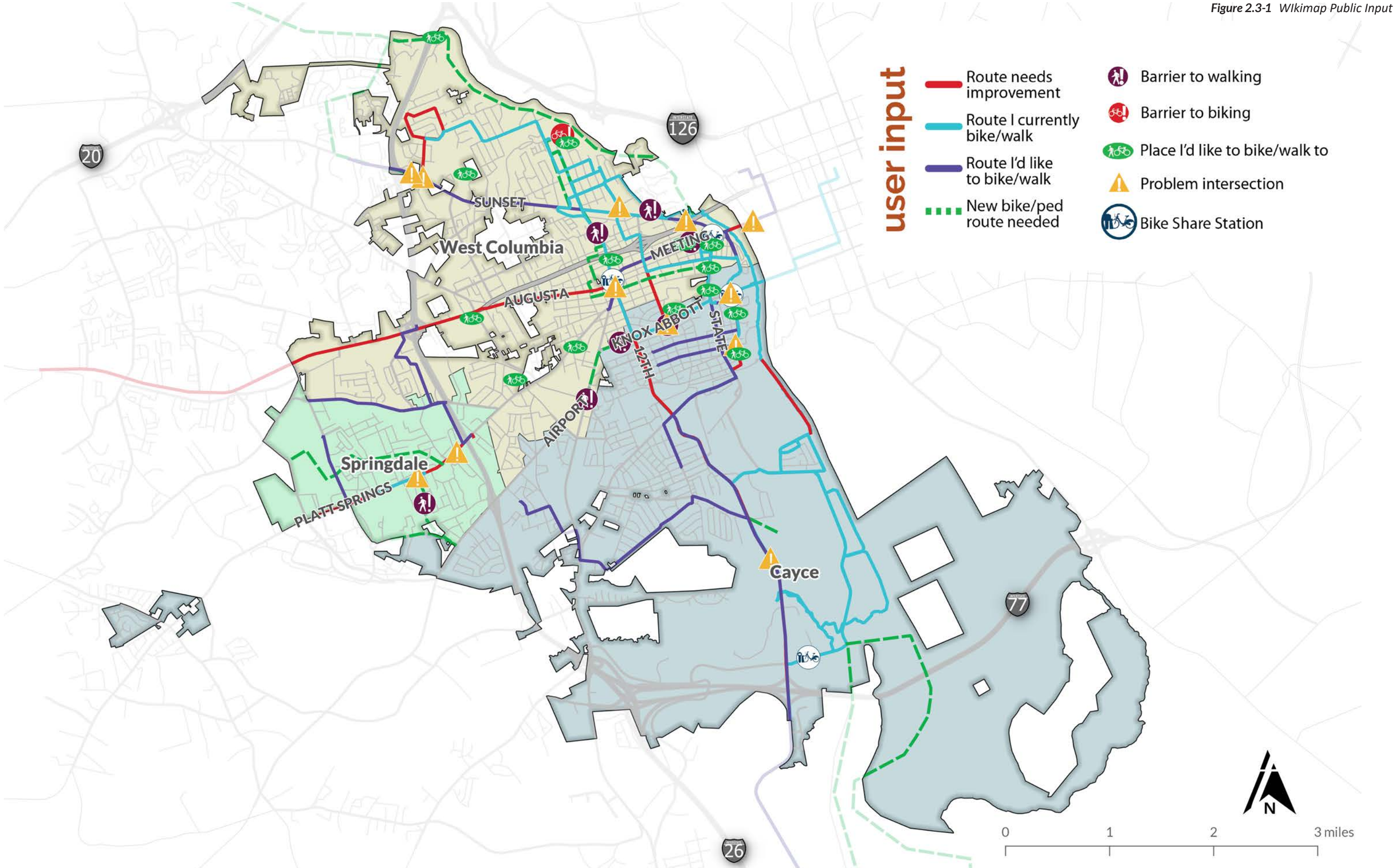
2.3 Public Input

Results from the Wikimap were included in the analysis to identify key destinations, barriers to biking and walking, and intersection and roads in need of improvement. Public comments were used as another layer of analysis when developing draft recommendations.

The results of the Wikimap along with other public input was used comparatively with the LOC and demand analyses. The proposed network considered the key destinations that users desired to access by biking or walking in order to recommend a facilities that would increase safety and connectivity for all existing and potential users. Additionally, barriers and problem intersections identified by the public were reviewed for targeted improvements as part of the overall network, as well as a key consideration for prioritization of projects.

Although a majority of comments received were within the municipal boundaries of Cayce, West Columbia, and Springdale, there were several public comments for connectivity outside of the study area. These comments were reviewed and incorporated into the proposed network where applicable regional connections were necessary.

Figure 2.3-1 *WIkimap Public Input*



THIS PAGE INTENTIONALLY LEFT BLANK

2.4 Accessibility Grid

To ensure that the proposed network connected destinations across the entire West Metro area, the Project Team used an "accessibility grid" as another factor for selecting roads for improvement. The grid consisted of multiple one square-mile blocks covering the study area. The proposed network was designed so that each square-mile block that contained identified amenities (e.g., schools, parks, destinations identified in the Wikimap results, etc.) had roughly one north-south connection and one east-west connection.

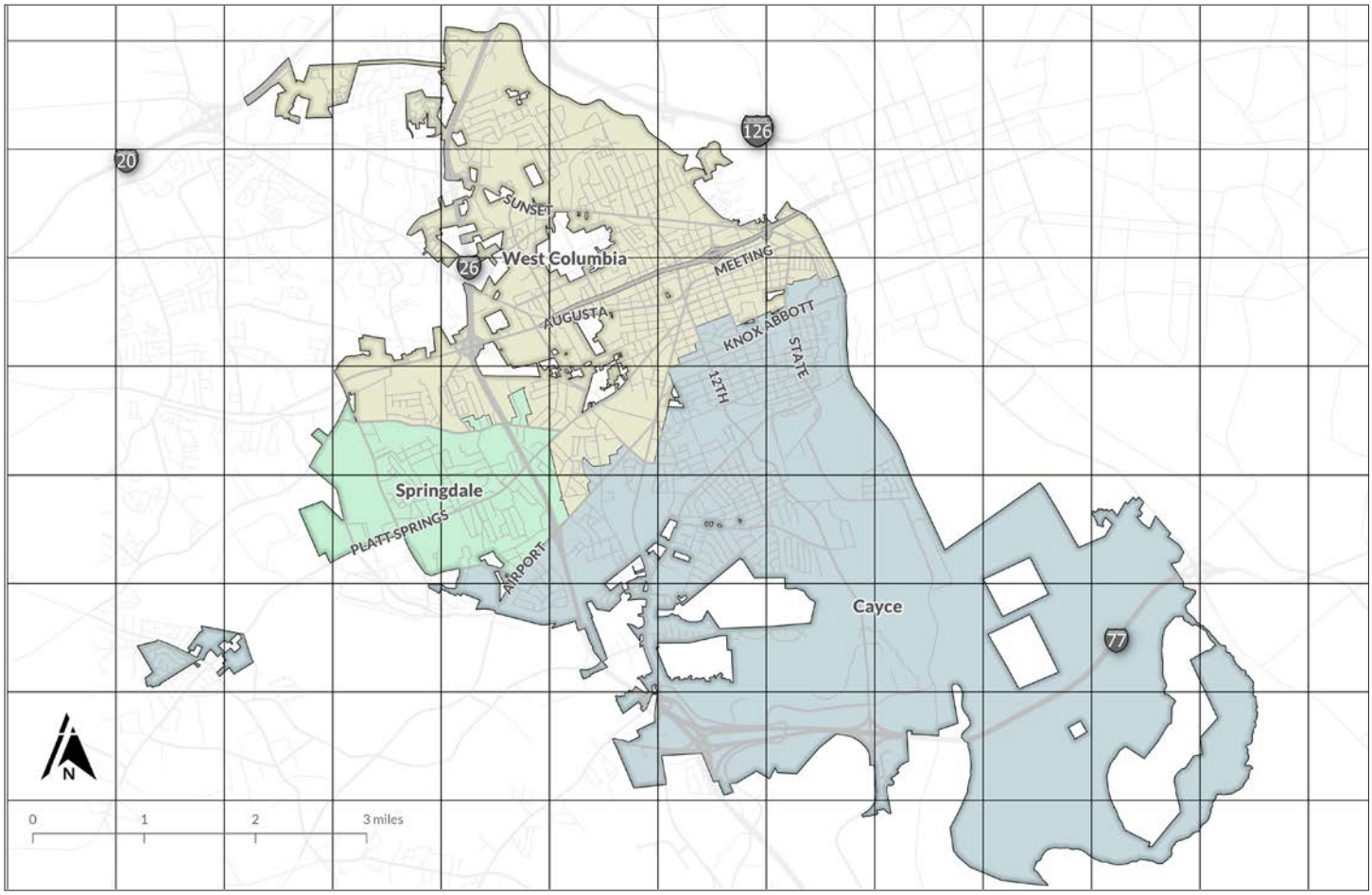


Figure 2.4-1 *Accessibility Grid*

RECOMMENDATIONS

3. Recommendations

Based on previous planning, public input received, and analysis performed as part of network development, recommendations for the proposed network were drafted and refined. Recommendations included here are comprised of the proposed network itself and facility toolboxes to guide the design of recommended facilities.

The proposed network has been crafted to increase comfort for all ages and abilities

3.1 Proposed Network

This section presents a brief review of the network development process, but the focus is the presentation of a bicycle and pedestrian facility network for implementation. This network strategically utilizes existing streets that provide the most connectivity to create a complete network accessible to people of all abilities throughout Cayce, West Columbia, and Springdale. The overarching strategy of the West Metro Bike and Pedestrian Master Plan is to create a network where the "Interested but Concerned" rider is the design standard.

The development of a successful bicycle and pedestrian network is the most important step that the West Metro area can take to become bicycle and pedestrian friendly. Providing a low-stress network that is connected, safety-focused, convenient, and comfortable will help the municipalities achieve the goals set forth in this plan. The following bullets explain how each of the Plan goals guided network design.

- ***Connectivity***: Network recommendations create continuous routes throughout the West Metro area, connecting neighborhoods to one another and to major destinations such as schools, trails, commercial districts and downtown.
- ***Safety***: Recommendations are provided to address the most typical safety issues and to prioritize improvements along priority corridors and intersections. Recognizable bike routes will alert drivers to be more conscious of bicycle traffic on the street.
- ***Increase Users***: Providing a complete, low-stress network that includes a range of facility types will enable more people to use a bicycle for more of their trips. Additionally, the lower the stress is for bicyclists, the lower the stress will be for pedestrians as well.
- ***Community-wide Access***: Network recommendations cover the entire geography of the West Metro area, ensuring residents of all types, including families with children, in all neighborhoods are served by the low-stress network. Streets that are more active with bicyclists and pedestrians can also promote the personal interactions that form the foundation for neighborhood livability and vitality.

As previously discussed, the proposed network was developed through an iterative process of existing conditions analysis, field work, public and stakeholder interview and discussion, level of comfort assessment, and demand analysis. Using these inputs, a draft network was developed and reviewed by the public and agency stakeholders. Their input was incorporated into the final recommended network.

Increasing bicycle ridership is best done by creating a low stress network of facilities so that those who may not feel comfortable riding in stressful traffic conditions can confidently use the active transportation network. With this in mind, the proposed routes have been paired with one or more types of recommended facility improvements that would provide a rider the experience of LOC 1 or LOC 2. The proposed bicycle and pedestrian network is presented graphically in Figure 3.1-1. In addition to route improvements, key intersection improvements are also included. All recommended facilities are further outlined in Section 4 of the Plan, where prioritization, cost, and phasing are articulated.

3.2 Facilty Toolboxes

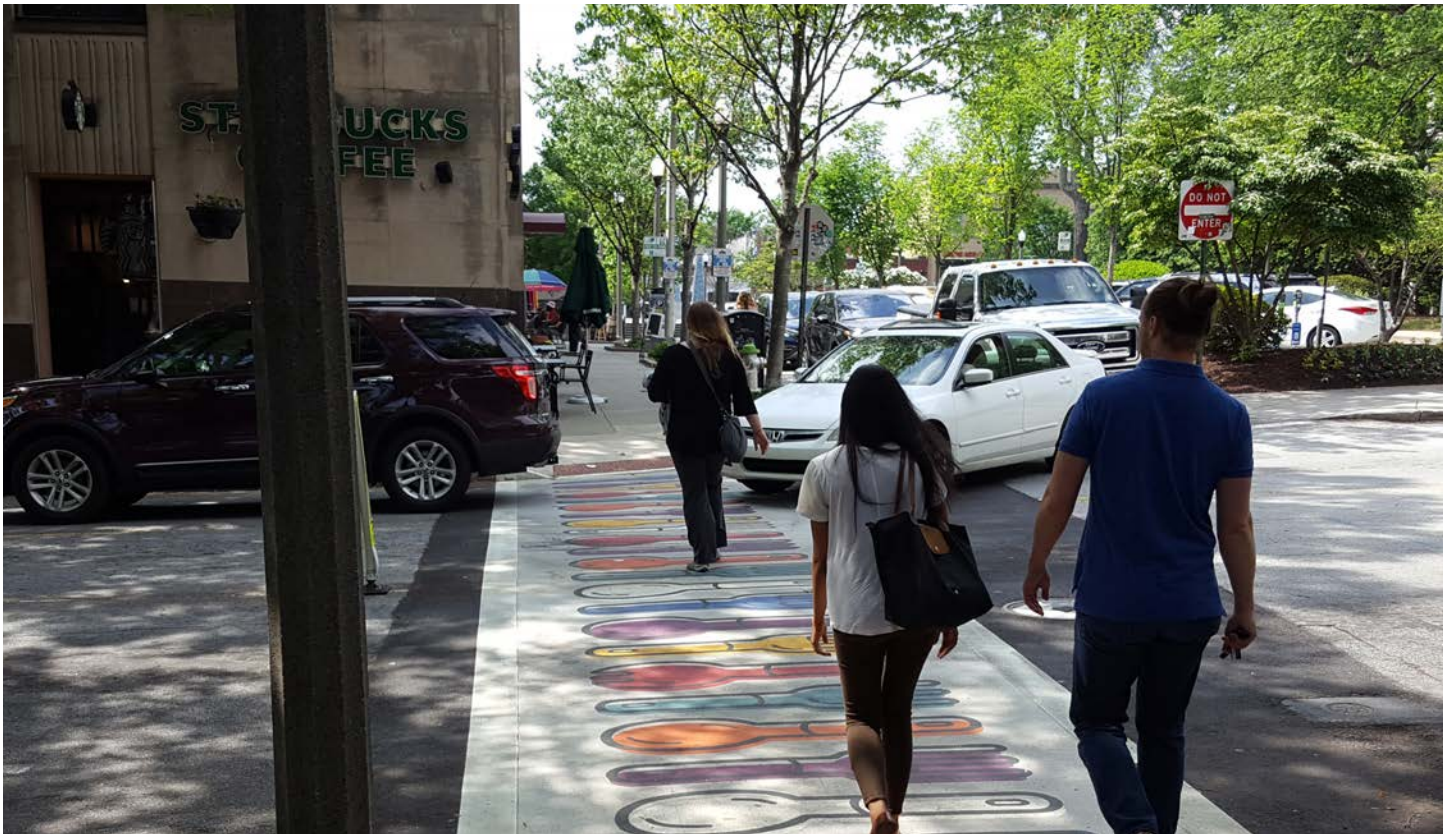
Network development should follow the design guidance presented in the "Bicycle Facility Toolbox" and the "Pedestrian Facility Toolbox" presented in this section. While the network outlines a framework for facility location decisions, these guidelines provide facility recommendations for each recommendation based on its existing level of comfort. These guides should be used as starting points for integrating new facilities into existing roadways, and they should be consulted throughout the design process.

The following facility toolboxes and spot improvement actions are recommended to build the proposed active transportation network. While this summary should not be used as a design standard, it can be helpful in making general design recommendations for each part of the proposed network. Application of the guidance provided in this document requires the use of engineering judgment. Useful design guidelines to help inform design decisions include:

- American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
- Federal Highway Administration (FHWA) Guide for Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts
- South Carolina Department of Transportation (SCDOT) Engineering Directive Memorandum No. 22: Considerations for Bicycle Facilities
- Manual on Uniform Traffic Control Devices (MUTCD)
- National Association of City Transportation Officials (NACTO) Urban Street Design Guide and Urban Bikeway Design Guide

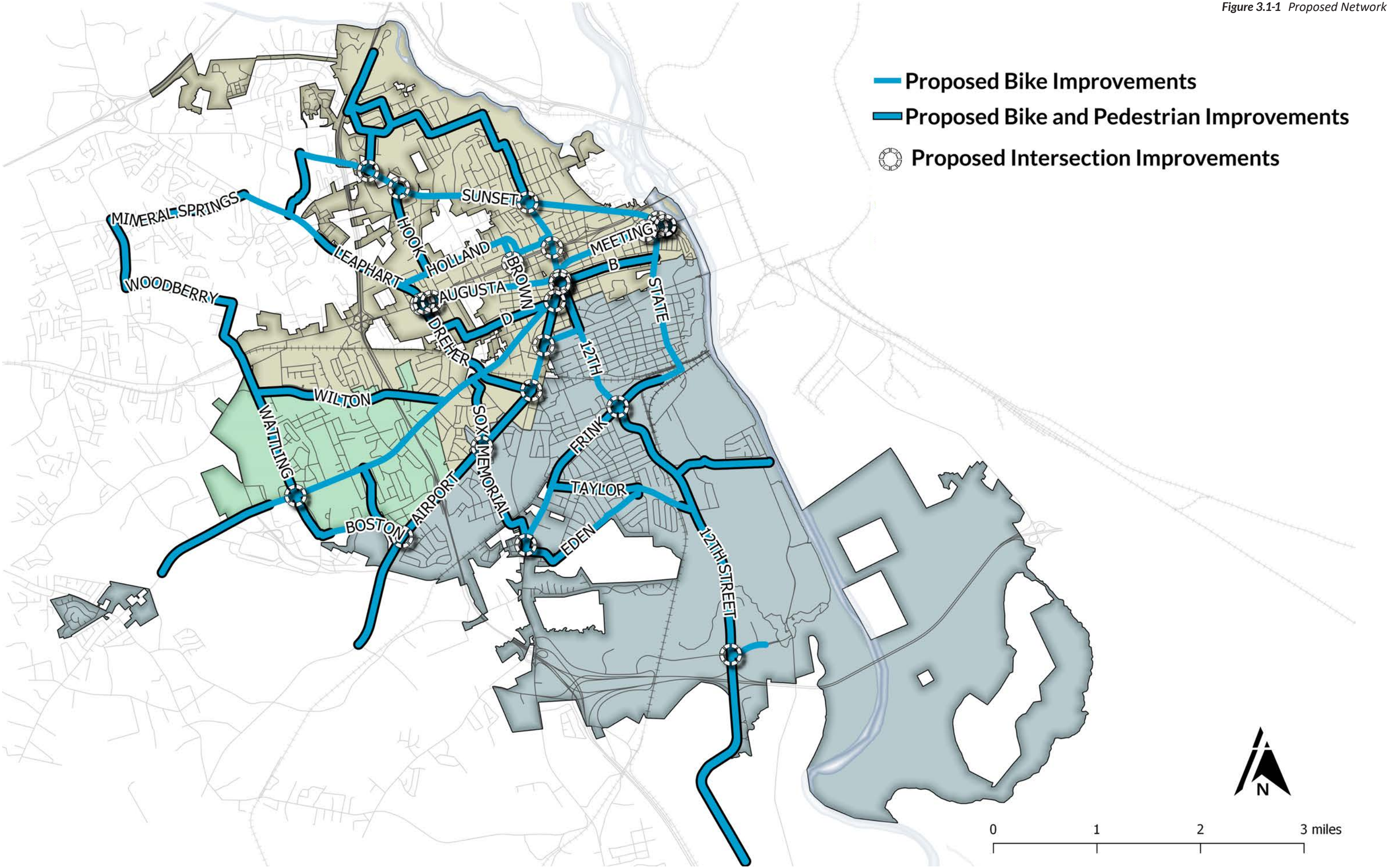
ART AS TRAFFIC CALMING

Art is a fun, community-engaging way to slow traffic down around bicycle and pedestrian crossings. Brightly colored patterns that pay homage to their context will draw drivers' attention towards crossing pedestrians and cyclists. While art does not always substitute for traditional markings, it can simultaneously beautify and calm traffic on lower stress streets.



Decatur, Georgia uses artistic crosswalks to draw attention to pedestrians and express community vitality

Figure 3.1-1 *Proposed Network*



THIS PAGE INTENTIONALLY LEFT BLANK

Bicycle Facility Toolbox

There are several different bicycle facility types that can be used to implement the proposed bicycle improvements. The facility types described below should be applied in the West Metro area using best practice standards described here as referenced from detailed design guidelines, including as those developed by the AASHTO, FHWA, SCDOT, and NACTO. The facilities are shown from greater to lesser level of separation from motor vehicle traffic, and each facility type corresponds to a specific context and rider comfort level.

Shared-Use Paths and Sidepaths

Both shared-use paths and sidepaths provide opportunities for cyclists who are not comfortable riding in or beside mixed traffic to use the active transportation system. A shared-use path or trail allows for multiple user types—cyclists, runners, walkers, etc.—to use the same facility at the same time. They can be located along a road right-of-way or in an independent right-of-way, such as a greenway, along a utility corridor, or an abandoned railroad corridor. An existing example of a shared-use path is the Three Rivers Greenway. A shared-use path can have one- or two-way traffic. For two-way traffic, shared-use paths should be 12 feet wide to allow for passing opportunities, allowing different skill/ability levels to comfortably use the path. In constrained areas, the path can narrow to a minimum of 8 feet, but this is not recommended for extended portions.

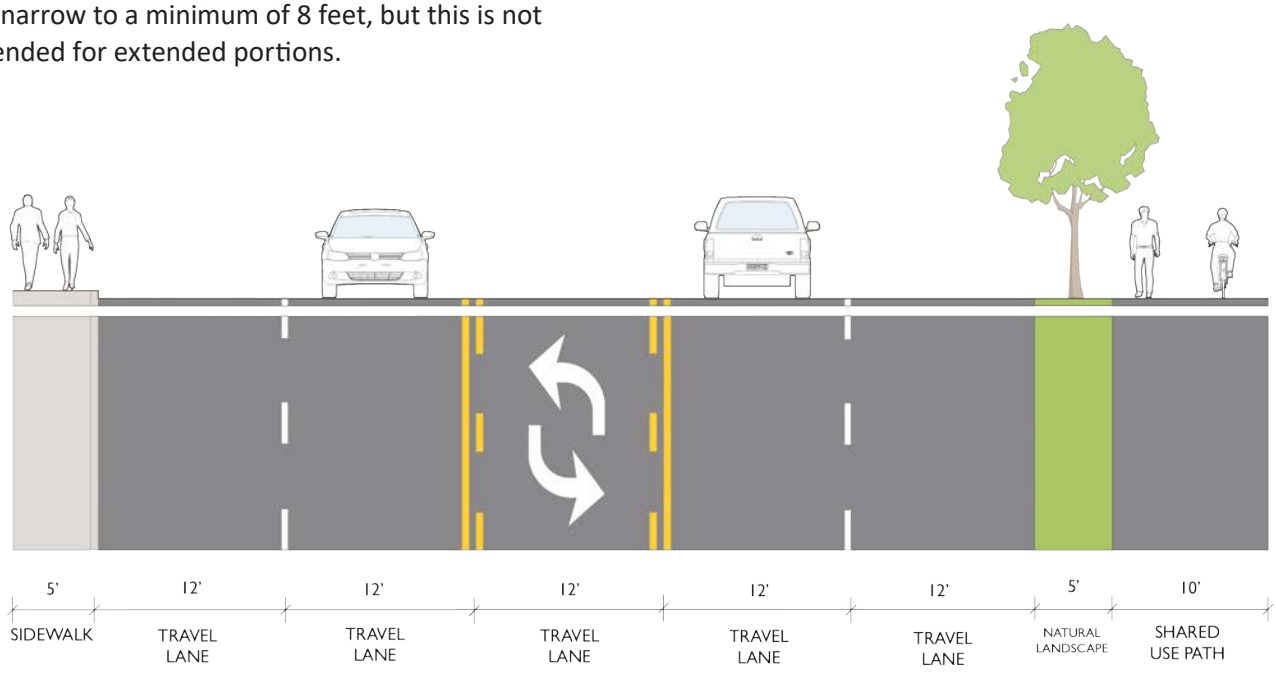
Sidepath parallel to existing street

Sidepaths are bi-directional paved routes for bicyclists, pedestrians, and other non-motorized uses. Sidepaths are often located parallel to existing streets within the right-of-way, particularly those that are of higher speed and volume. Due to the proximity to the road, sidepaths may not be appropriate where there are lots of driveways/side street access. All access point crossings must be carefully designed to ensure safety.

Appropriate Context for Shared-use Paths: Parks, greenways, abandoned railroad corridors

Appropriate Context for Sidepaths: Arterials

Comfort Level: LOC 1



SHARED USE PATH + SIDEWALK
3+ TRAVEL LANES

Example cross section for shared-use path

Separated Bike Lanes

Separated bike lanes are bicycle facilities that are physically separated from both the street and sidewalk. A key reason for providing separated bike lanes at intersections is to reduce the number of conflict points between bicyclists and motorists at intersections. On roadways with traditional bike lanes or shared lanes, bicyclists often must merge with motor vehicles that are traveling at a greater speed. These maneuvers are uncomfortable for most bicyclists due to their vulnerability in traffic.

In contrast, separated bike lanes at intersections reduce bicyclists' exposure by reducing multiple merging and crossing movements to a single predictable crossing point. Vertical separation can provide physical separation from motor vehicles using curbs, planters, or on-street parking. The separation increases the comfort, thereby reducing the traffic stress. Separated bike lanes can be one-directional on each side of the street, or bi-directional on one side of the street.

Designs of protected bike lanes will generally fall into the following two categories:

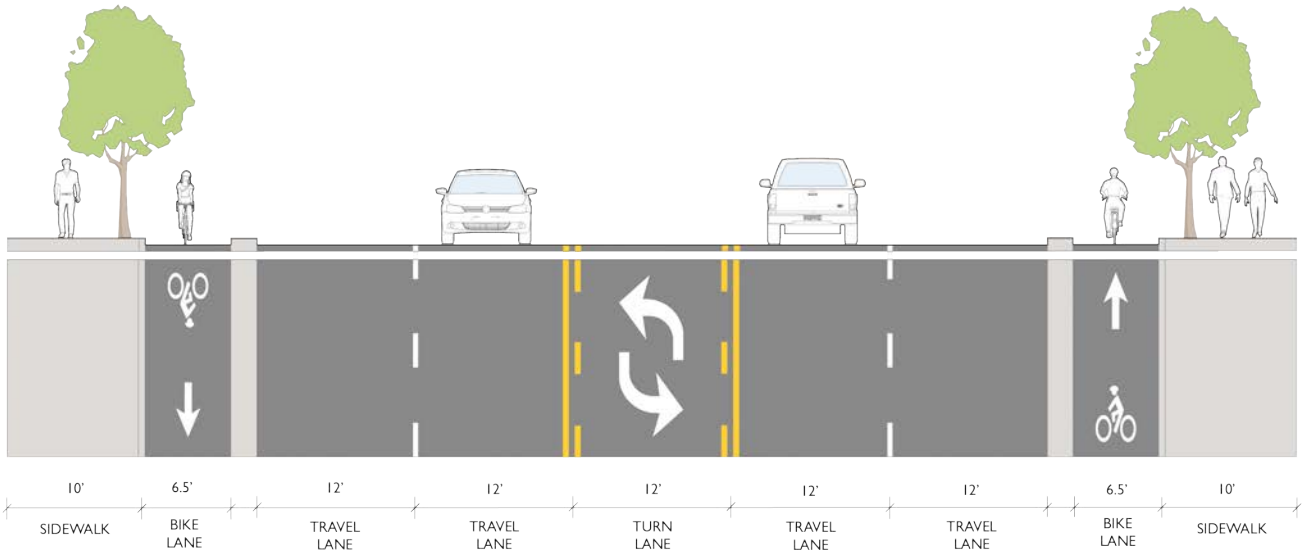
Flexible Post Protected: This bike lane is street level, and provides physical separation from vehicular travel lanes with vertical flexible delineators. This may be considered an interim treatment, as it is significantly cheaper, and easier to implement than a curb-protected bike lane. This design can lead to an increase in roadway debris within the protected bike lane as debris from the roadway can easily deposit within the buffer and bike lane area. The flexible delineators may require repair or replacement if struck by vehicles. On streets with parking, parking will be located between the bike lane and travel lane increasing the level of protection and comfort.

Separated bike lane intersection improvements

Curb Protected: This bike lane may be street level or sidewalk level. It provides physical separation from parallel vehicle travel lanes with vertical curbing. If the bike lane is street level, the barrier will form narrow medians between the vehicle travel lanes and the bike lane. The curbing can reduce the spread of debris from the roadway and offers more protection than flexible delineators. On streets with parking, parking will be located between the bike lane and travel lane.

Appropriate Context: Collector streets, arterials

Comfort Level: LOC 2



SEPARATED BIKE LANE
3+ TRAVEL LANES

Example cross section for separated bike lanes

Buffered Bike Lanes

Buffered bike lanes add a painted hatched buffer area to the bike lane on the side adjacent to vehicular travel lanes. This increased separation provides a more comfortable riding environment, and the hatched area reinforces the message that the wider lanes are not for parking or car travel. Narrower travel lanes may reduce speeds.

The buffer typically creates sufficient space for bicyclists to operate side-by-side if desired, or to pass slower moving bicyclists without having to encroach on adjacent travel lanes. Additional design considerations include:

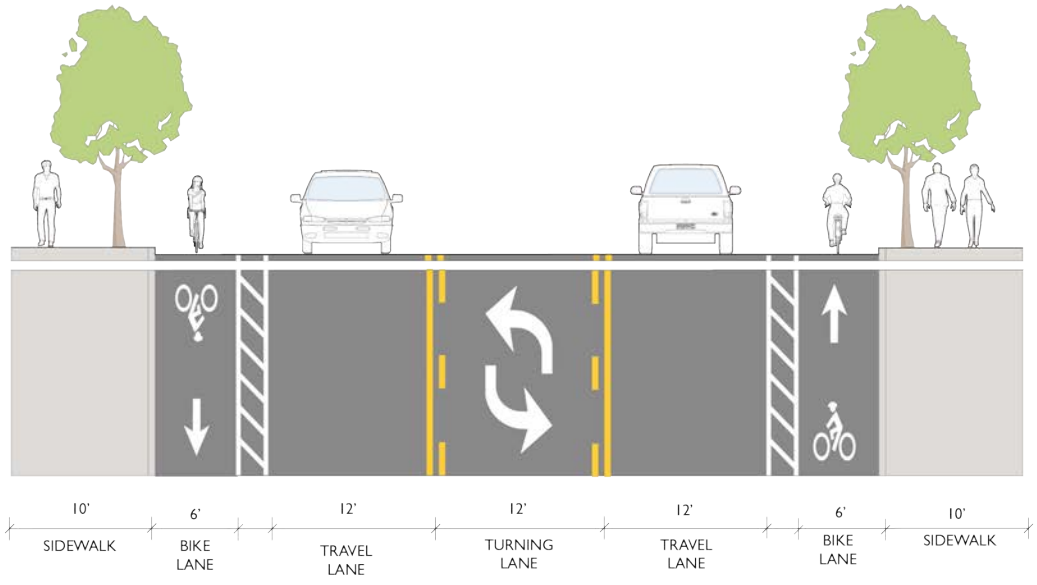
- Widths of buffered bicycle lanes are the same as those for bicycle lanes without buffers.
- The minimum width for the buffer area is 2 feet. There is no maximum.
- Consider placing the buffer next to the parking lane where there is high parking turnover.
- Consider placing the buffer next to the travel lane where speeds are 35 mph or greater or when traffic volume exceeds 8,000 vehicles per day.

Buffered bike lanes can use paint to increase separation

- The space between cross-hatching is flexible, but typically varies between 5 and 40 feet. Wider spacing is best in locations with no on-street parking and higher speed roadways. More frequent spacing may be desired in areas with on-street parking.

Appropriate Context: Local streets, collector streets

Comfort Level: LOC 2



BUFFERED BIKE LANE

Example cross section for buffered bike lanes

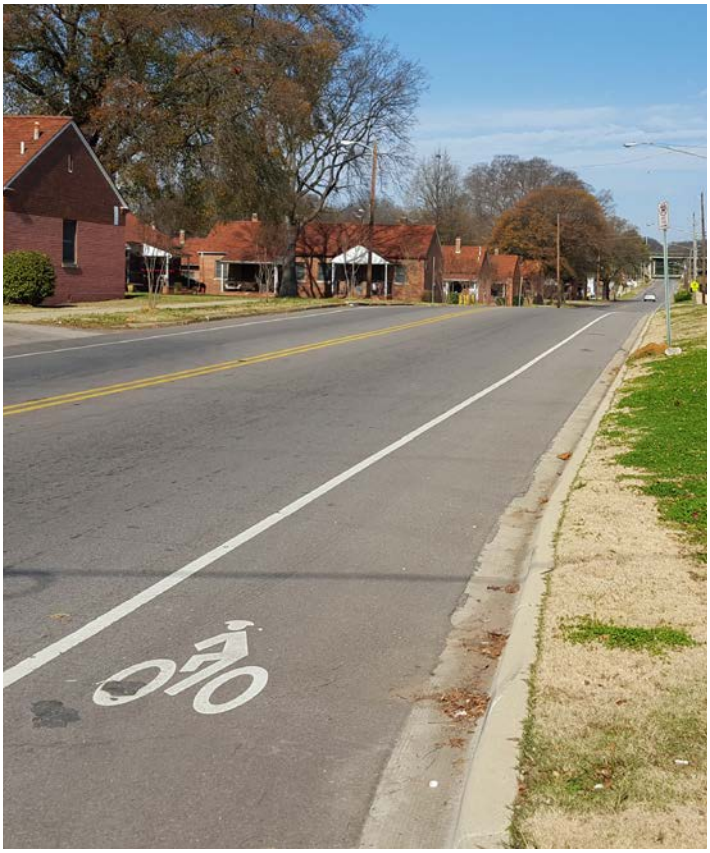
Bike Lanes

A bike lane designates a portion of a street for the exclusive use of bicycles. Bike lanes are one-way, on-road bike facilities that provide a dedicated lane of travel for bicycling. Bike lanes are often marked with pavement markings and, at conflict points, may be colored for higher visibility. Existing examples of bike lanes are Platt Springs Road and Knox Abbott Drive.

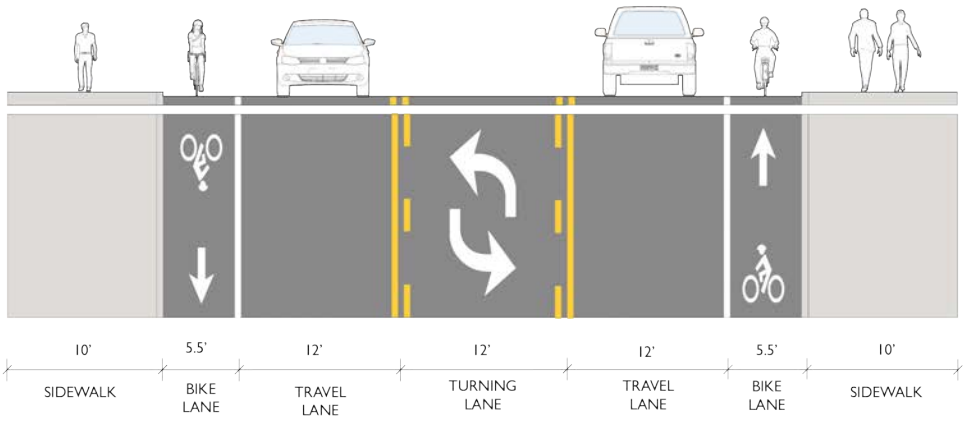
Bike lanes must be 5 feet wide at a minimum, with a 6-inch solid white line separating bicycle travel from vehicular travel. When more space is available, bike lane widths should be expanded to promote rider safety and comfort. Any stormwater controls (e.g., gutter pans, drainage grates, etc.) should be flush with the pavement surface as to avoid conflicts or accidents. Bike lanes should be marked with MUTCD appropriate arrows and bicycles, and "bike lane" signs can optionally be added to designate the cyclists' exclusive space. These facilities function best when connected to a network of other facilities, and when the bicycle lane continues through the intersection.

Appropriate Context: Local streets, collector streets

Comfort Level: LOC 3-4



Bike lanes can increase connectivity through striping, signage, and pavement markings



BIKE LANES + SIDEWALKS

Example cross section for bike lanes

Pedestrian Facility Toolbox

The main facilities that can be used to implement the proposed pedestrian improvements are sidewalks and sidepaths/shared-use paths (i.e., described in the previous section). Sidewalks should be applied in the West Metro area using best practice standards described here; more detailed design guidance can be found in guidelines published by AASHTO, FHWA, and NACTO.

Sidewalks

Sidewalks provide connectivity for pedestrians to safely use active transportation for traveling to work, school, or other trips, and for recreation/exercise. To meet Americans with Disabilities Act (ADA) standards (i.e., more information at follows), sidewalks must have 4 feet clear, but should be a minimum of 5 feet wide preferably, or, if the sidewalk is directly beside traffic, 6-8 feet wide. When possible, sidewalks should be widened to allow for street trees and other plantings for beautification and a buffer between pedestrians and traffic.

Sidewalk designs can vary by context. In suburban or residential areas, they can be narrower "ribbon" sidewalks, with equal width allotted to planting buffers or street tress when possible.

In urban or neighborhood settings, sidewalks should be planned or designed in terms of three zones:

- Frontage zone: The frontage zone is the space allotted as an extension of the building for businesses along a corridor. As a part of a wider sidewalk, the frontage zone can be used for extra café-style seating, planter boxes, and/or "sandwich board signs."
- Through zone: This zone is the travel lane for pedestrians. This should be at least 5 feet wide, or in busier, commercial areas, 8 feet wide.
- Buffer/planting zone: The buffer and planting zone acts as another level of separation between pedestrians and other types of traffic. Street trees or other landscaping, as well as street seating, lighting, or even artwork can be used to enhance the pedestrian experience on the street.

ADA Compliance

All sidewalks in the active transportation network should meet design standards as defined by ADA so that all abilities can safely and comfortably use the pedestrian facilities. This is a crucial component of an equitable, community-oriented network. While ADA places many requirements on the public right-of-way, and the Proposed Right-of-Way Accessibility Guidelines should always be consulted, several key elements to consider include:

- Curb ramps should be present at each crossing direction at intersections and at each curb cut along the network. The ramps should align with the painted crosswalks, and they should be wide enough for those in wheelchairs to comfortably maneuver (usually 4 feet).
- Tactile warning surfaces should be placed on the ramps entrance to the roadway for users with visual impairments.
- Sidewalks should be free of hazards, such as uneven, cracked, or broken pavement.

A robust network of sidewalks is essential to pedestrian access and safety

Mid-block Improvements

A goal of the West Metro Bike and Pedestrian Master Plan is to create a safe, multi-jurisdictional network for all types of users. While this can only be accomplished through implementing a complete network of bicycle and pedestrian facilities, safety issues can be addressed in part through improving high-stress spot locations.

Mid-block crossing treatments provide a safe way for pedestrians and bicyclists to cross a road in places where they are not served by existing infrastructure and where there is not an intersection of two or more roads. These treatments could be implemented where there are destinations and/or parking on both sides of the street and there is a notable distance between intersections. These crossing treatments provide safe ways for users to cross over the street without being unprotected or walking longer distances to cross at an intersection. Locations for mid-block crossings can be identified where there are significant "desire lines"—cyclists or pedestrians creating their own paths as opposed to using sidewalks, bike lanes, or crosswalks. These locations are often around transit stops, schools, office buildings, and parks.

Mid-block crossings can be supported with several different treatments, including:

Pedestrian Hybrid Beacons (a.k.a: HAWK Signal - High Intensity Activated Crosswalk)

This signal allows pedestrians and bicyclists to stop traffic to cross high-volume arterial streets. The signal allows traffic to stop and go while pedestrians and bicyclists may still be in the street by flashing red (i.e., motorists must remain stopped if the pedestrian or bicyclist is on their half of the roadway). The signal may be used in lieu of a full signal as well as at locations which do not meet traffic signal warrants where it is necessary to provide assistance to cross a high-volume arterial. Pushbuttons should stop traffic within 30 seconds, and be placed in convenient locations for bicyclist and/or pedestrian actuation (i.e., which can be identified by "desire lines"). These crossings should abide by ADA standards and fit within the local design context. Passive signal activation, such as video or infrared may also be considered.

HAWK Signals increase safety for pedestrians and may be used for high volume crossings locations

Rectangular Rapid Flashing Beacons

Rectangular rapid flashing beacons (RRFB) can be installed at mid-block crossings to assist pedestrians and bicyclists in crossing the street. Rectangular rapid flashing beacons have proven to be effective devices at uncontrolled intersections for increasing motorist yielding rates and reducing pedestrian-vehicle crashes at crosswalk locations. The rapid flashing beacon device consists of a pair of rectangular, yellow LED beacons, which can be pushbutton or passive detection activated and should be placed on both sides of the street. If a median exists at the crossing location across a multi-lane street, a third and fourth beacon may be placed in the median, which, studies show, significantly increases motorist yield rates.

Beautification and Materials

Adding street trees and plantings around and/or in the crossing can improve its visibility and be visually appealing. The crossing can also be highlighted by using different materials and/or by raising the crossings. Regardless of the material used, the crossing should always be striped to ensure that vehicles can see it in all lighting conditions.

High Visibility

Removing visual impairments for drivers approaching the crossing can make it safer for cars and pedestrians —a process often called “daylighting.” This can be accomplished by restricting parking spaces near the crossing or by adding a curb extension at both ends of the crossing.

High visibility crossing are useful for mid-block trail crossing as well as downtown environments

Unique materials for the crosswalk can add to the sense of place along with designating a location for crossing

Intersection Improvements

The following sections provide guidance for improving safety at intersections. In many cases, intersections are the most vulnerable point for cyclists and pedestrians. One way to ensure safe, comfortable bicycle and pedestrian facilities is to provide safe crossings at major street intersections.

At many intersections, signal improvements, geometric changes, and improved or additional pavement markings may be sufficient to provide comfortable crossings. These treatments may include bicycle/pedestrian signal detection, crosswalks, curb extensions, and curb radius reductions, among others. Specific examples of bicycle and pedestrian improvements are discussed below.

General Considerations

The best intersection designs are those that are context sensitive in their material use, increase visibility of cyclists and pedestrians, and provide accessible crossings for all types of users. Design challenges with many intersections include:

- Discontinuous bicycle facilities or sidewalks that drop before the intersection (e.g. bike lane striping that does not continue all the way to the stop bar) and are not carried through to the other side, thereby causing greater confusion and stress for bicyclists and other road users;
- Signalized crossings that do not adequately detect bicyclists and pedestrians, or that require bicyclists to wait long periods of time to cross; and
- Incomplete or faded striping may not clearly indicate where cyclists and pedestrians should cross or where other road users should stop.

Intersection improvements can improve functionality and safety for all modes of transportation

Pedestrian Improvements at Intersections

Crosswalks: Improved or Additional Striping or Beautification Materials

Crosswalk striping identifies the pedestrian's direct path across an intersection for both the pedestrian and other road users. Faded or missing striping may cause the pedestrian's right-of-way at an intersection to be ambiguous, especially when other road striping, such as stop bars, are also faded or missing.

Crosswalks should be at least 8 feet wide, and the boarders of the crosswalk should be set off with reflective white paint or thermoplastic. They should be separated from bicyclists' crossings. In addition, crosswalks can also be used to pull urban design elements from the surroundings into the intersections. For example, pavers that match materials used in the surrounding buildings (with additional white stripes on the outside of the pavement for increased visibility) can be used as a crosswalk treatment.

Median Crossing Islands

Median crossing islands can serve as a refuge for pedestrians and bicyclists when crossing a street at intersections. These treatments are typically installed at locations where a left-turn lane is not necessary or where a left-turn movement can be prohibited and redirected to another intersection as part of a neighborhood traffic management plan.

The median may extend across the intersecting roadway if restricted motor vehicle access is desired. When the crossing is unsignalized, this treatment would typically include other engineering interventions, such as an advanced yield line or rectangular rapid flash beacon. Where bicycle circulation is needed, these medians should be designed or retrofitted to include openings for bicyclists to pass through.

Curb Extensions

Curb extensions are a section of sidewalk extending into the roadway at an intersection or midblock crossing that reduces the crossing width for pedestrians and increases their visibility, and may help reduce traffic speeds. Curb extensions shorten bicyclist and pedestrian exposure time in traffic and increase the visibility of non-motorized users at roadway crossings. By narrowing the curb-to-curb width of a roadway, curb extensions may also help reduce motor vehicle speeds and improve bicyclist and pedestrian safety. Curb extensions are appropriate only for locations that have full-time, on-street parking. Some design considerations include:

- No wider than parking lane
- Curb radius can be tightened to slow right-turning vehicles
- Curb bulbs can provide additional space for curb ramp construction if there is limited right-of-way

CONTEXT SENSITIVITY

Intersections should be designed in a way that is appropriate to their context. They also provide opportunity to pay homage to elements that make the West Metro Area unique. By using local materials and mimicking building facades and styles, intersection improvements can add invaluable aesthetic as well as safety.

Curb extensions can also be used as a streetscape feature

Bicycle Improvements at Intersections

Bike Lane Extensions through Crossings

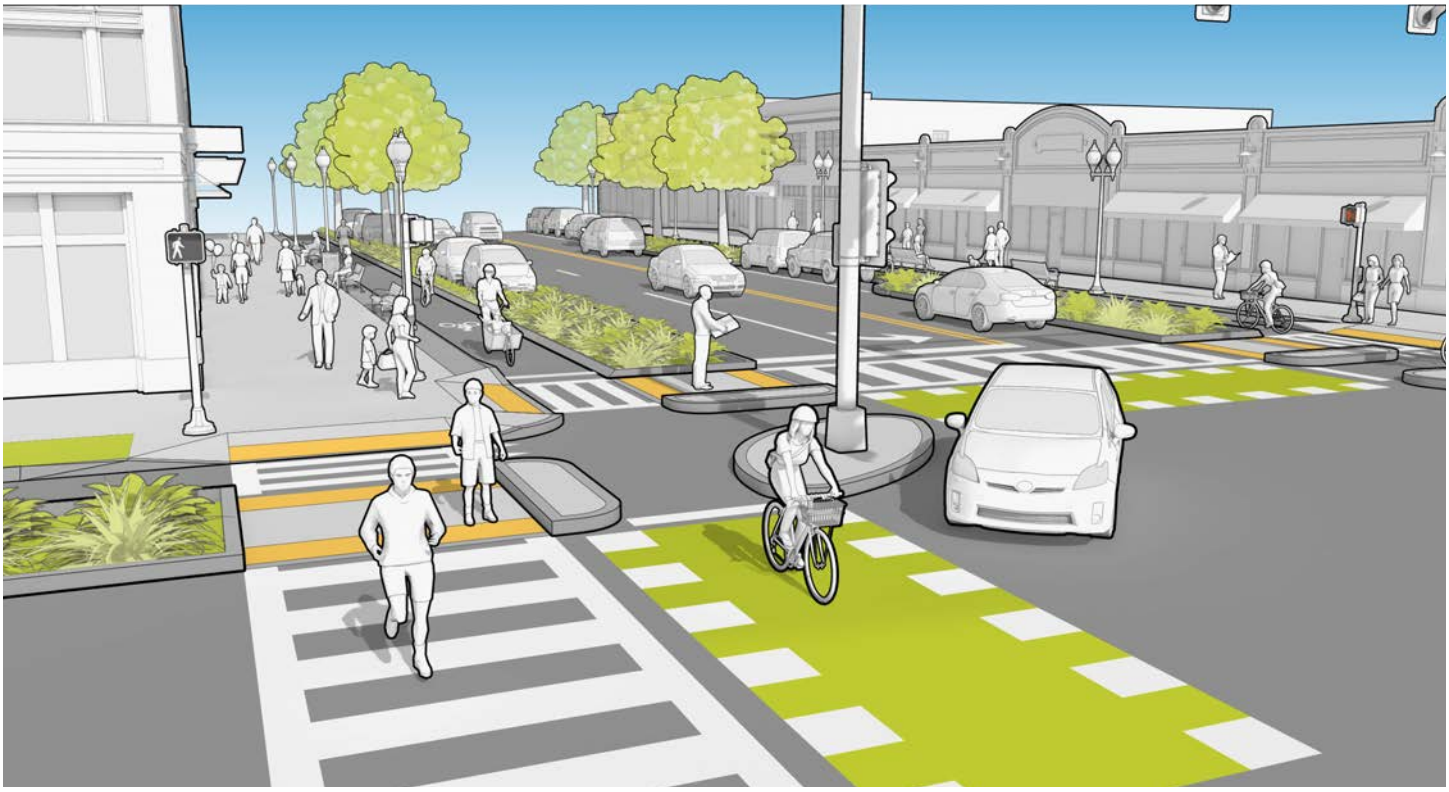
Bicycle lane extensions delineate a clearly defined and direct bicycle crossing through an intersection or driveway. The additional pavement markings provide a clear boundary between the paths of through bicyclists and either through or crossing motor vehicles in the adjacent lane. Within intersections, these are often parallel with pedestrian crosswalks. At two-way protected bike lane crossings, a dashed centerline should be used within the crossing to separate the two directions of bicycle traffic.

They may include bicycle lane markings and be highlighted with green colored pavement. The use of contrasting green color is used primarily to highlight areas with a potential for bicycle-vehicle conflicts, such as bicycle lane extensions through crossings where bicyclists are susceptible to conflicting left or right turning traffic. If a pair of dotted lines is used to extend a bicycle lane across an intersection or driveway, or a ramp, green colored pavement should be installed in the same dotted pattern as the white edge lines.

Protected Bike Lane Intersection Design

The design of intersections with separated bicycle infrastructure should ensure visibility between approaching and departing motorists, bicyclists and pedestrians. All users should have visual indicators that clearly identify right-of-way priority and expected yielding behavior. The following strategies can be used to accomplish this at intersections with protected bike lanes:

- Clearly indicate right-of-way priority: Signs and markings should reinforce correct yielding behaviors.
- Provide yielding geometry: Intersection geometry should not require users to turn their head more than 90 degrees to see a potential conflict.
- Reduce speeds: Slowing speeds at conflict points reduce conflicts between all users and the severity of injuries in the event a crash occurs. Speed reduction is achieved primarily through horizontal and vertical deflection.



Conceptual protected intersection design (Source: MassDOT Separated Bike Lane Planning and Design Guide, 2015)

Wayfinding

Wayfinding throughout the active transportation network can improve the viability of the network by guiding bicyclists and pedestrians to their desired destinations. Through directional or destination-based signing and marking, the West Metro area can clarify network junctions or connections that are not obvious, particularly to new riders or those unfamiliar with an area.

Wayfinding signage should have a consistent theme throughout the system, but individual municipalities can nuance the theme to fit local context and desires. This will require coordination among Cayce, West Columbia, and Springdale.

Wayfinding signage to existing trails or major destinations

Transit

Transit stops were used as a factor in the Demand Analysis, and they ultimately influenced the route choices of the proposed network. This was done to encourage truly multimodal transportation throughout the West Metro area. Seamless connections between walking, biking, and transit effectively extends the coverage of transit and allows more mobility options for existing users. Creating these "first- and last-mile connections" will also help to increase transit ridership throughout the West Metro area.

As a design consideration, it is important that transit stops interface conveniently and safely with the transportation infrastructure. At transit stops along protected bicycle lanes, special consideration should be given to manage bicyclist, pedestrian and transit operator interactions. The bike lane should be located behind the transit stop, and a 6-foot minimum width median should be provided for pedestrians to access the transit vehicle.

Wayfinding should also include clear information about how the active transportation network interacts with transit routes. Public signage, including maps and route times, should be included at bus stops.

Innovative bike facilities integrated with transit stops

IMPLEMENTATION

4. Implementation

The previous sections presented the planning process that led to the development of the active transportation network for the West Metro Bike and Pedestrian Master Plan. While that process was essential to developing the recommended network, realization of individual projects from those recommendations is critical to advancing Cayce, West Columbia, and Springdale as communities where walking and biking are modes of choice. This requires that a connected, safe, and comfortable network of low-stress facilities be implemented. To that end, this section provides:

- Summary of the project prioritization process and methodology;
- Overview of the project rankings;
- Review of cost estimating methodology;
- Defining of project phases to establish implementation periods;
- Short-term capital improvement projects by municipality; and
- Early action projects.

4.1 Project Prioritization

The West Metro Bike and Pedestrian Master Plan includes over 100 linear projects and 24 intersection improvement locations. With so many projects to implement, it could be overwhelming to determine what is most important and which projects should be given priority. Therefore, it is essential to gain some understanding of which projects will provide the most benefit and how projects relate to one another from an implementation perspective. To facilitate this process, a prioritization methodology was developed to score projects comparatively.

A number of variables were used to "score" each recommended project. The variables utilized were both quantitative and qualitative in nature to provide a balance to project prioritization. While it was desirable for scoring to reflect objective merits such as access, safety, and connectivity, it was also important for more subjective considerations to be weighed like probability of use and degree of barrier to the network. The prioritization methodology is presented in Table 4.1-1.

Implementing safe bicycle and pedestrian infrastructure is key to advancing active travel in the West Metro area

4.2 Project Rankings

Bicyle Improvements

Based on the prioritization methodology presented in Section 4.1, four project lists were developed. The first is a ranking of over 40 linear bicycle infrastructure capital construction recommendations; these projects include bike lanes, buffered bike lanes, and physically separated facilities (i.e., separated bike lanes, sidepaths, and shared-use pathways/greenways). Figure 4.2 1 graphically depicts the geographic location of the ranked bicycle projects. A summary of bicycle infrastructure projects is presented in Table 4.2-1, and the complete ranking of projects is included in Appendix D.

Table 4.2-1 *Bicycle Facilities by Type*

Facility Type	No. of Projects	Miles
Bike Lane	4	2.3
Buffered Bike Lane	23	23.1
Physically Separated Facility	15	21.5
TOTAL	**42**	**46.9**

Paving shoulders on slower speed roads can create a more comfortable experience for cyclists

The Three Rivers Greenway is a key connection for biking and walking

Table 4.1-1 *Prioritization Methodology*

Variables	Scoring	Notes
QUANTITATIVE VARIABLES	**Max Score: 74**	
Access to key destinations (miles to destination)	**Max Score: 12**	
0-0.25 mile	3 per category	3 points given for proximity to each category (existing/future school, park, commercial development, multi-family residential development)
Access to transit (miles to destination)	**Max Score: 5**	
0-0.5 mile from transit stop	5	
0.5-1 mile from transit stop	3	
Level of Effort to Implement	**Max Score: 10**	
Low	10	
Medium	6	
High	2	
Safety	**Max Score: 12**	
Speed Limit	5	Project on or adjacent to a road which has a posted speed limit 45 mph or greater
	3	Project on or adjacent to a road which has a posted speed limit 35-40 mph
Separated Facility	7	Project that is separated or protected from a road with a speed limit 35 mph or greater (i.e., greenway, cycle track, buffered bike lane)
Connectivity	**Max Score: 10**	
Connects to an existing facility	10	No points for connecting to a "loop" greenway
Connects to a planned facility	5	
Critical Corridor	**Max Score: 13**	
Within a critical corridor	10	Proposed improvement is within/along a critical corridor: Knox Abbott Drive State Street Platt Springs Road Meeting Street Sunset Boulevard 12th Street Airport Boulevard US 1 (State Street to Jarvis Klapman Boulevard)
Crosses or "feeds" into a critical corridor	5	Proposed improvements that intersect one of the critical corridors listed above
Route is on the National Highway System (NHS) Network	3	
Existing Riding Conditions	**Max Score: 12**	
Terrible for all bicyclists	12	Existing Level of Comfort Score 4
Uncomfortable for most bicyclists	8	Existing Level of Comfort Score 3
Slightly uncomfortable for some bicyclists	4	
QUALITATIVE VARIABLES	**Max Score: 26**	
Network Barrier	**Max Score: 16**	
Severe barrier	16	
Significant barrier	10	
Difficult barrier	8	
Minor barrier	4	
Probability of Use	**Max Score: 10**	
High probability of use	10	High frequency of public comments on the desired need for bike/pedestrian infrastructure
Medium probability of use	8	Medium frequency of public comments on the desired need for bike/pedestrian infrastructure
Low to medium probability of use	4	Low frequency of public comments on the desired need for bike/pedestrian infrastructure

THIS PAGE INTENTIONALLY LEFT BLANK

Pedestrian Improvements

The second list provides a ranking of over 70 pedestrian infrastructure capital improvement projects; this includes new sidewalks, elimination of sidewalk gaps, widening of existing sidewalks, and incidental intersection improvements along pedestrian routes. Figure 4.2-2 graphically depicts the geographic location of the ranked pedestrian projects. A summary of pedestrian infrastructure projects is presented in Table 4.2-2, and the complete ranking of projects is included in Appendix D.

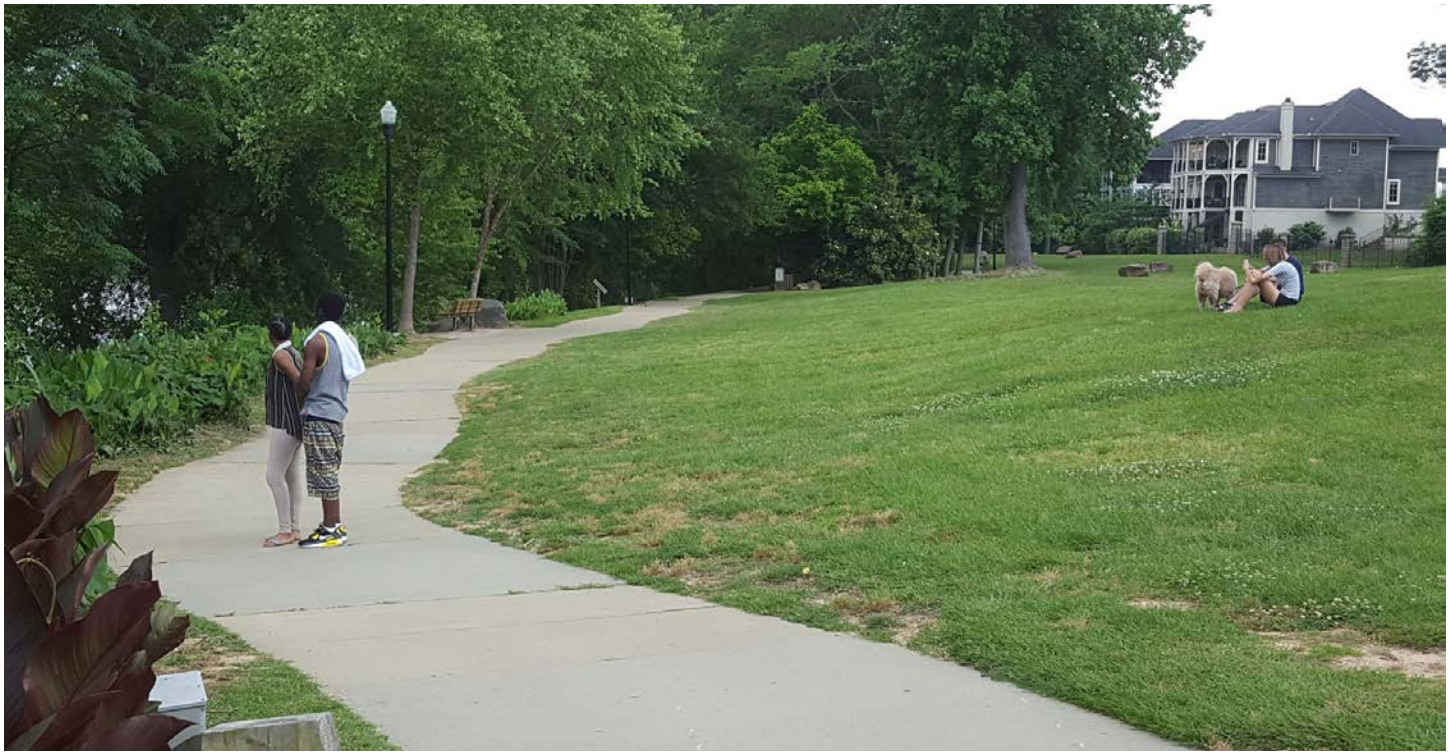
Table 4.2-2 *Pedestrian Facilities by Type*

Facility Type	No. of Projects	Miles
Add Sidewalks, Improve Intersections	42	54.8
Eliminate Sidewalk Gaps, Improve Intersections	10	25.8
Improve/widen Sidewalks, Improve Intersections	2	4.8
Improve Intersections	17	16.3
TOTAL	**71**	**101.7**

Intersection Improvements

The third list focuses on intersection improvements to benefit both walking and biking. It ranks 24 critical intersections within the West Metro area that require improvements to facilitate a low-stress network. Figure 4.2-3 graphically depicts the geographic location of ranked intersection projects. The complete listing of intersection projects is included in Appendix D.

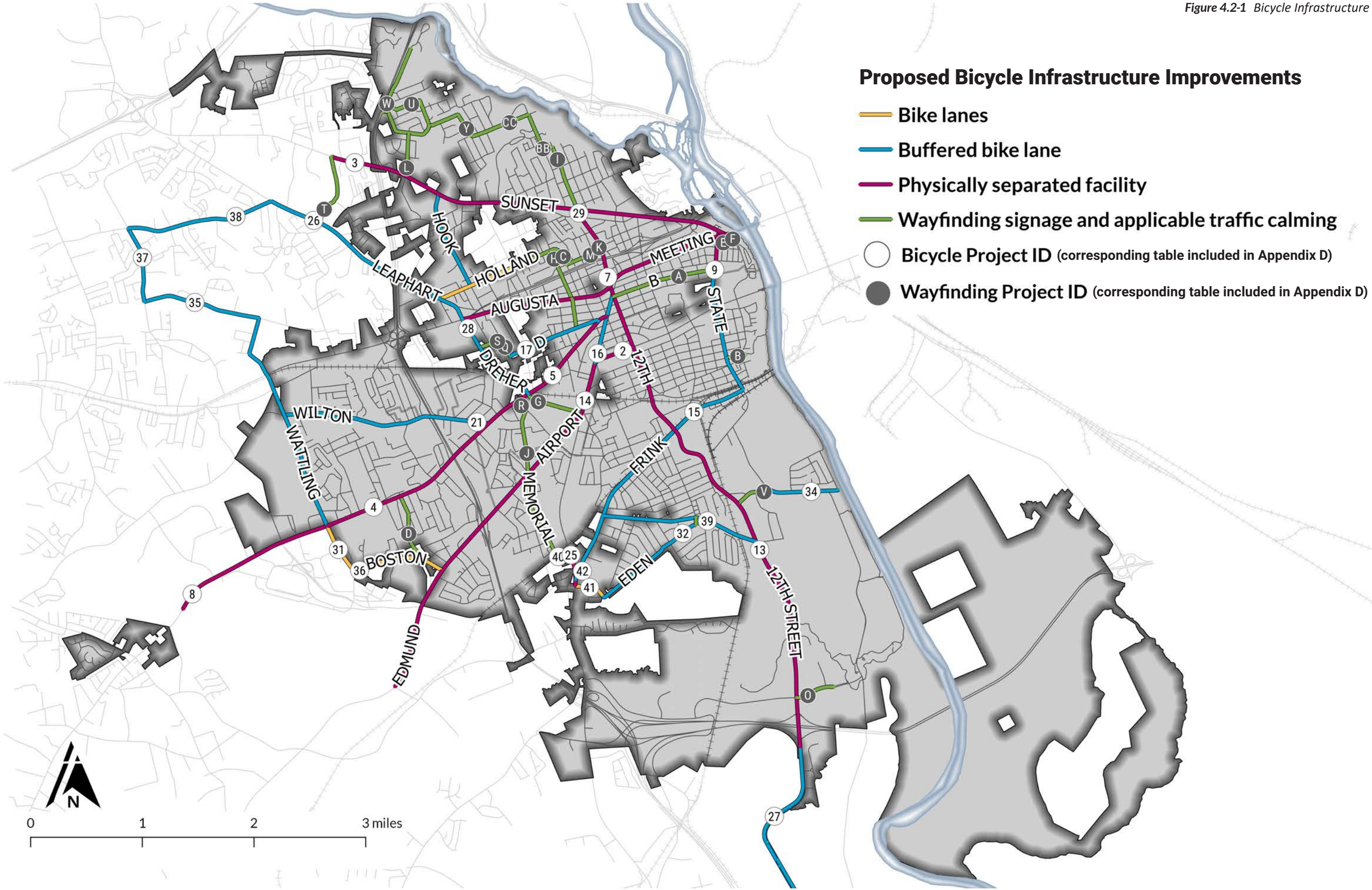
The stamped crosswalk at 12th Street in West Columbia clearly identifies pedestrians' place on the street



The Three Rivers Greenway provides pedestrians their own space for recreation and exercise

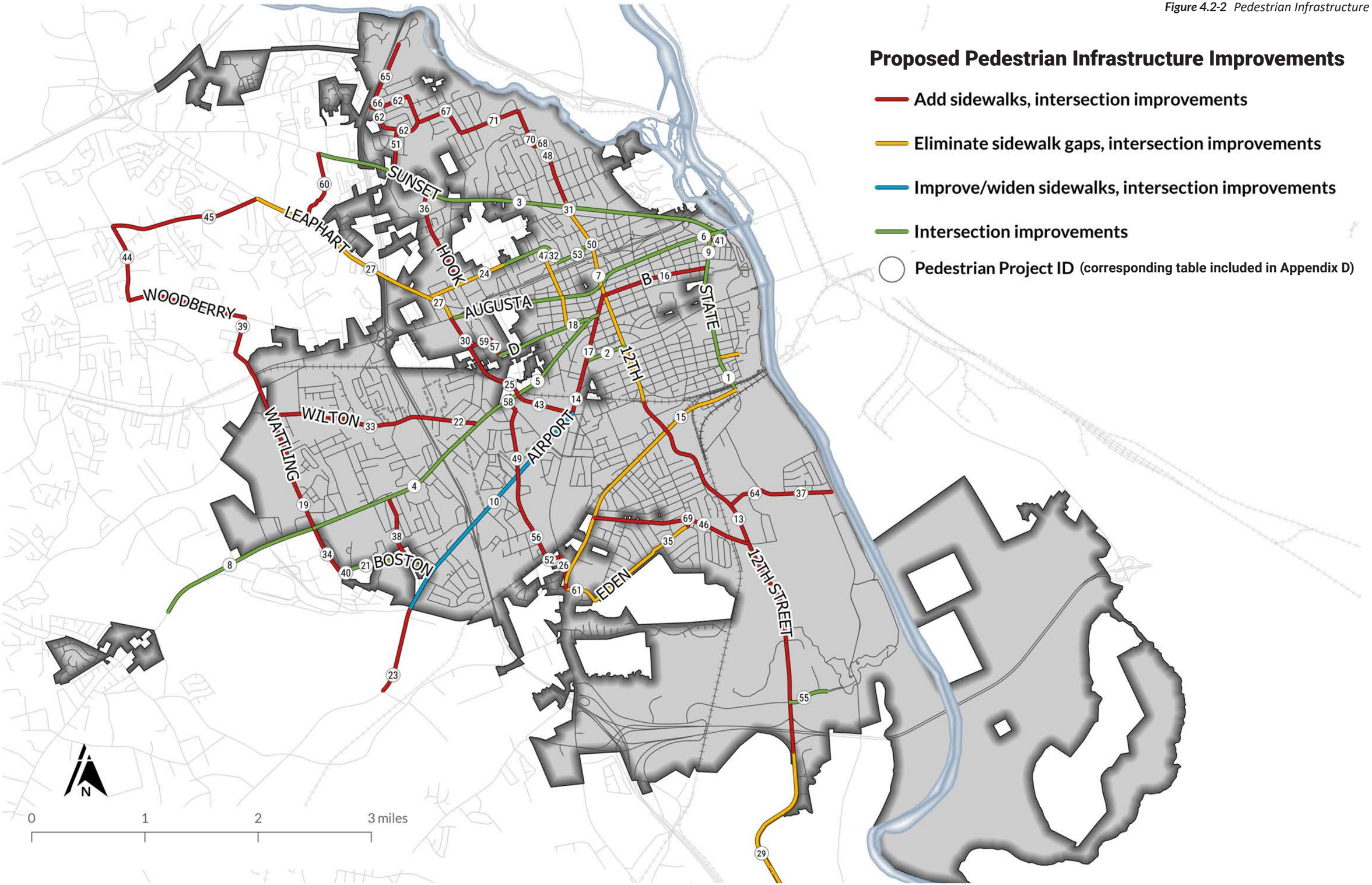

Pricing!
Jesto

Figure 4.2-1 *Bicycle Infrastructure Projects*



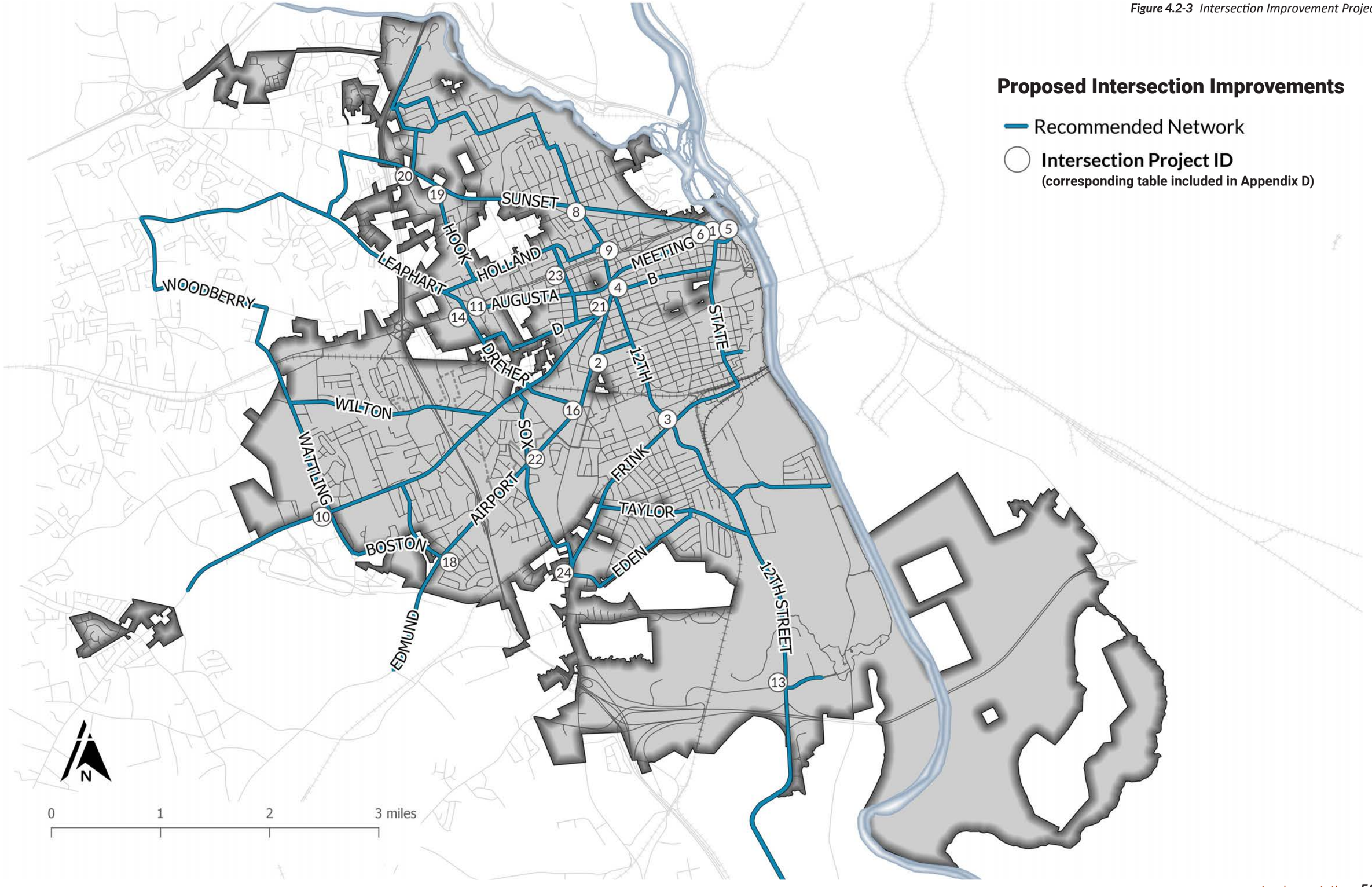
THIS PAGE INTENTIONALLY LEFT BLANK

Figure 4.2-2 *Pedestrian Infrastructure Projects*



THIS PAGE INTENTIONALLY LEFT BLANK

Figure 4.2-3 Intersection Improvement Projects



THIS PAGE INTENTIONALLY LEFT BLANK

Wayfinding, Signage, and Traffic Calming Improvements

Finally, the fourth list includes all wayfinding, signage, and traffic calming projects; these projects were not ranked, as they require a much lower level of funding and should be programmed on an annual, systematic basis. Wayfinding, signage, and traffic calming projects are included graphically as part of the bicycle infrastructure projects in Figure 4.2-1. The complete listing of wayfinding, signage, and traffic calming projects is included in Appendix D.

As a summary, Table 4.2-3 presents combined totals for all project types.

Table 4.2-3 *Combined Totals by Project Type*

Project Type	No. of Projects	Miles
Bike Projects	42	46.9
Pedestrian Projects	71	101.7
Intersection Projects	24	-
Wayfinding/ Signage/Calming	29	12
TOTAL	**166**	**160.6**

Art used as infrastructure can be both a wayfinding measure and a form of traffic calming

Wayfinding signage creates an identity for bike and pedestrian connections

4.3 Project Costs

Order-of-magnitude opinion of probable costs by linear foot were generated for each facility type and applied to each recommended project based on its total linear feet. Linear foot costs were developed by identifying pay items and establishing rough quantities. Unit costs are based on 2017 dollars and were assigned based on historical cost data from SCDOT and other sources. Please note that the estimates do not include any costs for engineering analysis and design, easement or right-of-way acquisition, or the cost for ongoing maintenance. Also, note that rough costs have been assigned to some general categories such as utility relocations, however these costs can vary widely depending on the exact details and nature of the work. A 30% contingency has been included. The estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e., potential combination or segmentation of projects) and economic conditions at the time of construction. Table 4.3-1 presents linear foot costs by facility type.

Because of the large geographic area being studied and scope constraints of the Plan, the West Metro Bike and Pedestrian Master Plan considered implementation at a planning level of detail. As quantified above, many aspects of implementation are not currently known, such as right-of-way, ability to accomplish projects within existing pavement, and exact extent of construction limits. Additionally, because flexibility of facility type has been programmed into the Plan to allow local jurisdictions to be agile in implementation, many projects may have more than one right solution to realize their completion. For example, a "physically separated facility" could be implemented as a separated bike lane, sidepath, or shared-use pathway/greenway, all of which have different construction costs. Therefore, a low and a high cost have been included for each recommended project. Over $215 million of projects are included in the Plan; Table 4.3-2 provides a summary of cost by project type. Individual project costs are presented in Appendix D as part of project rankings.

Table 4.3-1 *Linear Foot Costs by Facility Type*

Facility Type	Cost per Linear Foot*
Bike Lane (restripe/lane diet/road diet)	$32.00
Bike Lane (widen road, closed section)	$662.00
Bike Lane (widen road, open section)	$353.00
Buffered Bike Lane (widen road, open section)	$536.00
Buffered Bike Lane (restripe/lane diet/road diet)	$40.00
Sidepath (concrete)	$202.00
Sidepath (asphalt)	$112.00
Shared-use Pathway/Greenway (concrete)	$301.00
Shared-use Pathway/Greenway (asphalt)	$134.00
Separated Bike Lane (curb protected)	$632.00
Sidewalk (open section)	$218.00
Sidewalk (closed section)	$266.00
Improve Existing Sidewalks (eliminate gaps, widen)	$87.00
Incidental Intersection Improvements	$60.00
Wayfinding/Signage	$30.00
Traffic Calming	$50.00

*Costs are for implementing the facility on both sides of the street.

Table 4.3-2 *Summary of Cost by Project Type*

Project Type	No. of Projects	Miles	Low Cost	High Cost
Bike Projects	42	46.9	$17,953,000	$144,977,000
Pedestrian Projects	71	101.7	$47,856,000	$65,655,000
Intersection Projects	24	-	$1,519,000	$1,519,000
Wayfinding/Signage/Calming	29	12.0	$1,907,000	$3,178,000
TOTAL	166	160.6	$69,235,000	$215,328,000

4.4 Project Phasing

Breakpoints were established to categorize projects by three implementation phases:

- Short-Term (2-5 years)
- Mid-Term (5-10 years)
- Long-Term (10+ years)

Although the above implementation phases have been established, these designations are for planning purposes only; improvements should be implemented logically and as opportunities arise. For example, if circumstances provide an opportunity to complete a Mid-Term project two years after the Plan is adopted, the improvement should be made, regardless of its designation as "Mid Term." Use of common sense and good judgment must prevail. If a project in the Short-Term period is heavily reliant on a Mid-Term project to be successful (e.g., completing a connection), then it may make sense to hold off on the Short-Term project until resources are available to implement it along with the related Mid-Term project. Similarly, should one of the municipalities learn that a street is to be resurfaced, then that is the time to put a new striping pattern (e.g., bike lanes) in place, regardless of the timing of the recommendation based on its implementation phase.

Projects can be phased in over time with new development and construction

Capital Cost Breakdown

A breakdown of capital cost by phase is presented in Table 4.4-1. In years 2-5 $7.5 million to $36.0 million is needed. Mid-Term projects account for nearly $21 million to $65 million, but have the benefit of more time for planning, securing funding, and building public and political support in the 5-10 year period. Long-Term projects total over $39 million to nearly $111 million.

Table 4.4-1 *Summary of Cost by Implementation Phase*

Phase	No. of Projects	Miles	Low Cost	High Cost
Short-Term (2-5 years)	22	19.8	$7,457,000	$36,040,000
Mid-Term (5-10 years)	35	43.0	$20,695,000	$65,144,000
Long-Term (10+ years)	80	85.8	$39,176,000	$110,966,000
Wayfinding/Signage/Calming	29	12.0	$1,907,000	$3,178,000`
TOTAL	166	160.6	$69,235,000	$215,328,000

4.5 Capital Improvements by Municipality

While the West Metro Bike and Pedestrian Master Plan is a regional plan, it is important to provide each municipality with an understanding of key projects that are within their jurisdiction in the Short-Term period (2-5 years) and costs associated with those projects; this will allow for individual municipalities to plan for implementation within their respective capital improvement budgets and grant cycles. Short-term projects are taken from the overall rankings presented in Appendix D, but have been prioritized by each municipality based on local goals and objectives. The following sections present capital improvements by municipality in the 2-5 year period.

Updating intersections to be ADA compliant as a part of capital improvements ensures accessibility for all ages and abilities

Cayce Short-Term Capital Improvements

Table 4.5-1 presents Short-Term bicycle, pedestrian, and intersection projects within the City of Cayce. In addition to the capital improvement projects presented below, there are six wayfinding, signage, and calming projects within the City of Cayce, with a total cost that ranges from $372,000 to $619,000.

Table 4.5-1 *City of Cayce Short-Term Projects*

Local Priority	Location	Recommendation	Low Cost	High Cost
Bicycle Projects			**$466,000**	**$4,405,000**
1	State Street	Buffered Bike Lane	$229,000	$3,065,000
2	Knox Abbott Drive	Physically Separated Facility	$237,000	$1,340,000
Pedestrian Projects			**$236,000**	**$470,000**
1	State Street	Incidental Intersection Improvements along Pedestrian Route	$172,000	$343,000
2	Knox Abbott Drive	Incidental Intersection Improvements along Pedestrian Route	$64,000	$127,000
Intersection Projects			**$26,000**	**$26,000**
1	12th Street at Frink Street	High visibility crosswalks, curb ramps	$26,000	$26,000
SHORT-TERM TOTAL			**$728,000**	**$4,901,000**

West Columbia Short-Term Capital Improvements

Table 4.5-2 presents Short-Term bicycle, pedestrian, and intersection projects within the City of West Columbia. In addition to the capital improvement projects presented below, there are 23 wayfinding, signage, and calming projects within the City of West Columbia, with a total cost that ranges from $1,516,000 to $2,526,000.

Table 4.5-2 *City of West Columbia Short-Term Projects*

Local Priority	Location	Recommendation	Low Cost	High Cost
Bicycle Projects			**$3,932,000**	**$22,188,000**
1	Meeting Street	Physically Separated Facility	$730,000	$4,121,000
2	Sunset Boulevard	Physically Separated Facility	$2,213,000	$12,486,000
3	Platt Springs Road*	Physically Separated Facility	$989,000	$5,581,000
Pedestrian Projects			**$1,054,000**	**$2,106,000**
1	Meeting Street	Incidental Intersection Improvements along Pedestrian Route	$196,000	$391,000
2	Sunset Boulevard	Incidental Intersection Improvements along Pedestrian Route	$593,000	$1,185,000
3	Platt Springs Road*	Incidental Intersection Improvements along Pedestrian Route	$265,000	$530,000
Intersection Projects			**$397,000**	**$397,000**
1	State Street at Meeting Street	High visibility crosswalks, curb ramps	$26,000	$26,000
2	Knox Abbot Drive at Charleston Highway	Curb Extensions	$67,000	$67,000
3	12th Street at B Avenue	High visibility crosswalks, curb extensions	$78,000	$78,000
4	Meeting Street at Sunset Boulevard	High visibility crosswalks, curb extensions	$78,000	$78,000
5	Meeting Street	Mid-block crossing with RRFP	$56,000	$56,000
6	State Street at Sunset Boulevard	Restripe Crosswalks	$4,000	$4,000
7	12th Street at Sunset Boulevard	Curb extensions	$67,000	$67,000
8	12 Street at Jarvis Klapman Boulevard	Priority pavement makrings for bikes and pedestrians across Jarvis Klapman and slip lanes	$21,000	$21,000
SHORT-TERM TOTAL			**$5,383,000**	**$24,691,000**

* Shared project with the Town of Springdale

Springdale Short-Term Capital Improvements

Table 4.5-3 presents Short-Term bicycle, pedestrian, and intersection projects within the Town of Springdale. In addition to the capital improvement projects presented below, there is one wayfinding, signage, and calming project within the Town of Springdale, with a total cost that ranges from $111,000 to $185,000.

Table 4.5-3 *Town of Springdale Short-Term Projects*

Local Priority	Location	Recommendation	Low Cost	High Cost
Bicycle Projects			**$2,028,000**	**$11,442,000**
1	Platt Springs Road	Physically Separated Facility	$1,039,000	$5,861,000
2	Platt Springs Road*	Physically Separated Facility	$989,000	$5,581,000
Pedestrian Projects			**$543,000**	**$1,086,000**
1	Platt Springs Road	Incidental Intersection Improvements along Pedestrian Route	$278,000	$556,000
2	Platt Springs Road*	Incidental Intersection Improvements along Pedestrian Route	$265,000	$530,000
Intersection Projects			**$29,000**	**$29,000**
1	Platt Springs Road at Watling Road	Restripe corsswalks, median refuge	$29,000	$29,000
	SHORT-TERM TOTAL		**$2,600,000**	**$12,557,000**

4.6 Early Action Projects

To generate momentum for implementation of projects recommended in the West Metro Bike and Pedestrian Plan, Early Action Projects are presented in Appendix E. Each page provides a "cut sheet" of an Early Action Project that can be implemented in the near-term. Three bicycle projects and three pedestrian projects are included for each municipality. The cut sheets provide a short description of the improvement, associated graphic, and cost estimate.

Implementing safe routes for cyclists and pedestrians generates momentum for more cycling and walking in communities


Transit
CHINA HUT III
RESTAURANT
WENTWORTH
KFC
Tri-City Surplus