THE CITY OF Alexandria VIRGINIA

TRANSPORTATION MASTER PLAN

Pedestrian and Bicycle Chapter

April 2016

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SECTION 1

Introduction

INTRODUCTION

Successful cities evolve over time – retaining their heritage, while adapting to changing technologies, cultural attitudes and community priorities. Today, many people desire dynamic, vibrant places that provide an array of high quality transportation options and accommodate a wide range of travelers including those with disabilities. Cities are responding by enhancing their transportation systems to adapt to this new paradigm. Alexandria is fortunate in having a great walking and bicycling network to build upon, as recognized by the City's Silver status in the national Walk- and Bicycle-Friendly Communities programs.[1]

Walking has been one of the primary means of travel in Alexandria since the City's founding in 1749. The street pattern in older parts of the City are a direct result of the transportation technology of that time: short blocks, sidewalks on most every street and relatively narrow roadways. With the emergence of the automobile-development patterns changed. Roads became wider, speeds increased and destinations separated by greater distances. Development patterns in areas of the City built between the 1950s through the late 1990s - especially central and west Alexandria - reflect the prevailing approach to land use. Residential uses were separated from commercial and other uses, and the automobile became a necessary form of transportation.

Today, Alexandria has a robust mixture of transportation options including a strong transit network, streets that facilitate vehicle trips both within and through the City, Capital Bikeshare, and several major trails that serve commuters as well as recreational users. This Pedestrian and Bicycle Chapter demonstrates the City's continued commitment to providing a world-class transportation system that serves people of all ages and abilities and builds a bridge between Alexandria's early past and its future. Many Alexandrians do not drive, and many use assistive devices such as wheelchairs, walkers or other mobility devices. A high-quality pedestrian and bicycle transportation system allows all to move about all parts of the city with dignity, independence and comfort.

As the City continues to evolve, it will increase its focus on providing safe, comfortable and convenient pedestrian and bicycle transportation options for residents and visitors. This effort will build upon past plans and studies completed in Alexandria, many of which include a strong focus on multimodal transportation. In some areas that already have high quality walking and bicycling environments, achieving the vision of this plan may simply mean enhanced emphasis on maintenance and increasing awareness and education of the rights and responsibilities of pedestrians, bicyclists and motorists. In other locations, new sidewalks and crossings, on- and off-street bicycle facilities, and improved trail/road transitions are recommended.

The Pedestrian and Bicycle Chapter articulates a vision for walking and bicycling in Alexandria that serves the needs of all users, and of all ages and abilities. The Chapter includes several goals, objectives, performance measures and specific strategies to achieve that vision. Strategies address physical improvements to the transportation system as well as policy and programmatic recommendations that aim to increase the education and awareness of all users of the transportation system. Many strategies are interdependent and must be pursued in a coordinated manner to achieve desired results. For example, focusing on infrastructure alone will not achieve the vision.

Existing Crosswalk on Duke Street

1 The Walk Friendly Community Program is managed by the Pedestrian and Bicycle Information Center and the Bicycle Friendly Community Program is run by the League of American Bicyclists. Both programs award ratings based on programs, policies, and infrastructure.

Holmes Run Trail in Alexandria

Planning Process

Several recent changes in the City created a need to update these chapters of the Plan. Since the 2008 Transportation Master Plan and the 2008 Pedestrian and Bicycle Mobility Plan (the Mobility Plan), the City has completed numerous Small Area Plans that include proposed pedestrian and bicycle improvements. Capital Bikeshare was launched in 2012, creating increased demand for comfortable and safe places to bicycle. In 2011, Alexandria adopted a Complete Streets policy which states that the City will incorporate, to the extent possible, infrastructure that enables reasonably safe travel for all users.[2] Additionally, new innovations and trends at the national level have created the need to take a fresh look at Alexandria's programs, policies, and infrastructure related to bicycling and walking.

The 2015 Pedestrian and Bicycle Chapter builds on the recommendations included in the 2008 Alexandria Transportation Master Plan, the Mobility Plan, and other City plans. Some recommendations from the 2008 Transportation Master Plan and the Mobility Plan have been removed because they have been completed, some have been revised based on current conditions, and others remain relevant and have been carried forward in this Chapter. Whereas the 2008 Mobility Plan contained detailed inventory of improvements to be made across the City, this update aims to prioritize and focus the City's efforts over the next ten years on specific corridors that have significant potential to benefit non-motorized transportation.

One particular area of focus for this Plan is an effort to ensure that people throughout the entire city have access to comfortable, safe places to walk and bike. This led to a consistent effort throughout the planning process to ensure that recommendations and priority projects serve the west side of the City, which has historically had fewer on-street bicycle facilities and pedestrian-friendly areas.

> "Making it safe for more people to walk and bike in our City provides health and economic benefits to both individuals, as well as to our community as a whole."
>
> — Jim Durham, *Chair, Bicycle and Pedestrian Advisory Committee*

2 The Alexandria Complete Streets Policy was reenacted in 2014.

Pedestrians crossing Seminary Road

Groups with Representation on Advisory Committee
Commission on Aging
Design Professional Representative
Traffic and Parking Board
Transportation Commission
Business Representative
Commission on Persons with Disabilities
Planning Commission
Parks and Recreation Commission
Bicycle and Pedestrian Advisory Committee
Community Representatives

As part of the process, planners identified and assessed six Case Study Areas focused primarily on pedestrian issues and needs. The Case Study Areas represent recurring issues that are found throughout Alexandria. Recommendations include closing gaps in the sidewalk network, changes to intersection geometry, and crossing improvements. In some cases, programmatic and policy changes are recommended, as well. The recommendations are based on national best practices and designed to increase safety and comfort. These recommendations are intended to be applied to similar conditions in other parts of the City.

The Plan considered many of Alexandria's roadways for their potential to serve bicyclists- including people who may be interested in bicycling but do not feel comfortable riding with traffic on many streets. Particular emphasis was placed on connecting neighborhoods to destinations such as schools, commercial centers, transit and the regional trail system. Many of Alexandria's local streets have relatively low motor vehicle speeds and volumes, and are subsequently appropriate for most bicyclists; however, due to the City's topography and street network, a larger road is often the only reasonably direct connection between destinations. These roads tend to carry higher volumes of traffic moving at greater speeds, thereby requiring significant improvements such as bicycle lanes and sidepaths that separate bicyclists from motor vehicles. This Plan Chapter identifies priority on-street bicycle, trail and sidewalk improvements for City staff to focus on in the near term, but also includes many other recommendations to be addressed as opportunities arise (e.g. redevelopment or roadway resurfacing).

The Pedestrian and Bicycle Chapter reflects the input and feedback gained over an 18-month period – and has been a demonstration of the City's robust *What's Next, Alexandria* civic engagement process. An Ad-Hoc Pedestrian and Bicycle Master Plan Advisory Committee (Advisory Committee) representing key City committees and stakeholder groups met ten times over the course of the planning process to help guide development of the vision, goals, recommendations and strategies. Community input was also received at these meetings. Two interactive public meetings were held to solicit input from the community. The first meeting focused on issues, needs and priorities while the second was held to receive feedback on draft recommendations. City staff attended community events such as farmers markets and neighborhood festivals to reach out to groups and individuals who do not typically engage in planning efforts, but use the walking and bicycling network every day.

In addition to in-person civic engagement, the plan outreach had a robust online component. The project website served as a central location for online information about the plan as well as a place where people could review presentations, draft reports and recommendations. The project had an online survey and interactive map, provided in English and Spanish, to gather input from residents about their concerns and priorities for walking and bicycling througout the City. People also had an opportunity to participate in the survey and mapping exercise in-person at several events in different parts of the City.

The public engagement process was complemented by a planning process that included coordination with City departments involved in planning, design, operations, implementation and maintenance of Alexandria's transportation system as well as briefings with City Council, meetings with key City commissions and committees and Alexandria City Public Schools (ACPS). A detailed synopsis of the public engagement is presented in Appendix B.

Complete Streets Design Guidelines

In a process paralleling the development of the Pedestrian and Bicycle Chapter, the City developed a Complete Streets Design Guide. This Guide integrates existing City policy and design guidance related to roadway, sidewalk and trails, and incorporates new information to reflect best practices for developing a transportation system that serves the needs of people who walk, bike, ride transit or drive vehicles. The Complete Streets Design Guide identifies new street types for Alexandria and provides direction on the design of sidewalks, roadways, intersections and curbsides.

The Design Guide will be used by City staff in the planning and design of improvements to existing roadways and intersections, as well as new roads. The Guide will also be used by developers to ensure that new roadways, intersections, sidewalks and trails are achieving the City's objectives for a safe and effective multimodal transportation system.

"Complete Streets" describes a comprehensive, integrated transportation network with infrastructure and design that allows safe and convenient travel along and across streets for all users, including pedestrians, bicyclists, riders and drivers of public transportation, as well as drivers of other motor-vehicles, and people of all ages and abilities, including children, older adults, and individuals with disabilities.

—Alexandria 2011 Complete Streets Policy

Plan Organization

The Pedestrian and Bicycle Chapter is organized into four sections. This introductory section provides context for the plan, as well as an overview of the planning process. Section 2, *Walking in Alexandria*, and Section 3, *Biking in Alexandria* provide the vision, goals and objectives for each of these modes. Each section summarizes existing conditions and provides an array of strategies designed to improve the accommodation of people who walk and bike, respectively. Although trails are used for both walking and bicycling, they are covered in section 3. Section 4, *Implementation*, contains guidance on implementing the strategies recommended in sections 2 and 3. *Implementation* is presented as a unified section in recognition that many plan recommendations address the needs of people who walk and bike. Technical appendices provide more detail on the planning process, public meeting materials, existing conditions assessment and specific recommendations.

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SECTION 2

Walking in Alexandria

WALKING IN ALEXANDRIA

The City of Alexandria is currently one of the most walkable communities in the Commonwealth of Virginia, as well as the country. Many of its residents enjoy neighborhoods served by a substantial network of sidewalks that make walking to schools, commercial areas, and jobs safe. Through significant investments in its pedestrian network and related programs, the City has experienced an increase in the number of people walking to work since 2008 (from 3.0 to 3.8 percent in 2012);[3] however, challenges related to the safety and comfort of pedestrians throughout the City persist. According to the Alexandria Police Department (APD), the City has experienced an average of 64 crashes involving pedestrians per year over the past ten years. Furthermore, while some areas of the City are extremely attractive and inviting places to walk, others are uncomfortable for pedestrians due to relatively high vehicular speeds and limited or inaccessible sidewalks. These issues are at the heart of this Chapter, which serves as the pedestrian element of the City's Transportation Master Plan.

Vision, Goals and Objectives

The project team worked with the Advisory Committee and public to develop the following vision, goals and objectives to guide the pedestrian section of this Chapter. These themes were used to develop the strategies presented in the next section, and can be used to assess the City's progress over time. In the strategies section, the goals addressed by each strategy are noted using the icons shown in the table on the following page. A set of specific performance measures was also developed and is presented in the Implementation section of the Chapter.

Vision for Walking in Alexandria

Walking is vital to the health and mobility of Alexandria's residents, workers and visitors. The City provides safe and accessible streets, intersections and trails, as well as programs and policies that encourage increased walking as a safe and active form of transportation and recreation. Pedestrian facilities, programs and policies foster social equity, ensuring that investments benefit people of all backgrounds, abilities, including children, older adults and persons with disabilities and income levels, as well as geographic equity, ensuring that people throughout the City have access to safe and comfortable places to walk.

Kids walking to school

3 2008-2012 American Community Survey 5-Year Estimates. S0801 Commuting characteristics by Sex. U.S. Census Bureau.

Goals	Objectives
SA SAFETY The City will create a safe, well-maintained, comfortable and enjoyable pedestrian environment that encourages walking and is accessible for people of all ages and abilities.	1.1 Ensure that all streets, trails and intersections are accessible, safe and well designed using national best practices for safety and accessibility.
	1.2 Partner with Alexandria Police Department to improve the safety of pedestrians, cyclists and drivers through effective law enforcement implemented in coordination with other pedestrian-focused programs, policies and pedestrian facility improvements.
	1.3 Reduce conflicts between pedestrians, vehicles, and bicyclists by implementing a range of pedestrian and bicycle facility treatments appropriate to a street and its surrounding context.
	1.4 Eliminate pedestrian fatalities and injuries citywide.
EG ENGINEERING The City will provide a continuous, connected and accessible pedestrian network that enables people of all ages and abilities to move safely and comfortably between places and destinations.	2.1 Ensure sidewalks are available on both sides of all streets.
	2.2 Make intersections throughout the City safe, comfortable and accessible for pedestrians.
	2.3 Increase the number and quality of off-street pedestrian connections between adjacent destinations not connected by the street network, such as neighborhoods, multifamily housing developments, shopping districts, parks, schools and trails.
EC ENCOURAGEMENT The City will promote walking as a means of improving transportation circulation, transit access, public health, environmental quality and recreation, with the ultimate goal of increasing walking trips as a percent of all travel in Alexandria.	3.1 Encourage and provide incentives for active lifestyles that include regular walking.
	3.2 Partner with other local and regional organizations to support existing and new programs that promote walking and active lifestyles.
	3.3 The City will advance to a recognized gold level "walk friendly community" (www.walkfriendly.org)
ED EDUCATION The City will educate users of all transportation modes about pedestrian safety, rights and responsibilities.	4.1 Initiate targeted outreach that aims to increase adult pedestrians' and motorists' knowledge of safe walking and driving behaviors and traffic laws related to pedestrian travel
	4.2 Partner with Alexandria public and private schools to implement pedestrian safety education and programs that support increased walking among the City's youth.
	4.3 Ensure that education efforts reflect the diversity of the Alexandria community, with messages and programs offered in various languages whenever possible and targeting communities with the greatest need.
	4.4 Educate public and private sector design professionals, city groups and the public who are involved with Alexandria's transportation system on Complete Streets principles and design.

Figure 2.1: Pedestrian Goals and Objectives

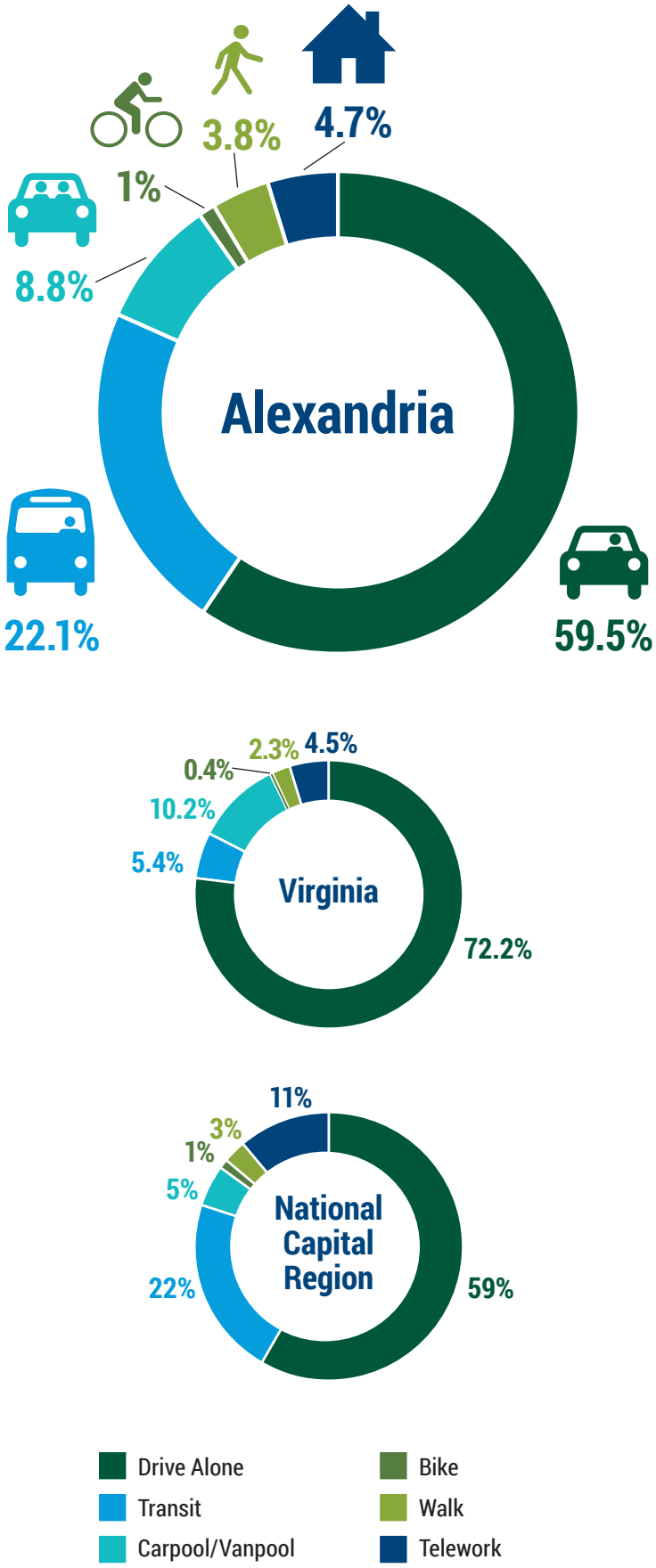

Figure 2.2: Commute to Work Data

Existing Conditions

The baseline for pedestrian needs and issues in Alexandria included a targeted review of public perceptions and existing conditions for walking. Key takeaways from this review are presented below, and a full report of findings can be found in Appendix C: Progress Report.

Alexandria has experienced a 28 percent increase in walking to work since 2000,[4] and has a higher average walk to work rate than both the state and region (see Figure 2.2). This trend creates a strong foundation on which the strategies for improving walking can build.

Each year, volunteers from the Alexandria Bicycle and Pedestrian Advisory Committee (BPAC) conduct pedestrian and bicycle counts at seventeen locations throughout the City. Among the count locations, the areas of the City experiencing the highest levels of pedestrian activity include Old Town, Arlandria, Del Ray, as well as the Mount Vernon and Holmes Run Trails.[5]

4 2008-2012 American Community Survey 5-Year Estimates. S0801 Commuting characteristics by Sex. U.S. Census Bureau.

5 These counts have been performed annually during the months of May and September. Counts are completed two times per week 5:00 p.m. to 7:00 p.m. on Thursdays and 12:00 to 2:00 p.m. on Saturdays. In 2013 and 2014 additional counts were done in the months of January and July. The counts have been taken in 17 locations throughout Alexandria. BPAC volunteers note the time of day, location, and gender of the pedestrians.

Existing Crossing in Mount Vernon Avenue

Although these counts do not provide a comprehensive portrait of walking everywhere in the City, they do provide a general understanding of relative pedestrian activity levels in the seventeen count locations (see Figure 2.3). In 2015, the City installed automated counters in eight locations which collect data on pedestrian and bicycle activity 24 hours a day. This new data will provide an improved understanding about pedestrian and bicycle demand over time.

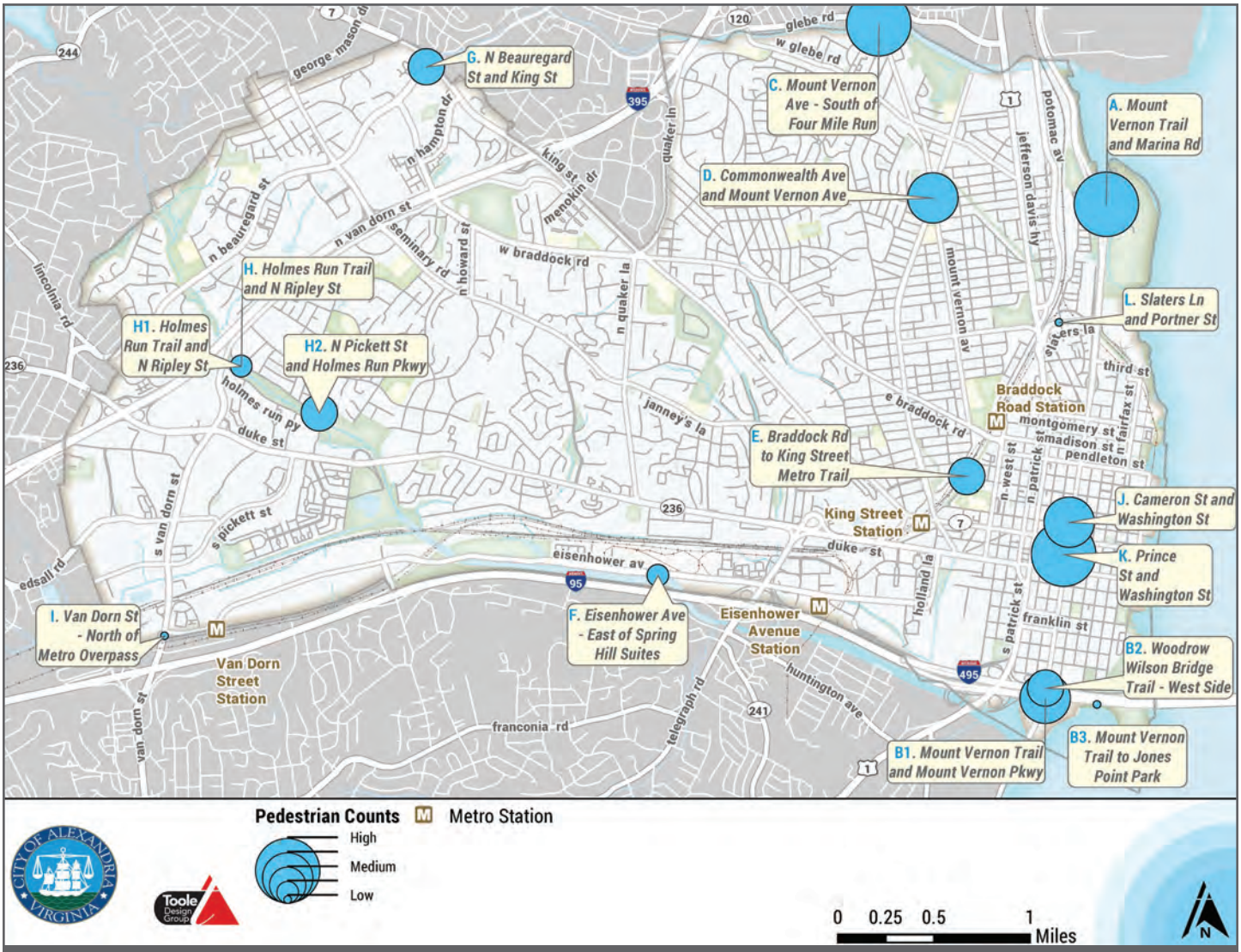

Figure 2.3: Pedestrian Count Locations and Data (BPAC Volunteer Counts, 2011-2014)

Infrastructure

Alexandria has approximately 575 miles of sidewalks which cover approximately 76 percent of City streets. The City has completed a number of new sidewalk projects since the completion of the 2008 Transportation Master Plan and Mobility Plan, including most of the projects that could be accomplished without significant new right of way acquisition, utility relocation or other investments (see Figure 2.4). Areas without sidewalk coverage on both sides of streets tend to be residential neighborhoods such as locations in the North Ridge/Rosemont area, the Dowden Terrace neighborhood and the Taylor Run area. While sidewalk coverage is fairly comprehensive, some sidewalks have obstructions that impede pedestrians such as overgrown vegetation, utility poles or other obstacles.

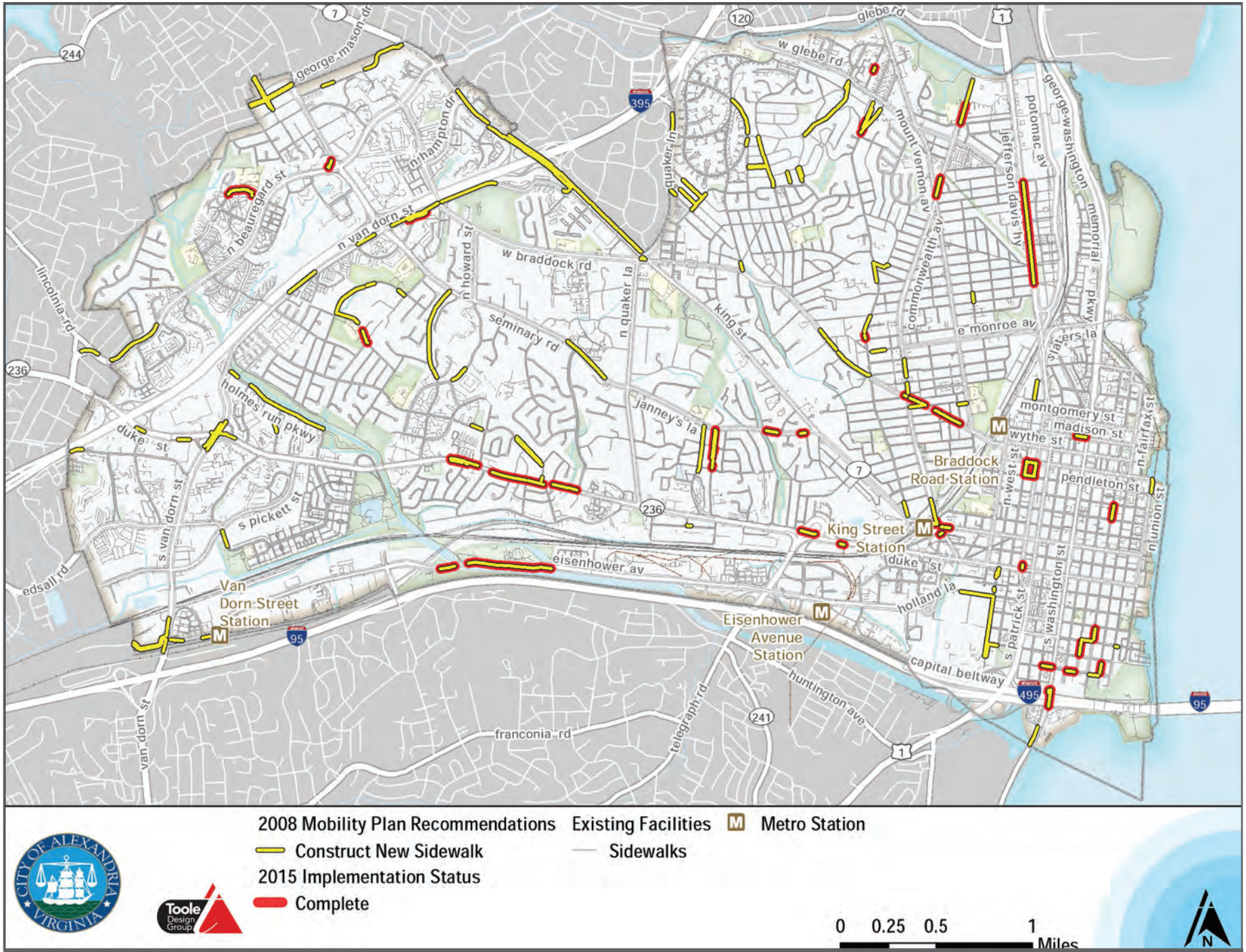

Figure 2.4: Status of 2008 "New Sidewalk" Recommendations

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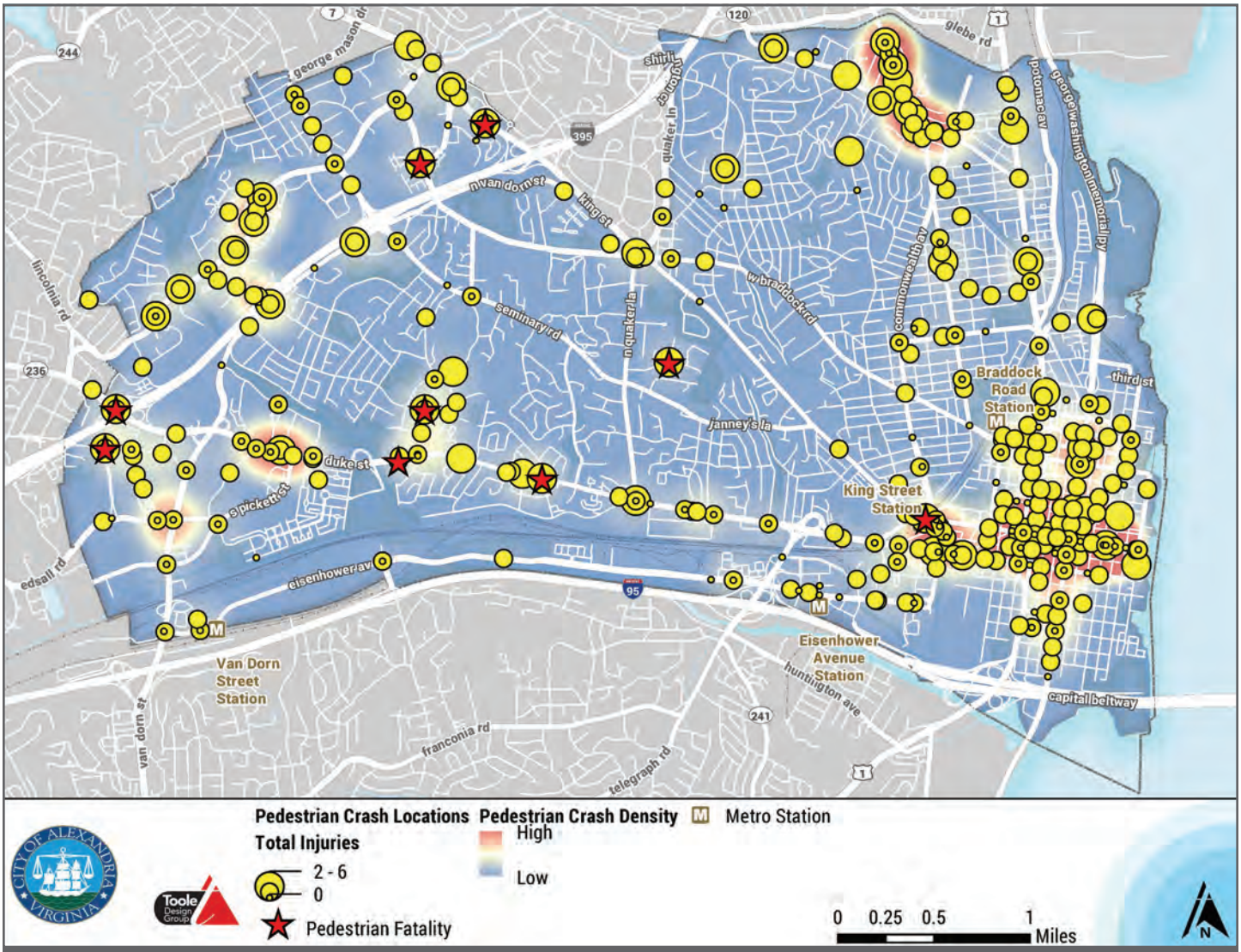
Throughout Alexandria, there is significant variability in the presence and quality of other pedestrian facilities such as curb ramps, crosswalks, pedestrian signals, accessible bus stops, wayfinding and regulatory signage. For example, while the City has installed countless accessible curb ramps over the past ten years, there are still areas of the City where substandard or missing curb ramps create barriers for people with disabilities and people pushing strollers or pulling wheeled luggage. Similarly, many City traffic signals provide pedestrian countdown signals but some areas feature an older type of signal without a countdown, or none at all. While a citywide inventory of curb ramps and similar features was not feasible during this project, the City recognizes the need to continue to upgrade these facilities and has incorporated a number of strategies for doing so into this Chapter.

Recently Installed Sidewalks and Existing Curb Ramps in Alexandria

Pedestrian Safety

Safety has been a key component of every aspect of this planning process, and will remain the foremost consideration related to street design in Alexandria. As shown in Figure 2.5, there were nine pedestrian fatalities on City of Alexandria streets between 2005 and 2014, with another one occurring in 2015 during the planning process.[6] As shown by the darker red areas in Figure 2.5, locations with higher concentrations of pedestrian crashes include Old Town and the King Street Metrorail station area, Mt. Vernon Avenue in Arlandria, and areas on Duke and Van Dorn Streets on the west side of Alexandria.


Pedestrian Crash Locations
Total Injuries
2 - 6
0
Pedestrian Fatality
Pedestrian Crash Density
High
Low
Metro Station
0 0.25 0.5 1 Miles
Van Dorn Street Station
King Street Station
Braddock Road Station
Eisenhower Avenue Station
duke st
eisenhower av
n van dorn st
king st
seminary rd
n quaker la
janney's la
w braddock rd
commonwealth av
potomac av
glebe rd
third st
capital beltway
franconia rd
telegraph rd
huntington ave
edsall rd
lincolnia rd
van dorn st
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s columbus st
n union st
s union

Programs and Outreach Effort

The majority of the City's existing outreach related to walking is managed through Local Motion, Alexandria's Transportation Demand Management program. The Local Motion website provides educational materials on pedestrian safety, and information on ongoing City plans that impact the pedestrian environment and similar content. Local Motion also promotes the Guaranteed Ride Home program for people who walk or use other transportation alternatives, and promote events such as Car Free Day.

Alexandria also provides training for DASH bus drivers on pedestrian safety and participates in the Metropolitan Washington Council of Governments (MWCOG) StreetSmart Campaign, which includes bus advertisements, fliers and other media focused on pedestrian safety.

Another existing City program related to pedestrian and bicycle education is the Safe Routes to School (SRTS) program. Alexandria has completed SRTS infrastructure improvements focused on pedestrian/bicycle safety near Charles Barrett, Cora Kelly and George Mason Elementary Schools. As noted in Figure 2.6, 30 percent of students at participating schools reported regularly walking to school in 2014, which is significantly higher than regional and statewide averages.[7]

While the average of percentage of students walking to school at participating schools exceeds regional and statewide averages, wide disparities in walking rates exist across the school district. In 2015, the Alexandria City Public Schools (ACPS) adopted a 2015-2020 Strategic Plan that included an objective to encourage walking and biking at all schools, and to work with city authorities to ensure safe routes to school are available and publicized as part of its Health and Wellness Goal.

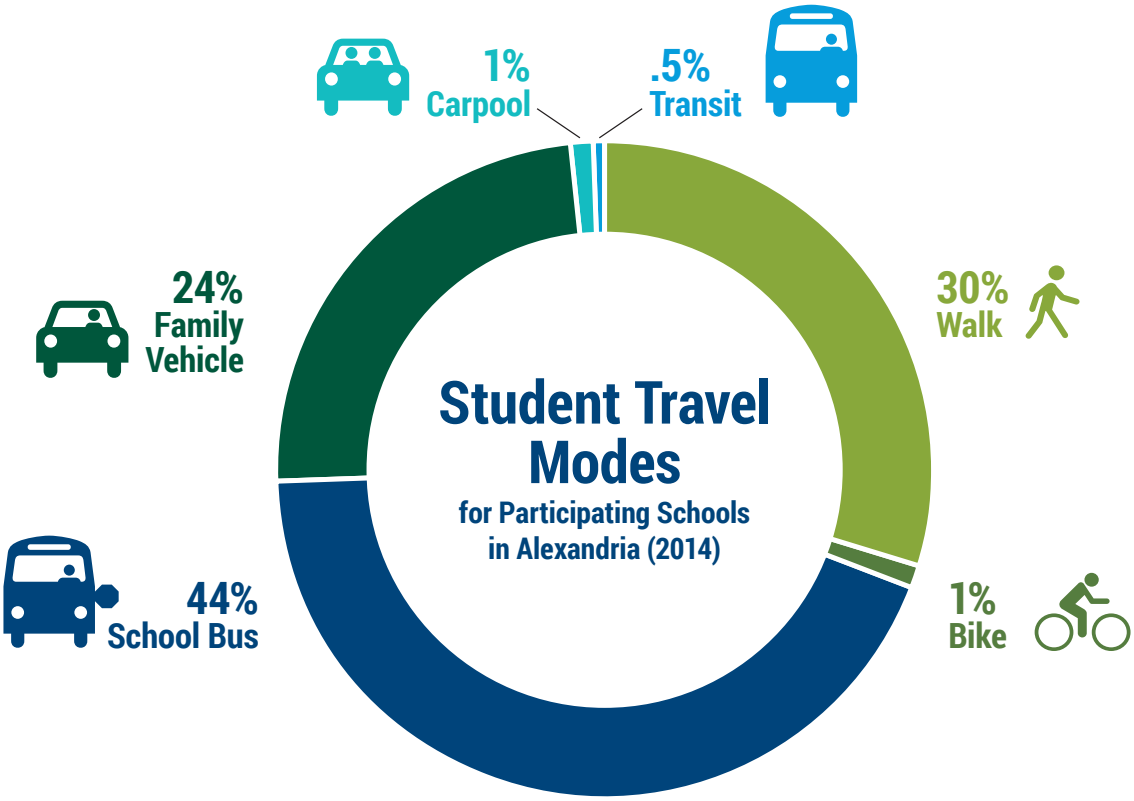

Figure 2.6 : Student Travel Modes for Participating Schools in Alexandria (2014)

7 National Center for Safe Routes to School. Data Central. Parent Survey 2014. Accessed from http://www.saferoutesinfo.org/data-central on December 9, 2014. Participating schools included: Charles Barrett ES, Cora Kelly ES, Francis Hammond MS, George Mason ES, George Washington MS, James K. Polk ES, Jefferson-Houston ES, John Adams ES, Patrick Henry ES, and William Ramsay ES.

Case Study Areas

In order to develop the strategies presented later in this Chapter, a closer look at the physical conditions that make up Alexandria's pedestrian environment was needed. To do this, the City identified six Case Study Areas that represent different "place types" in Alexandria and feature issues that occur throughout the City. Because these Case Study Areas have characteristics similar to many other places in Alexandria, the recommendations can inform efforts to improve pedestrian safety and comfort in those areas with comparable issues and needs.

The themes shown in Figure 2.6 were developed based on input from Advisory Committee, the public and City staff. These themes reflect both recurring issues noted by the public and "place types" in Alexandria where pedestrian safety and comfort are particularly critical. A map of the specific Case Study Areas used to study these themes is shown in Figure 2.8.

THEMES	CASE STUDY AREAS:	I-395 and Landmark Mall	Hammond Middle School Area	Duke Street Corridor	Mount Vernon Avenue/ Four Mile Run	King Street Station	Braddock Road and Commonwealth Avenue
	Major Barriers/Freeway Interchanges	●	●			●	
	Schools and Neighborhoods		●		●		●
	Transit Access and Integration	●		●		●	
	Neighborhood Main Streets				●		
	Suburban Commercial Connectors	●		●			
	Trail/Roadway Transitions				●		

Figure 2.7: Themes and Case Study Areas

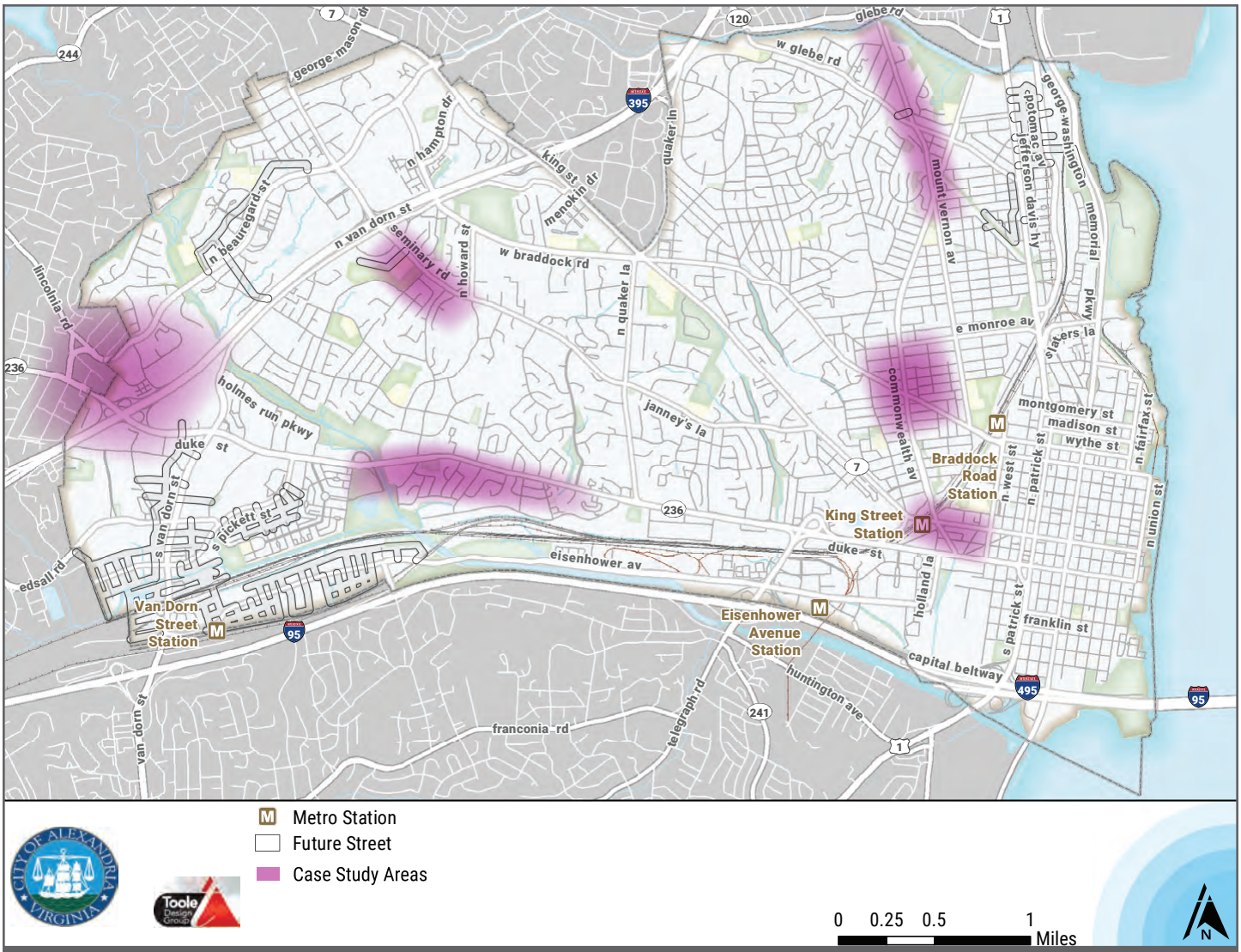

Figure 2.8: Map of Case Study Areas

The project team conducted field work in each of the Case Study Areas, collected data about existing conditions, observed pedestrian and bicycle behaviors, and developed recommendations for facility improvements. While the focus was on pedestrian infrastructure, some localized bicycle issues and recommended improvements were also noted. A summary of the recommendations for one of the Case Study Areas (Seminary Road/Hammond Middle School) is presented on the following pages.

Complete details on all six areas can be found in Appendix D.

Hammond Middle School entrance

Example Case Study: Seminary Road / Hammond Middle School

This Case Study Area is located in western Alexandria along Seminary Road near I-395 and the Inova Alexandria Hospital. Centered around Francis Hammond Middle School, this area was selected as a case study to represent the theme of *schools and neighborhoods*. It also has characteristics related to other themes evaluated through the case studies including *major barriers/freeway interchanges* and *transit access and integration*.

Seminary Road serves as a major, cross-city transportation corridor that connects from Quaker Lane to I-395 and Bailey's Crossroads in Fairfax. There are heavily used WMATA and DASH bus routes along Seminary Road that serve the school, hospital and other residential and commercial development. There is a significant amount of pedestrian activity in the area, with many people crossing Seminary Road at both signalized and unsignalized locations.

As was true in all of the Case Study Areas, missing or substandard curb ramps was a prevalent issue. Additionally, there are several gaps in the sidewalk network and many areas where the sidewalks are four feet wide, which is less than the City's minimum standard of five feet for new sidewalks. Similarly, sidewalk buffers between four and six feet exist on some segments of Seminary Road and nearby local streets, but in some instances buffers are too narrow given the speed and volume of traffic. Other issues in this corridor include missing or inadequate crosswalks, poor bus stop access and inaccessible or broken pedestrian signals.

Student crossing mid-block on Seminary Road at Kenmore Avenue near I-395 entrance

Figure 2.9 shows the recommendations that were made for the Seminary Road/Hammond Middle School area. One goal of this exercise is to improve pedestrian access to Francis Hammond Middle School. The team recommended several improved curb ramps and crosswalks in front of the school, as well as additional highly-visibility school zone signage. There may also be a need for improved management of school drop off/pick up zones, to minimize vehicle backups onto Seminary Road.

Another location in this study area where the team made numerous recommendations was at the intersection of Seminary Road and Kenmore Avenue. The team observed many pedestrians crossing Seminary Road at an unsignalized, mid-block location in order to access the bus stop and shopping centers to the north of Seminary Road, on Kenmore Avenue and Library Lane. This condition likely results from the concentration of higher density housing to the south of Seminary Road, the commercial development and bus stops to the north, and the long distances between marked crossings in this area. To help with the issue of people crossing mid-block across Seminary Road at Kenmore Avenue, a near-term recommendation is to consider relocating the bus stop on the north side of the street closer to the signalized intersection of Seminary Road and Library Lane. Longer term, the City could evaluate the potential for a new traffic signal or pedestrian activated signal at Seminary Road and Kenmore Avenue; however, the close proximity to the adjacent signal at Library Lane may make this infeasible.

Use the following links to read the other five Case Study summaries, which are presented in Appendix D:

- I-395 and Landmark Mall
- Duke Street Corridor
- Mount Vernon Avenue/Four Mile Run Trail
- King Street Station
- Commonwealth and Braddock

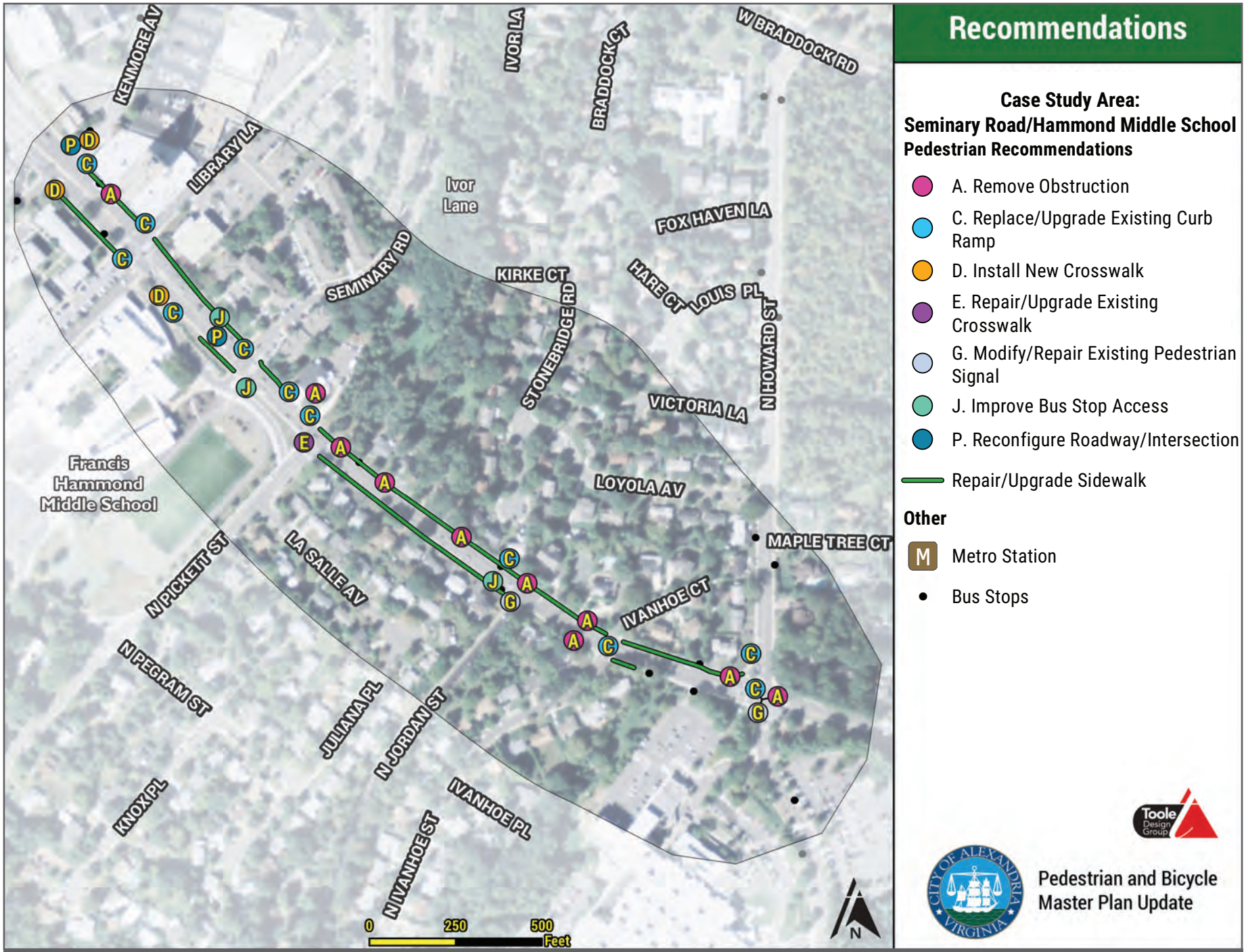

Figure 2.9 : Map of Recommendations for Seminary Road / Hammond Middle School Area

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Pedestrian Strategies

The existing conditions analysis, case studies, and public/stakeholder input were used to develop a series of strategies that will guide the implementation of the Pedestrian and Bicycle Chapter. Strategies apply citywide and aim to accomplish the vision, goals and objectives developed at the beginning of the planning process. Strategies are organized under two categories:

1. **Engineering strategies** relate to the sidewalks and other physical characteristics of the built environment in Alexandria.
2. **Program and policy strategies** include changes to City plans or procedures, as well as education, encouragement and enforcement efforts.

Many of the strategies are self-explanatory from their title, however a short description is provided for some of the strategies where more explanation or background information is needed. Throughout this section, the icons below indicate which of the Plan goals are addressed by each strategy.

Example of an Existing Complete Street in Alexandria (Stevenson Ave)

Pedestrian Goals	
SAFETY (SA)	ENGINEERING (EG)
ENCOURAGEMENT (EC)	EDUCATION (ED)

Pedestrian Engineering Strategies

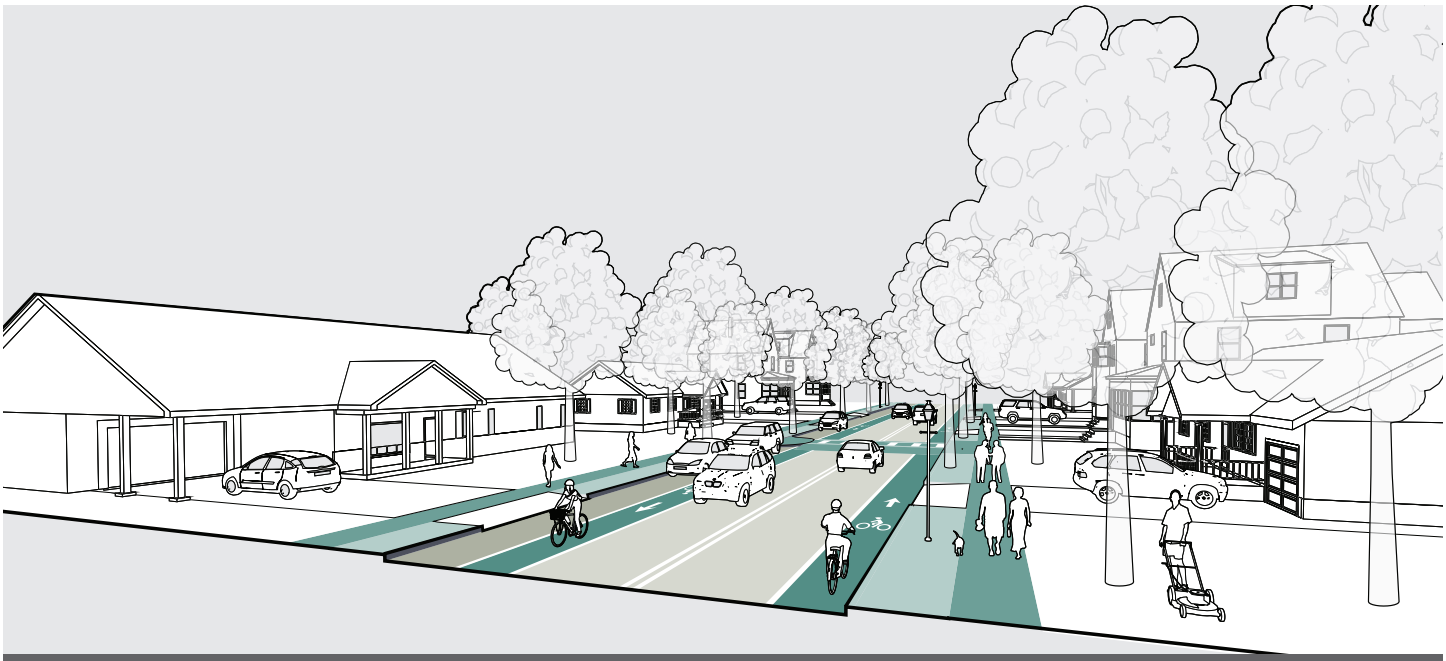
STRATEGY #1 EG

Apply the Complete Streets Design Guidelines on all street projects in the City.

a. Regularly utilize the Guidelines for direction regarding sidewalk width and materials, sidewalk buffers, street trees and other green features, wayfinding, street furnishings, methods for activating the pedestrian experience and other topics related to the pedestrian environment.

b. Integrate the Guidelines into City policies and the development review process as required by 2011 Complete Streets policy.

Pedestrian Engineering Strategies



Example Graphic from the Alexandria Complete Streets Design Guidelines

STRATEGY #2 SA EG

Close sidewalk network gaps and improve sidewalks where needed.

a. Implement the prioritized new sidewalk recommendations (see Figure 4.4), and increase the annual capital budget for new sidewalks to allow for construction of these sidewalks. Continue to address narrow sidewalks through redevelopment.

b. Use the Complete Street Design Guidelines or other applicable, adopted City plans to determine sidewalk width and design for all new and reconstructed sidewalks.

c. Ensure a clear pedestrian zone on sidewalks by inspecting and enforcing right-of-way encroachment.

d. Promote the use of Call.Click.Connect for reporting maintenance issues on City property (e.g. vegetation management, sidewalk upheavals, etc.).

e. Develop a citizen petition process for new, citizen-requested sidewalks on neighborhood residential streets.

Figure 2.10 documents the areas in the City where new sidewalks on one or both sides of the street are recommended. Many of these new sidewalk projects were recommended in the 2008 Mobility Plan but have not been completed due to cost, right-of-way limitations or other design complexities. Since implementing these projects will likely require dedicated City resources, the project team used a data-driven process to prioritize sidewalk projects for implementation. This process and the results are presented in Section 4: Implementation.

Call.Click.Connect is the City's online customer service system which allows users to submit service requests related to sidewalk repairs and cleaning needs, snow and ice removal, potholes, signage problems and a range of other issues (including many topics not related to transportation). Access Call.Click.Connect at **http://request.alexandriava.gov/CCC** or 703.746.HELP.

Pedestrian Engineering Strategies

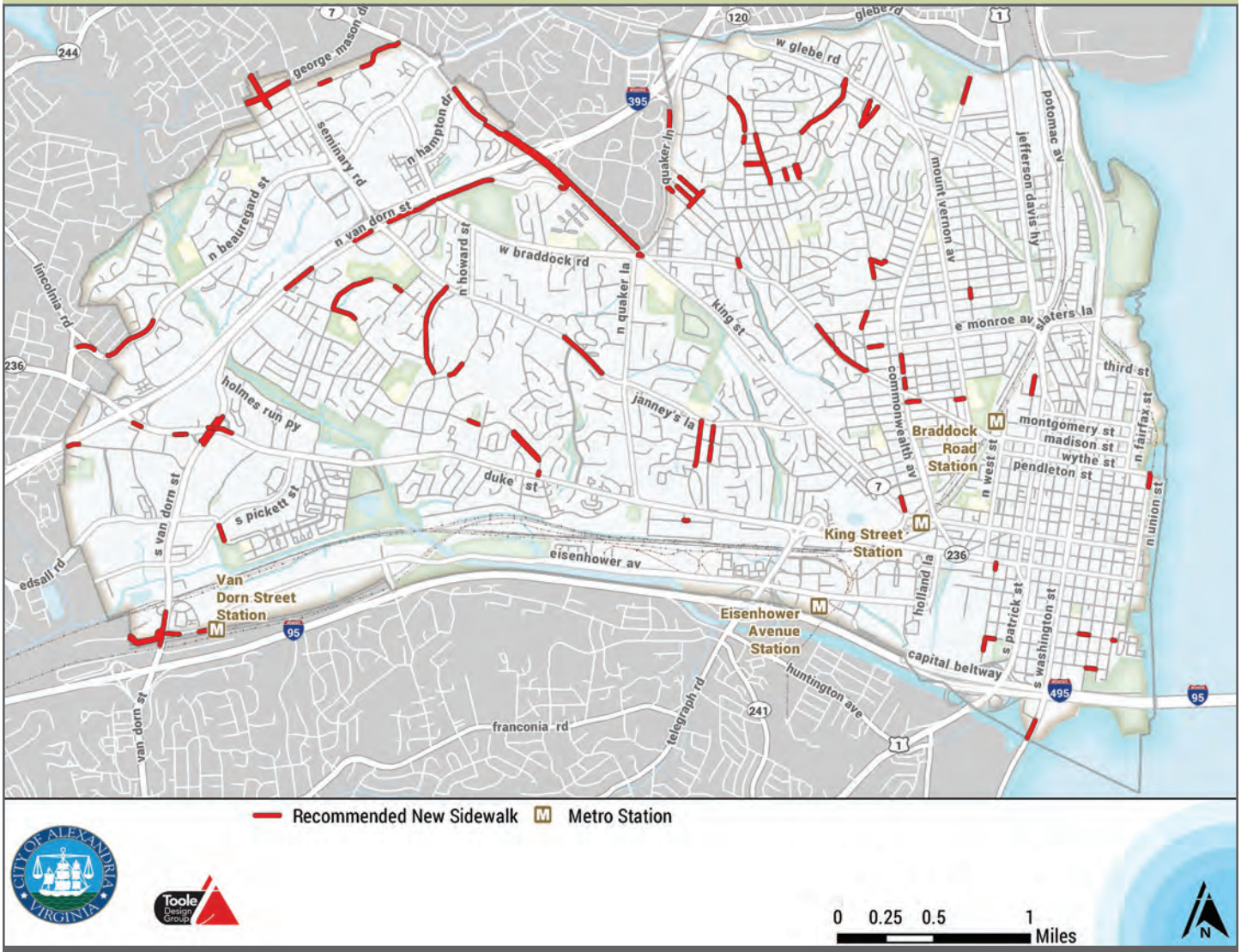


Figure 2.10 Citywide Map of All Recommended New Sidewalk Projects

STRATEGY #3 EG

Prioritize and standardize curb ramp upgrades and other Americans with Disabilities Act (ADA) improvements.

a. Provide ADA accessible curb ramps at every intersection and ensure that curb ramps align with crosswalks where feasible, in conjunction with reconstruction of streets, or development opportunities. See the Complete Streets Design Guidelines for more information on curb ramps.

b. Provide pedestrian pushbuttons at all actuated signals (signals that do not automatically provide a pedestrian phase). Pedestrian pushbuttons should be easily activated and conveniently located near each end of the crosswalk. Install accessible pedestrian signals (i.e. audible tones, speech messages, detectable arrow indications and/or vibrating surfaces) at all new signals, as is the recommended Federal standard used by the City (see Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way).

c. Develop a phased approach for assessing ADA needs throughout the City, starting with areas near schools and transit stops and stations. Request dedicated and sufficient funding to implement the ADA upgrades identified through these studies.

d. Maintain a continuous, level and clearly delineated pedestrian path across driveways-prioritizing new sidewalks and areas of higher levels of pedestrian activity. Limit or consolidate the number and width of driveways where possible. See the Complete Streets Design Guidelines for more information on driveway design.

ADA compliant paths and curb ramps make it possible for users of assisted mobility devices to safely use the transportation network. For example, curb ramps in Alexandria have been installed with different designs and materials over time, and have various issues from steep grades to lack of alignment with crosswalks. Addressing all accessibility issues is a monumental task, and improvements will be phased. The City recently finalized an ADA analysis of transit stops in Old Town and Del Ray[8] that can serve as the first step in the phased approach to addressing ADA retrofits at transit stops.

> Improving bike and pedestrian ways is very important to persons with disabilities that limit mobility. Safe bike routes help persons with disabilities who wish to bike and, when fewer cyclists ride on the sidewalks, persons with disabilities feel safer walking.
>
> — Mollie Danforth, *Commission on Persons with Disabilities*

8 City of Alexandria, Pedestrian and ADA Improvements to Transit Stops Study, June 2015 (https://www.alexandriava.gov/localmotion/info/default.aspx?id=78360)

STRATEGY #4 SA EG

Improve safety and access through and across major barriers including freeways, waterways and rail corridors.

a. In high-speed areas such as those near freeway interchanges, use enhanced design elements to improve:

   I. Safety: Provide high-visibility crosswalks, pedestrian-activated signals and ample crossing time for pedestrians at intersections. Crossing islands should be considered where the crossing distance is greater than 50'. Design features to slow vehicles should also be used, including narrower travel lanes and speed feedback signs. Preferred crossing locations should be highly apparent to pedestrians so that they are encouraged to use the safest locations.

   II. Comfort: Wider sidewalks and buffers should be used.

   III. Pedestrian Visibility: Areas with poor visibility for pedestrians should be evaluated for possible street reconfiguration including narrowing turning radii, installing bulb outs, leading pedestrian intervals, reorienting intersection geometry, strategic parking removal or other design changes.

   Partner with VDOT as needed for improvements in these areas. See Complete Streets Design Guidelines for more information about these strategies.

b. Identify locations that need enhanced pedestrian connections over rail tracks, freeways, waterways and other barriers to connect key destinations/attractors (i.e. near existing and future Metrorail stations, mixed-use development sites or commercial districts). Encourage at-grade crossings whenever possible to support pedestrian activity at the street level. Partner with CSX, WMATA or others to ensure that connections are created. Ensure adequate lighting and ADA access on bridges and tunnels.

c. Provide wayfinding to guide pedestrians to crossings of major barriers.

Pedestrian Engineering Strategies

STRATEGY #5 SA EG

Improve crossing conditions, especially in areas with high pedestrian demand or documented safety concerns, and in all new development and future capital improvement projects.

a. Evaluate current signal timing practices and revise, as needed, to improve safety and minimize pedestrian crossing delay while minimizing the impact on vehicle throughput. Apply Leading Pedestrian Intervals and eliminate Right Turns on Red when appropriate to improve pedestrian comfort and safety. Provide automatic pedestrian signals where feasible in order to minimize pedestrian delay.

b. Prioritize select angled intersections with high crash rates and long crossing distances to reduce pedestrian exposure and increase visibility for and of pedestrians.

c. Prioritize the installation of new/improved pedestrian-scale street lights in areas near schools, transit stops/stations, parks, senior centers and commercial districts. See Complete Streets Design Guidelines for more information about street lighting design, use and placement.

d. Discourage slip ramps as part of new roadway or development projects. As opportunities arise through roadway improvements or development, improve or eliminate existing slip ramps.

Slip ramps and slip lanes present a particular safety challenge by creating and additional potential conflict point between pedestrians and automobiles in a situation where drivers are, by virtue of wide curb radii, able to turn at higher speeds.

STRATEGY #6 SA EG

Prioritize ongoing maintenance and repair of the pedestrian network.

a. Develop internal and external practices to improve snow and trash removal on streets and trails, prioritizing popular commuter trails. Work with the National Park Service to formalize a partnership related to maintenance and snow removal on the Mount Vernon Trail.

b. Promote Call-Click-Connect as a means for residents to report maintenance and safety concerns. Address reported issues as part of routine staff activities, prioritizing areas near schools, transit stops/stations, parks and senior centers.

STRATEGY #7 ED SA EG

Improve access and safety for all users on trails; particularly at entrance/exit points.

a. Remove unnecessary bollards, signs or obstructions that create choke-points at trailheads.

b. Widen trail access points and segments that experience higher volumes of pedestrian and bicycle traffic. Use pavement markings in these areas to delineate separate spaces for each user group.

c. Use signage, pavement markings and surface treatments to create simple and obvious paths of travel for people trails.

d. Provide wayfinding at access points and key interior trail junctions/intersections to aid navigation.

Pedestrian Engineering Strategies

STRATEGY #8 ED EG

Reduce conflicts between bikes, pedestrians and other users on sidewalks.

a. In areas with significant pedestrian traffic, provide dedicated, on-street bicycle facilities on roadways (or on parallel roadways when needed).

b. Explore revisions to the City code to better define and address conflicts between pedestrians, bicyclists, drivers and other users, such as skateboarders.

Union Street is an example of a location where heavy pedestrian and bicycle traffic create frequent conflicts between modes. While increased enforcement and education related to appropriate behavior can help address this issue, it is also important to provide each user group with dedicated facilities that provide a convenient and direct route. Strategy #8 also addresses the need for added clarity in the city code regarding skateboarding, inline skating, people using push-scooters and other forms of non-motorized transportation.

STRATEGY #9 EC EG

Improve walkability, connectivity and ADA access to transit.

a. Prioritize pedestrian improvements such as new/widened sidewalks, curb ramp upgrades and high visibility crosswalks near transit stops/stations.

b. Encourage transit providers to locate transit stops close to signalized intersections. See Complete Streets Design Guidelines for more information about bus stop design, bus shelters and related features.

c. Increase the number of ADA compliant bus stops in the City.

STRATEGY #10 ED SA

Improve walkability, connectivity and ADA access near schools and parks.

a. Prioritize pedestrian improvements such as new/widened sidewalks, curb ramp upgrades, sidewalk buffers and high-visibility crosswalks near these key destinations. Also employ traffic calming measures, based on assessments of need, in these areas.

b. Partner with ACPS and APD to conduct school zone audits. Dedicate adequate staffing and funding to complete school audits and implement identified improvements.

c. Partner with the Department of Recreation, Parks and Cultural Activities (RPCA) to evaluate access to parks.

Child pedestrian travel in Alexandria is often heaviest near school sites and parks, and Strategy #10 recommends prioritizing these areas for walkability, connectivity and accessibility improvements. Traffic calming in areas with identified need can help drivers avoid conflicts with pedestrians by increasing reaction time, and slower speeds can mitigate the impact of crashes when they do occur. Partnership with ACPS, APD and RPCA will be essential to the success of this strategy.

Pedestrian Program and Policy Strategies

STRATEGY #1 SA

Conduct an evaluation of traffic fatalities and develop a Vision Zero program that outlines the framework, budget and staffing needed to work towards eliminating pedestrian and bicycle related deaths and serious injuries in Alexandria.

Vision Zero is an international program based in the idea that all traffic fatalities are preventable. Vision Zero combines engineering, education, enforcement and other strategies to address traffic safety issues, with the express goal of eliminating traffic-related fatalities and serious injuries. In Alexandria, a Vision Zero program will include many of the City's existing programs and investments, as well as some new efforts specifically targeting high-crash locations or documented safety issues. Dedicated staff time and funding for Vision Zero program and project implementation will be essential to the success of this strategy.

STRATEGY #2 ED

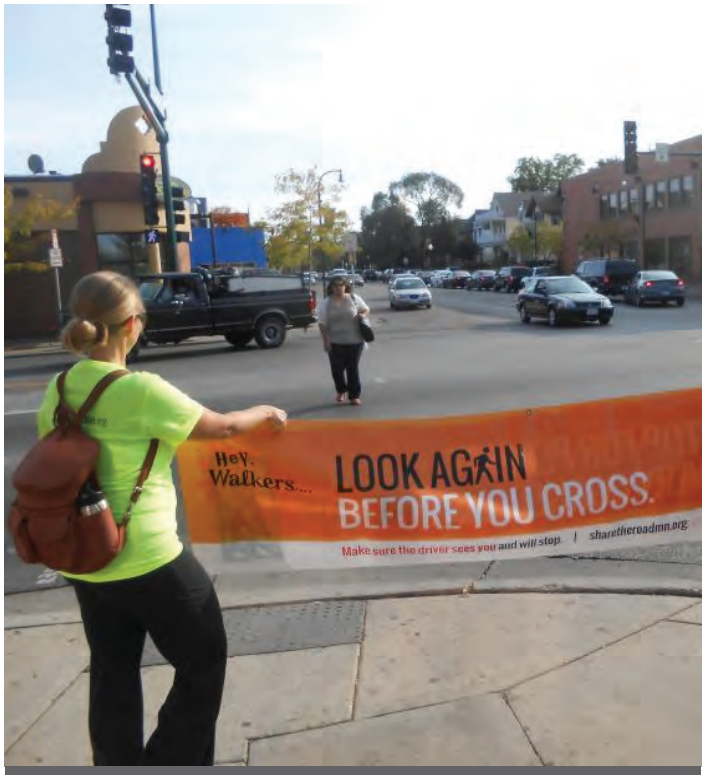
Pursue funding to oversee education and outreach for pedestrian/multimodal transportation safety initiatives citywide.

It takes more than good infrastructure to create a walkable city; you must also support walking through education and outreach programs and campaigns that give people the motivation and knowledge needed to encourage increased walking and safe behavior. There is also a need for similar education focused on drivers, to ensure that they are aware of safe practices and laws related to driving around pedestrians.

VISION ZERO was launched in Sweden in 1997 and has gained great momentum both internationally and throughout the U.S. The goal for Vision Zero is to reduce the number of traffic fatalities by making safety a top priority for every user of the transportation system. The ultimate goal is zero traffic fatalities.

Vision Zero initiatives in the United States are using a broad range of strategies to prevent and reduce traffic fatalities. Some efforts include targeted data collection, detailed safety studies of crash hot spots, community education campaigns, or safety-focused roadway design guidance. Some examples from the U.S. include:

- **San Mateo, CA** has embraced a Vision Zero policy through its Sustainable Streets Plan. This Plan calls for a review of the locations and causes of traffic collisions every year, and the implementation of design changes that aim to improve walking and bicycling conditions at intersections with the highest collision rates.
- In **New York City**, some of the actions taken to date related to Vision Zero include: the reduction of the citywide speed limit to 25 mph, the creation of a permanent Vision Zero Task Force, and the development of Borough focused pedestrian safety action plans.
- In **Santa Barbara, CA**, two nonprofit groups have partnered to develop a Vision Zero Plan and work with the city to adopt a policy targeting zero traffic fatalities. The Plan will include not only engineering and education strategies; it will have a strong focus on traffic laws and enforcement.



Pedestrian Safety Education Campaign (Minneapolis, MN)

STRATEGY #3 SA EG

Regularly conduct construction inspections to ensure safe, convenient and accessible pedestrian accommodations are provided during all phases of construction.

Good pedestrian infrastructure networks must be connected, and pedestrians must be able to expect infrastructure and routes to be consistently available to them. The existing City policy requiring safe, convenient and accessible accommodation during construction must be enforced and inspected to effectively retain pedestrian routes. Where construction projects have unavoidable impacts that result in the closure of sidewalks, the first choice should be to provide alternate accommodation on the same side of the street.

STRATEGY #4 ED EC SA EG

Develop an annual report card with information on the performance measures identified in this Plan (see Section 4: Implementation), as well as those identified by the Office of Performance Accountability related to bicycling and walking.

a. Make the report card available on the City website and promote through listserves, social media and local organizations.

STRATEGY #5 EC

Explore a pilot Open Streets Event to encourage active transportation and lifestyles.

a. Use the event to increase education about Complete Streets, health benefits, transportation options and programs in Alexandria, and innovative facility types.

Open Streets events are community gatherings where a portion of a street, or an entire street, are temporarily closed to automobile traffic and made available for walking, bicycling and other health related activities. These events can be used to demonstrate a new street design, for example by using chalk paint and other temporary means to create a buffered bike lane, or may be used more generally to raise awareness and community support for active, healthy transportation options.

Photo of Open Streets Event (Howard County, MD)

Pedestrian Program and Policy Strategies

STRATEGY #6 EC

Evaluate the use of the employee alternative transportation benefits program, and expand promotion efforts related to the program.

Alexandria currently provides a stipend to City employees who take transit, walk or bike to work at least four times per week. Alexandria is a major employer and a role model for others in the City. The employee alternative transportation benefits program should be evaluated for usage and efficacy, and then refined and promoted as needed.

STRATEGY #7 EG

Pursue funding for high priority pedestrian projects (see Section 4: Implementation).

Example of high priority project (Union Street)

STRATEGY #8 ED EC

Partner with the Alexandria Health Department and Department of Community and Human Services, as well as non-profits such as Partnership for a Healthier Alexandria, to identify funding and prioritize programs related to active transportation and lifestyles.

STRATEGY #9 ED

Continue to provide training for appropriate City staff on national ADA design standards, Complete Streets and other best practices.

Pedestrian design and planning are quickly evolving fields. As the best thinking in these fields advances, key staff should strive to remain current with information and create or access trainings for additional staff who work on implementation or policy change.

STRATEGY #10 ED EC SA

Partner with Local Motion and the Alexandria Police Department to build upon regional safety campaigns and other similar efforts that promote pedestrian, bicycle and driver safety, rights and responsibilities, as well as the benefits of active transportation.

Large apartment building in Alexandria.

STRATEGY #11 EG

Continue to improve pedestrian access within and through large properties such as shopping centers and multifamily housing complexes through partnerships with developers/ landowners, small area plans and the development review process.

Large private properties can serve as barriers to pedestrian travel if they are not designed to accommodate all modes. The pedestrian environment on these properties, especially in parking lots, can also pose safety challenges through unpredictable conflict points between pedestrians and automobiles. City staff will continue to review development applications and site plans to ensure adequate access is provided in new development, and will take advantage of opportunities to work with owners to improve access on existing sites. Access easements are a proven way to implement this strategy.

STRATEGY #12 ED EC SA EG

Strive for Gold designation in the Walk Friendly Community program of the Pedestrian and Bicycle Information Center through implementation of the pedestrian projects and strategies presented in this Plan.

This strategy refers to a national program administered by the Pedestrian and Bicycle Information Center. Alexandria currently holds a Silver Walk Friendly Community designation, which reflects the City's "dedicated pedestrian staff time, excellent Safe Routes to School program, and pedestrian development and encouragement strategies."[9] Earning a Gold-level designation would place the City on par with Washington, DC and Arlington for the most walk-friendly community in the region. To achieve Gold status, Alexandria will need to continue to expand its pedestrian programs and infrastructure.

9 More information available at www.walkfriendly.org.

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SECTION 3

Bicycling in Alexandria

BICYCLING IN ALEXANDRIA

If you visit any of the City's trails on a sunny Saturday afternoon, or look at the bike racks at the Braddock Road Metrorail stations on a typical week day, it is clear: Alexandria has a strong culture of bicycling. Over the past several years, the City has made significant strides to support bicycling as a viable, affordable and healthy transportation option. Alexandria is also a major regional center for bicycle tourism and recreational bicycling. Since 2008, the City has launched Capital Bikeshare, built over 22 miles of bicycle lanes and shared-lane markings, approximately 6 miles of shared-use paths, and installed over 200 bicycle parking spaces throughout many of its streets. Alexandria has also piloted a number of new bicycle facility types in recent years, including the region's first advisory bike lane on Potomac Greens Drive and a colored bike lane on King Street.

Despite this progress, growth in bicycle commuting remains relatively low compared to leading bicycle cities in the U.S.: around one percent of all commute trips for Alexandria residents are made by bike.[9] Although work trips comprise only a small percentage of all travel,[10] the opportunity exists to support increased bicycling in the City. This section, the Bicycle element of the Transportation Master Plan, aims to leverage past investments and help Alexandria become a world class place to ride a bike.

Vision, Goals and Objectives

City staff collaborated with the Advisory Committee to create a vision and corresponding goals and objectives relating to bicycling (see Figure 3.1). These were used to guide the planning process and to develop the strategies presented later in this section. In the strategies section, the goals addressed by each strategy are noted using the icons shown in the table on the following page.

Vision for Bicycling in Alexandria

Bicycling is a convenient, safe, and desirable choice for transportation and recreation trips in Alexandria. The City provides a network of facilities that link important destinations and appeal to bicycle riders of different ages and abilities, including children, older adults, and persons with disabilities, as well as programs and policies that encourage increased bicycling as a safe and active form of transportation and recreation. Bicycle facilities, programs and policies foster social equity, ensuring that investments benefit people of all backgrounds and income levels, as well as geographic equity, ensuring that people throughout the City have access to safe and low-stress places to bike.

> I want to ride my bike to the market in Alexandria, but riding next to cars makes me feel uncomfortable.
>
> — Sophie Henry, *10 years old*

9 2008-2012 American Community Survey 5-Year Estimates. S0801 Commuting characteristics by Sex. U.S. Census Bureau.

10 American Associate of State Highway and Transportation Officials, National Report on Commuting Patterns, May 2013.

Goals	Objectives
SA SAFETY The City will create a safe, well-maintained bicycling environment that encourages bicycling as an enjoyable and convenient mode of travel and recreation for riders of all ages and abilities.	1.1 Reduce conflicts between bicyclists, vehicles, and pedestrians by implementing a range of bicycle facility treatments appropriate to a street and its surrounding context.
	1.2 Improve the safety of bicyclists and drivers through effective law enforcement implemented in coordination with other bicycle-focused programs, policies and facility improvements.
	1.3 Eliminate bicycle fatalities and injuries citywide.
EG ENGINEERING The City will develop a connected bicycle network that includes both on-street and off-street facilities, as well as support facilities such as bicycle parking, that provide safe, enjoyable and comfortable accommodations for riders of all ages and abilities	2.1 Increase the total miles of on-street bicycle facilities to create a citywide network that enables safe bicycle travel in and between all City neighborhoods and from Alexandria to key destinations and bicycle facilities in neighboring jurisdictions.
	2.2 Develop a citywide network of low-stress bicycle routes that are appealing to lower skilled riders, made up of protected and buffered bicycle lanes, sidepaths, trails and neighborhood bikeways that connect important destinations and promotes bicycling as a safe and convenient mode of travel.
	2.3 Integrate the off-street trail system with the on-street bicycle network by providing wayfinding and well-designed transitions at trail access points, ensuring smooth transitions for bicyclists and minimizing conflicts between users of all travel modes.
EC ENCOURAGEMENT The City will promote bicycling as a means of improving transportation circulation, transit access, public health, environmental quality and recreation, with the ultimate goal of increasing bicycling trips as a percent of all travel in Alexandria.	3.1 Encourage and provide incentives for active lifestyles that include bicycling for transportation or pleasure.
	3.2 Partner with other local and regional organizations to support existing and new programs that promote bicycling and active lifestyles.
	3.3 The City will advance to a gold level bicycle-friendly community (http://bikeleague.org/community).
ED EDUCATION The City will educate users of all transportation modes about bicycle safety, rights and responsibilities.	4.1 Initiate targeted outreach that aims to increase adult cyclists' and motorists' knowledge of safe bicycling and driving behaviors and safety.
	4.2 Partner with public and private schools to support bicycle safety education and programs that support increased bicycling among the City's youth.
	4.3 Educate public and private sector professionals who work on transportation, land use and development issues in Alexandria about Complete Streets principles and design.

Figure 3.1: Bicycle Goals and Objectives

Existing Conditions

Similar to the analysis of existing conditions for walking, the study team conducted a thorough analysis of the current infrastructure and programs that relate to bicycling. This baseline review provided a framework for the rest of the planning process for this Chapter.

Between 2000 and 2012, Alexandria experienced an 87 percent increase in people who biked to work. The rate of bicycle commuting in Alexandria is consistent with the average for the DC region (also one percent) and is higher than the statewide average in Virginia (0.4 percent).

To gain a general sense of volumes of cycling at a few high-traffic locations throughout the City, the team looked at data collected by volunteers with the Bicycle and Pedestrian Advisory Committee (BPAC). BPAC counts are taken two times a year at various locations throughout the City where bicycle activity is expected.[11] The top five count locations in 2013, shown in Figure 3.2 below, provide an understanding of relative bicycling levels on some of the City's busiest bicycling corridors. As mentioned previously, data collection began in 2015 through the installation of automated bicycle and pedestrian counters.

Automated pedestrian/bike counter installed in 2015 in Alexandria

Count Location	Total bicyclist counted
Mount Vernon Trail, South of Marina Road	2,537
Mount Vernon Trail, South of the Woodrow Wilson Bridge Trail	1,178
Commonwealth and Mount Vernon Avenue	517
Mount Vernon Avenue South of Four Mile Run	371
West Side of Woodrow Wilson Bridge Trail	360

Figure 3.2: Top 5 Bicycle Count locations, 2013 (last full year of data available, see footnote 11 for count details)

11 It is important to note that the data is not available for all locations and all years. Because there was some variation in the count locations from year to year, a longitudinal data comparison is difficult to provide. Figure 3.2 shows the total number of bicyclists counted in 2013. That year, counts were completed in January, May, July and September. Counts were completed two times per week: 5:00 to 7:00pm on Thursday and 12:00 to 2:00pm on Saturdays. Data can be used to understand relative levels of bicycling in count locations.

Safety

Regarding bicycle safety, statistics from the Alexandria Police Department show that the City has averaged 19 collisions involving bicyclists per year over the past ten years (2004- 2014). Figure 3.3[12] shows locations with higher concentrations of crashes, which included King Street north of I-395, the areas around both the King and Braddock Road Metrorail stations, Old Town and areas around Mt. Vernon Avenue and Commonwealth Avenue in Arlandria. There was one reported bicycle fatality in this timeframe.

Police data reflects reported collisions, which typically involve a car. It is important to also consider other safety issues. Examples of common safety concerns raised during the planning process included crossing conditions at large intersections with fast-moving traffic, conflicts between users on high-traffic trails (like the Mount Vernon Trail), bicycling conditions on roads with heavy traffic and without dedicated bicycle facilities, bicyclists not stopping at stop signs, and the need to address conflicts between pedestrians and bicyclists on sidewalks (particularly in Old Town), among others.

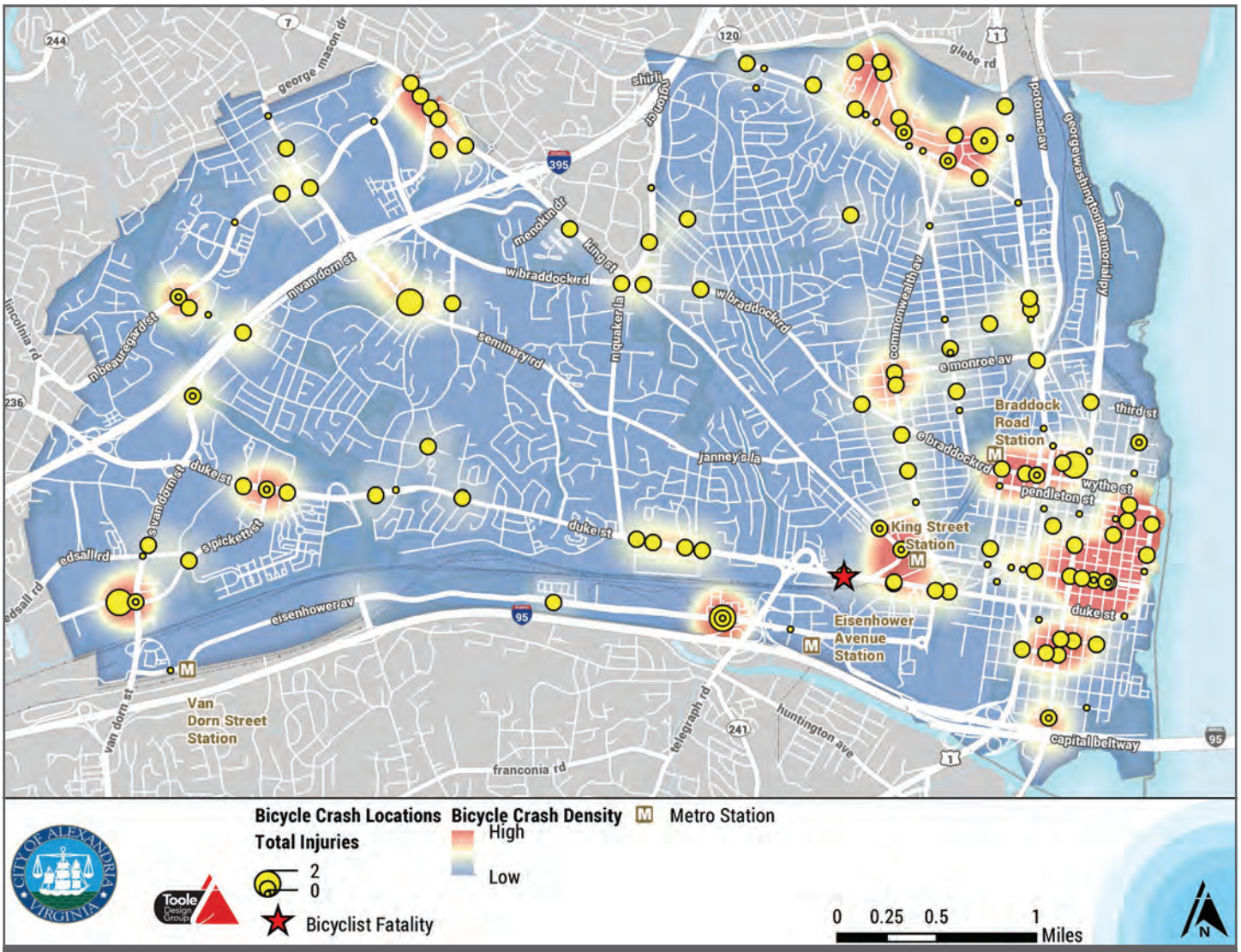

Figure 3.3: Reported Bicycle Crashes (January 2005 – December 2014)

12 Alexandria Police accident reports for the years of 2005 to 2014 were used for this analysis. It is important to note that while this data includes information on reported bicycle related incidents for the ten year period, the true number of incidents may be different as many bicycle crashes tend to not be reported to police and therefore are not reflected in the data.

Infrastructure

The existing bicycle network in the City of Alexandria consists of on-street facilities (e.g., bike lanes, shared lane markings, and signed routes), and off-street sidepaths and trails. Figure 3.4 shows the total mileage in the bicycle network as of 2015.[13] It is notable that Alexandria installed Virginia's first Advisory Bike Lane on Potomac Greens Drive.

Other elements of the existing bike network include bike boxes (e.g., Commonwealth Avenue and Mount Vernon Avenue) and the first-in-Virginia bicycle signal at the intersection of the Mount Vernon Trail, South Washington Street and South Alfred Street. Also, since 2008, Alexandria has provided over 200 new bicycle parking spaces on City streets and has adopted bicycle parking standards for all new development, which have resulted in over 500 new bicycle parking spaces. There are bike parking corrals in five locations, many of which are often full. That said, there are still locations where the quantity of bike parking does not meet the demand.

Programs and Outreach Efforts

Alexandria offers a number of bicycle-related programs and outreach through its Local Motion program. The Local Motion website provides bike maps and other information, and promotes events such as Bike to Work Day, Car Free Day and an annual Commuter Challenge. Other programs offered in the City include an annual Lights for Bikes event, where staff and volunteers distribute bicycle lights to bicyclists, and funds regular bicycle education courses offered by the Washington Area Bicyclists Association (WABA).

Safe Routes to School is an important element of City's existing bicycle programs. While overall rates of students cycling to school are still relatively low (approximately 1 percent of students at participating schools), some schools have notable rates of biking and offer programs such as bicycle rodeos and "bike trains" to support active travel to school.

Facility Type	Miles
Bike Lanes	10.35
Shared Lane Markings (Sharrows)	13.31
Paved Trails	21.02
Unpaved Trails	7.99
TOTAL	**52.67**

Figure 3.4: Existing Bicycle Network Facilities (as of 2015)

Local Motion

On-Street Bicycle Parking Corral in Alexandria

Photo of SRTS Bicycle Rodeo at Alexandria School

13 Based on City of Alexandria GIS data of transportation facilities.

Bicycle Strategies

Making bicycling a convenient, safe, and desirable choice for more people in Alexandria will require support from staff in numerous City departments, elected officials and a range of community partners. It will require both targeted infrastructure investments as well as sustained leadership from staff and elected officials. This section provides specific direction on the investments and other efforts that can help elevate Alexandria's status as a leading city for biking. The bicycle-related recommendations of this Chapter were developed with significant input from the Advisory Committee and the public, and are comprised of three elements:

1. **The Future Bicycle Network**
2. **Bike Share Recommendations**
3. **Citywide Bicycle Strategies**

Future Bicycle Network

The proposed bicycle network (Figure 3.5) includes recommendations for on-road and off-road routes that will be important for bicycling in the City. The network builds upon the recommendations of the 2008 Transportation Master Plan and 2008 Mobility Plan, and was developed through extensive field work as well as input from the project team, Advisory Committee, the Bicycle and Pedestrian Advisory Committee (BPAC) and the general public. The proposed network ensures that the entire City is reachable by continuous routes that connect existing bike facilities, adjacent neighborhoods, key destinations, and existing and planned facilities in neighboring jurisdictions. The implementation of this proposed system will be dependent on funding availability and opportunity, and will be accomplished over the long term.

Bicycling along Holmes Run Trail

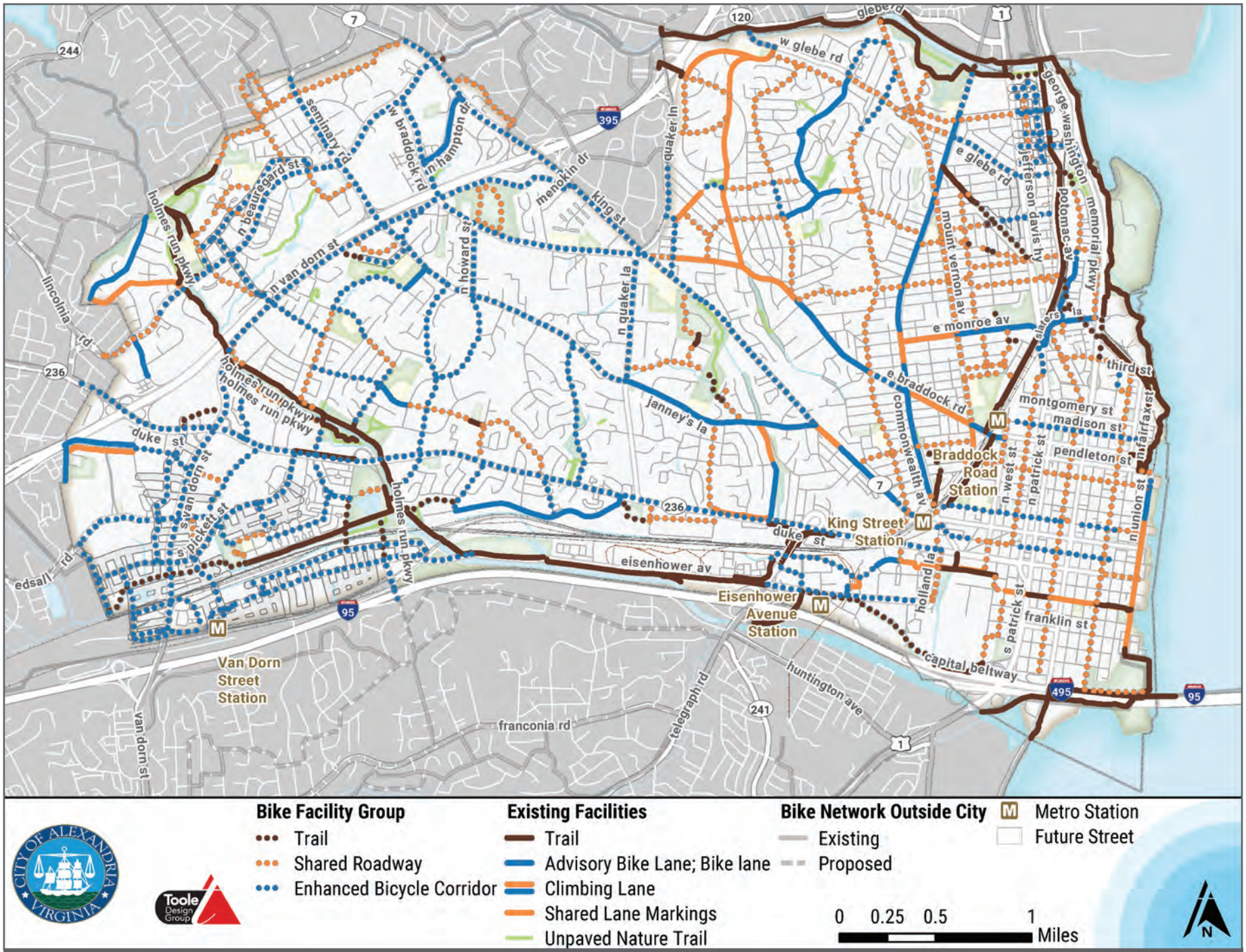

Figure 3.5: Proposed Bicycle Network

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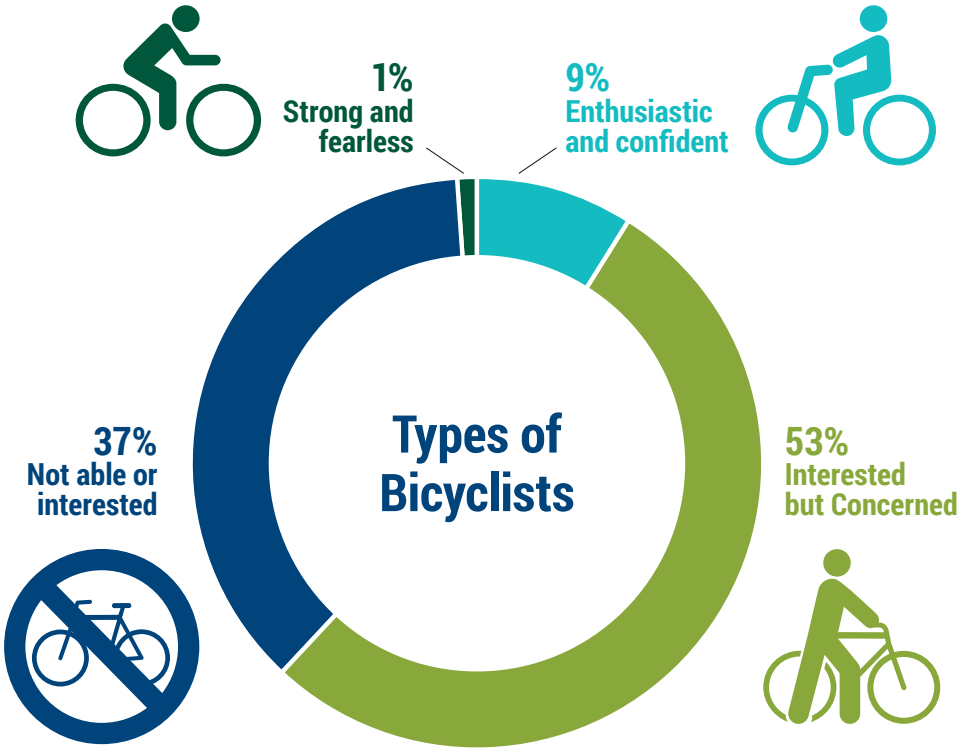
Bicycle Facility Groups

One of the central goals of the bicycle element of this project was to create a system where more cyclists of all abilities would feel comfortable riding in Alexandria, including younger, older and novice bicyclists. This target group, often called "interested but concerned" riders, is estimated to comprise roughly 53 percent of the population (see Figure 3.6). Research shows that "interested but concerned" bicyclists prefer low-stress bicycling environments that are either slow/low-traffic streets or facilities that provide separation from motor vehicles. In some cases, existing local streets and trails are well-suited for all types of bicyclists. However, larger roads that carry heavier volumes of traffic require greater attention to design and separation in order to attract less confident bicyclists. With this in mind, the future bike network will incorporate low-stress facilities like separated bike lanes, buffered bike lanes, and Neighborhood Bikeways whenever possible and appropriate (these facilities are defined on the following pages).



Bicyclists generally fall into one of four categories based on their level of comfort:

Strong and Fearless bicyclists will ride in any road conditions or environment.

Enthusiastic and Confident bicyclists will ride comfortably on most types of streets, but may be uncomfortable in certain situations or road conditions.

Interested but Concerned bicyclists require physical bicycle infrastructure improvements before they will want to ride.

People who identify as **No Way, No How** will not ride a bicycle, no matter the circumstances.

Figure 3.6: Types of Bicyclists[14]

14 Dill, Jennifer and Nathan, McNeil, Four Types of Cyclists? Testing a Typology to Better Understand Bicycling Behavior and Potential, Portland State University, August 10, 2012.

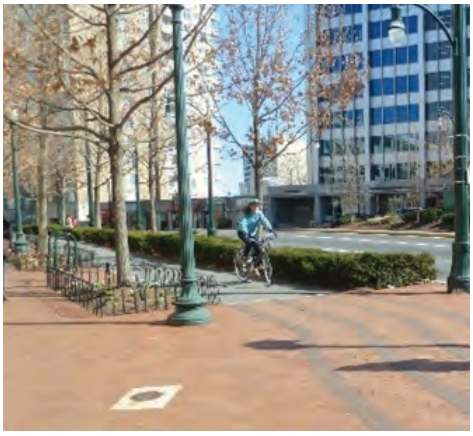
In order to serve a broad array of bicycle riders, Alexandria will use a range of bicycle facility types to implement the proposed bicycle network over time. While specific design decisions for each corridor will be made in the future based on targeted public input and detailed analysis, the map in Figure 3.7 sorts recommendations into three groups: enhanced bicycle corridors, shared roadways, and trails. Each facility type is described below and organized based on each facility's anticipated level of comfort for the user.

1. Enhanced Bicycle Corridors:

Enhanced bicycle corridors are bicycle facilities located within the road right-of-way (either between the curbs or immediately parallel to the road) that provide dedicated space for bicyclists. Enhanced bicycle corridors might be implemented as any of the following facility types:

Protected Bicycle Lanes: Protected bicycle lanes, sometimes referred to as cycle tracks, are exclusive bicycle facilities physically separated from the adjacent motor vehicle lanes by a vertical element (i.e. more than just striping on pavement). Separation can be achieved through a curb, a parking lane, flexposts, plantings, removable curbs, or other measures. This type of facility can improve rider comfort and decreases stress of riding in or directly adjacent to vehicle traffic, and are usable by a broad spectrum of bicyclists including young and more cautious bicyclists. Protected bike lanes may be used on many different street types and are especially beneficial on higher speed, higher volume roadways. Protected bike lanes can be one-directional or two-directional. They may be provided on both sides of two-way streets or on one side of one-way streets.

Buffered Bicycle Lanes: Buffered bicycle lanes are created by painting or using a different surface treatment to create a flush buffer zone between a bicycle lane and the adjacent travel lane. Buffered bicycle lanes are distinct from protected bicycle lanes in that they have no vertical barrier between travel lanes and/or parking. Like protected bicycle lanes, buffered bicycle lanes have been found to dramatically increase bicycling comfort for a wide range of bicyclists.



Sidepaths: Sidepaths run parallel to a roadway and provide shared space for both bicyclists and pedestrians. Ideally, paint or surface treatments identify separate spaces for walkers and bicyclists.

Enhanced Bicycle Corridors *(continued)*

Colored Bicycle Lanes: Colored bicycle lanes are used to increase the visibility of a bike lane facility, particularly in potential areas of conflict, and reinforce bicyclists' space in conflict areas (e.g., at intersections).

Bicycle Lanes: Bicycle lanes provide an exclusive space for bicyclists in the roadway. Bicycle lanes are for one-way travel and are normally provided in both directions on two-way streets. A contra-flow bicycle lane is used on a one-way street to create space for bicyclists to travel in the opposite direction of motor vehicles. A climbing lane can be used on roadways with steep and/or sustained grades where there is not enough space to install standard 5' wide bicycle lanes on both sides of the street. Climbing lanes use a standard bike lane on the uphill side of roadway and shared lane markings in the downhill direction.

Advisory Bicycle Lanes: Where the width of a two-way street is too narrow for a standard bicycle lane or protected bicycle lane, advisory bicycle lanes can be an alternative to the marked shared lane. Advisory bike lanes are appropriate on streets with low traffic volumes. On streets with advisory bike lanes, there is no centerline. Dashed bicycle lanes are provided on either side of a single, central vehicle lane. Motorists drive in the center lane and use bicycle lanes to pass other cars as needed, yielding to any bicyclists that may be in the lane.

2. Shared Roadways:

City ordinances legally allow people bicycling to use all of the City's roadways (the only restrictions are limited access highways such as I-495 and I-395). Subsequently, the majority of road mileage in the City can be considered available for cyclists. The facilities included in this group have been organized based on the level of comfort they may provide for people bicycling and include:

Neighborhood Bikeways: Primarily located in residential areas, Neighborhood Bikeways are designed to encourage slow vehicular traffic and to be comfortable for people walking and bicycling. These streets may feature design elements such as curb extensions and roundabouts, "calming" traffic and giving priority to local vehicle trips over cut-through traffic. As an important part of the citywide bicycle network, Neighborhood Bikeways may also feature bicycle facilities such as shared lane markings or bike route signage.

Priority Shared Lane Markings: On multi-lane streets, marked shared lane symbols, or sharrows, can be enhanced with dashed longitudinal lines and colored pavements. This marked "lane within the lane" can reduce conflicts by encouraging (though not requiring) vehicles to use inside lanes on multi-lane roads and reserve the outside lane for bicyclists. On streets with narrow travel lanes, priority shared lanes direct the bicyclist to the correct and most conspicuous position on the road—the middle of the travel lane.

Signed Route on Shared Roadways: A signed route or bicycle wayfinding system consists of signing and/or pavement markings to guide bicyclists to the different destinations within the City.

Shared Roadways: *(continued)*

Marked Shared Lane (Sharrows): Marked shared lanes are indicated by specific bicycle symbols called shared lane markings or sharrows. Sharrow markings are two chevrons positioned above a bicycle symbol. In general, this is a design solution that can only be used in locations where a standard bike lane or protected bike lane is not feasible due to space constraints. Shared lane markings should be placed in such a manner to direct bicyclists to ride in the most appropriate location on the roadway. They can also be used in multiple lanes to position bicyclists for turning movements.

3. Trails

Trails or shared use paths are off-street separated facilities serving more than one type of user. Trails serve as part of a transportation circulation system and support multiple recreation opportunities, such as walking, bicycling, and inline skating. A trail is physically separated from motor vehicular traffic with an open space or barrier. This Chapter focuses on paved trails that offer greater accessibility and utility as part of the transportation system. Trails located in Resource Protection Areas (RPAs) will be constructed in an environmentally sensitive manner, typically using pervious surface treatments.

> I like the Holmes Run Trail because the trees give you shade and make you feel like you're in nature. Also, it's an easy path to follow.
>
> – Vicki Kenneally, *Alexandria Trail User*

Bikeshare

Capital Bikeshare is the D.C. region's bike share program. The system began its service on September 20, 2010 with 1,100 bikes at 114 stations in the District of Columbia and Arlington County. The regional system is the third largest bike share program in the U.S. with over 355 stations throughout the City of Alexandria, Washington DC, Arlington County and Montgomery County.

Capital Bikeshare in Alexandria

In 2011, the City of Alexandria expanded the regional Capital Bikeshare program by deploying eight stations and 80 bicycles. The system serves as an enhancement to the City's overall bicycle system, offering expanded opportunities for people to bike in Alexandria. In its first two years, the system recorded over 50,000 rides and 90,000 miles ridden by users.[15] Based on the program's success, the City expanded its fleet to include eight more bike share stations (for a total of 16) in 2014. New stations now serve the neighborhoods of Del Ray, Carlyle, Arlandria and the Eisenhower Avenue Metrorail Station.

Capital Bikeshare Station in Old Town Alexandria

Capital Bikeshare in Alexandria by the numbers:
Top Stations by usage: King Street Metro, Braddock Road Metro, Market Square
Rides logged since 2012: 101, 283
Miles logged since 2012: 238, 665
Carbon offset since 2012: 129,000 lbs. of CO2 emissions
Membership growth since 2012*: 165 percent
Ridership growth since 2012*: 587 percent

** 2015 figures only include numbers until October 2015.*

Benefits of Capital Bikeshare

Capital Bikeshare has been a boon to local transportation in the City by helping increase mobility and connectivity for many residents and visitors, and by introducing new riders to bicycling as a form of transportation. The system has also brought a variety of economic, transportation, health, and safety benefits:

Economic Benefits

Capital Bikeshare has allowed members to reduce their transportation costs related to car ownership and maintenance. For example, the latest Capital Bikeshare member survey found that around eight percent of all members surveyed had sold a household vehicle since joining Capital Bikeshare, and 81 percent of these members said bike share was a factor in their decision to sell the vehicle.[16] Furthermore, users reported saving an average of $13.65 per week (around $710.00 per year) on personal transportation costs as a result of their bike share use.

15 Capital Bikeshare Data Dashboard (http://cabidashboard.ddot.dc.gov/cabidashboard/)

16 2014 Capital Bikeshare Member Survey Report. Obtained from http://www.capitalbikeshare.com/assets/pdf/cabi-2014surveyreport.pdf

Capital Bikeshare has also had a positive economic impact on local businesses. A 2013 study of five Capital Bikeshare stations located in the D.C. region found that a large number of bike share users travelling to these stations spent money within a four block area and planned to return to the neighborhood on a regular basis.[17]

Transportation Benefits

Based on feedback received from the latest Capital Bikeshare Member survey, around one quarter of respondents (24 percent) said they had reduced their driving miles since joining Capital Bikeshare. Additionally, 55 percent reported driving a car less often and 59 percent used a taxi less often, suggesting some shifts from each of these modes to biking. Capital Bikeshare has also helped increase the reach of transit. In Alexandria, the bikeshare stations located near Metrorail stations have the highest ridership, with King Street having the highest and Braddock Road having the second highest use.[18]

Health and Environmental Benefits

The health benefits of bicycling are well known in helping to address preventable diseases such as obesity, heart disease, and diabetes,[19] and Capital Bikeshare has contributed to keeping Alexandrians healthy. For example, 60 percent of survey respondents said that getting exercise/fitness was an important motivator to join Capital Bikeshare,[20] and around 32 percent of respondents reported stress reduction after joining Capital Bikeshare.[21] Capital Bikeshare has also had an impact on the environment and the reduction of greenhouse gas emissions. Since 2012, Capital Bikeshare users in the City have helped offset an average of 32,000 lbs. of carbon dioxide emissions per year, by replacing trips taken previously by automobile.[22]

17 Economic Impact & Operational Efficiency for Bikeshare Systems. Anderson, Ryan et al. Accessed from: http://ralphbu.files.wordpress.com/2014/01/virginia-tech-capital-bikeshare-studio-report-2013-final.pdf on July 2015

18 Capital Bikeshare Dashboard. Obtained from http://cabidashboard.ddot.dc.gov/cabidashboard/ in October 2015. Data included September 2012-July 2015.

19 Lindström, J. et al. The Finnish Diabetes Prevention Study: Lifestyle intervention and 3-year results on diet and physical activity. Diabetes Care, December 2002, vol. 26 no. 12 3230-3236. Accessed online at http://care.diabetesjournals.org/content/26/12/3230.full on July 2015.

20 Capital Bikeshare Dashboard.

21 Ricci, Miriam. Bike sharing: A review of evidence on impacts and processes of implementation and operation. Managing the Business of Cycling. Research in Transportation Business & Management

22 Alexandria Capital Bikeshare Dashboard, 2012 – October 2015

Safety Messaging on Capital Bikeshare Bicycle

Safety Benefits

Because improving safety for people walking and bicycling is a major goal for the City, it is important to note that, to date, there have not been any fatalities from collisions involving Capital Bikeshare riders. Further, the system has helped increase awareness about the "rules of the road" through safety messages placed on bicycles, stations, website and other marketing materials. Finally, recent studies have indicated that the rates of injury crashes have been typically lower compared with non-Bikeshare riders.[23]

23 Injury rates for private bicycling obtained from: Beck, L. et al. (2007). Motor Vehicle Crash Injury Rates by Mode of Travel, United States. Published in the American Journal of Epidemiology.

Proposed Expansion

To determine where expansion of the popular Capital Bikeshare system should take place in Alexandria, a demand analysis was performed using data from U.S. Census, Bureau of Labor Statistics, and the City of Alexandria. Data used for the analysis included employment and population density, location of attractions (i.e., tourist destinations, parks, malls/shopping, schools and libraries), transit density by ridership (i.e., metro and bus stops), existing bicycling infrastructure (on-and off-road), topography, percentage of minority populations and percentage of zero-car households. While this was a data driven examination, the final recommendations took into account the City's program goals as defined by City staff, as well as stakeholder and community input received through the project's online crowdsourcing interactive map.

The heat mapping exercise was used to identify areas of the City with the highest potential demand for bike share, which include areas with high concentration of people, jobs, attractions, and transit availability. Figure 3.9 presents generalized station location recommendations for a five-year time horizon. The recommendations call for expanding the system into other areas of the City, especially on the west end, as well as enhancing existing services by providing infill stations in current service areas. Final station sizing, location and placements will require additional public outreach and fieldwork to confirm availability of space and identify right of way, property ownership, and other site considerations. Private developments above a certain size will support the City's Bikeshare system through monetary contributions.

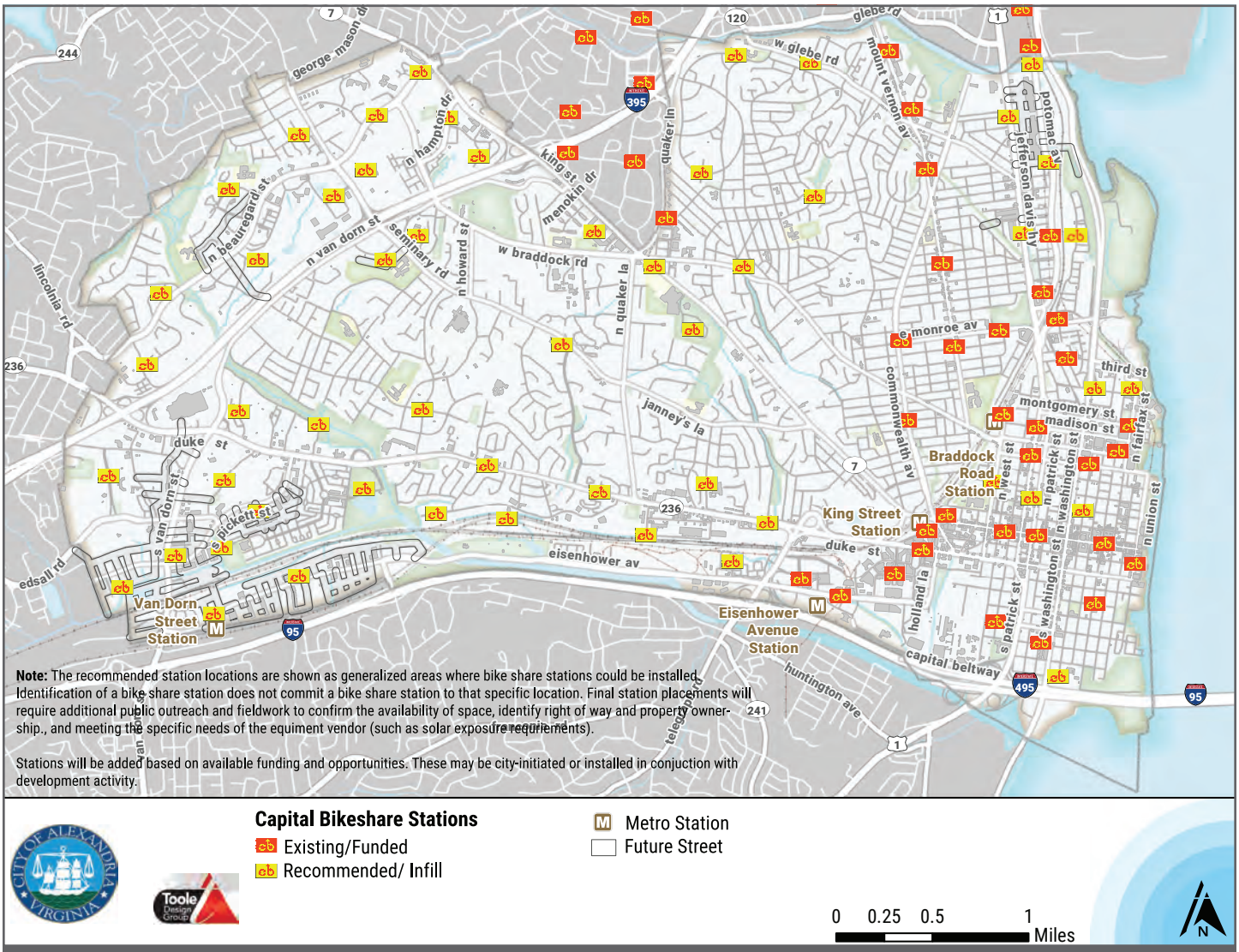


Figure 3.7: Recommended Capital Bikeshare Expansion Map (General Station Locations)

Bicycle Strategies

The existing conditions analysis, case studies, and public/stakeholder input were used to develop a series of strategies that form the backbone of the Pedestrian and Bicycle Chapter. Strategies apply citywide and aim to accomplish the vision, goals and objectives developed at the beginning of the planning process. Strategies are organized under two categories:

1. **Engineering strategies** relate to the on-street bicycle facilities, trails and other physical characteristics of the built environment in Alexandria.
2. **Program and policy strategies** include changes to City plans or procedures, as well as education, encouragement and enforcement efforts.

Many of the strategies are self-explanatory from their title; however, a short description is provided for some of the strategies where more explanation or background information is needed. Throughout this section, the icons below indicate which of the Plan goals are addressed by each strategy.

Bicycle Goals	
SAFETY (SA)	ENGINEERING (EG)
ENCOURAGEMENT (EC)	EDUCATION (ED)

Existing Bike box Mount Vernon Avenue

Bicycle Engineering Strategies

STRATEGY #1 EG

Add new bicycle lanes, signed bicycle routes and shared lane markings to expand the on-street bicycle network.

a. Focus implementation efforts on the priority projects presented in this Plan (see Section 4: Implementation) and on opportunities related to repaving or redevelopment.

STRATEGY #2 SA EG

Implement and evaluate protected bike lanes and neighborhood bikeways on City streets where appropriate.

a. Identify corridors in the 2015 Bicycle Network to serve as priority locations for **protected bike lanes** and **neighborhood bikeway** projects. Conduct public outreach, evaluate right-of-way, parking impacts and other design considerations as needed. Evaluate these new protected bike lanes and neighborhood bikeway projects in order to optimize the design, operations, maintenance, safety and usage. Use findings from the evaluation to refine the Complete Streets Design Guidelines, as needed, related to protected bike lanes and neighborhood bikeways in Alexandria, and to inform the design of future projects. Share lessons learned with national partners to contribute to the emerging state of practice related to low-stress bicycle facility design.

The existing bicycle network attracts riders who are more experienced and comfortable with greater exposure to sharing space with automobile traffic. This plan includes two new facility types - protected bike lanes and neighborhood bikeways – that have the potential to serve a wider range of bicyclists in Alexandria. Public outreach and analysis process will help ensure the success of these new treatments, and post-construction evaluations will help the City refine designs so that future projects can provide even greater outcomes for all roadway users.

STRATEGY #3 SA EG ED

Improve access and safety for all users on trails, particularly at entrance/exit points.

a. Design trails to maximize user safety and meet standards and best practices, including the placement of fixed structures at transition points, and appropriate wayfinding and signage.

b. Remove unnecessary bollards, signs or obstructions that create choke-points at trailheads.

c. Widen trail access points and segments that experience higher volumes of pedestrian and bicycle traffic. Use pavement markings in these areas to delineate separate spaces for each user group or direction of travel.

d. Use signage, pavement markings and surface treatments to create simple and obvious paths of travel for bicyclists entering and exiting trails.

e. Provide wayfinding at access points and key interior trail junctions/intersections to aid navigation.

STRATEGY #4 SA EG

Use bicycle-specific treatments at intersections to improve safety and provide a more continuous, low-stress experience for people biking.

Large, complex intersections can present barriers to bicycle travel and prevent some people from choosing to ride a bicycle for their trip. Bicycle-specific intersection treatments are being installed in Alexandria today, such as the bicycle box on Commonwealth Avenue at Mount Vernon Avenue. Designs such as bicycle boxes, left-turn boxes and protected intersections can be installed in priority locations and evaluated for more widespread use throughout the City.

STRATEGY #5 EC

Increase the availability of bicycle parking throughout Alexandria.

a. Prioritize locations for installing bicycle parking racks in the public right-of-way with an emphasis on commercial areas, parks, libraries, schools, and transit stops/stations.

b. Continue to install bike parking corrals in on-street parking spaces with the goal of installing new corrals each year.

c. Ensure that all City-sponsored events have bicycle parking and increase the number of City events that provide bike valet services.

d. Regularly review the City's bicycle parking guidelines and revise as needed to reflect increasing bicycling or other changes.

Riders should be able to expect end-of-trip facilities that enable them to safely and securely park a bicycle while they are at a destination. For locations with especially heavy bicycle traffic where sidewalk-level space is not available, in-street bike corrals should be installed to provide adequate parking. The City can set a good example of adequate parking accommodation by ensuring that City-sponsored events have bike parking provided. This may require set-up of temporary racks or partnership with local groups to provide bike valet service at events that expect to draw high volumes of bicyclists.

Streetsblog

Bicycle Facility Maintenance

STRATEGY #6 SA EG EC

Prioritize ongoing maintenance and repair of the bicycle network.

a. Develop internal and external maintenance practices to improve snow and trash removal on streets and trails, prioritizing popular commuter routes. Work with the National Park Service to formalize a partnership related to maintenance and snow removal on the Mount Vernon Trail.

b. Promote Call-Click-Connect as a means for residents to report maintenance and safety concerns. Address reported issues as part of routine staff activities, prioritizing areas near schools, transit stops/stations, parks and senior centers.

> "Vehicle traffic and parking is a challenge for almost any business in the city. As the operator of a small business, I think that a reduction in the amount of cars is a win/win for business and residents alike."
>
> – Bill Blackburn, *President, Del Ray Business Association*

STRATEGY #7 EG EC

Improve bicycle access to transit.

a. When building out the citywide bicycle network, prioritize facility improvements that create continuous, low-stress connections to bus, Metro, and rail stations in Alexandria. Continue partnering with WMATA and DASH to implement access improvements near transit facilities.

b. Incorporate bicycle access and bicycle parking near stations as critical elements of design plans for future transitway corridors and stations.

Bicycle Racks on Buses

STRATEGY #8 EC ED

Improve signage and wayfinding for people biking.

a. Develop a citywide system for installing bicycle wayfinding on signed bike routes, near transit and in activity centers.

b. Review streets for potential applications of regulatory and advisory signs at intersections and along existing and new bicycle facilities. Possible sign types may include "Bicycles May Use Full Lane," "Cross Traffic Does Not Stop," and "Right Turning Traffic Yield to Bikes."

c. Implement wayfinding signage for off-street bike trails as recommended in the City's Wayfinding System.

Wayfinding can help introduce new riders to potential routes and facilities. Signage can help introduce all road users (cyclists and motorists) to newly-installed facilities that are installed in the future. Regulatory signage, such as "Right Turning Traffic Yield to Bikes," can help reinforce traffic patterns created by geometric, striping and traffic control infrastructure. Advisory signage will help drivers and bicyclists better understand what to expect from one another. For instance, "Cross Traffic Does Not Stop" sings are often used at two-way stop-controlled intersections on neighborhood bikeways to indicate that bicyclists (and drivers) will need to exercise additional caution when crossing. Pedestrian and bicycle signage and wayfinding improvements will be coordinated with the Citywide Wayfinding Signage System.

STRATEGY #9 EC ED

Continue to expand the citywide Capital Bikeshare system using the recommendations presented in this Plan as well as other opportunities that arise related to redevelopment. Seek additional funding opportunities to support maintenance, operations and system expansion.

Bicycle Program and Policy Strategies

STRATEGY #1 SA EG

Regularly conduct construction inspections to ensure safe, convenient and accessible bicycle and pedestrian accommodations are provided during all phases of construction.

When an existing, dedicated bicycle or pedestrian facility is blocked during prolonged construction, an alternative accommodation should be provided. Ideally, the facility will be of a similar type. For instance, if a bike lane is removed, shifting travel lanes and/or temporarily removing parking to stripe an interim bike lane should be the first choice. If space is not available, shared lane markings should be temporarily placed on the roadway to indicate that bicyclists will be shifting into the automobile travel lane for that segment of roadway. Adequate signage directing bicyclists and alerting drivers to the temporary traffic pattern must be included in the designs of these temporary facilities.

STRATEGY #2 EG

Conduct post-construction development inspections to ensure that new bicycle facilities, including bike parking, is installed and appropriately designed.

When on-street bicycle facilities, trails or bicycle parking are provided by a private property owner as part of new development, the City should conduct routine post-construction inspections to ensure that the facilities meet City standards and national best practices for design. Seemingly minor characteristics of a design, for example the exact width of a bike lane or placement of a shared lane marking, can influence the functionality and safety of a facility.

STRATEGY #3 SA EG EC ED

Develop an annual report card with information on the performance measures related to walking and biking identified in this Plan, as well as those identified by the Office of Performance Accountability related to bicycling and walking.

a. Make the report card available on the City website and promote through listserves, social media and local organizations.

STRATEGY #4 EG ED

Incorporate key bicycle commuting routes into the existing map that shows the current status of maintenance and snow removal on City streets/ facilities.

Alexandria maintains a citywide map (http://apps.alexandriava.gov/SnowReport/) that indicates the priority and status of various streets for snow plowing or ice treatment. Important bicycle commuting routes, including major City trails, should be added to this map. It is important to note that the Mount Vernon Trail is maintained by the National Park Service, which historically has not plowed the trail during snow events.

STRATEGY #5 EC

Explore a pilot Open Streets Event to encourage active transportation and lifestyles.

a. Use the event to increase education about Complete Streets, health benefits, transportation options and programs in Alexandria.

STRATEGY #6 EC

Evaluate the use of the employee alternative transportation benefits program, and expand promotion efforts related to the program.

STRATEGY #7 EG

Pursue funding for high priority bicycle projects (see Section 4: Implementation).

STRATEGY #8 EG

Conduct a biennial citywide survey to learn more about the non-commute transportation habits of Alexandria residents and employees.

The U.S. Census and the Regional Household Travel Survey by the Metropolitan Washington Council of Governments (MWCOG) provide valuable data on the commute patterns of Alexandria residents and workers. However, less quantitative data is available on non-commute trips, which are estimated to comprise approximately 70 percent of vehicle miles traveled.24 Strategy #8 provides useful data on travel habits, needs and desires for non-work trips, allowing staff to better align City investments with travel demand.

STRATEGY #9 EC ED

Partner with the Alexandria Health Department and DCHS to identify funding and prioritize programs related to active transportation and lifestyles.

> Our daily environment plays an important role in our community's well-being. Ensuring equitable access to the pedestrian and bicycle network creates increased opportunities for Alexandrians to live healthy lifestyles.
>
> — Katie Leonard, *Public Health Planner, Alexandria Health Department*

STRATEGY #10 ED

Continue to provide staff training on Complete Streets Design Guidelines and other bicycle-related topics as needed.

STRATEGY #11 SA EC ED

Partner with Local Motion and the Alexandria Police Department to build upon the regional safety campaign and other similar efforts that promote bicycle, pedestrian and motorist safety, rights and responsibilities, as well as the benefits of active transportation.

24 American Associate of State Highway and Transportation Officials, National Report on Commuting Patterns, May 2013.

STRATEGY #12 EC ED

Partner with local bicycle groups and Alexandria City Public Schools to support bicycle education, outreach and promotion amongst underrepresented groups including children, women, senior citizens and non-English speaking communities.

Alexandria and the greater Washington, DC region have many nonprofit organizations that conduct bicycle education, outreach and promotion to diverse audiences. Partnership with these groups will be the most effective way for Alexandria to deliver targeted programing to underrepresented groups, since these organizations are often already embedded in and trusted by the targeted communities.

Bicycle Activities for Walk and Bike to School Day in Alexandria

STRATEGY #13 EC

Promote the City's existing Bicycle Friendly Businesses (from the League of American Bicyclists' program) on the Local Motion website, in order to support businesses that provide bike parking and take others steps to support bicycling.

Some of the most bike friendly communities in the country have initiated programs of encouraging businesses to apply for the League of American Bicyclists Bicycle Friendly Business (BFB) designation. BFB designation rewards businesses that provide incentives, perks and infrastructure to help employees and customers access their location by bicycle. Promoting Bicycle Friendly Businesses on the Local Motion website will further promote these leaders and incentivize others to apply for designation.

STRATEGY #14 SA EG EC ED

Strive for Gold designation in the League of American Bicyclists Bicycle Friendly Community program[25] through implementation of the bicycle network and other strategies presented in this Plan.

This strategy refers to a national program administered by the League of American Bicyclists. Alexandria currently holds a Silver Bicycle Friendly Community designation. Earning a Gold-level designation would make Alexandria the highest ranking bicycle friendly community in the Washington, DC metro area and in the state of Virginia. To achieve Gold status, Alexandria will need to continue to expand its bicycle programs and infrastructure.

25 Learn more at http://bikeleague.org/bfa.

SECTION 4

Implementation

IMPLEMENTATION

The infrastructure improvements and strategies described in the previous sections will allow Alexandria to achieve the pedestrian and bicycle vision statements presented in the beginning of the Chapter. Continuing to improve conditions for walking and bicycling is an important priority for the City; however, the implementation of the projects and strategies in this document will necessarily be phased over time and will depend on available resources. This section presents an implementation strategy that includes:

1. **Information on relevant funding sources;**
2. **High priority sidewalk, bicycle and trail projects; and,**
3. **Performance measures for ongoing evaluation.**

To be most useful to the City, this implementation strategy must allow for flexibility and encourage City staff to take advantage of opportunities as they arise. For example, the City will continue to implement pedestrian, bicycle and other Complete Streets improvements in concert with routine street resurfacing or based on safety concerns. Similarly, opportunities may arise to implement pedestrian, trail or bicycle improvements in coordination with development/redevelopment. These types of opportunities should always be leveraged in support of a more walkable and bicycle-friendly future for Alexandria.

The City will also take proactive steps to implement the strategies and projects recommended in this Plan. Within the first five years, staff will work to implement many of the recommendations in the Case Study Areas, and will leverage repaving and development opportunities to implement pedestrian-focused improvements in areas not covered by the Case Studies. The City will pursue funding from grants and through the City's budget process to begin implementation of the priority projects shown on the following pages. Additionally, the City will immediately begin to develop a Vision Zero Program and identify what elements would be included in the program, as well as funding needs. The City already has many, existing safety-focused programs that may be incorporated into the Vision Zero effort, in addition to the development of new programs.

Project Prioritization

A data-driven prioritization process was used to identify projects that have significant potential to benefit the City. The prioritization process was based on the 10-step method described in the national publication, *The ActiveTrans Priority Tool Guidebook* by the National Cooperative Highway Research Program (NCHRP).[26] The process uses factors (broad themes related to walking and bicycling) and variables (measurable characteristics related to each factor) to calculate a score for each of the bicycle, trail and sidewalk projects in this plan. The factors, variables and weights (see Figure 4.1) were developed with significant input from the Advisory Committee and the interdepartmental Technical Advisory Committee. A detailed explanation of the prioritization methodology is provided in Appendix F.

People walking in Alexandria

26 NCHRP Report 803, Pedestrian and Bicycle Transportation Along Existing Roads – ActiveTrans Priority Tool Guidebook, 2015 (http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_803.pdf)

Factor	Variable	Weight
Existing & Potential Demand	Population Density	3
	Future Population	
	Employment Density	
	Existing Bicycle Mode Share	
	Number of Online Interactive Map Comments ("Place I ride," "Place I want to ride")	
	Proximity to Attractors (Libraries, Community Centers, Parks, Schools)	
	Transit Proximity (Metrorail and BRT Stations)	
	Transit Proximity (Bike Share Stations, Bus Stops)	
Geography	Project Located in Western Alexandria	3
Connectivity*	Project Connects to Existing Bicycle Facilities	2
Safety	Number of WikiMap Comments ("Barrier to biking")	2
	Number of Collisions Involving Bicycles/Pedestrians	

** This factor was used for on-street bicycle and trail projects, but not sidewalk projects.*

Figure 4.1: Prioritization Factors, Variables and Weights

The top scoring projects were reviewed with City staff, the Advisory Committee and at a public meeting on September 24, 2015. Revisions were made based on input from these groups. The top ten on-street bicycle and sidewalk projects, as well as the top three trail projects, are presented in the following maps and tables. **It is important to note that the rankings presented on these maps do not reflect the order in which projects will be implemented.** Project implementation depends on available funding and opportunities to align with other projects in the area (e.g., utility work, redevelopment, etc.). Also, each project will require targeted public engagement, analysis and design, which may influence the timing of implementation.

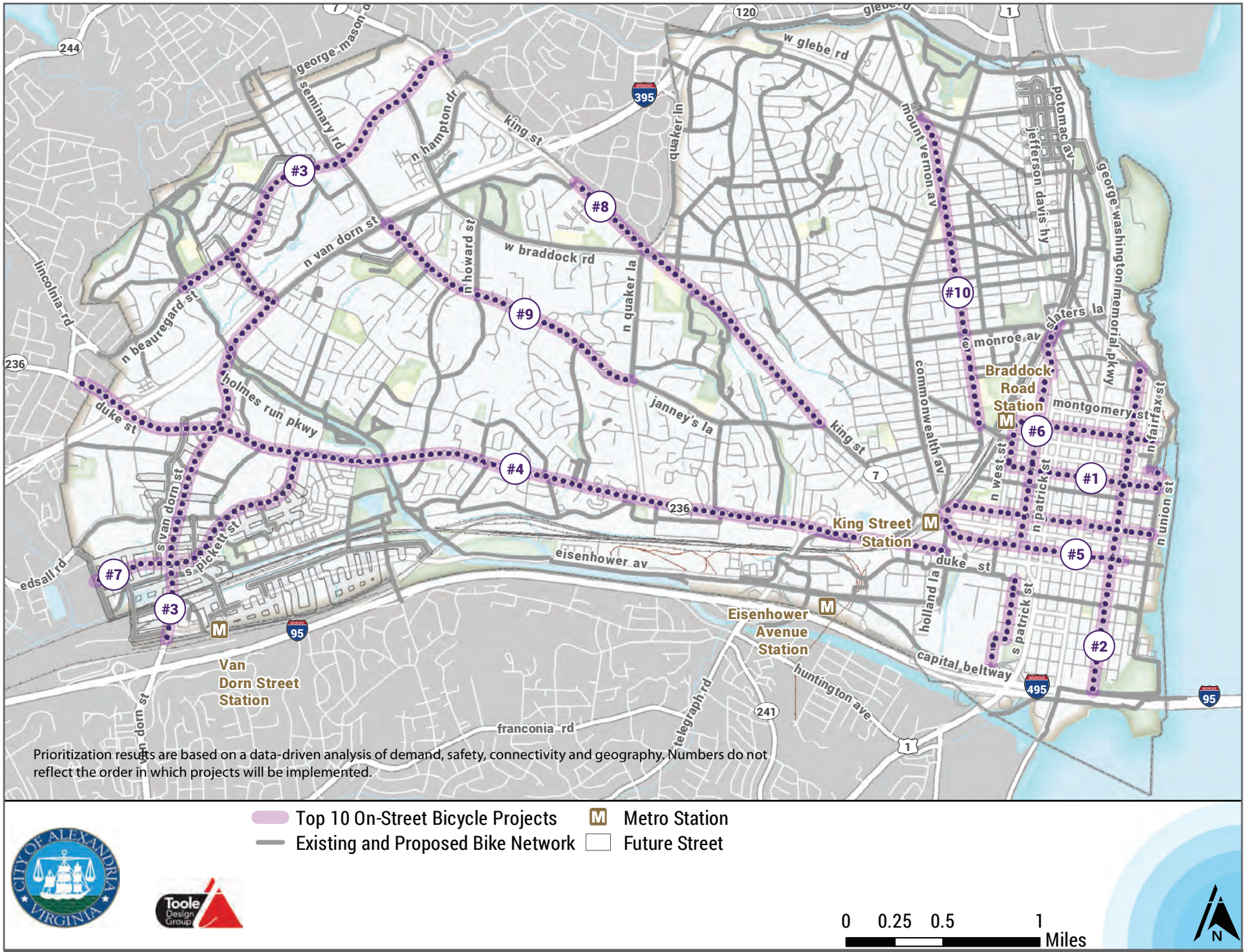


Figure 4.2: Top 10 On-Street Bicycle Projects

Rank	Street	Recommendation
1	Madison Street / West Street / Oronoco Street (from West Street to Mt. Vernon Trail / Union Street)	Provides east-west connectivity in North Old Town and to the Mt. Vernon Trail and Braddock Metrorail Station. Madison Street would be an enhanced bicycle corridor that may remove one travel lane; Oronoco Street would include shared on-street facilities. Traffic study needed.
2	Royal Street (from Jones Point Drive to Bashford Lane)	Neighborhood bikeway to provide north-south connectivity in Old Town and provide connection to the Mt. Vernon Trail. This improvement would provide a more desirable and comfortable route for bicyclists, leading to less walking and bicycling conflicts on Union Street and parallel sidewalks. Additional analysis needed.
3	Van Dorn Street (from Eisenhower Avenue to Sanger Avenue) / Sanger Avenue (from N. Van Dorn Street to N. Beauregard Street) / N. Beauregard Street (from Holmes Run Parkway to King Street)	Enhanced bicycle corridor (specific facility type to be determined through further study) to provide north-south connectivity in West End and provide a connection to the Van Dorn Metrorail station and Arlington County to the north. A sidepath on Van Dorn Street, N Beauregard Street, and future Sanger Avenue were recommended in the Beauregard Small Area Plan. This improvement is being coordinated with the West End Transitway project, currently underway.
4	Duke Street (from I-395 to Daingerfield Road)	Enhanced bicycle corridor (specific facility type to be determined through further study) to provide east-west connectivity in central Alexandria. This facility will be beneficial in providing connectivity to the commercial and residential development along Duke Street. This improvement will need to be coordinated with the analysis and design of the Duke Street transitway (Corridor B).
5	Prince / Cameron Streets (from Reinkers Lane to Union Street)	Bike lanes to provide east-west connectivity in Old Town and as a connection between the King Street Metrorail Station and the waterfront. This project is currently in the City's Capital Improvement Program and will be coordinated with the Pavement program.
6	Payne / Fayette Streets (from Old Cameron Run Trail to Slaters Lane)	Shared on-street facility or neighborhood bikeway to provide north-south connectivity in west Old Town and improved connections to the Old Cameron Run Trail and Mt. Vernon Trail. Additional analysis needed.
7	S. Pickett Street (from City/County line to Duke Street)	Enhanced bicycle corridor (specific facility type to be determined through further study) to provide east-west connectivity in west Alexandria. Also provides connectivity to the future Multi-modal bridge which will connect to the Van Dorn Metrorail station. This improvement is also recommended in the Eisenhower West Small Area Plan.
8	King Street (from Janney's Lane to Menokin Drive)	Enhanced bicycle corridor (specific facility type to be determined through further study) to provide east-west connectivity in central and west Alexandria. Provides a connection to existing bike lanes on King Street east of Janney's Lane and connects to the Bradlee shopping area. Additional analysis needed.
9	Seminary Road (from N Van Dorn Street to N Quaker Lane)	Enhanced bicycle corridor (Specific facility type to be determined through further study) to provide improved east-west connectivity and linkage with the existing bike lane on Janneys Lane. Additional analysis needed.
10	Mount Vernon Avenue (from Braddock Road to West Glebe Road)	Shared lane markings and signage are recommended to provide improved north-south connectivity in the northeast quadrant of the City. This route would connect to the existing bike lanes on Commonwealth Avenue and provide access to commercial and residential nodes in Del Ray and Arlandria.

Figure 4.3: Top 10 On-Street Bicycle Projects

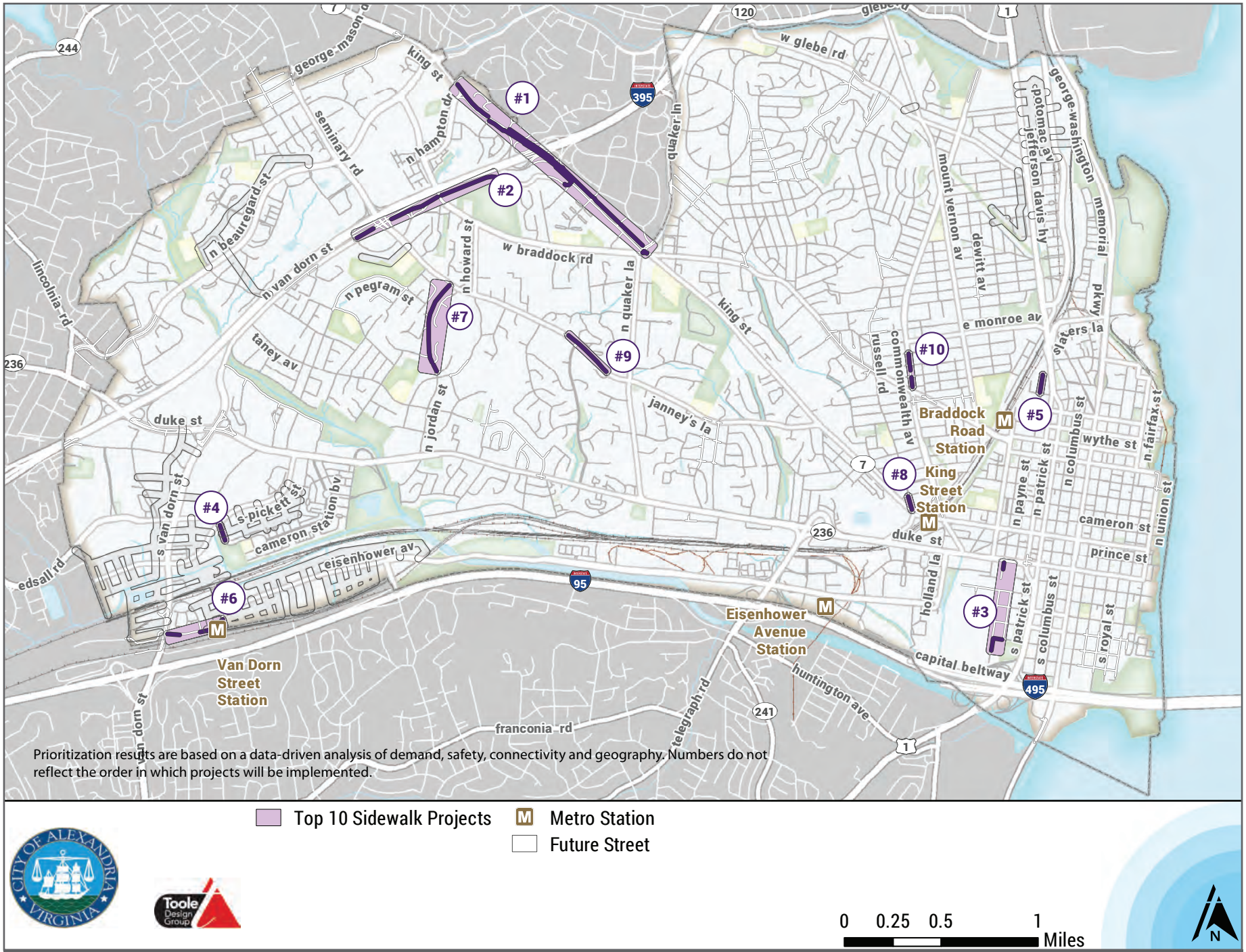
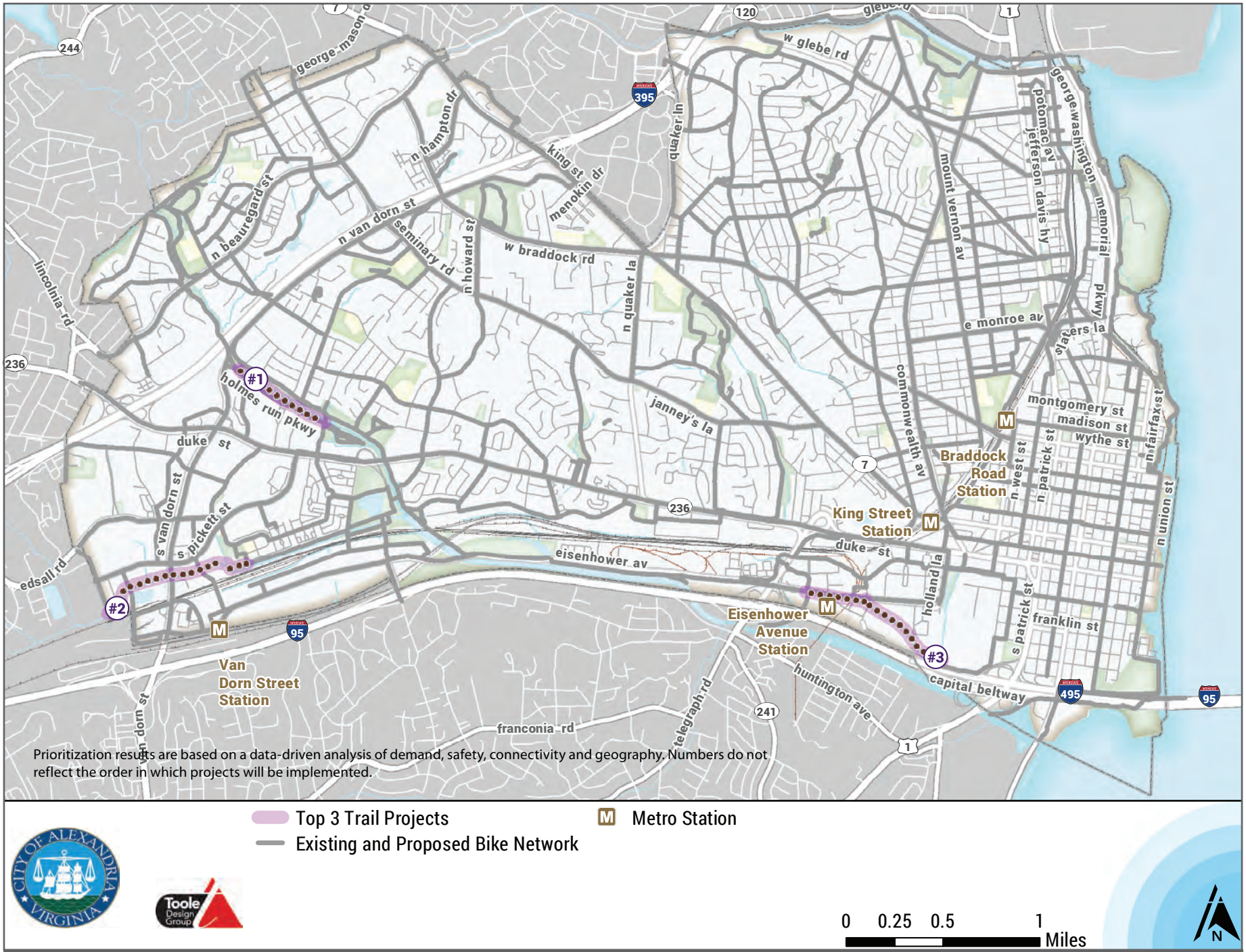


Figure 4.4: Top 10 Sidewalk Projects

Rank	Street	Recommendation
1	King Street (from Quaker Lane to N. Hampton Drive)	New sidewalks along the north and south sides of King Street, including over I-395, where missing. This project improves important pedestrian access and connectivity along a street with higher volumes and speeds, and a history of pedestrian fatalities.
2	Van Dorn Street (from Kenmore Avenue to the north of Braddock Road)	New sidewalk along the west side of Van Dorn Street. This project improves pedestrian access and connectivity in west Alexandria.
3	Payne Street / Jefferson St. (300 block of S. Payne St.; 700 block of S. Payne St.; 1200 block of Jefferson St.)	New sidewalk on the east side of the 300 block of S. Payne Street where missing; new sidewalk on the east side of the 700 block of S. Payne Street where missing; new sidewalk on the south side of the 1200 block of Jefferson Street where missing.
4	Cameron Station Boulevard (from S. Pickett Street to Armistead Boothe Park)	New sidewalk on the east side of Cameron Station Boulevard where missing. Provides an important connection to Armistead Boothe Park / Cameron Station and future redevelopment along S. Pickett Street and areas to the north. This project was also recommended in the Eisenhower West Small Area Plan.
5	Fayette Street (from Route 1 and First Street)	New sidewalk on the west side of Fayette Street, south of Route 1 to First Street. This project was recommended in the Braddock Metro Station Small Area Plan.
6	Eisenhower Avenue (from Van Dorn Street to Van Dorn Metrorail Station)	New sidewalk on the south side of Eisenhower Avenue where missing. Provides an important connection to the Van Dorn Metrorail Station. This project is being coordinated with the West End Transitway and was recommended in the Eisenhower West Small Area Plan.
7	N. Jordan Street (from Howard Street to Seminary Road)	New sidewalk along the east side of N. Jordan Street where missing. Provides connectivity between residential neighborhood and Seminary Road and Hammond Middle School.
8	Russell Road (from King Street to W. Cedar Street)	New sidewalk along the west side of Russell Road where missing. Provides connectivity between the Rosemont neighborhood and Union Station and King Street Metrorail station.
9	Seminary Road (from west of Quaker Lane to west of Ft. Williams Parkway)	New sidewalk along the north side of Seminary Road where missing. Provides connectivity to the Episcopal High School, and to the Virginia Theological Seminary.
10	Commonwealth Avenue	Segments of new sidewalk are needed on the east side of Commonwealth Avenue to provide improved access along this busy residential corridor.

Figure 4.5: Top 10 Sidewalk Projects



Prioritization results are based on a data-driven analysis of demand, safety, connectivity and geography. Numbers do not reflect the order in which projects will be implemented.

Figure 4.6: Top 3 Trail Projects

Rank	Street	Recommendation
1	Holmes Run Trail (South side of Holmes Run between Ripley Street and N. Pickett Street)	Construct a new trail along the south side of Holmes Run to provide improved connectivity of the existing trail system. This project is recommended in the Citywide Parks Improvement Plan (2014). As the Trail is located within a resource protection area, it will be constructed in an environmentally sensitive manner.
2	Backlick Run Trail (Cameron Station to Fairfax County)	Extend the existing Backlick Run Trail to the west along the north side of Backlick Run to the Alexandria / Fairfax County line. This project is recommended in the Eisenhower West Small Area Plan. This project is partially funded in the FY16-25 Capital Improvement Program (CIP) budget. Additional analysis needed.
3	Old Cameron Run Trail (Eisenhower Avenue / Stovall St. to approximately where Holland Lane alignment is located)	Construct a new trail from Eisenhower Avenue at Stovall Lane to the east along future development in Eisenhower East, continuing along the south side of the Alex Renew plant where the previous trail was located. This trail provides an important connection from Eisenhower East and the Eisenhower Metrorail station to Old Town and the Mt. Vernon Trail. This project is partially funded in the FY16-25 Capital Improvement Program (CIP) budget. Additional analysis needed.

Figure 4.7: Top 3 Trail Projects

The Potomac Yard Trail, a recently-completed connection in the City's trail network

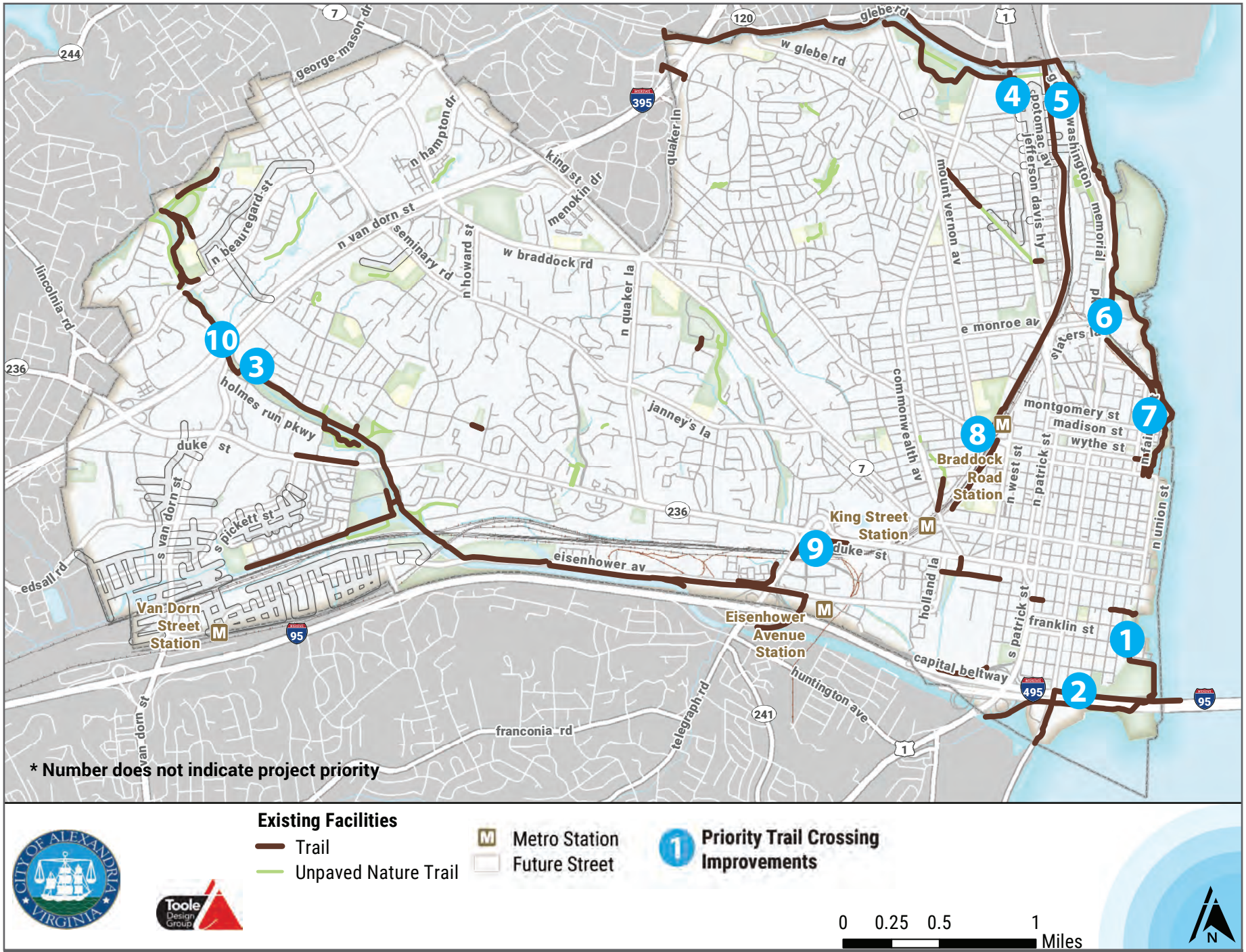


Figure 4.8: Priority Trail Crossing Improvements

The Priority Trail Crossing/Transition Improvements were identified through public and staff input and were not prioritized using the data-driven process described earlier in this section. The map in Figure 4.8 uses project identification numbers that do not reflect priority.

ID #	Street	Recommendation
1	Mount Vernon Trail near Jones Point Park	Widen trail and add signage in areas where trail turns sharply around Jones Point Park. This improvement is on National Park Service property.
2	Mount Vernon Trail and Royal Street	Improve signage, widen trail on sharp turns and provide wayfinding signage in this area.
3	Bridge Across Holmes Run	Replace crossing of Holmes Run to allow for ADA access at all times of year.
4	Four Mile Run and Route 1 Intersection	Widen trail at northeast corner of intersection and install trail crossing and wayfinding signage.
5	Potomac Yard Trail near Shoppers/Barnes and Noble	Work with property owners at Potomac Yard Center to formalize connection to Potomac Yard Trail from northeast corner of shopping center. A worn dirt path exists now, indicating demand.
6	E. Abingdon Street from Mt. Vernon to Slaters Lane	Widen trail as it transitions from off-street to on-street, add signage and improve crossing at Slaters Lane. Install southbound contraflow lane on E. Abingdon Drive to connect to Mt. Vernon Trail spur.
7	Mount Vernon Trail and Canal Center Plaza Intersection	Install improved crossing and trail signage where the Mount Vernon Trail intersects Canal Center Plaza.
8	Potomac Yard Trail at Braddock Road Metrorail Station	Improve connection along Braddock Road between the Potomac Yard Trail and the Braddock Road Metrorail station.
9	Telegraph Avenue Tunnel Under Railroad Tracks	Install lighting and other improvements to increase user comfort and safety in the tunnel from Mill Road to Duke Street along Telegraph Road, under the railroad tracks.
10	Holmes Run Tunnel under I-395	Install lighting and other improvements to increase user comfort and safety in the tunnel on the Holmes Run Trail under I-395.

Figure 4.9: Priority Trail Crossing/Transition Improvement Projects

Funding

The City of Alexandria programmed roughly $3 million in Fiscal Year (FY) 2016 on specific non-motorized transportation improvements in its 2016-2025 Capital Improvement Program (CIP). This represents eight percent of Alexandria's total Transportation and Transit Infrastructure budget (see Figure 4.10). A recommendation of this Plan is to identify additional dedicated funding to implement the Plan. Revenue sources used in other, comparable communities include a percentage of parking revenues, a devoted percentage of the overall City transportation budget, and/or bonds to bundle and implement multiple small improvement projects related to bicycling and walking.

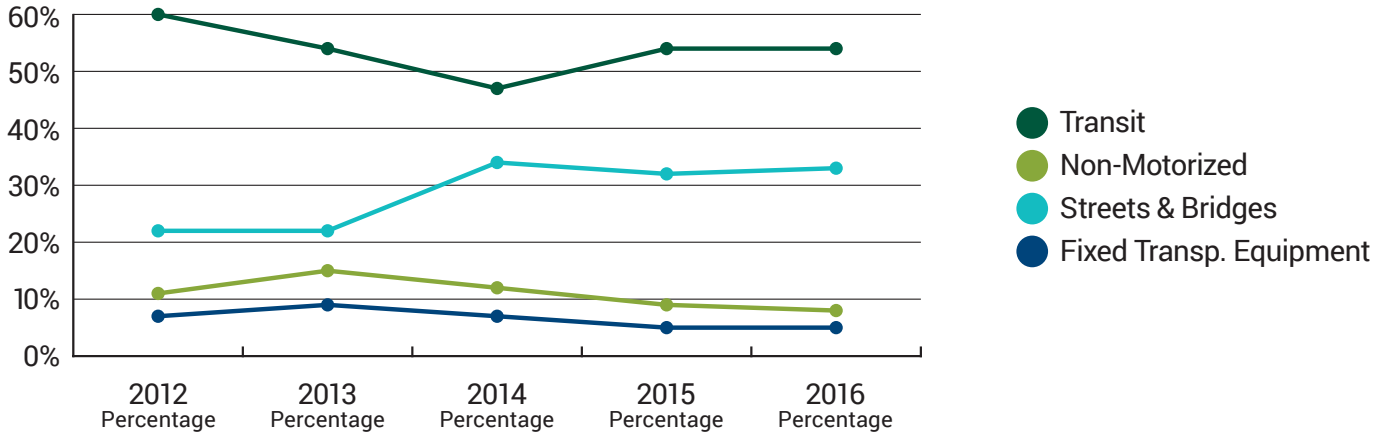
> The specificity provided in the revised Master Plan is valuable for future small area planning and for the review of development proposals, which will be the source of funding for many improvements identified in the Plan.
>
> — Dave Brown, *Alexandria Transportation Commission*

	FY 16 Budget	10 Year Total	Percent of 10 Year Total
Transit*	$11,684,229	$165,279,229	54%
Non-Motorized	$3,046,000	$25,457,685	8%
Streets and Bridges	$7,381,500	$100,581,500	33%
Fixed Transportation Equipment	$1,200,000	$15,503,063	5%
TOTAL	**$23,311,729**	**$306,591,477**	**100%**

**Transit excludes funding for Potomac Yard Metrorail station, and WMATA Capital funds*

Figure 4.10: City of Alexandria Transportation Expenditures (FY 2016-2025)

CIP Historical Breakdown by Transportation Mode



**Transit excludes funding for Potomac Yard Metrorail station, and WMATA Capital funds*

Figure 4.11: CIP Historical Breakdown by Transportation Mode

The majority of the revenue sources identified the City's 2016-2025 Transportation and Infrastructure Capital Improvement Program are local funding programs, including bonds, the general fund and private developer contributions. The remaining 3.9 percent of the funding is divided among State and Federal programs including state revenue sharing programs and the Federal Congestion Mitigation and Air Quality (CMAQ) Improvement Program. Additional funding opportunities exist through the Virginia Department of Transportation and its administration of Federal transportation funds including:

Surface Transportation Block Grant Set-aside Program.

This program, established in the FAST Act signed by President Obama on December 4, 2015, replaces the Transportation Alternatives Program (TAP), which in turn had combined the Transportation Enhancements, Safe Routes to School and Recreational Trails Programs created in previous transportation bills.

As an example, in FY2015, the Virginia Department of Transportation received an apportionment of approximately $20 million for the TAP, of which half is allocated by VDOT directly and half is sub-allocated to local governments in the state. Of that latter half, approximately $6 million goes directly to MPOs with urbanized areas above 200,000 in population. According to the Federal Highway Administration, the Metropolitan Washington Council of Governments will have received $2.8 million of FY2015 TAP funding from Virginia's share of the program funds. TAP funds are not limited to bicycling and walking projects but nationwide this is an important source for funding for active transportation projects and programs – 18.9% of FY2015 spending on this kind of work.

Surface Transportation Block Grant.

This program, established in the FAST Act signed by President Obama on December 4, 2015, replaces the Surface Transportation Program (STP). The STP has historically been one of the largest and most flexible sources of transportation funding administered by the Virginia Department of Transportation. Bicycle and pedestrian projects and programs (e.g. bike lanes, trails, bicycle parking, intersection improvements, crosswalks, streetscaping etc) are eligible activities for STP funds, and STP was the source for 18% of all Federally-funded active transportation projects in FY2015. In FY2015, Virginia received an apportionment of $251 million for the STP, of which $36 million was sub-allocated to the MWCOG.

Highway Safety Improvement Program.

The Highway Safety Improvement Program funds safety infrastructure projects on all public roadways – not just state routes (the Federal-aid Highway System) – and can be used for traffic calming, intersection improvements, sidewalks, crosswalks and signals, and bike facilities of all kinds. The funds are often focused on high crash locations, but can also be used to address systemic design and operational problems that affect traffic safety.

Nationally, the HSIP program has not been used extensively for nonmotorized safety projects. However, Virginia is one of the few states that has made a significant commitment to use these funds to improve bicyclist and pedestrian safety. The state has a goal of spending 10 percent of their $57 million annual HSIP apportionment on nonmotorized safety projects.

Traffic Calming on Local Streets in Alexandria

Chapter Updates and Performance Measurement

This Pedestrian and Bicycle Chapter of the Transportation Master Plan is designed to be flexible, providing sufficient direction for staff while also encouraging them to respond as opportunities arise and conditions change over time. For this reason, the Chapter should be viewed as a "living document" that is re-revaluated and expanded over time. A formal update is recommended in five years, with a particular focus on updating the recommended bicycle network and priority projects.

A set of draft performance measures related to the goals identified in the beginning of the planning process will be used to evaluate progress toward plan completion. Performance measures will keep the City accountable throughout the implementation of Plan recommendations.

By continuing to update the stakeholders involved in this plan-making process, and all members of the public, the City can keep the issues of pedestrian and bicycle safety and travel in the public consciousness.

Figures 4.12 and 4.13 present the measures, the agency or department responsible for tracking the measure, the frequency the measure will be updated, and the goal area that the measure supports. Staff will review performance against these measures annually and, every two years, present a status update for review by the Transportation Commission and/or other appropriate bodies. This update will also include a status report on the implementation of Case Study area recommendations and priority sidewalk, trail and on-street bicycle projects.

Pedestrian Performance Measure	Responsible Department/Group	Frequency	Targeted Goal
Number of pedestrian-motor vehicle crashes, as well as pedestrian injuries and fatalities	APD	Annually	Safety
Number of intersections that are treated with safety and accessibility improvements	T&ES	Annually	Safety
Percent of signalized intersections with pedestrian countdown signals	T&ES	Annually	Safety / Engineering
Percentage of maintenance requests related to a pedestrian issue that are addressed	T&ES	Annually	Safety / Engineering
Linear feet of new sidewalk, citywide	T&ES	Annually	Engineering
Miles of paved off-street trails, citywide	T&ES	Annually	Engineering
Percent of people walking to work	T&ES	With Census	Encouragement
Number of people who are reached through the Local Motion program	Communications	Annually	Encouragement
Percent of people walking to work at employers participating in Local Motion Transportation Demand Management (TDM) program	T&ES	Annually	Encouragement
Percentage of people walking to transit	Dash/WMATA	TBD	Encouragement/ Engineering
Percentage of schools with Safe Routes to School programs and/or offering pedestrian safety education	ACPS	Annually	Education / Safety
Percentage of children walking to school	ACPS	Annually	Education

Figure 4.12: Pedestrian Performance Measures

Bicycle Performance Measure	Responsible Department/Group	Frequency	Targeted Goal
Number of bicycle-motor vehicle crashes, bicycle-pedestrian crashes as well as bicyclist injuries and fatalities	APD	Annually	Safety
Percentage of maintenance requests related to bicycle issues that are addressed	T&ES	Annually	Safety / Engineering
Miles of on-street bicycle facilities citywide by type	T&ES	Annually	Engineering
Miles of off-street trails citywide	Parks and Recreation	Annually	Engineering
Number of intersections improved with bicycle accommodations (bike boxes, bike signals, bicycle-compatible loop detectors, etc.)	T&ES	Annually	Engineering
Number of bike parking spaces installed		Annually	Engineering/ Encouragement
Percent of people bicycling to work	T&ES	With Census	Encouragement
Number of bike share trips in Alexandria	T&ES	Annually	Encouragement
Number of people who are reached through the Local Motion program	Communications	Annually	Encouragement
Percentage of schools participating in Safe Routes to School programs and/or offering bicycle safety programs	ACPS	Annually	Education / Safety
Number of adult bicycle safety courses offered	Local Motion	Annually	Education
Percentage of children biking to school	ACPS	Annually	Education

Figure 4.13: Bicycle Performance Measures

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SECTION 5

Glossary

GLOSSARY

Accessible:

Able to be reached or used by people of all levels of abilities. Often used to describe a facility that is compliant with the Americans with Disabilities Act (ADA, see below).

Active Transportation:

A means of getting around that is powered by human energy (e.g., walking, bicycling, roller blading, using a push scooter or skateboard, etc.).

ADA:

The Americans with Disabilities Act (ADA) prohibits discrimination against people with disabilities in employment, transportation, public accommodation, communications, and governmental activities.[27] Federal standards provide guidance on accessible routes, curb ramps, transit shelters and other elements of the build environment.

Bicycle facility:

A general term denoting infrastructure, improvements and provisions that accommodate and/or encourage bicycling. Some examples include bicycle racks, bicycle lanes, trails and shared lane markings (sharrows).

Comfortable:

When used to describe bicycle or pedestrian facilities, denotes a low-stress experience that is perceived as safe by the user.

Complete Streets:

Streets that are designed to provide safe and convenient travel along and across streets for all users, including pedestrians, bicyclists, riders and drivers of public transportation, as well as drivers of other motor-vehicles, and people of all ages and abilities, including children, older adults, and individuals with disabilities.

Incentives:

Information, messaging, rewards or goods that induce or motivate a desired behavior. In the context of transportation, incentives may include literature, resources, subsidies, giveaways or information that encourages safe behavior and/or increased biking, walking, ridesharing, teleworking and transit use.

Leading pedestrian interval (LPIs):

A signal timing change that gives pedestrians a crossing signal before cars have a green light. This gives pedestrians a "head start" into the crosswalk, which has been shown to increase drivers' yield rate and improve the visibility of pedestrians in crosswalks.

Low-stress bicycle facility:

Infrastructure or other provisions that are perceived as comfortable by novice or inexpert bicyclists, and which do not involve an undue level of detour between a rider's origin and destination.

Pedestrian facility:

A general term denoting infrastructure, improvements and provisions that accommodate and/or encourage walking, including for persons with disabilities. Some examples include sidewalks, crosswalks and curb ramps.

Slip lane/slip ramp:

A lane that allows vehicles to turn right without entering an intersection or waiting behind cars that are not making the same right-turn movement. Slip lanes are often, though not always, uncontrolled (meaning there is no traffic signal or stop sign for vehicles).

Wayfinding:

A system of comprehensive signing and/or pavement markings to guide bicyclists or pedestrians to their destinations along preferred routes. Signs are typically placed at decision points along users' routes, often at the intersection of two or more streets, bicycle routes or trails.

27 United States Department of Justice, Civil Rights Division (http://www.ada.gov/)

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