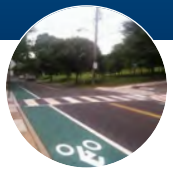
THE CITY OF *Alexandria* VIRGINIA

TRANSPORTATION MASTER PLAN
Pedestrian and Bicycle Chapter

CITY OF ALEXANDRIA VIRGINIA



DRAFT

March 2016

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGEMENTS

City Council

Mayor Alison Silberberg
Vice Mayor Justin Wilson
Willie F. Bailey Sr.
John T. Chapman
Timothy B. Lovain
Redella S. "Del" Pepper
Paul C. Smedberg

Ad Hoc Advisory Committee Members:

Jennifer Hovis, *Committee Chair*
Carol Abrams
Scott Anderson
Steve Beggs
Dave Brown
Linda Couture
Mollie Danforth
Alan Dinsmore
John Fennell
Dr. Ayne Furman
Timothy Hanson
Casey Kane
Dr. Dan Kulund
Skip Maginniss
Christine Michaelis
Kevin Posey
William Schuyler
Pablo Torres
Stephen Wenderoth

Department of Transportation and Environmental Services

Yon Lambert, *Director*
Steve Sindiong, *Project Manager*
Sandra Marks
Carrie Sanders
Hillary Orr
Maha Gilini
Pierre Holloman
Allan Fye
Khoa Tran
Jeff DuVal
Raymond Hayhurst
Patrick Reed

Department of Planning and Zoning

Karl Moritz, *Director*
Jeff Farner
Carrie Beach
Nathan Imm

Department of Recreation, Parks and Cultural Activities

Jim Spengler, *Director*
Dana Wedeles

Department of Project Implementation

Mitchell Bernstein, *Director*
Daphne Kott
Chris Balallo
Anthony Gammon

Department of Health

Stephen Haering, M.D., M.P.H., *Director*
Katie Leonard

Alexandria City Public Schools

Alvin Crawley, *Superintendent*
Anne Booth
Michael Humphreys

Fire Department

Robert Dubé, *Chief*
Maurice Jones

City Manager's Office

Mark Jinks, *City Manager*
Emily Baker, *Deputy City Manager*

Information Technology Services

Steven Chozick, *Division Chief*
Jason Agatone
James Bryant

Consultant Team

Toole Design Group

Jennifer Toole
RJ Eldridge
Alia Anderson
Mauricio Hernandez
Wendy Phelps
Jessica Zdeb
Galen Omerso
Sarah Saviskas

Nelson Nygaard

Iain Banks
Dan Reed
Karina Ricks

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

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.

THIS PAGE INTENTIONALLY LEFT BLANK

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

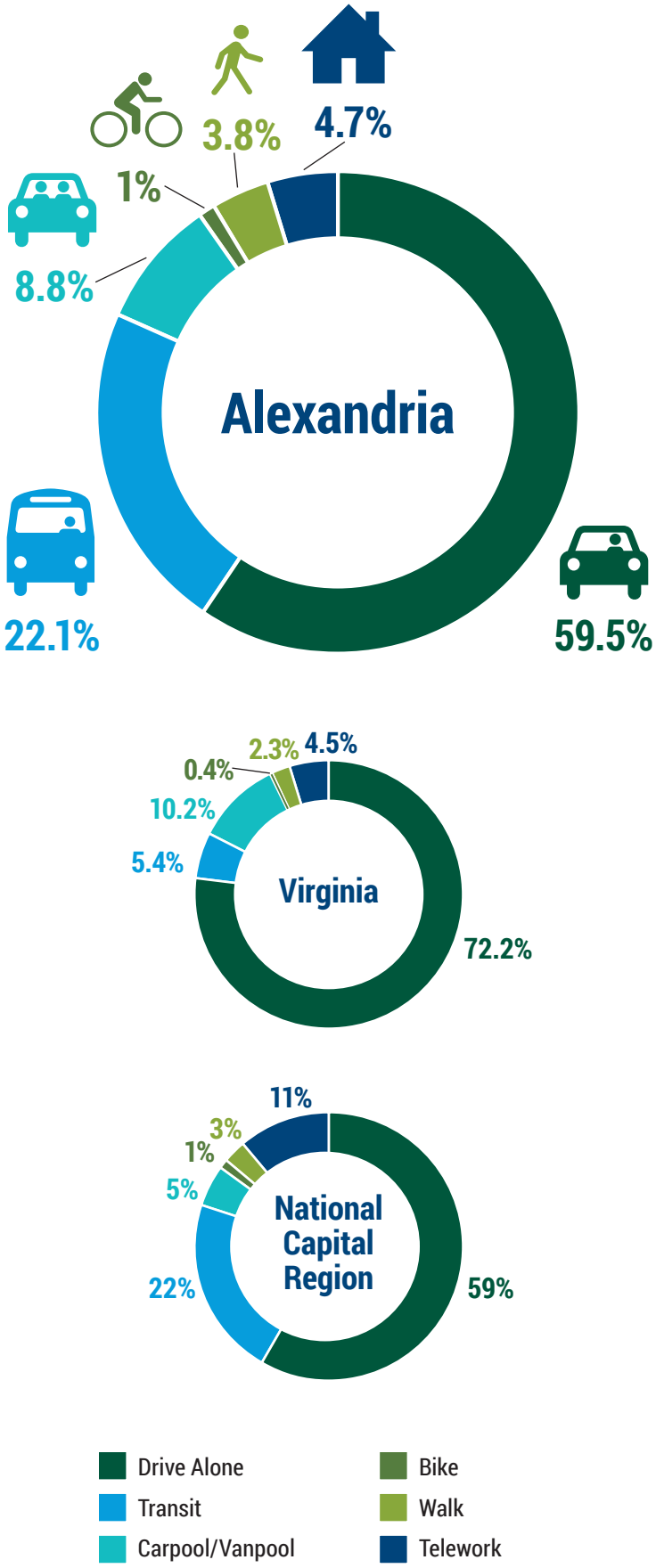


Figure 2.2: Commute to Work Data

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.

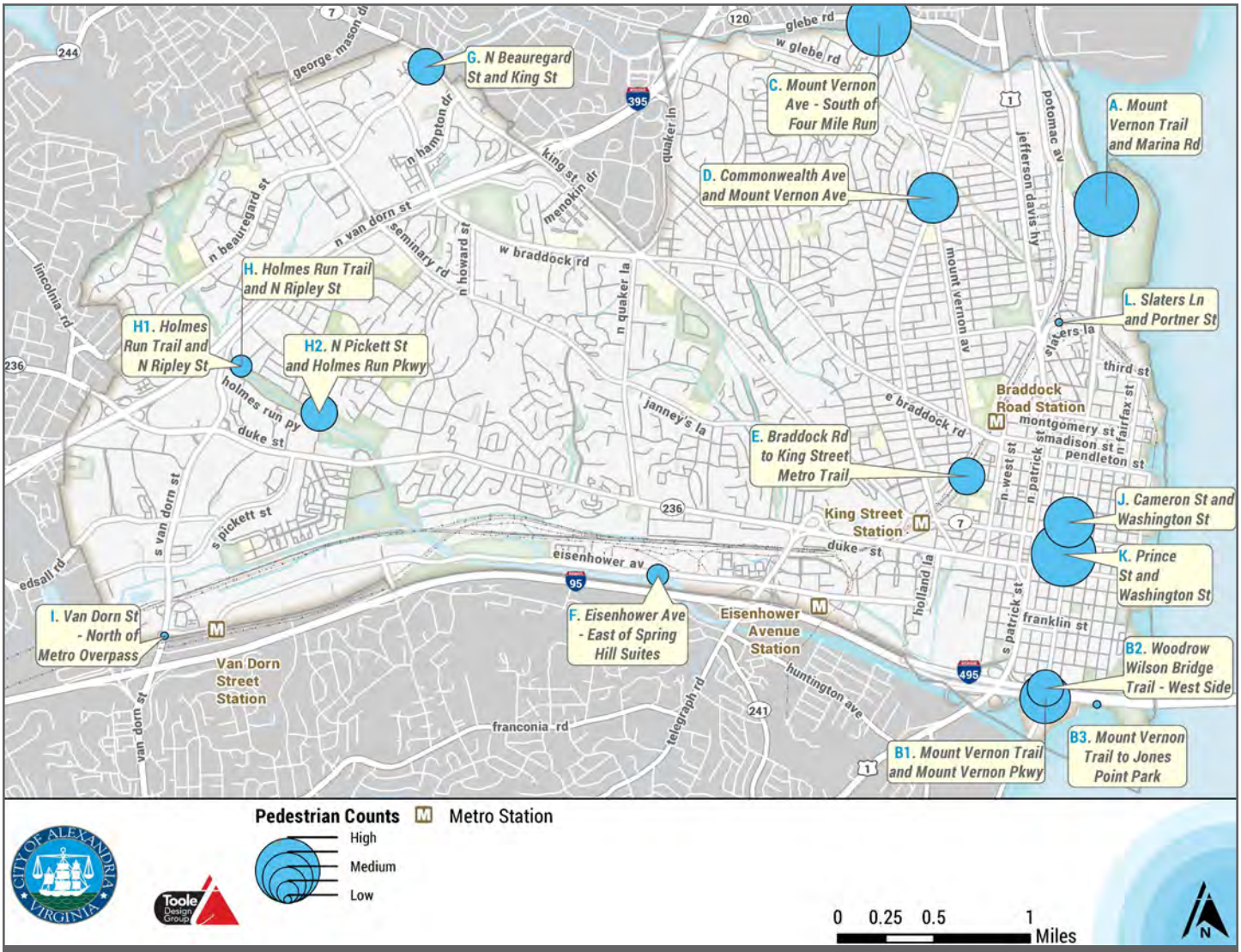


Figure 2.3: Pedestrian Count Locations and Data (BPAC Volunteer Counts, 2011-2014)

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.

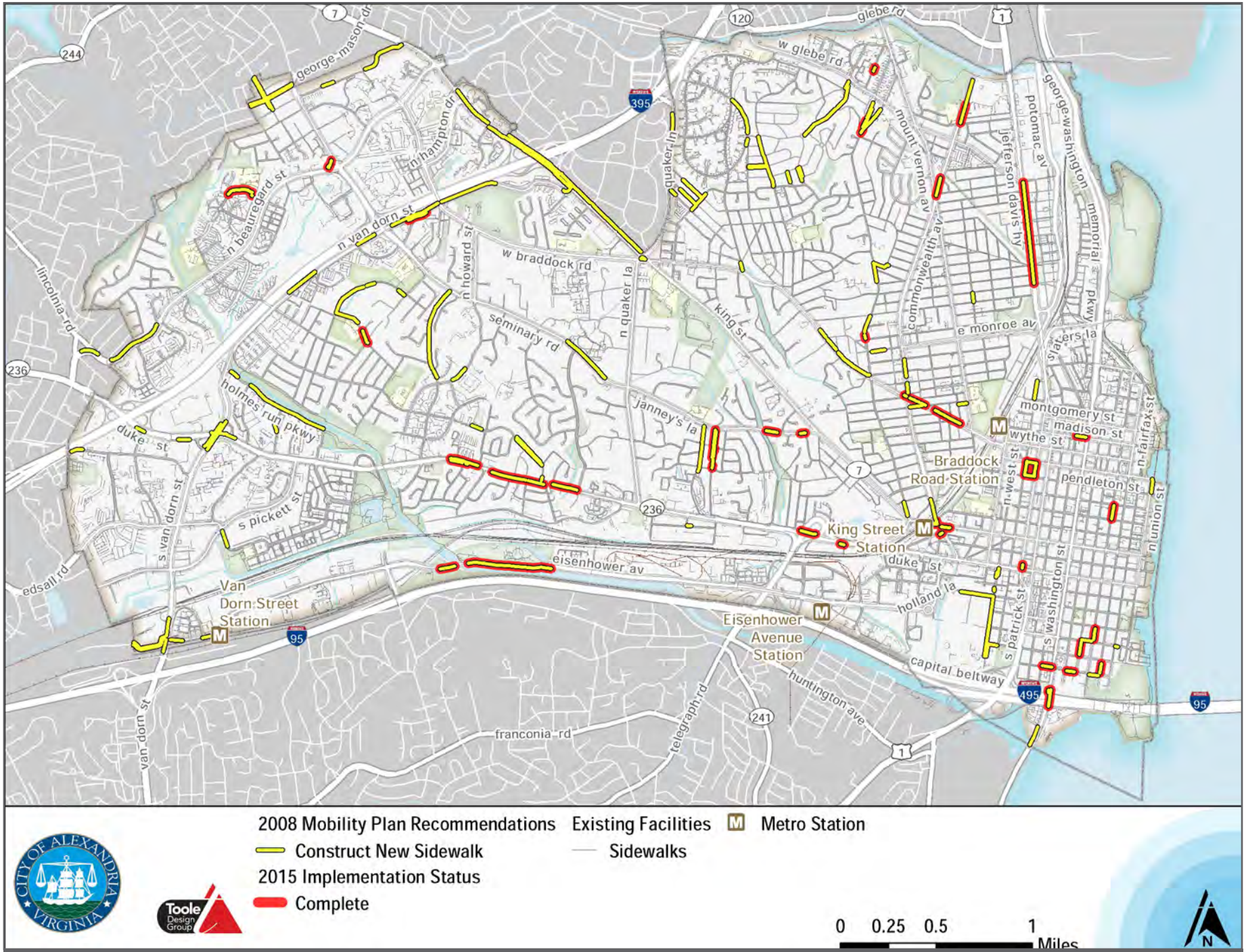


Figure 2.4: Status of 2008 "New Sidewalk" Recommendations

THIS PAGE INTENTIONALLY LEFT BLANK

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.

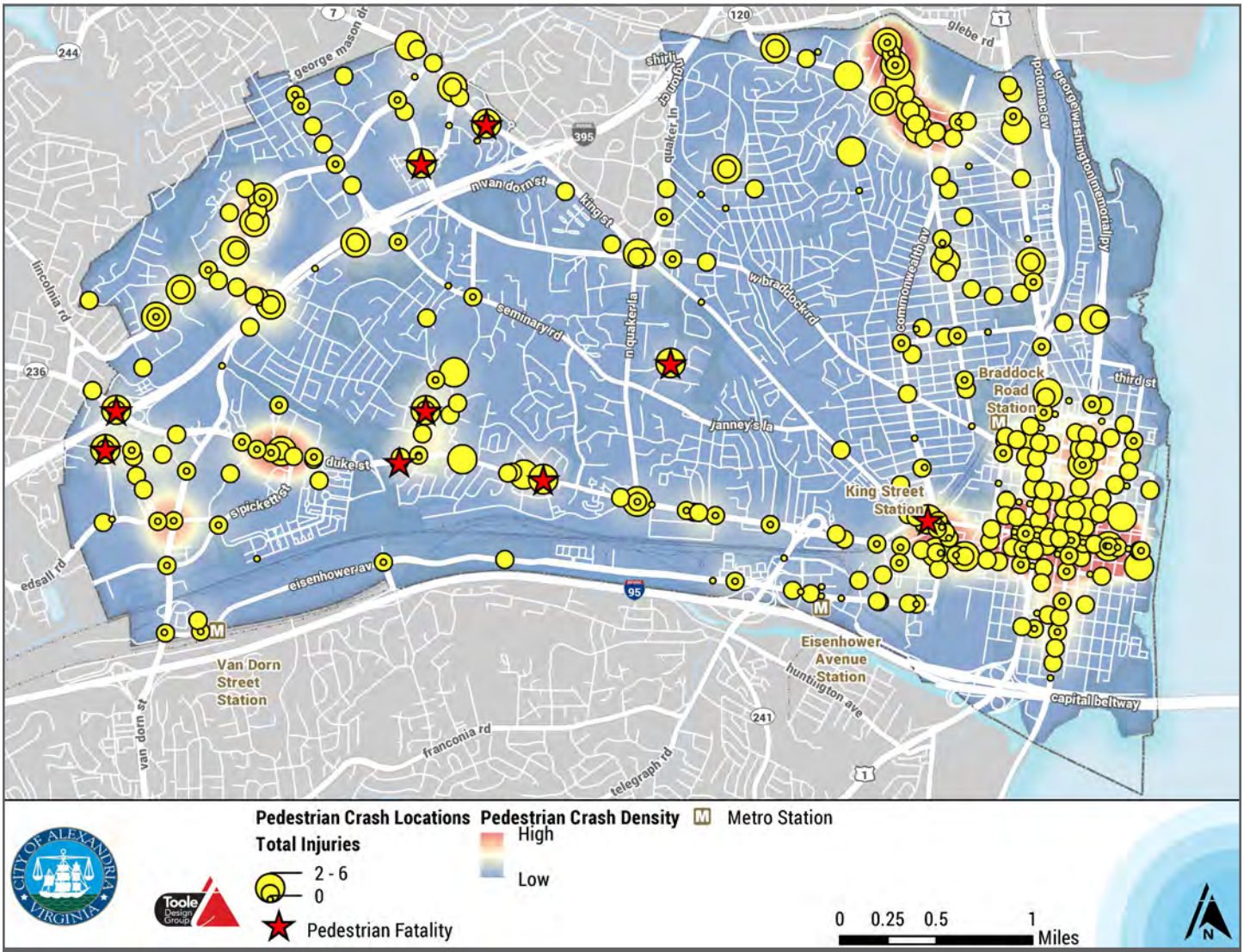


Figure 2.5: Reported Pedestrian Crashes (January 2005 – December 2014)

6 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 641 pedestrian related incidents for the ten year period, the true number of incidents may be different as many pedestrian crashes tend to not be reported to police and therefore are not reflected in the data.

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.

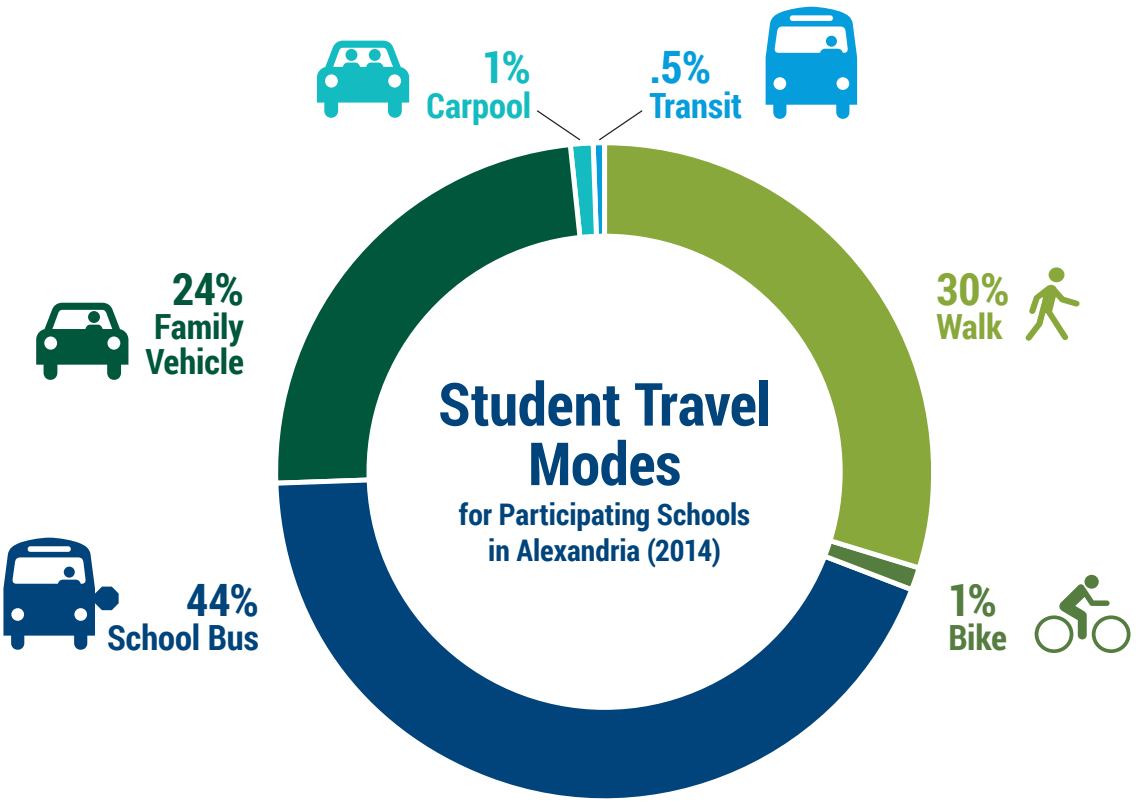


Figure 2.6 : Student Travel Modes for Participating Schools in Alexandria (2014)

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

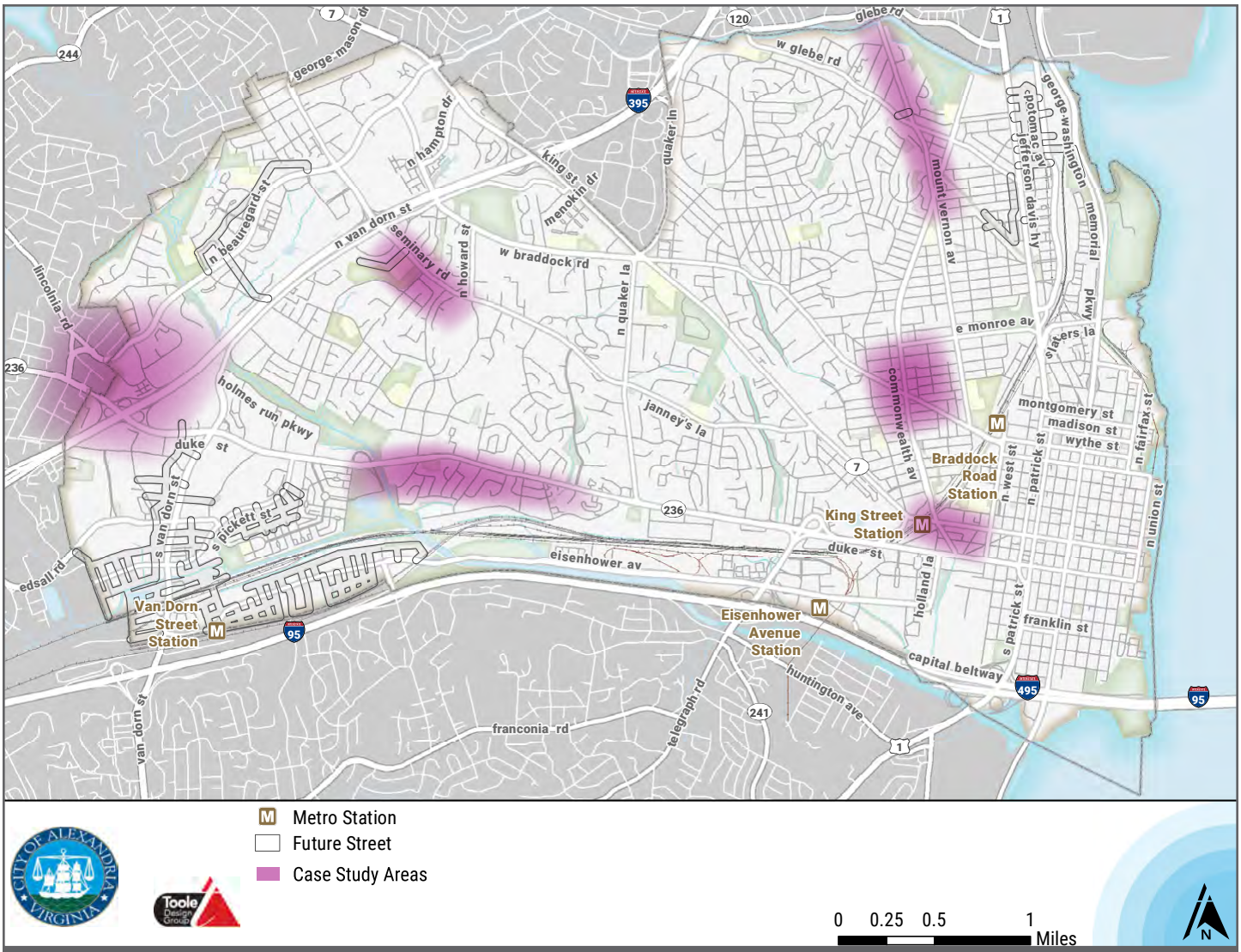


Figure 2.8: Map of Case Study Areas

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 (web link)
- Duke Street Corridor (web link)
- Mount Vernon Avenue/Four Mile Run Trail (web link)
- King Street Station (web link)
- Commonwealth and Braddock (web link)

Recommendations

Case Study Area:
Seminary Road/Hammond Middle School
Pedestrian Recommendations

- A. Remove Obstruction
- C. Replace/Upgrade Existing Curb Ramp
- D. Install New Crosswalk
- E. Repair/Upgrade Existing Crosswalk
- G. Modify/Repair Existing Pedestrian Signal
- J. Improve Bus Stop Access
- P. Reconfigure Roadway/Intersection
- Repair/Upgrade Sidewalk

Other

- M Metro Station
- Bus Stops

Toole Design Group

CITY OF ALEXANDRIA VIRGINIA

Pedestrian and Bicycle Master Plan Update

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

THIS PAGE INTENTIONALLY LEFT BLANK

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)

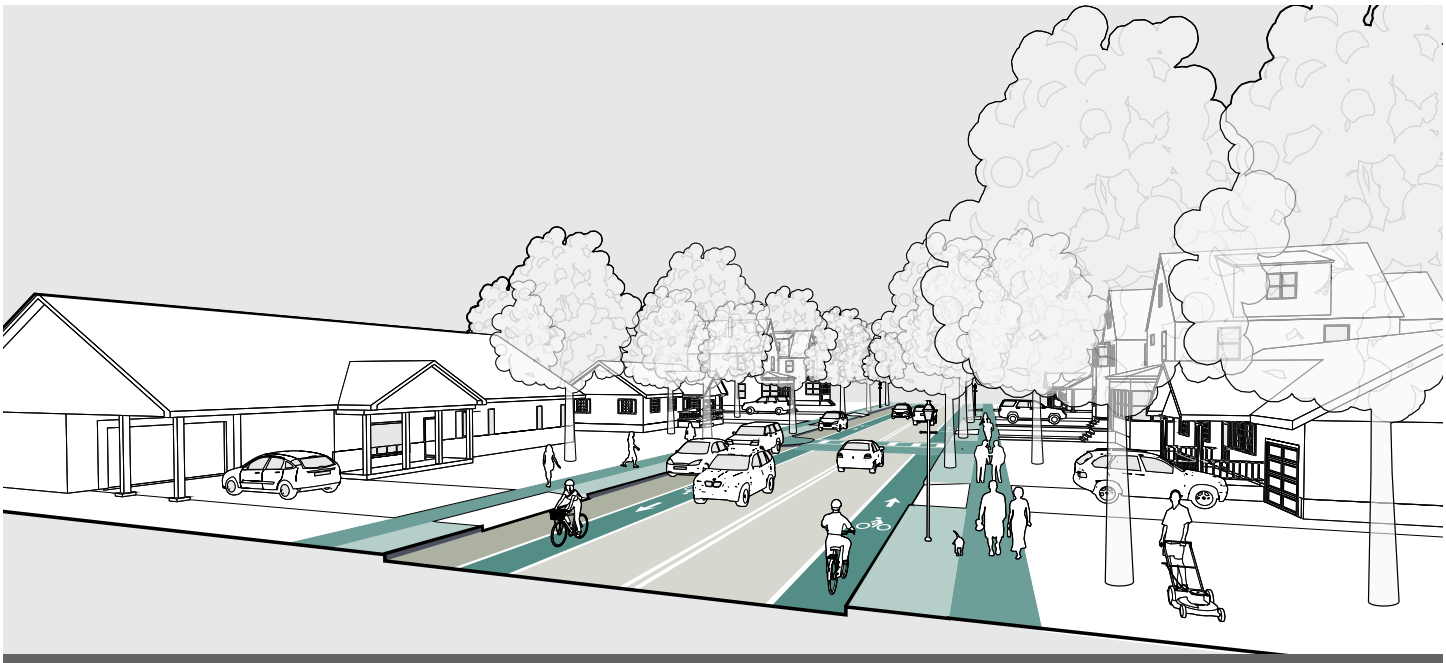
Pedestrian Engineering Strategies

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.



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

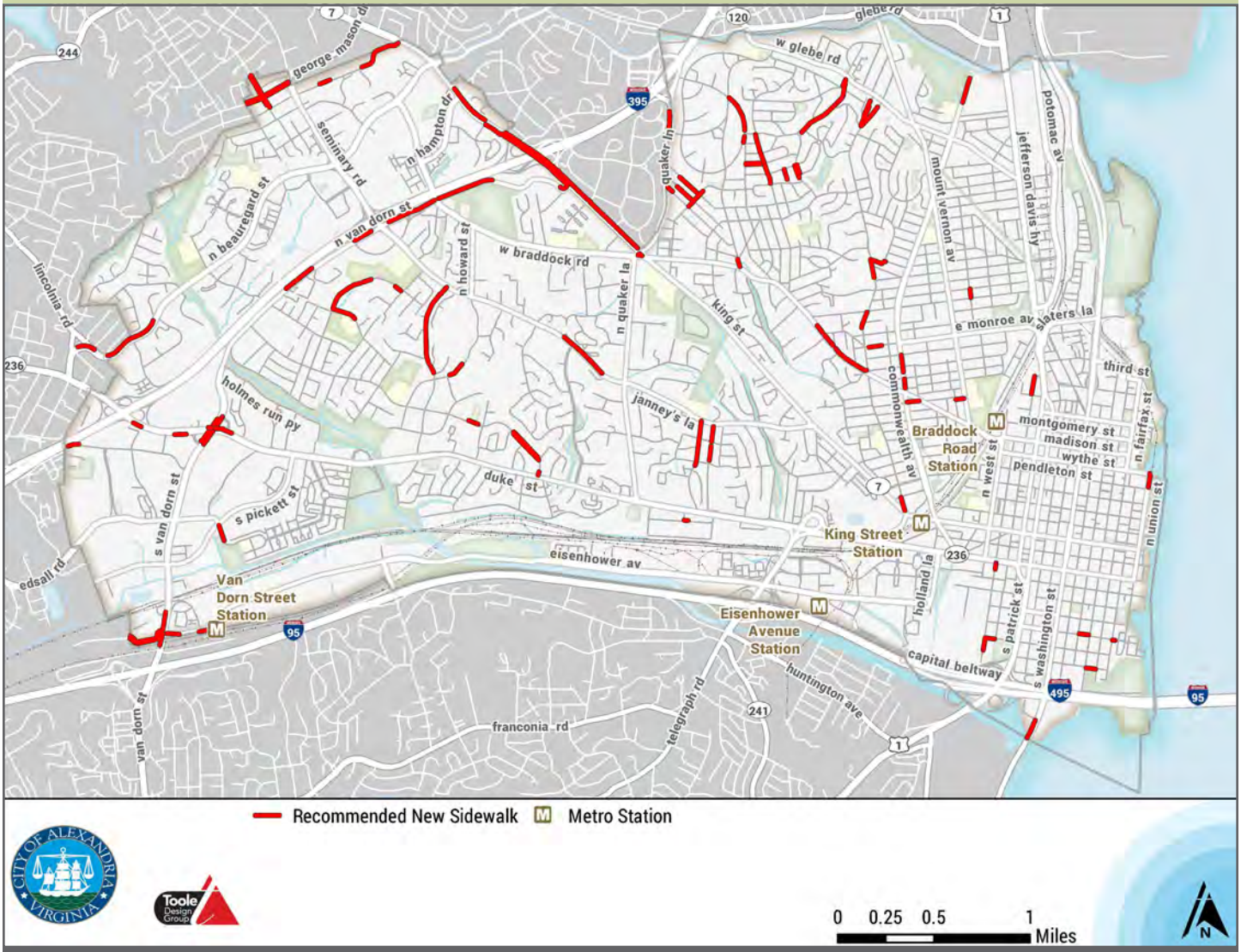


Figure 2.10 Citywide Map of All Recommended New Sidewalk Projects

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*

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.

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

Pedestrian Engineering Strategies

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.

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.

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.

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.

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.

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.

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.

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.

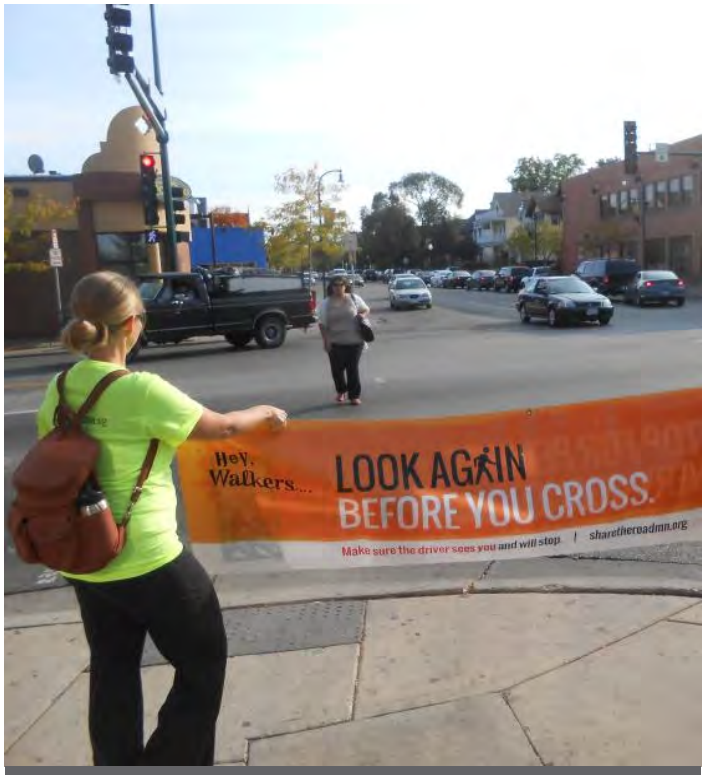
Pursue funding to oversee education and outreach for pedestrian/multimodal transportation safety initiatives citywide.

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.

THIS PAGE INTENTIONALLY LEFT BLANK

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.

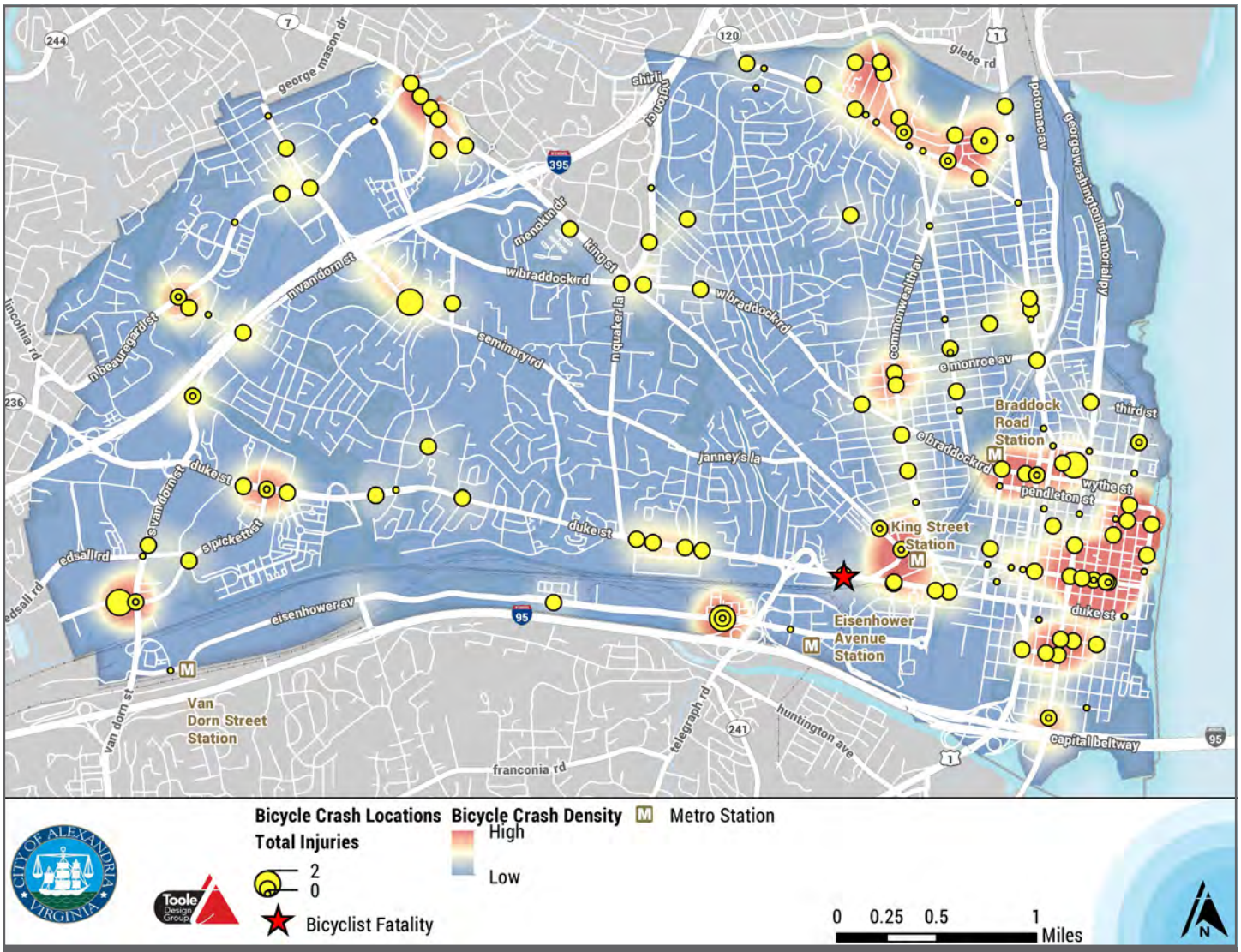


Figure 3.3: Reported Bicycle Crashes (January 2005 – December 2014)

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.

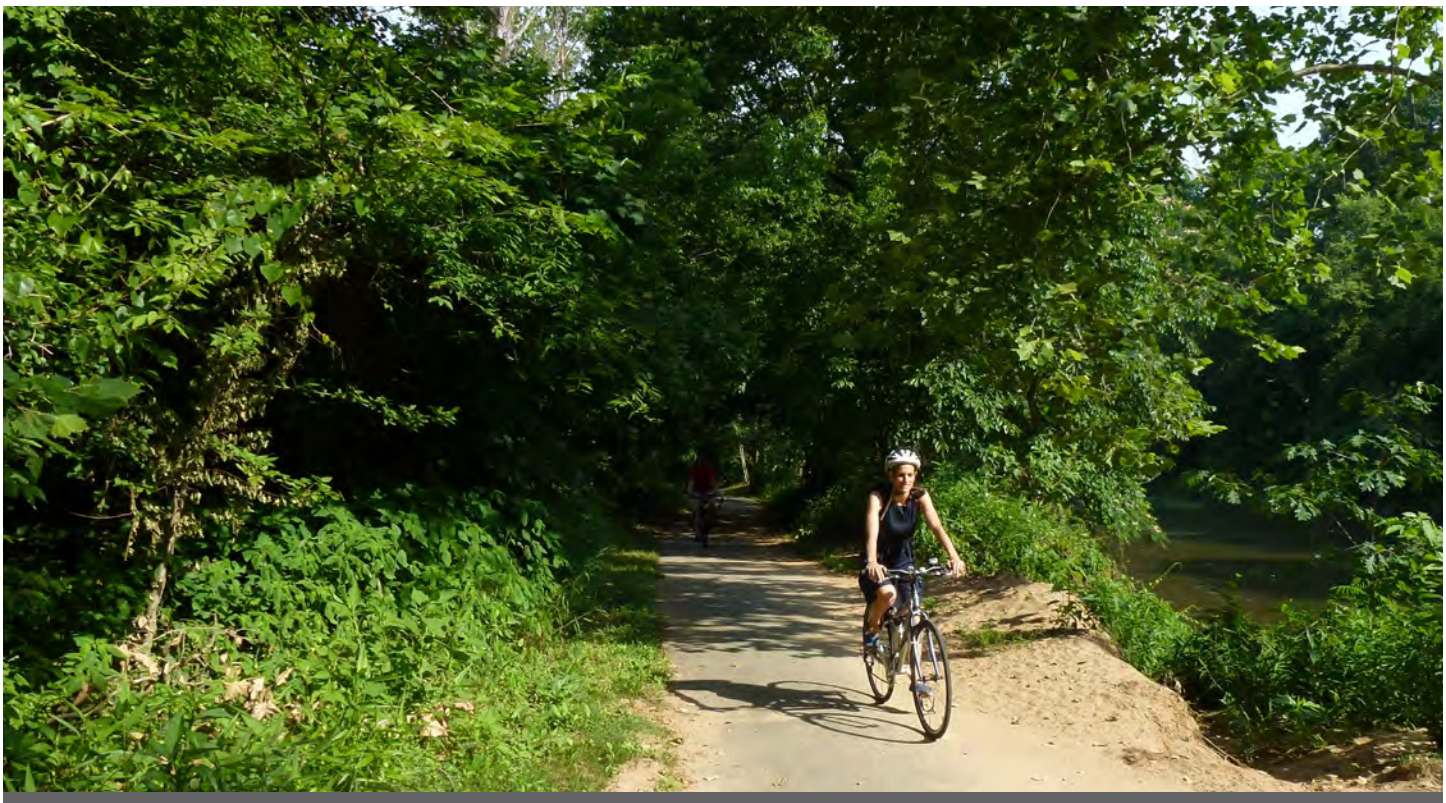
Bicycle Strategies

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

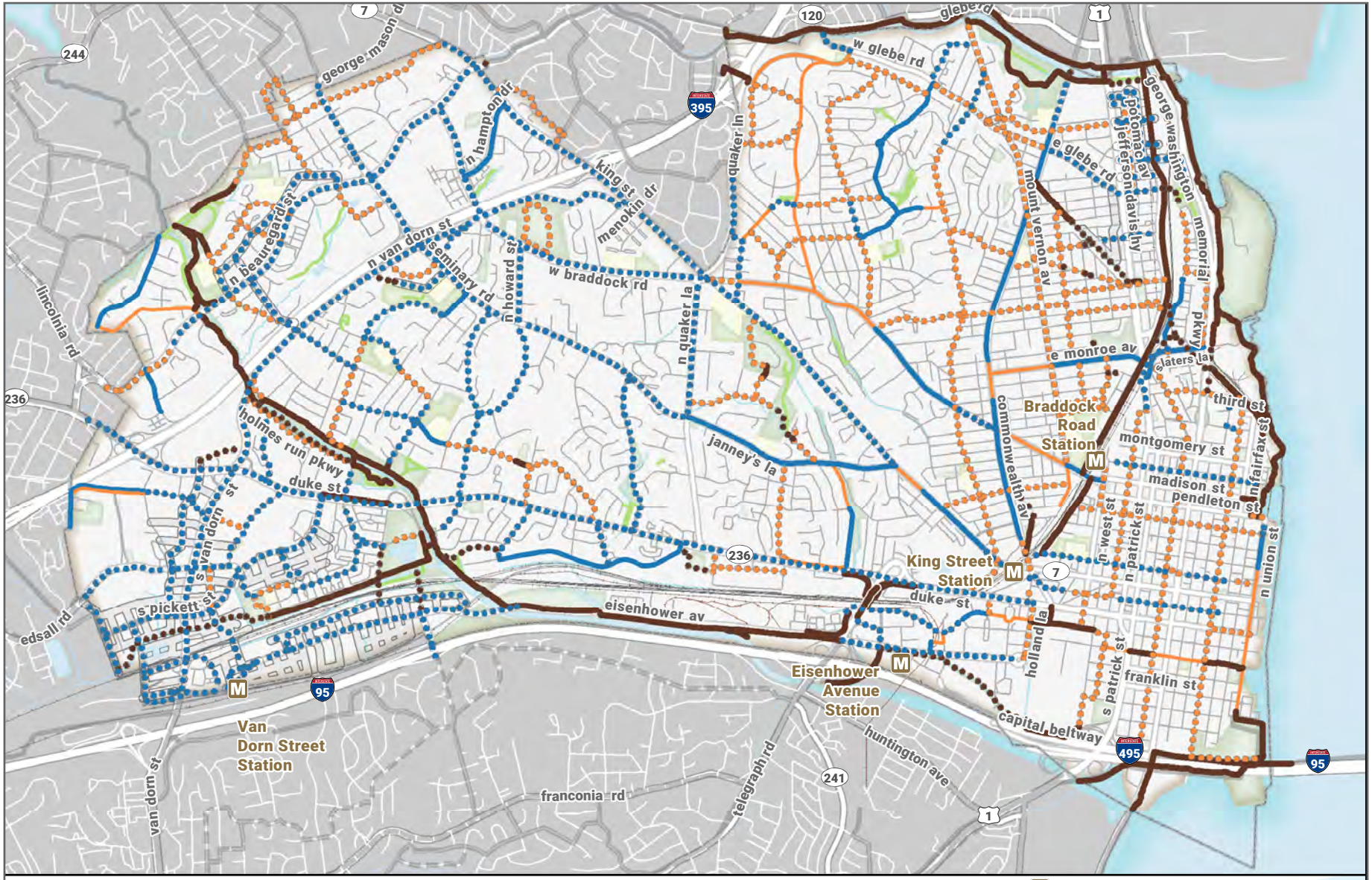
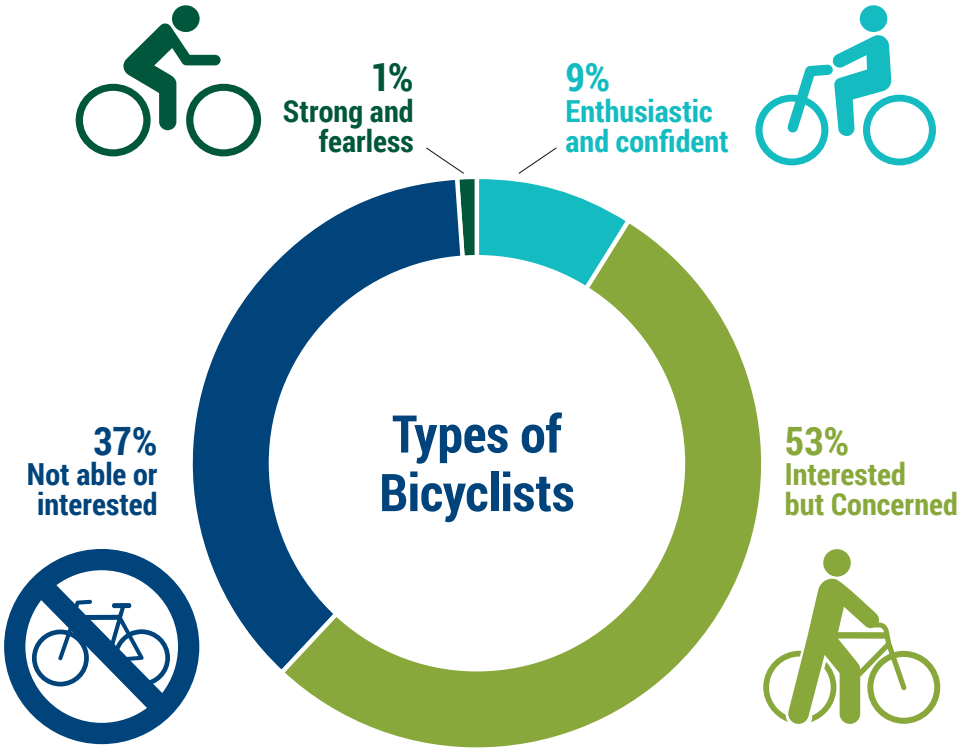


Figure 3.5: Proposed Bicycle Network

THIS PAGE INTENTIONALLY LEFT BLANK

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[13]

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.

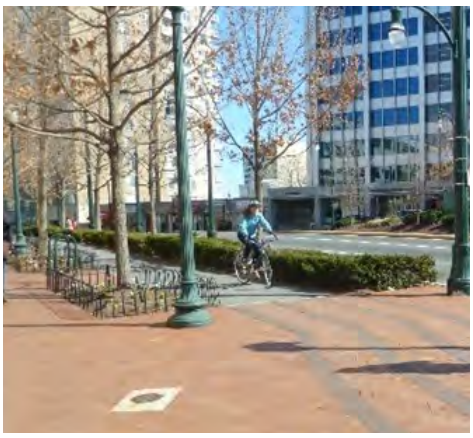
In order to serve a broad array of bicycle riders, Alexandria will use a range of bicycle facility types to implement the proposed bicycle network over time. While specific design decisions for each corridor will be made in the future based on targeted public input and detailed analysis, the map in Figure 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]

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]

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

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.

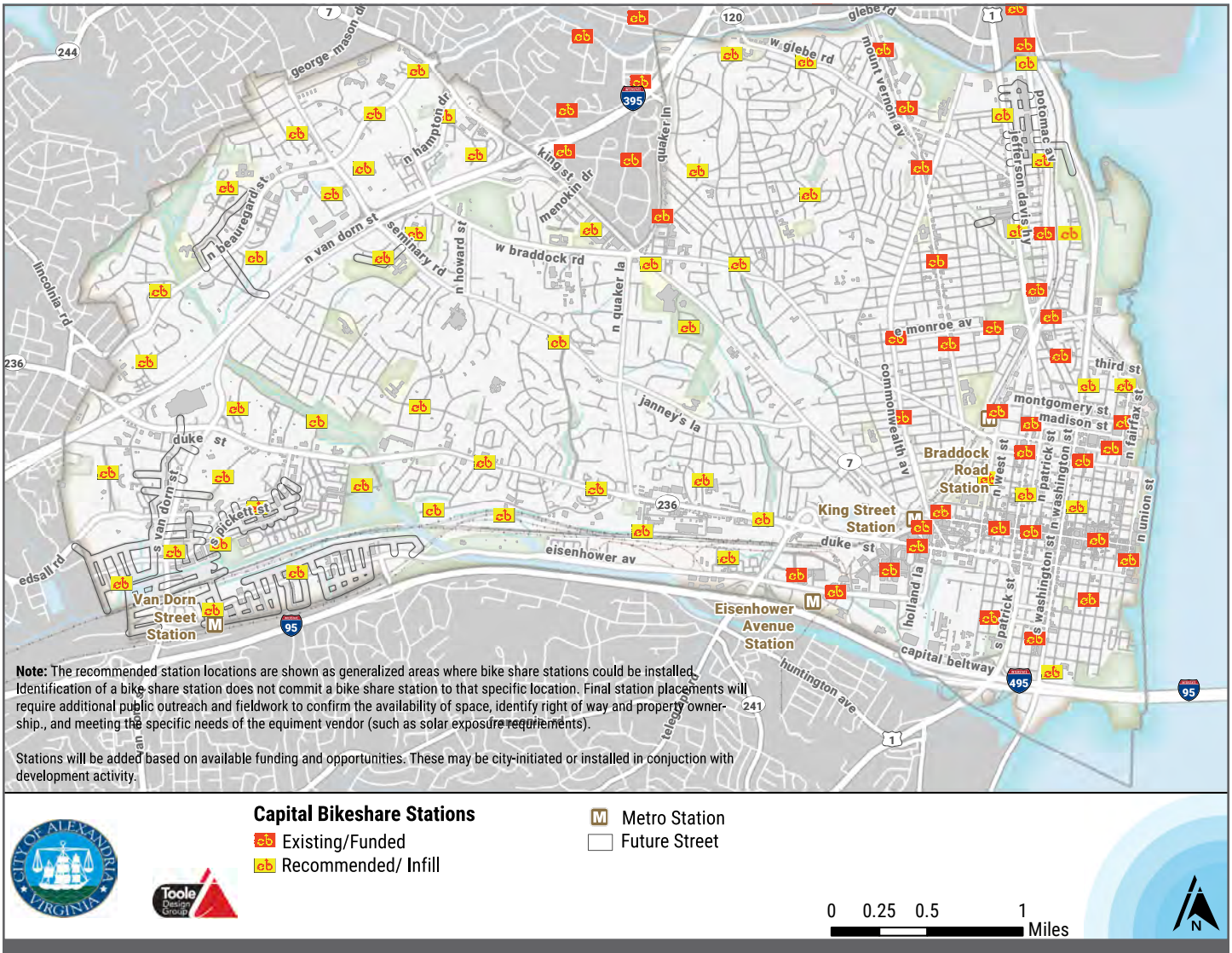


Figure 3.7: Recommended Capital Bikeshare Expansion Map (General Station Locations)

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

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.

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.

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.

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

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.

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.

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.

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.

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.

Bicycle Program and Policy Strategies

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

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

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.

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*

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

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 to support bicycle education, outreach and promotion amongst underrepresented groups including 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.

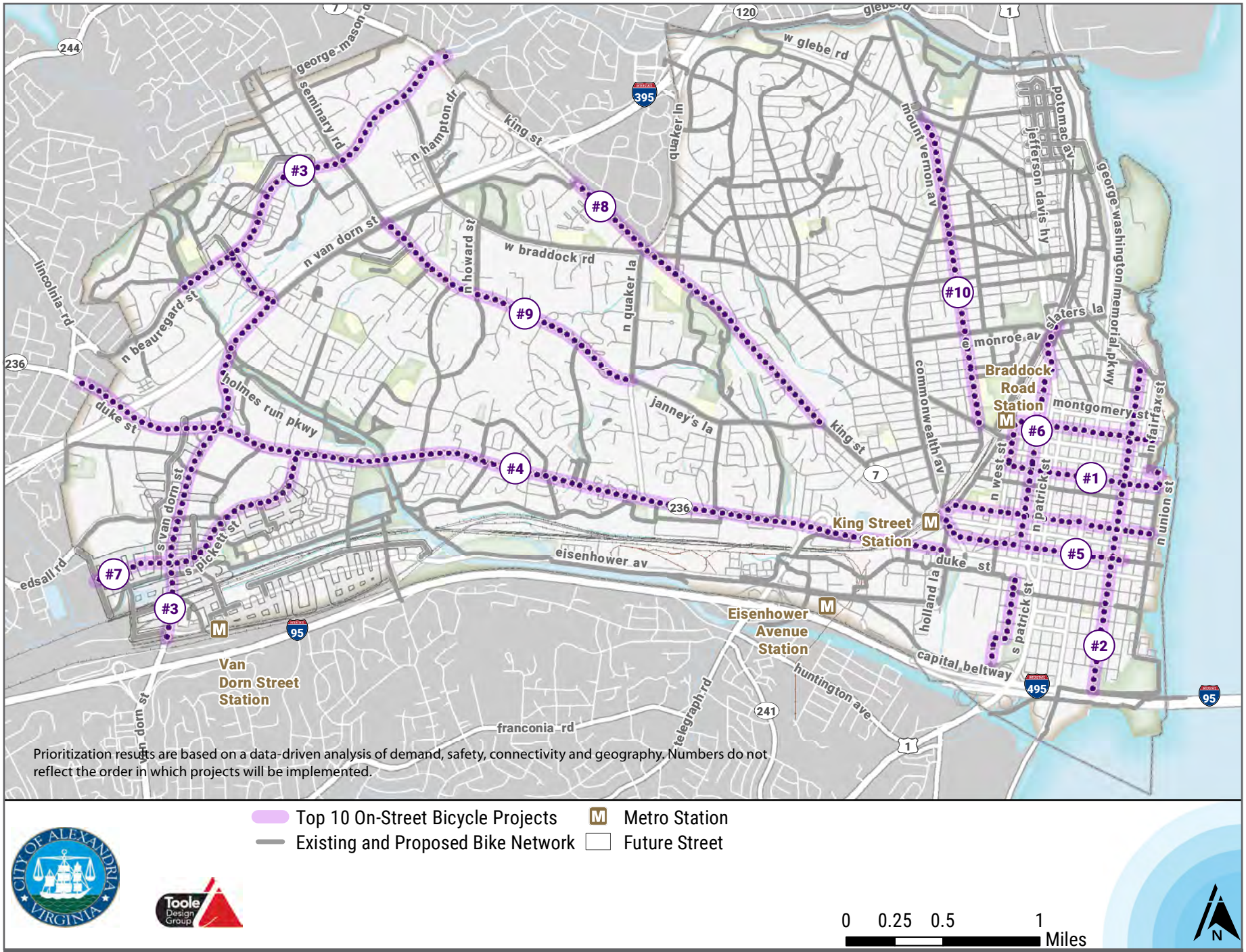
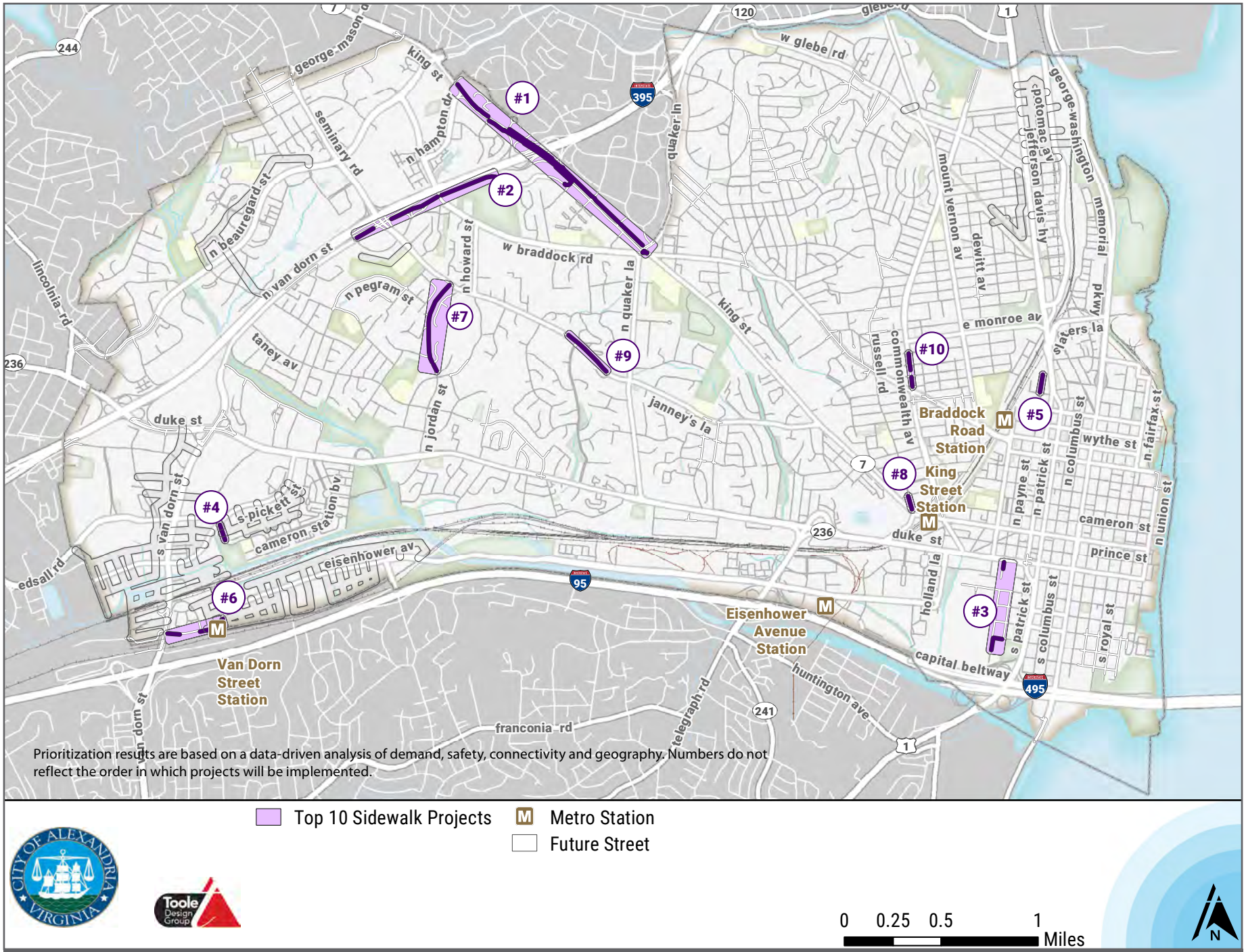


Figure 4.2: Top 10 On-Street Bicycle Projects

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



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 4.4: 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

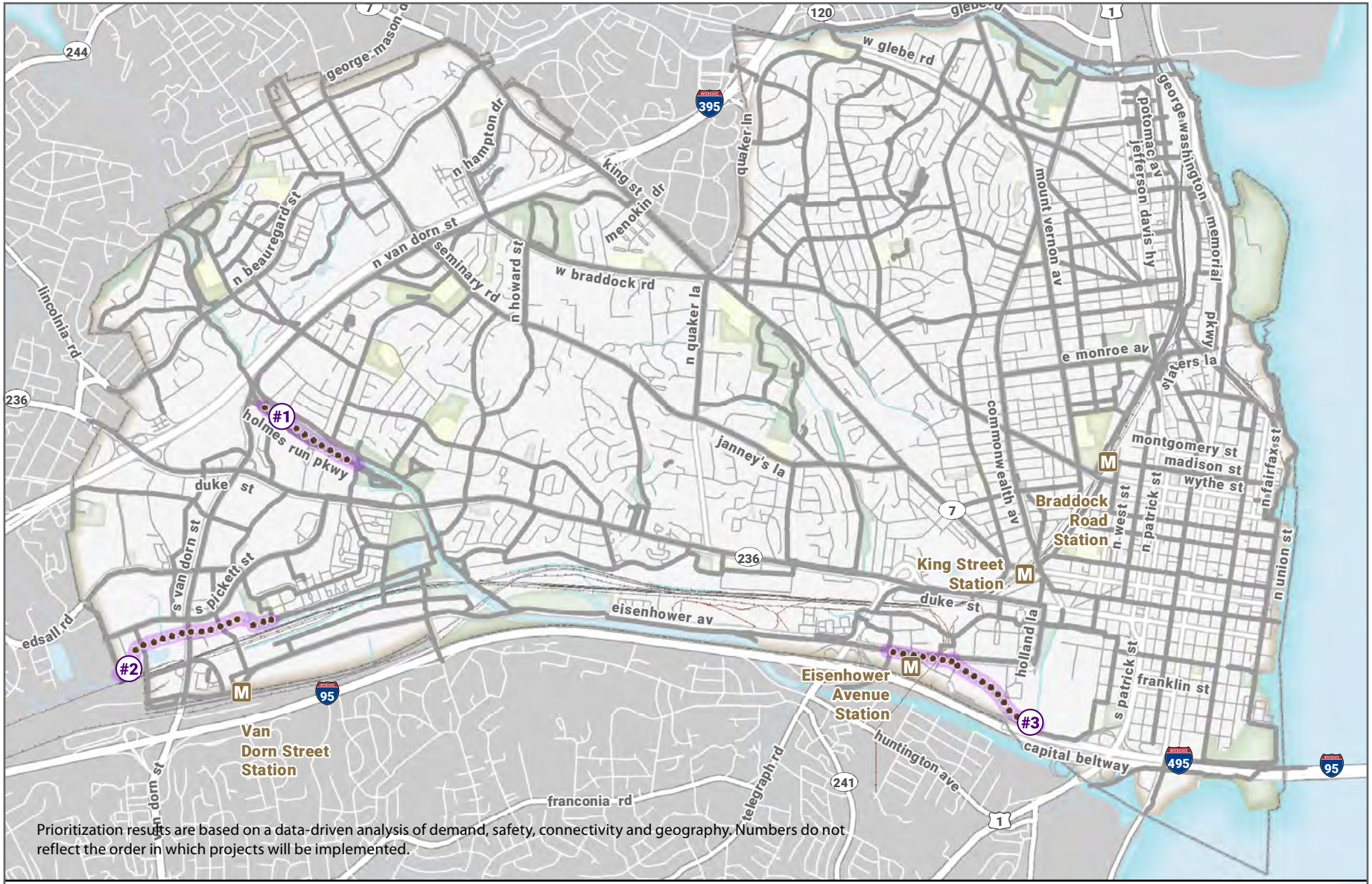


Figure 4.6: Top 3 Trail Projects

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

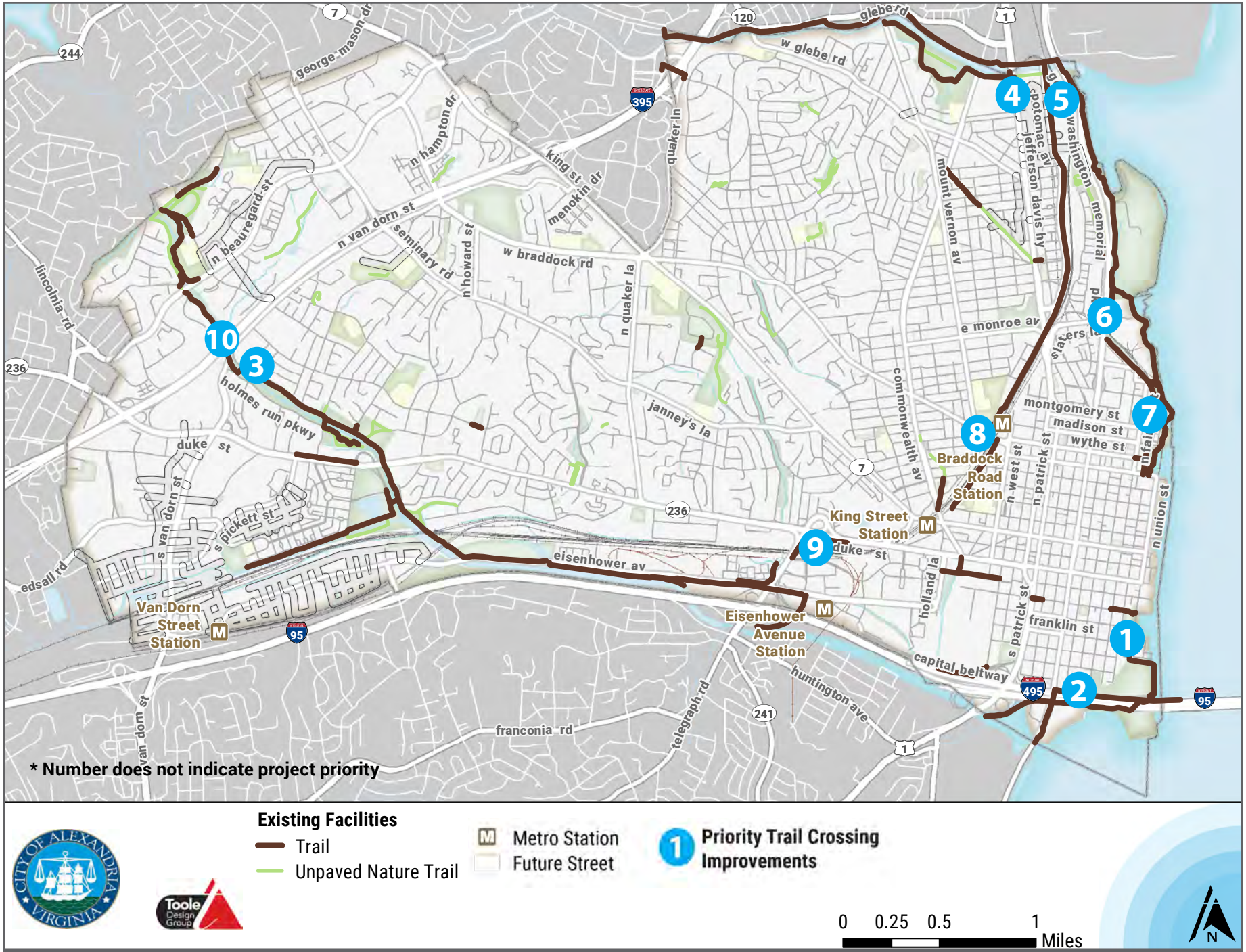


Figure 4.8: Priority Trail Crossing Improvements

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.

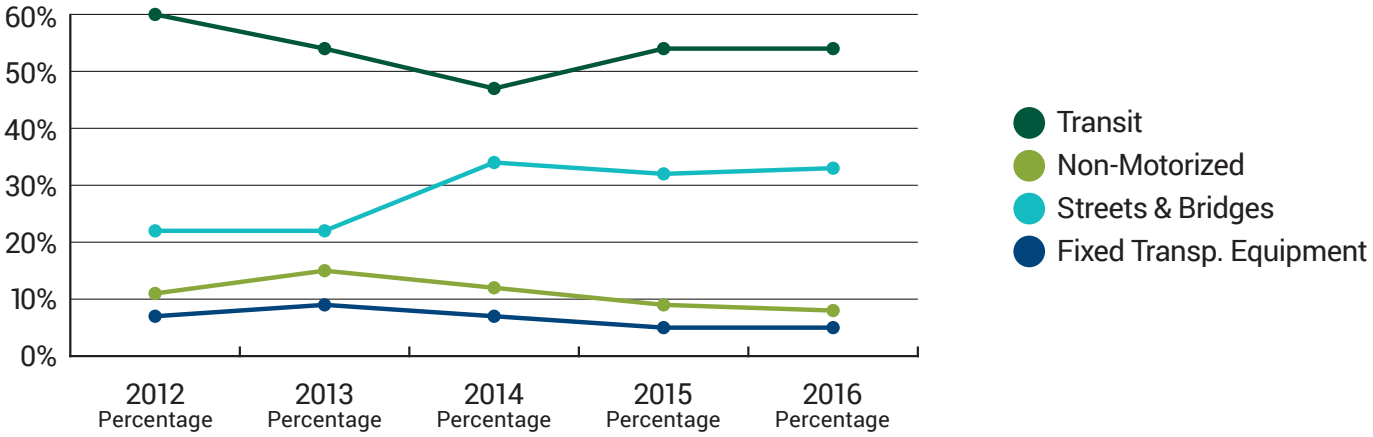
> The specificity provided in the revised Master Plan is valuable for future small area planning and for the review of development proposals, which will be the source of funding for many improvements identified in the Plan.
>
> – Dave Brown, *Alexandria Transportation Commission*

	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.

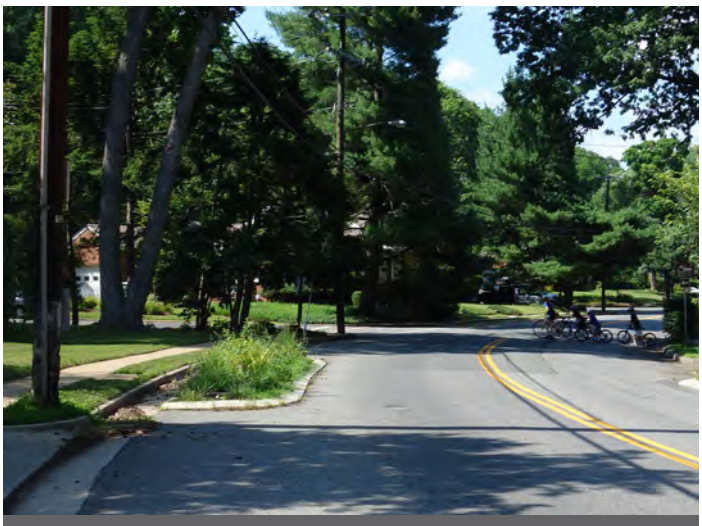
Surface Transportation Block Grant.

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

THIS PAGE INTENTIONALLY LEFT BLANK

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/)

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A:
Civic Engagement Plan

Pedestrian and Bicycle Master Plan Update and Complete Streets Design Guidelines

Civic Engagement Plan

July 2014

Introduction

In 2014 and 2015, the City of Alexandria will update its Pedestrian and Bicycle Master Plan and will concurrently develop Complete Streets Design Guidelines. The Pedestrian and Bicycle Master Plan Update will include an assessment of the existing transportation network, the identification of priority pedestrian and bicycle corridors, and recommendations for policies and programs that support increased walking and bicycling in Alexandria. The Complete Streets Design Guidelines will provide guidance for developers, City staff and the public on how to incorporate the needs of all transportation system users into street design and redevelopment projects. The two projects will be undertaken through a coordinated approach managed by the Department of Transportation and Environmental Services and with support from a consultant team led by Toole Design Group.

On April 8th, 2014, the Alexandria City Council created the Ad Hoc Pedestrian and Bicycle Master Plan Advisory Committee, a twelve-member body that will make recommendations to City staff on the update to the Pedestrian and Bicycle Master Plan and Complete Streets Design Guidelines. The group will work closely with City staff and the project consultants throughout the plan development process, helping to facilitate civic engagement and providing input on pedestrian and bicycle issues and needs, policy and facility recommendations, and criteria for project prioritization.

The purpose of this Civic Engagement Plan is to outline the process that will be used to ensure broad public participation and meaningful engagement in the development of the Pedestrian and Bicycle Master Plan Update and Complete Streets Design Guidelines. This Plan describes how the City will provide timely and appropriate information about project meetings and milestones, and identifies the strategies that will be used to gather public and stakeholder input.

This process is designed to incorporate the principles of engagement outlined in *What's Next Alexandria: Handbook for Civic Engagement*, including:

- Respect
- Inclusiveness and Equity
- Early Involvement
- Easy Participation
- Meaningful Engagement
- Mutual Accountability
- Transparency
- Sustained Collaboration
- Evaluation

The project timeline and key civic engagement strategies are summarized in the figure on page 5. Details on specific strategies are provided in the *Key Civic Engagement Strategies* section on page 6. For more information about the City's *Handbook for Civic Engagement*, visit: www.alexandriava.gov/WhatsNext. For current information about the Bicycle and Pedestrian Master Plan Update and Complete Streets Design Guidelines, visit: www.alexandriava.gov/PedBikePlan.

Civic Engagement Goals and Objectives

The primary goal of civic engagement in the Bicycle and Pedestrian Master Plan Update and Complete Streets Design Guidelines is to ensure that members of the community are actively, constructively, and meaningfully involved in the public decisions that affect their lives. Specifically, the civic engagement process for this project will seek to:

- Set goals for the Pedestrian and Bicycle Master Plan Update
- Inform the Guiding Principles of the Complete Streets Design Guidelines
- Provide input on existing conditions, opportunities and challenges
- Provide feedback on recommendations and concepts
- Ensure adequate transparency for the project process and decisions
- Increase public knowledge about bicycle and pedestrian transportation concepts

Target Groups and Stakeholders

To ensure that the final products of this project reflect the needs and values of City residents, workers and visitors, a range of strategies will be applied to engage as broad and diverse a group as possible. A variety of engagement mechanisms, including online, in person, formal and informal methods, will provide many ways for people to participate in the process. Stakeholders that this process will seek to reach include:

- The general public (including pedestrians, bicyclists and motorists)
- Bicycling, walking and public health advocates
- Regional partners
- Private-sector developers (this applies particularly to the Complete Streets Design Guidelines)
- Civic groups
- City and Alexandria Transit Company (ATC) staff

In addition to these stakeholders, key focus areas for engagement will include:

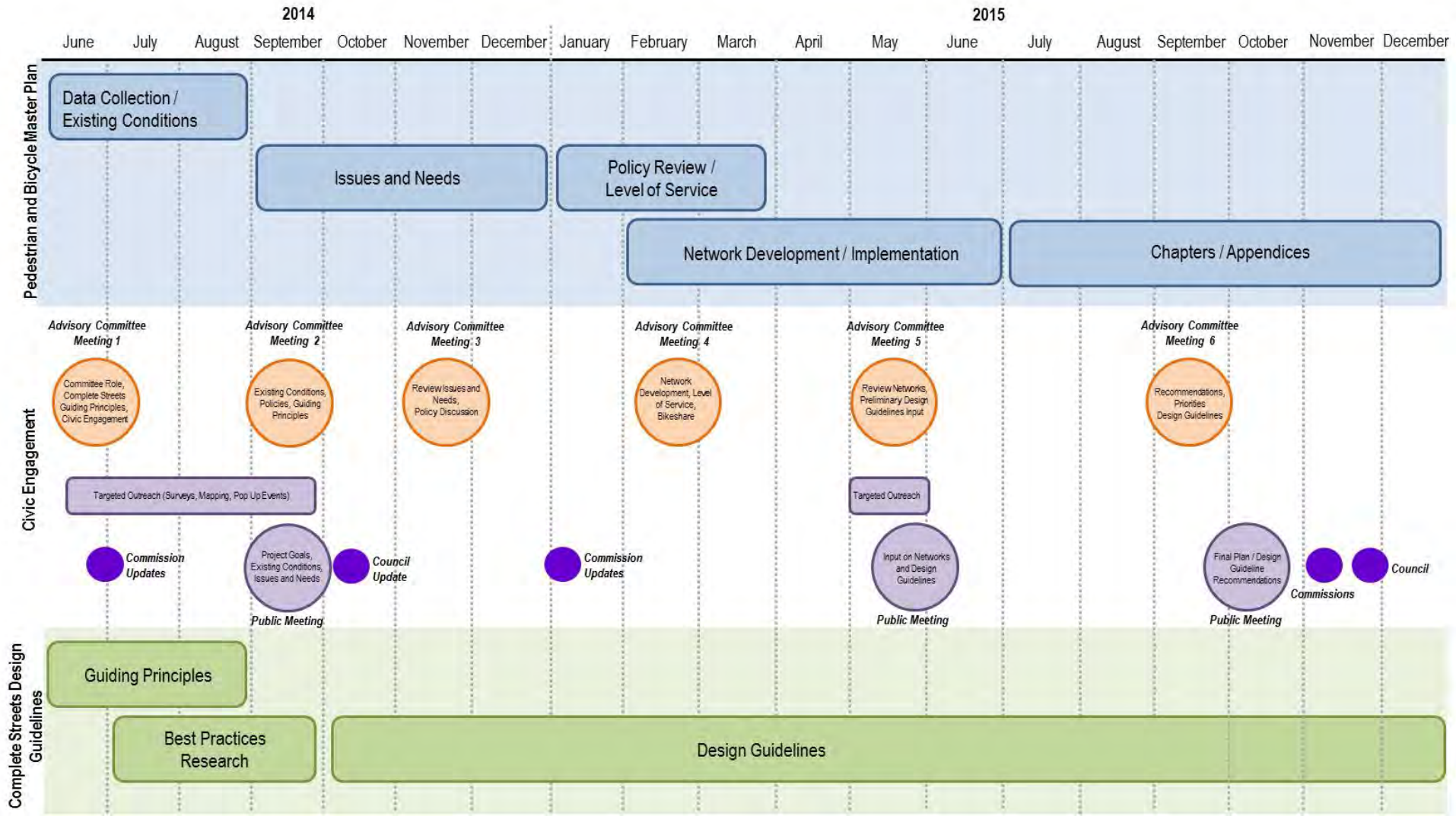
- Cultural diversity: To engage people of various cultural backgrounds, the City will hold Ad Hoc Pedestrian and Bicycle Master Plan Advisory Committee meetings in different, rotating neighborhoods located throughout the City; advertise meetings and open houses in through local TV channels and newspapers, including Spanish-speaking publications; provide Spanish-language versions of the project's online survey and interactive web map; and provide Spanish-language translation services at the three public open houses.
- Geographic distribution: To ensure that this citywide project includes participation from residents who live throughout Alexandria, the City will post fliers about public meetings at community gathering places located throughout the City; provide information at community events such as farmers markets or street fairs; hold Ad Hoc Pedestrian and Bicycle Master Plan Advisory Committee meetings (open to the public) in different, rotating neighborhoods located

throughout the City; and collect data from project participants (those completing online surveys/map and those participating in meetings/open houses) on where they live (by neighborhood), so that participant distribution can be monitored and outreach strategies can be modified as needed during the project.

In the same way that the planning process will seek to engage a broad and diverse cross-section of residents, employees and visitors of Alexandria, the Pedestrian and Bicycle Master Plan Update and Complete Streets Guidelines will be designed to support improved walking and bicycling conditions for people of all skill-levels and ages, including those with physical disabilities, people traveling for recreation and transportation purposes, and people who may not currently bicycle.

PEDESTRIAN AND BICYCLE MASTER PLAN / COMPLETE STREETS DESIGN GUIDELINES
PROJECT PROCESS AND CIVIC ENGAGEMENT

June, 2014



Key Civic Engagement Activities

The primary engagement activities for this project are described below. The relevant principles of engagement from Alexandria's *Handbook for Civic Engagement* are highlighted for each activity.

Civic Engagement Activity	*Key Principles of Engagement*
Ad Hoc Pedestrian and Bicycle Master Plan Advisory Committee • An Ad Hoc Pedestrian and Bicycle Master Plan Advisory Committee (Advisory Committee) comprised of citizen representatives and civic leaders will be established. It is anticipated that the Advisory Committee will meet at least six (6) times over the course of the project. • The purpose of the Advisory Committee is to make recommendations to City staff on the update to the Pedestrian and Bicycle Master Plan and Complete Streets Design Guidelines. The group will identify pedestrian and bicycle issues and needs; provide input on policy recommendations and proposed pedestrian and bicycle networks; and evaluate criteria for prioritizing project recommendations. • The focus of the Advisory Committee will be on the Pedestrian and Bicycle Master Plan Update, though updates will be provided on the Complete Streets Design Guidelines. • Advisory Committee meetings will be announced via the project website and City eNews with at least one week notice. • Advisory Committee presentations and meeting materials will be posted on the project webpage. • Meeting comment forms will be provided at each Advisory Committee meeting to allow participants multiple channels to contribute. • The City will post the Civic Engagement Meeting Ground Rules at each Advisory Committee meeting (see Appendix A). • Although Advisory Committee meetings are not intended to serve as a primary mechanism for public feedback, agendas will include time for public comment whenever possible. • The Advisory Committee will play an important role in helping to promote project activities and opportunities for public involvement to their affiliated organizations and networks.	**Respect** **Inclusiveness and Equity** **Meaningful Engagement** **Mutual Accountability** **Transparency** **Sustained Collaboration**

Project Website • The City will maintain an up-to-date project website that features regular project updates, announcements for public meetings (including Advisory Committee meetings), open houses, links to online input tools, and draft plan documents. • The City will post all meeting materials from public open houses on the project website within two weeks of the meeting date. • The project website will include staff contact information and a Frequently Asked Questions sheet.	**Inclusiveness and Equity** **Early Involvement** **Easy Participation** **Transparency** **Evaluation**
Social Media • The City will provide periodic project updates and notice of all public open houses/events via Facebook and Twitter. • To the extent possible, the City will distribute notices about key project milestones (public meetings, etc) to Community Associations to enable them to post the information on neighborhood blogs and listserves.	**Early Involvement** **Easy Participation** **Transparency**
Online Survey and Interactive Web Map • The City will seek input on pedestrian and bicycle routes, issues and priorities through an online survey and interactive web map. Both online tools will be available for at least two months during the early phases of the project. • The online survey and interactive web map will be advertised through the City's website, social media, email listservs, and other appropriate venues.. • The online survey and interactive web map will be available in English and Spanish. • Anonymous survey and web map responses will be assembled and posted on the project website. Data on survey respondents (age, gender and geographic diversity) will also be made public. The City recognizes that responses to online surveys are not typically representative of the community due to self-selection. For this reason, the City will consider survey input alongside public input gathered through other means.	**Inclusiveness and Equity** **Early Involvement** **Easy Participation**

Community Events • The City will provide information for community events during the course of this project, such as farmers markets, street fairs and similar neighborhood activities. At each event, the City will provide information on the project and on the process for public involvement.	**Respect** **Inclusiveness and Equity** **Easy Participation** **Transparency** **Sustained Collaboration**
Public Meetings/Open Houses • This project will include three (3) public meetings/open houses. Meeting venues will be easily accessible by transit and accessible to persons with disabilities. • The goal of the first public meeting will be to introduce the project, identify key goals for the project and preliminary needs of the transportation network, and promote the project website, online survey and interactive web map. • The second meeting will be an open house format, with stations designed to gather input on the existing conditions of the transportation network, programs and policy opportunities, and design treatments. • The goal of the third public meeting will be to review and provide input on the draft pedestrian and bicycle network and design guidelines. • Meeting materials (maps, presentations, handouts) will be clear and concise, presenting options and providing relevant background information to the extent feasible. • It is the City's goal is to provide ample notice for public meetings. Public Meetings will be advertised through the project website, social media, the City eNews, neighborhood listserves, and fliers at libraries, community centers, and at other popular gathering places. • The Ad Hoc Pedestrian and Bicycle Master Plan Advisory Group will also provide notice to their respective organizations (for those who are representing or affiliated with community organizations) about upcoming public meetings and open houses.	**Respect** **Inclusiveness and Equity** **Early Involvement** **Easy Participation** **Meaningful Engagement** **Mutual Accountability** **Transparency** **Sustained Collaboration** **Evaluation**

- Background information (meeting purpose and agenda) will be distributed at least one week in advance of the public meetings via eNews, social media and the City's webpage. Input from meetings will be summarized and posted on the project website within two weeks of meetings.
- Meeting evaluation forms will be available at all public meetings.
- The Civic Engagement Meeting Ground Rules will be posted and applied at each meeting.

Commission/Council Presentations

- The City and consultant team will provide presentations at key stages of the project to City Council and Commissions, to include at a minimum the Planning Commission, the Parks and Recreation Commission and the Transportation Commission. Presentations will provide updated information on the project status and will seek input from Commission/Council members on priorities, issues, and proposed pedestrian and bicycle networks.

Respect
Early Involvement
Mutual Accountability
Transparency

Better Block

- This project will potentially include a unique civic engagement activity called a Better Block. A Better Block is a short-term event that uses quick, inexpensive changes to temporarily transform an existing street into a Complete Street. These events have been used in cities around the country to demonstrate the transformative power of good pedestrian and bicycle infrastructure.
- The City will work with the Advisory Committee and consultant team to select the priority site for the Better Block. The City and consultants will work with the Advisory Committee to identify local stakeholders who will be engaged in planning, developing, promoting and executing the event.
- The Better Block will be advertised through the project website, social media, the City eNews, neighborhood listserves, and fliers at libraries, community centers and other popular gathering places.

Inclusiveness and Equity
Easy Participation
Transparency
Sustained Collaboration
Evaluation

Civic Engagement Framework

To ensure consistency in how the City engages the community in different projects, Alexandria's *Civic Engagement Handbook* established the following Framework for Engagement, which will be completed for each City project.

City Department: T&ES	Project: Pedestrian and Bicycle Master Plan Update and Complete Streets Design Guidelines	Goal: Prepare update to the Transportation Master Plan, including future non-motorized network, project recommendations and Complete Streets Design Guidelines Manual	Overall project timeline: June 2014 – December 2015
Phase 1 – Information (Gathering, Organizing, Understanding)	**Phase 2** – Options (Discuss and Evaluate Options)	**Phase 3** – Recommendations	**Phase 4** – Implementation and maintenance
June 2014 – January 2015 Tasks: Preparation of civic engagement plan, Identify stakeholders, establish Advisory Group (AG) to represent various stakeholder and community groups. Solicit feedback from AG and community members through meetings, social media, targeted outreach and other communication. Help facilitate AG members' communication to the broader community and their respective groups. Communication: Post Civic Engagement Framework (including proposed schedule) and AG committee information to City website. Provide 3-week notice of meetings in appropriate forums (City website, flyers, eNews, social media etc.), and post agendas and meeting materials one week in advance.	**February - Apr 2015** Tasks: Solicit feedback from AG and community members through meetings and other communication. Help facilitate AG members' communication to the broader community and their respective groups. Communication: Provide 3-week notice of meetings in appropriate forums (City website, flyers, eNews, social media etc.), and post agendas and meeting materials one week in advance. Engagement Activities: - AG Mtg 4 - Network development and Level of Service, bike share expansion Deliverables: - Community Feedback and follow-up on how feedback was utilized for	**May - October 2015** Tasks: Solicit feedback from AG and community members through meetings and other communication. Help facilitate AG members' communication to the broader community and their respective groups. Communication: Provide 3-week notice of meetings in appropriate forums (City website, flyers, eNews, social media etc.), and post agendas and meeting materials one week in advance. Engagement Activities: - AG Mtg 5 - Review network recommendations, level of service, preliminary design guidelines - Public Mtg 2 - Issues and needs, policy development, networks development - Better Block – Input and Education	**November - December 2015 and ongoing** Tasks: Solicit feedback from public to ensure that established Principles are followed within the project recommendations, Transportation Master Plan update, and Complete Streets Design Guidelines Manual Communication: Provide 3-week notice of meetings in appropriate forums (City website, flyers, eNews, social media etc.), and post agendas and meeting materials one week in advance. Engagement Activities: - Ongoing notification of project implementation, as outlined in City policies Deliverables: - Final nonmotorized networks - Implementation recommendations

City Department: T&ES	Project: Pedestrian and Bicycle Master Plan Update and Complete Streets Design Guidelines	Goal: Prepare update to the Transportation Master Plan, including future non-motorized network, project recommendations and Complete Streets Design Guidelines Manual	Overall project timeline: June 2014 – December 2015
Phase 1 – Information (Gathering, Organizing, Understanding)	**Phase 2** – Options (Discuss and Evaluate Options)	**Phase 3** – Recommendations	**Phase 4** – Implementation and maintenance
<u>Engagement Activities:</u> - AG Mtg 1 - Intro, background, schedule, Civic Engagement Plan, issues - AG Mtg 2 - Existing conditions, stakeholder input, policies and guiding principles - AG Mtg 3 - Existing conditions, needs and issues, policy recommendations - Public Mtg 1 - Purpose, Existing conditions, preliminary needs and issues <u>Deliverables:</u> - Civic Engagement Plan - Existing Conditions report - Issues and Needs report - Complete streets guiding principles, best practices - Summaries of Community Feedback (such as surveys, field trips) and follow-up on how feedback was utilized for next steps	next steps - Policy Review and Development - Level of Service recommendations - Preliminary pedestrian and bicycle Networks - Draft Bike Share Operations Analysis	around Complete Streets concepts - AG Mtg 6 - Review project recommendations and priorities, implementation and final design guidelines - Public Mtg 3 - Present network, project recommendations, priorities and Complete Streets Design Guidelines <u>Deliverables:</u> - Implementation strategy - Summaries of Community Feedback and follow-up on how feedback was utilized for next steps	- Transportation Master Plan Chapter updates - Complete Streets Design Guidelines Manual - Summaries of Community Feedback and follow-up on how feedback was utilized for next steps

Conclusion

Civic Engagement is a central and essential element of the Update to the Pedestrian and Bicycle Master Plan and will provide valuable insight into the development of the Complete Streets Design Guidelines. The City is committed to using this Civic Engagement Plan to guide a process that emphasizes respect, transparency and inclusiveness. In addition to the participant evaluations that will be completed after each public meeting/open house, the entire civic engagement process will be evaluated by the Civic Engagement Interdepartmental Working Group at the culmination of the project. City staff will develop a brief summary of the project's civic engagement outcomes and will consider the level of public participation, the geographic distribution of participants and the effectiveness of outreach methods. That evaluation will be publicized via the City website and will be used to inform the civic engagement process and approach for future City projects.

Appendix A: Civic Engagement Meeting Ground Rules

These ground rules were developed for Alexandria's Civic Engagement Handbook and will be posted at all Advisory Committee meetings and Public Open Houses.

- Everyone's opinions are important and valid
- Meetings will begin and end on time
- Follow the agenda, please stay on topic
- Be respectful and courteous - avoid dominating the conversation
- Questions are welcomed
- (For Ad Hoc Committee meetings) Committee members have the floor first. Where possible, time will be allocated at the end of meetings for public comment.
- Please silence cell phones and other mobile devices

APPENDIX B:
Civic Engagement Summary

Civic Engagement Summary

Civic engagement played a large role in the completion of this Chapter related to bicycling and walking in the City. As outlined in the *What's Next Alexandria* Civic Engagement Handbook, a civic engagement plan was developed as part of the overall planning process (see Appendix A). This plan included outreach to various community stakeholders and groups, the establishment of an Ad Hoc Pedestrian and Bicycle Master Plan Advisory Committee (Ad Hoc Advisory Committee), and general outreach to the community at large. Online engagement played an integral role in updating the public on the progress of the planning process, and provided a platform for polling, and receiving feedback on issues related to bicycling and walking. This Appendix provides a summary of outcomes related to the civic engagement process which included: Ad Hoc Advisory Committee Meetings, online outreach via public website, interactive crowdsourcing map, and online surveys; public meetings, and general outreach throughout the City.

1. Ad Hoc Advisory Committee Meetings

To guide the direction of the Pedestrian and Bicycle Chapter of the City's Transportation Master Plan, an Ad Hoc Advisory Committee was appointed by the City Manager. The committee encompassed members of the community representing various stakeholders including the Parks and Recreation Commission, Planning Commission, the Commission on Persons with Disabilities, Commission on Aging, Transportation Commission, Traffic and Parking Board, as well as general representatives from the Community.

The Committee provided insight to issues related to walking and bicycling in the City and provided feedback on the direction of the project. More specifically, the committee focused on providing advice on existing issues and needs, future priorities for the City, proposed recommendations and next steps.

This 14 member Committee met on a bi-monthly basis throughout the duration of the project. This section summarizes the major topics and outcomes discussed in each of the meetings:

Meeting 1 – This meeting was held at the Alexandria City Hall on June 25, 2014, and served as the introduction to the project for the Ad Hoc Advisory Committee members. In this meeting, Representatives from the City presented the proposed Vision and Objectives for the project; the proposed scope of work for the consultants; the proposed civic engagement plan; and the proposed project timeline. Other issues discussed included potential priorities for the project, separation of modes, and the parameters the study team would use to understand the "hot spots" that need to be addressed.

Meeting 2 – Following an August break and a public meeting held in September 2014, the AdHoc Committee met on October 9, 2014 at the TC Williams High School to discuss and comment on the Goals and Objectives for the project. Additionally, a short summary of existing conditions was presented which included current bicycle and pedestrian mode share, trends in commute mode over time, commute trip length, pedestrian and bicycle count data, as well as crash data, and Capital Bikeshare data. Committee members also discussed the Case Study Areas to understand the issues related to walking and bicycling in the City.

Meeting 3 – The third Ad Hoc Advisory Committee meeting was held on December 3, 2014 at the Samuel Tucker Elementary School. The study team provided updates on public input received via the interactive crowdsourcing map (see section below). A briefing on the Complete Streets component of the project was also provided. Further, a recap presentation on the Pedestrian and Bicycle Vision, Goals and Objectives was given, and a discussion on measurable outcomes related to bicycling and walking in the City was had. Committee members provided input on the proposed language and priorities related to the Vision and Goals. Finally, a short breakout session was used to identify a finite set of pedestrian Case Study Areas where the study team was tasked to conduct field work identifying issues with the pedestrian network.

Meeting 4 – The Ad Hoc Advisory Committee met on February 4, 2015 at the Alexandria City Hall to finalize the Vision, Goals and Objectives for the Plan. Committee members were also provided with a progress report on what the City has accomplished and built since the 2008 Mobility Plan was adopted. Finally, the Committee discussed the proposed pedestrian Case Study Areas and scope of fieldwork for this task. The Project team was then asked to document general conditions for walking as well as specific issues including pedestrian desire lines (worn paths or commonly used street crossings), ADA access needs and issues, intersection designs, and connectivity needs. The full final focus areas can be found in Appendix D of this Chapter.

Meeting 5 – This meeting was held at the William Ramsay Center on April 16, 2015. The Project Team provided an update on the project milestones, presented a detailed explanation about the process for prioritizing proposed improvements and the reasoning behind it, and allowed committee members to provide feedback on how this process could be refined. Committee members raised a variety of issues about the prioritization process including the need to focus on safety, geographic equity, and accessibility. Further, a presentation and discussion related to the Draft Bicycle Facilities Network in the Western half of the City was held. Committee members raised questions on how the Plan would address the differences between recreational and utilitarian/transportation-related bicycling. Finally, members of the general public raised concerns about how the proposed bicycle network would provide a continuous link to regional trails and destinations.

Meeting 6 – The meeting was held on May 14, 2015 at the Cora Kelly Center. The Project Team presented the final draft of the prioritization process used to rank proposed projects in this Chapter. The factors and weights included in this process were Safety (5 points), Demand (3 points), Geography (3 points), and Connectivity (2 points). The meeting also included a presentation on the proposed bicycle network within the Eastern half of the City. The Committee was asked to comment on the network, and to point out any important destinations that were not being served by the proposed network. Further, the Committee was asked to note any important connections or routes that were missing. Committee members raised concerns about transitions and connections to the Mount Vernon Trail, Eisenhower Avenue trail, and Four Mile Run trail. The meeting also included a short presentation on the Pedestrian Case Study areas.

Meeting 7 – The meeting was held at the Alexandria City Hall on June 8, 2015. A recap from the Proposed Bicycle Network Discussion was provided as well as a presentation on the Draft Pedestrian Case Studies. These case study areas included Landmark area, Duke Street (between Jordan and Wheeler Ave), King Street near King Street Metrorail Station, Arlandria, and Seminary Road (between I-395 and N. Howard Street). For each case study, extensive fieldwork was conducted and a set of

recommendations was developed based on the issues observed. The project team presented the Seminary Road case study as an example, and provided an explanation of existing conditions and recommendations using maps and photographs. The meeting was also used to discuss the Draft Pedestrian Strategies which included programmatic, policy and infrastructure related recommendations. Issues raised by the Committee included: the need to address conflicts between people walking and people biking especially in Old Town; bicycling on sidewalks; how the Complete Streets guidelines would be implemented, and general connectivity for bicyclists and people walking.

Meeting 8 – The meeting was held once again at the Alexandria City Hall on August 12, 2015. The project team provided a summary of several draft pedestrian and bicycle related strategies that were discussed at previous Ad Hoc Advisory Committee meetings. These strategies were also refined using feedback and comments from the Ad Hoc Advisory Committee and community at large. The Committee raised the following concerns: need to focus on maintenance especially as it relates to trash and snow removal; need for targeted outreach to non-native English speaking communities and lower income groups; and the need for longitudinal tracking of measurable outcomes related to each strategy.

Meetings 9 – This meeting was held at TC Williams High School on January 19th, 2016. The project team presented the draft plan and highlighted changes that had been made based on Committee and Commission feedback. In addition to the Ad Hoc Committee, draft plan content was presented at a public meeting in September 2015 as well as to the Transportation Commission and Planning Commission. Key changes based on input from these audiences included the addition of a sixth Case Study Area at Commonwealth and Braddock Road, the revision of several plan strategies and chances to the proposed bike network. Committee discussion focused on the need to prioritize low-stress bicycle facilities when implementing enhanced bike corridors, the need to enhance the importance of Vision Zero in the plan, and the need to clarify the timeline/process for implementation.

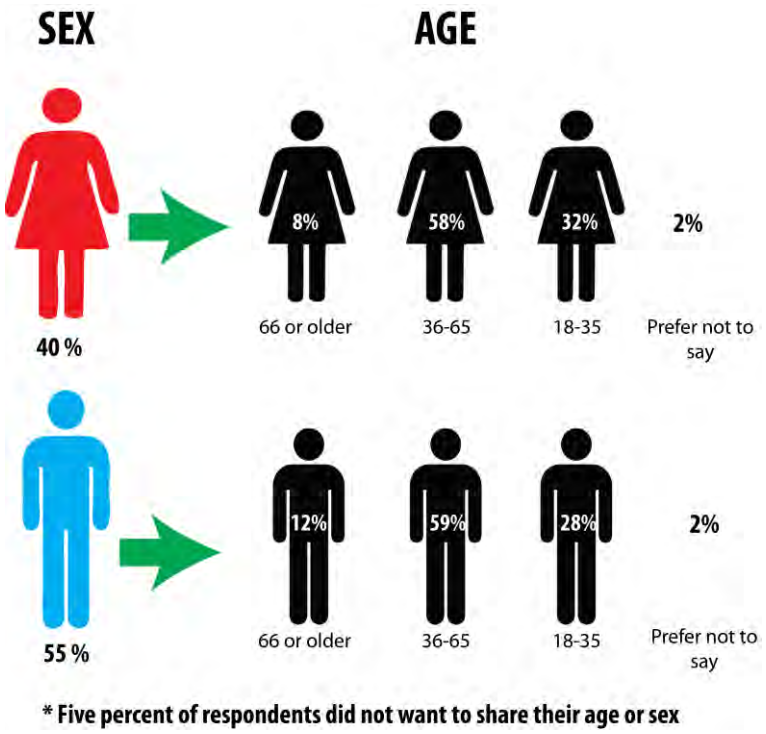
Meeting 10 - The final Ad Hoc Advisory Committee Meeting was held on February 25th, 2016 at Alexandria City Hall. The project team presented the final draft plan, highlighting edits that had been made in response to input from the Ad Hoc Committee and other stakeholders. The project team summarized the input received from 415 users through the AlexEngage input process - noting that Safety and Engineering were the most important goal areas for both bicycle and pedestrian components. Committee input addressed a variety of topics, including prioritization, Vision Zero, accommodation during construction, and plan implementation schedule. There were also a few specific suggested wording or map edits. The Committee passed a motion to endorse the draft plan by unanimous vote with one abstention (based on the member's view that he didn't have authority from his commission to endorse the plan).

2. Interactive Crowdsourcing Map (Wikimap)

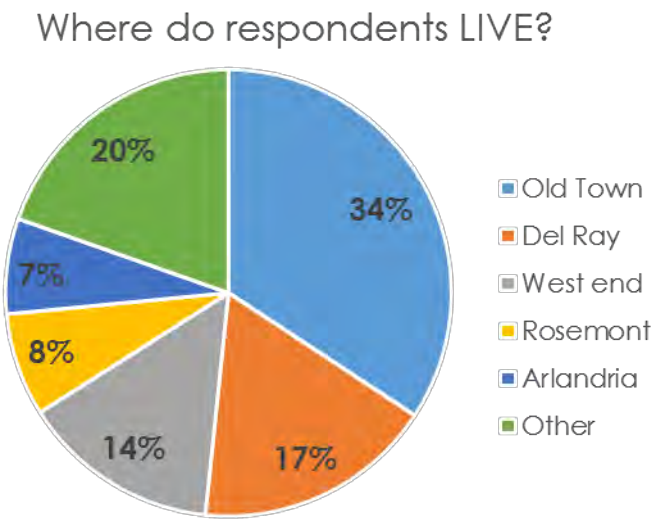
To support the City's efforts to create an online presence to complement the in-person community outreach efforts of this Plan, and to request information from the public via the internet, an interactive crowdsourcing map, or wikimap was developed and placed on the project website. The wikimap was made available in English and Spanish to reach the largest representation of City residents. The wikimap was advertised and its use was encouraged through various community meetings, stakeholder meetings, and at public outreach events in different parts of the City.

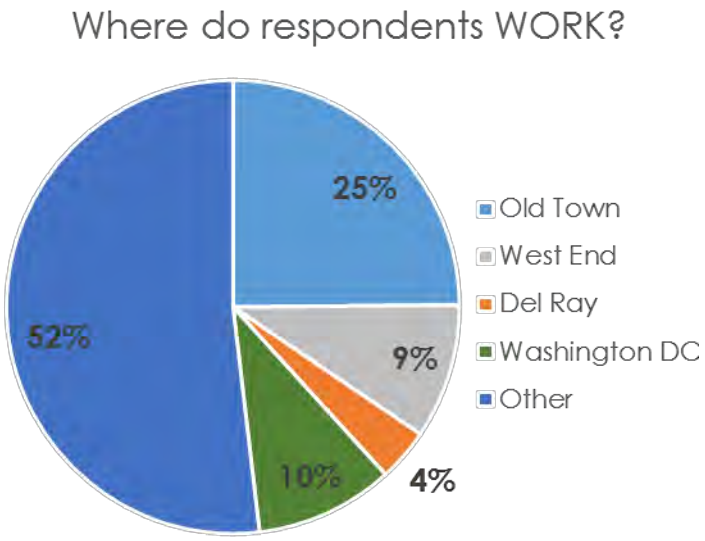
The wikimaps were available for input from June through October 2014. During this time, 380 unique users provided over 800 comments (71 percent were in the form of lines, and 29 percent in the form of points). The grand majority (over 99 percent) of comments were received through the English version of the wikimap. Users were asked to identify routes they currently walk and bike through, destinations they'd like to reach via walking or bicycling, barriers to walking and biking, and potential locations for Capital Bikeshare stations. The figures below present a summary of the feedback received.

As seen on below respondents were evenly split by sex, and almost two thirds of them between the ages of 36 and 65.

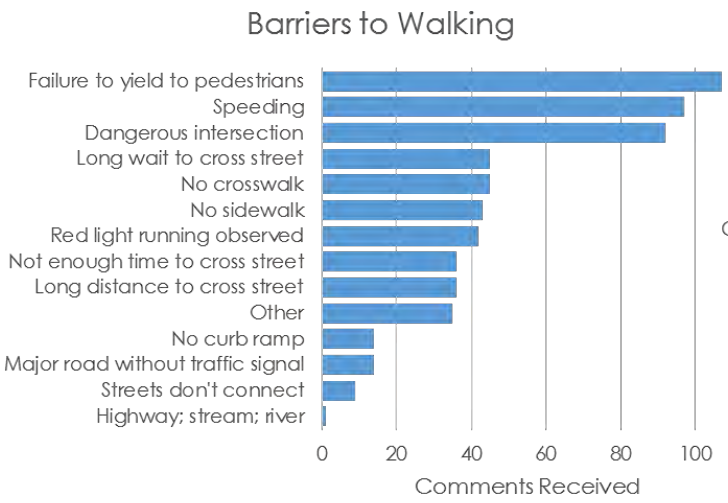


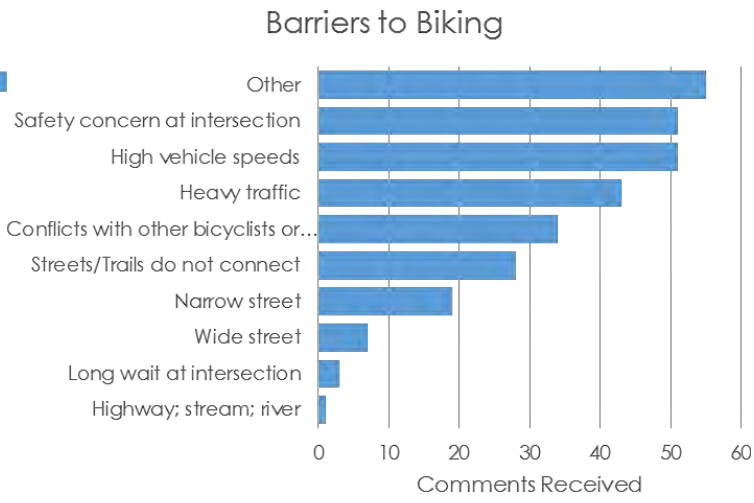
Wikimap users were also asked to identify their home and work zip code:



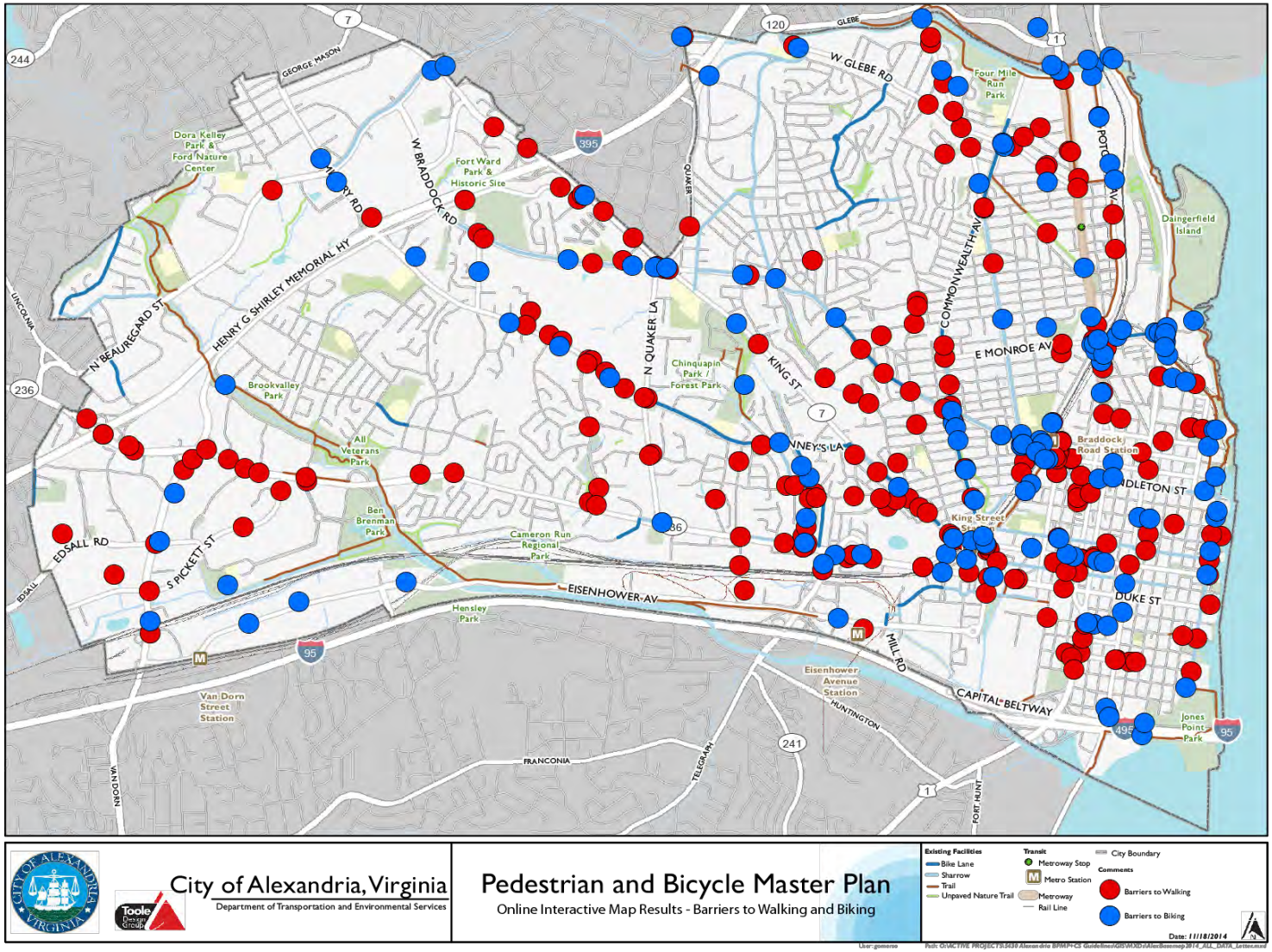


Users were asked to identify the types of barriers to walking and biking:

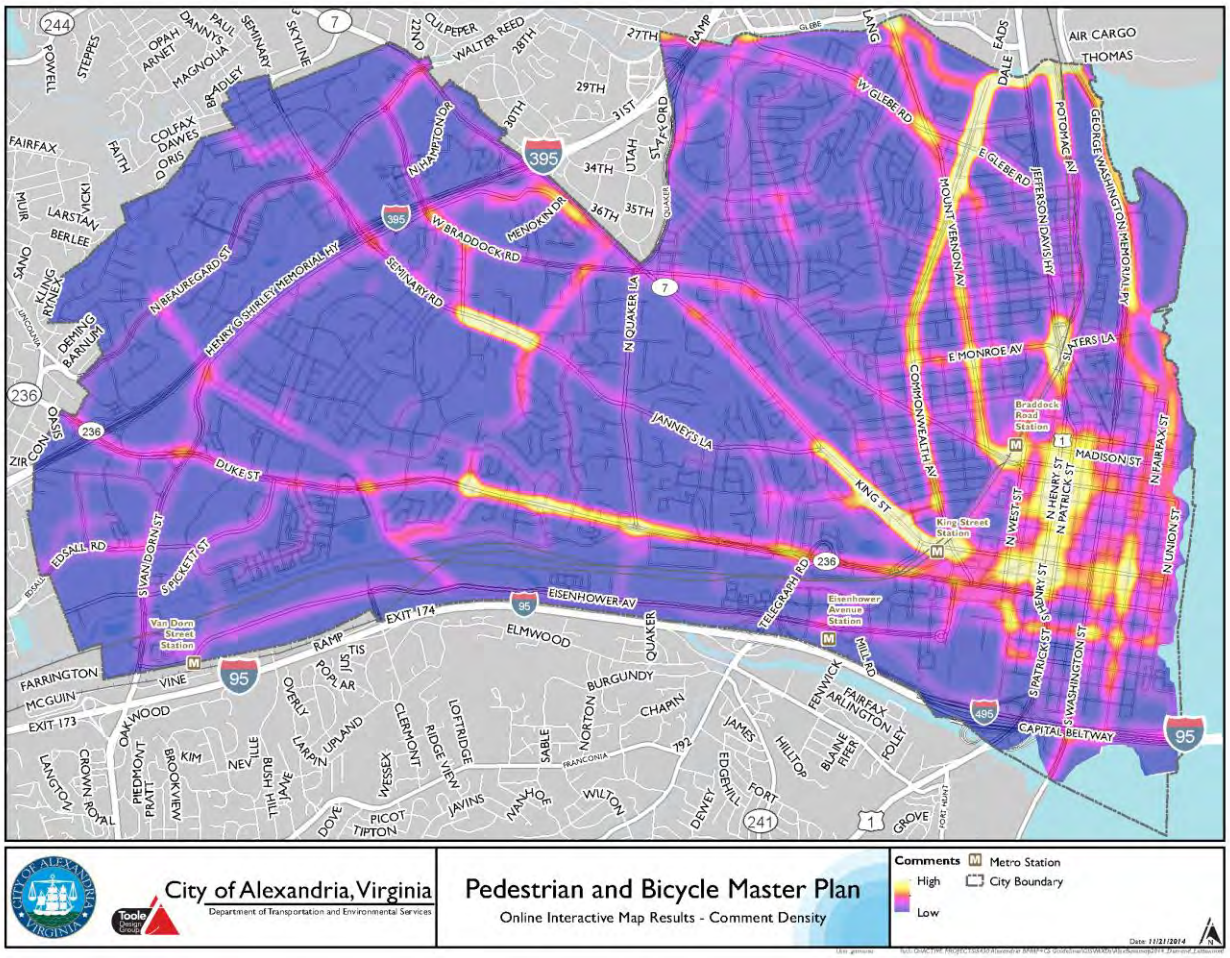




The map below shows the location of those barriers to walking and bicycling identified.



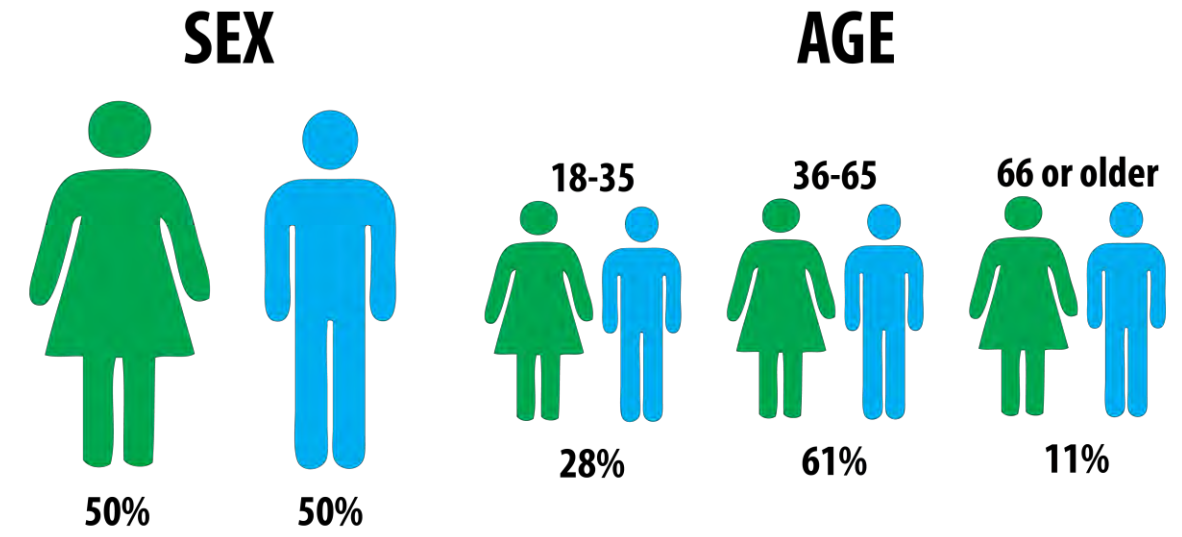
Wikimap users were also asked to identify routes they would like to walk and bike on. The map below is a composite of the most common routes where residents would like to walk and bike on. Not surprisingly, the most common routes people would like to walk or bike include Mount Vernon Avenue, Duke Street, King Street, several north-south routes in Old Town connecting to the Mount Vernon Trail, Seminary Road and Commonwealth Avenue.

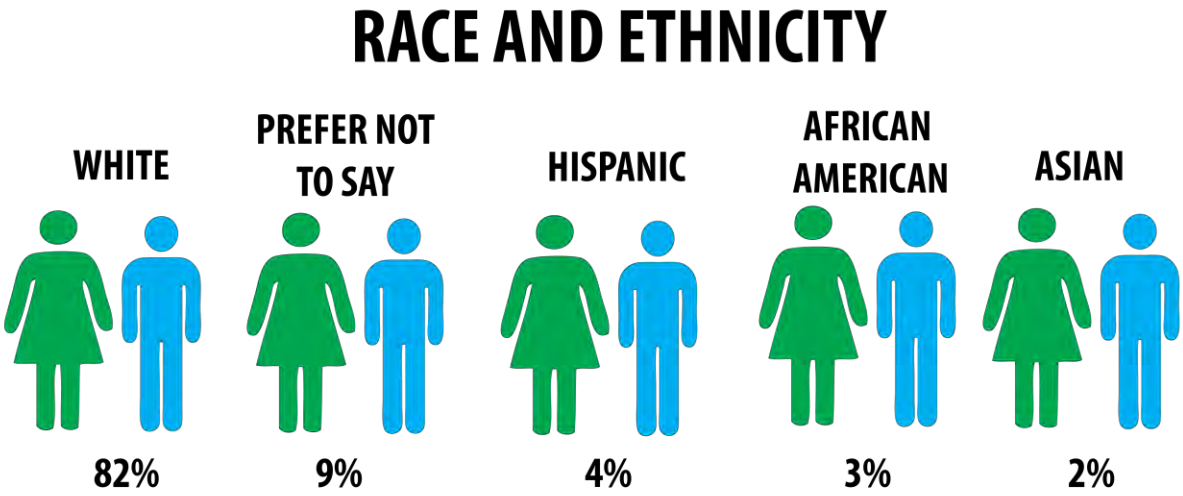


3. Online Survey

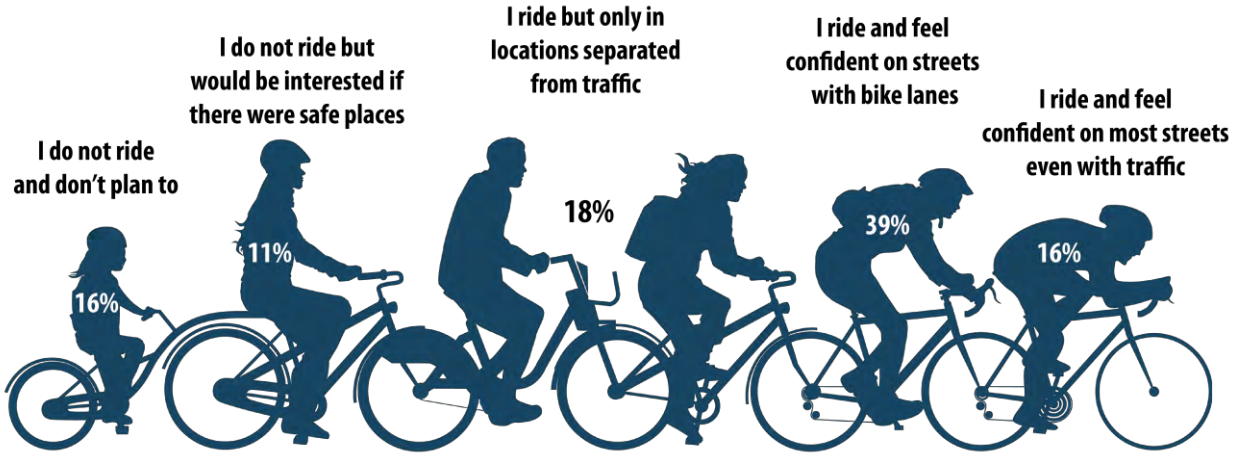
The online survey available in both English and Spanish and was posted on the project website between August and October 2014. In this time, 540 responses were received. The survey was used to understand residents' habits and preferences related to bicycling and walking in the City. The figures below provide a summary of the responses received.

The demographics of survey respondents included an even split between males and females, with the majority of respondents between ages of 36 to 65. The majority of respondents were white.

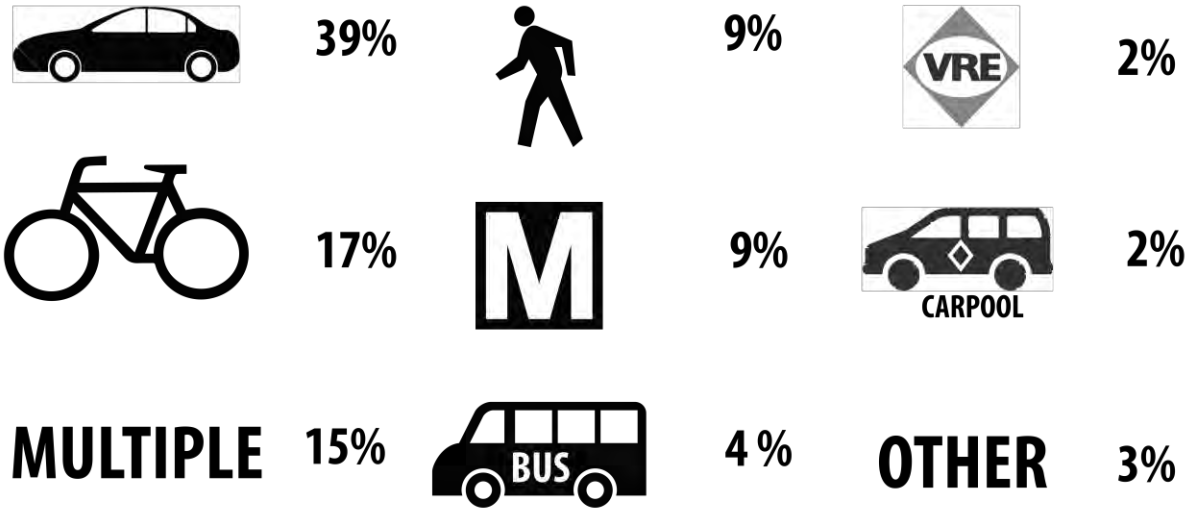




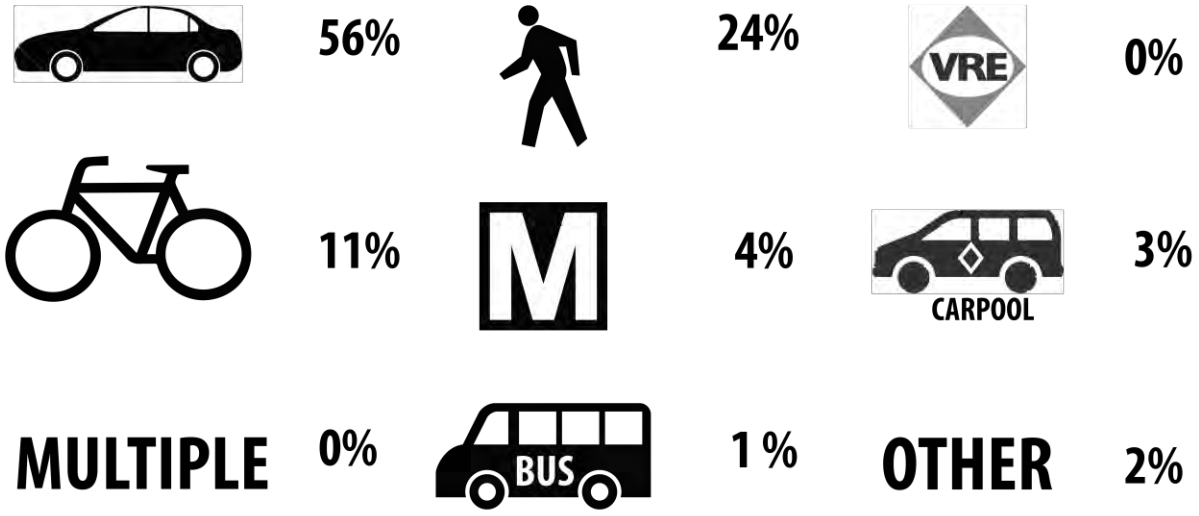
The survey asked respondents to identify their skill and comfort level riding bicycles. Thirty-nine percent of respondents self-identified as “Strong and confident riders” who are comfortable ridign on streets with bike lanes.



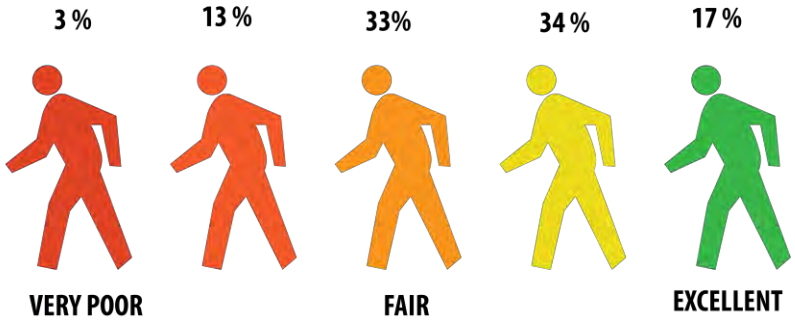
While the proportion of respondents walking and biking to work is high, a large proportion of respondents reported driving to work (39 percent).



On non-work related trips the majority of respondents (56 percent) reported using private automobilies as their primary mode of transportation.

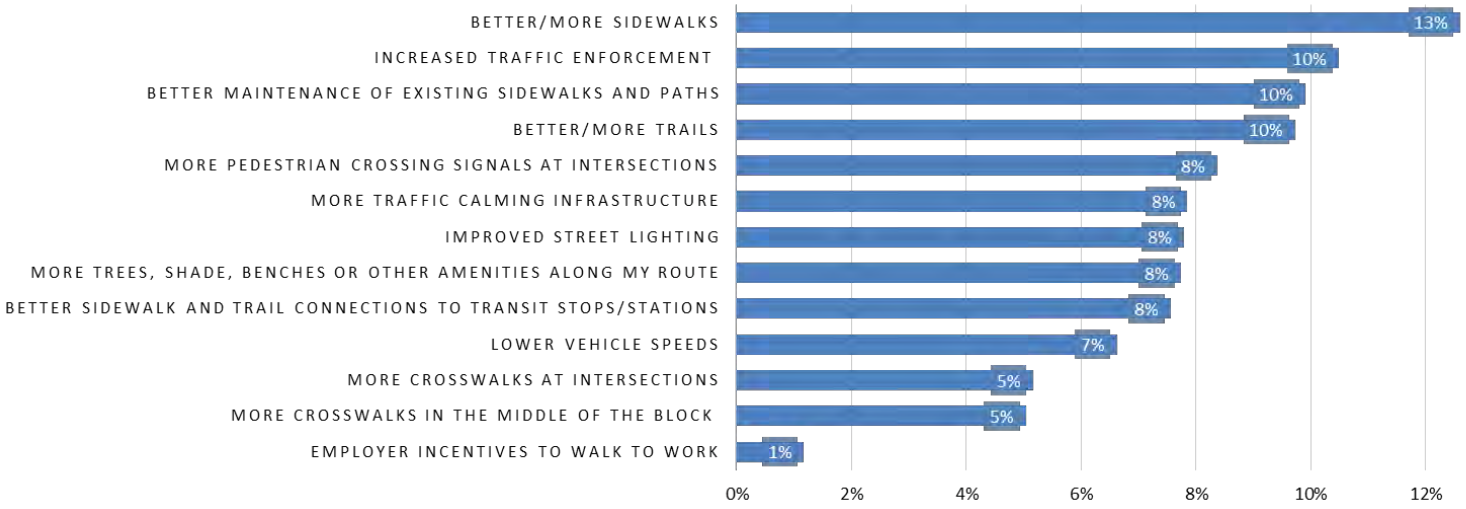


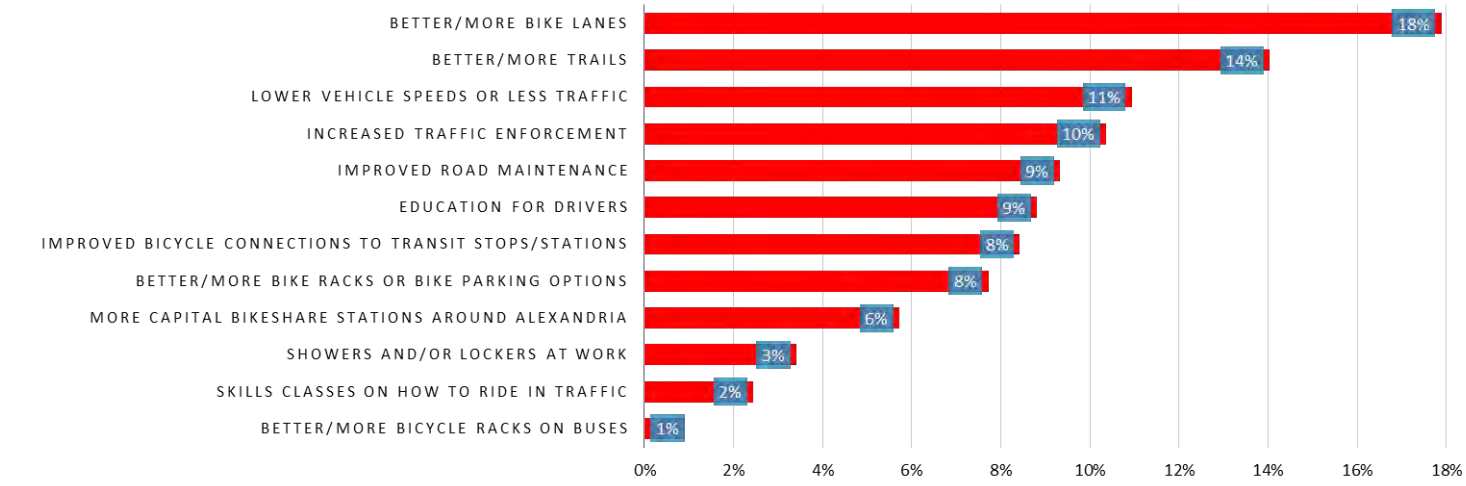
Survey respondents were also asked about their perception of walking and biking in Alexandria, perceived barriers, and what improvements would encourage them to walk or bike more. When asked, ""How pedestrian-friendly is Alexandria?," survey participants responded as follows:



When asked, "How bicycle-friendly is Alexandria?," forty percent (40%) of survey respondents said "Fair."

The bar charts below show responses to questions about the most important types of improvements needed related to walking (shown in blue) and biking (shown in red at the bottom of the page).





4. PUBLIC MEETINGS

To complement the aforementioned public outreach efforts and to increase public participation through the planning process, the City of Alexandria hosted two public meetings. The following section provides a summary of each meeting.

A. Public Meeting #1

On September 30th, 2014, representatives from the City of Alexandria and the consultant team were joined by approximately 50 people from Alexandria for the first public meeting for the Pedestrian and Bicycle Master Plan Update and Complete Streets Design Guidelines Project in the Minnie Howard Campus cafeteria.

During the meeting, City of Alexandria staff and the consultant team provided an overview of the project. The presentation included highlights from the existing conditions analysis, mode share trends and a timeline to the study. In the last portion of the presentation section of meeting, participants asked questions to City staff and the consultant team about the project.

Following the presentation, workshop participants divided into four separate groups for more detailed discussions on programmatic issues and opportunities for expanding Education, Enforcement as well as Engineering and Infrastructure programs. Finally, participants within each group were asked to share their opinion on what the most important change that could be made to encourage people to walk and bicycle more:

Education and Enforcement

Attendees were asked to discuss issues and opportunities dealing with education and enforcement of walking and bicycling. Key themes from the discussion included:

- Issues: difficulty with enforcement of traffic laws by Alexandria Police; confusion about traffic laws; unfamiliarity with the City's rules, laws and customs related to walking and biking by the significant number of tourists visiting the City.
- Opportunities/solutions: support for institutionalizing bicycle safety classes in public schools; increase information on existing rules of the road; provide regular training to City police on rules and regulations related to bicycling and walking.

Engineering and Infrastructure

Participants discussed infrastructure challenges to walking and bicycling in Alexandria and provided solutions to the four themes that emerged:

- Issues: concern about existing sidewalk conditions and its connectivity; concerns about the clearly marked pedestrian crossings at various intersections; concern about lack of connection to and from trails; and concern about the lack of separated facilities in comparison to other neighboring jurisdictions.
- Opportunities/solutions: implement a program to fill in gaps in brick sidewalks and increase maintenance of sidewalks; implement city-wide policy to have crosswalks on all four legs of all intersections; implement a pedestrian only phase for street crossings; increase the number of

bicycle and pedestrian facilities connecting eastern and western parts of the City focusing on King Street, Duke Street and Braddock Road.

Big Ideas and Important Changes

At the end of the meeting, participants were asked to identify one change that would make it easier for them to walk or bike in Alexandria. Ideas included:

- Increase the number of separated bicycling facilities in addition to bike lanes on major connector roadways.
- Expand Capital Bikeshare to western parts of the City.
- Increase connectivity to trails and to transit
- Embrace Complete Streets
- Reduce speed limits
- Provide dedicated, separate facilities for bicyclists, pedestrians and motorists

B. Public Meeting #2

The second public meeting was held on September 24th, 2015. Representatives from the City of Alexandria and the consultant team were joined by approximately 40 people at the Oswald Durant Center. The meeting served as a forum to present the draft project recommendations and receive input from the community at large. Attendees were asked to visit various stations and provide comments on the following topics: complete streets design guidelines; findings and recommendations from the pedestrian focus area assessment; draft recommended city-wide bicycle facility and trail network, and proposed Capital Bikeshare expansion; and draft Plan strategies for improving walking and bicycling. Attendees also had the opportunity to participate in an interactive station where they could design a multimodal street.

The project team provided a presentation introducing various elements of the Plan including the vision, goals and objectives; the Plan strategies; recommendations for pedestrian improvements; proposed citywide bicycle network; and the draft priority pedestrian and bicycle improvements.

Participants were also asked several multiple choice questions related to walking and bicycling in Alexandria. While the responses only represented the perspectives of those in attendance, they were useful in helping City staff and the project team to understand the community's opinions on key issues relevant to the Plan. Participants were asked about their age, place of residence and employment; main reasons to walk in Alexandria; self-assessment on the type of bicyclist; and the highest priorities for biking and walking in Alexandria.

5. Additional Public, Committee and Commission Outreach

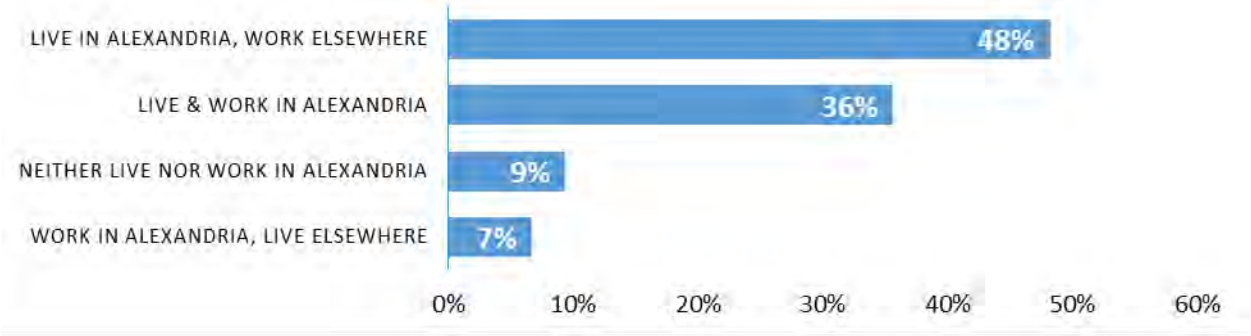
During the summer and fall of 2015, City staff took draft Plan materials to a number of community events including First Thursday in Del Ray, the Old Town Farmers Market, the West End Farmers Market and *Le Tour de Alexandria* (a bike tour of the City). At each event, the public was invited to put "dot stickers" on the draft Plan strategies that they thought were the most important. They were also invited to comment on the draft citywide bicycle network. Input from these events was used to make refinements to the plan content.

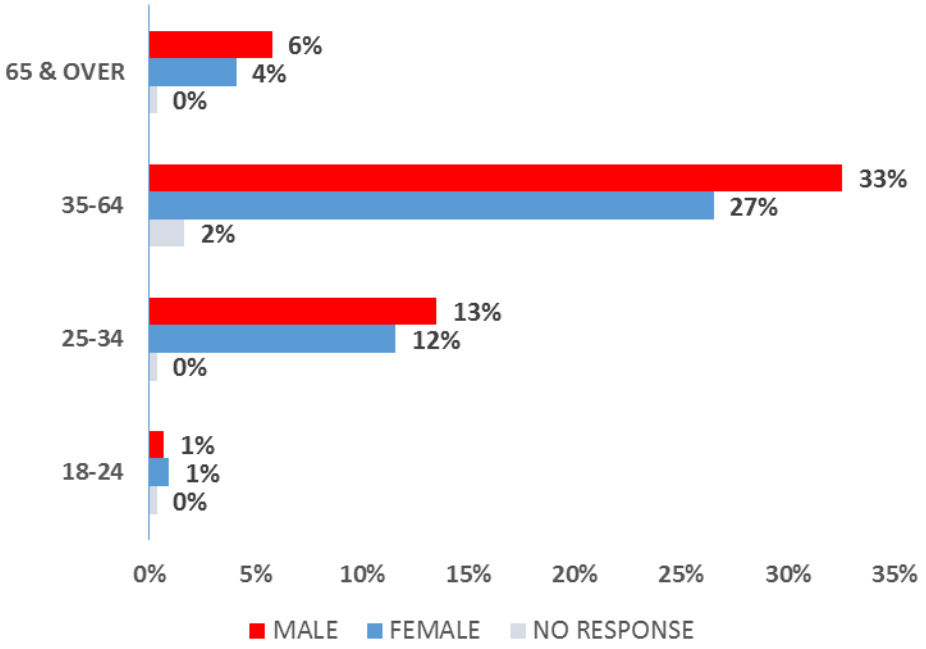
Additionally, City staff presented key elements of the draft final Plan to the Planning Commission, Transportation Commission, Alexandria City Public Schools, the Bicycle and Pedestrian Advisory Committee (BPAC), the Environmental Policy Committee and the Parks and Recreation Commission. Each of these groups provided input that was used to make further refinements to the Plan content.

6. Summary of AlexEngage Input on Draft Plan

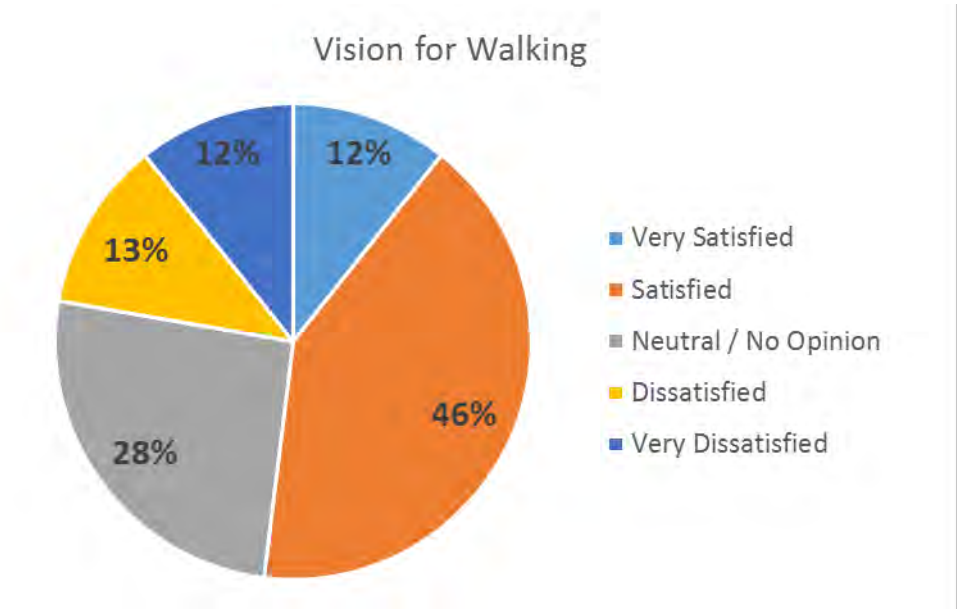
A preliminary draft version of the City's Pedestrian and Bicycle Master Plan—complete with draft appendices—was released to the public on Thursday, January 14, 2016 via AlexEngage, the City's online engagement forum. AlexEngage allows users to view content and provide input on City proposals through various forms of survey questions. For the Pedestrian and Bicycle Master Plan Update, AlexEngage users responded to simple multiple choice questions about the City's visions for walking and biking, as well as more complex question regarding project and strategy prioritization. Respondents also had the ability to comment on the Plan via an open response prompt at the end of the survey.

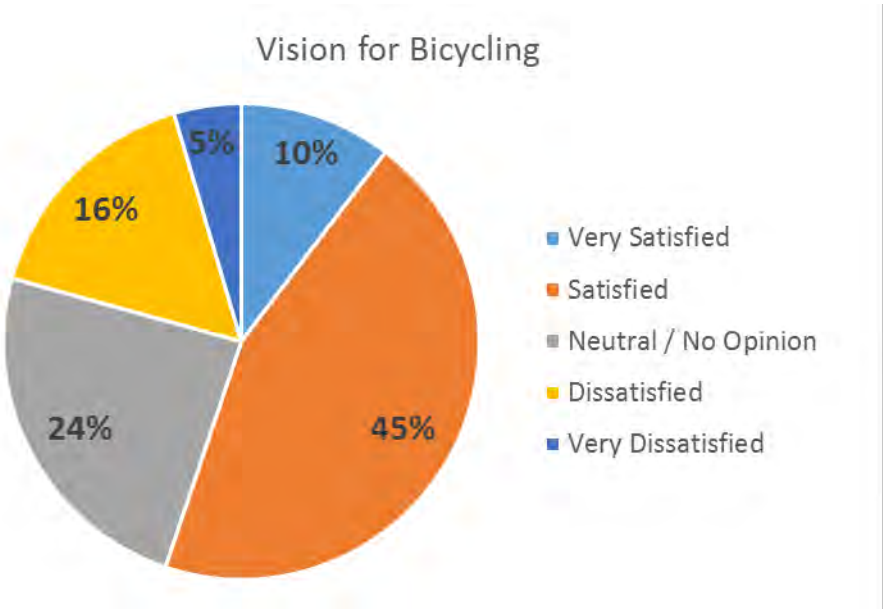
The response period ended at 11:59pm on February 5, 2016. The City received 415 responses over the 3 week period. The chart below provides information about whether respondents live or work in Alexandria. The next chart provides a demographic breakdown of respondents' gender by age.



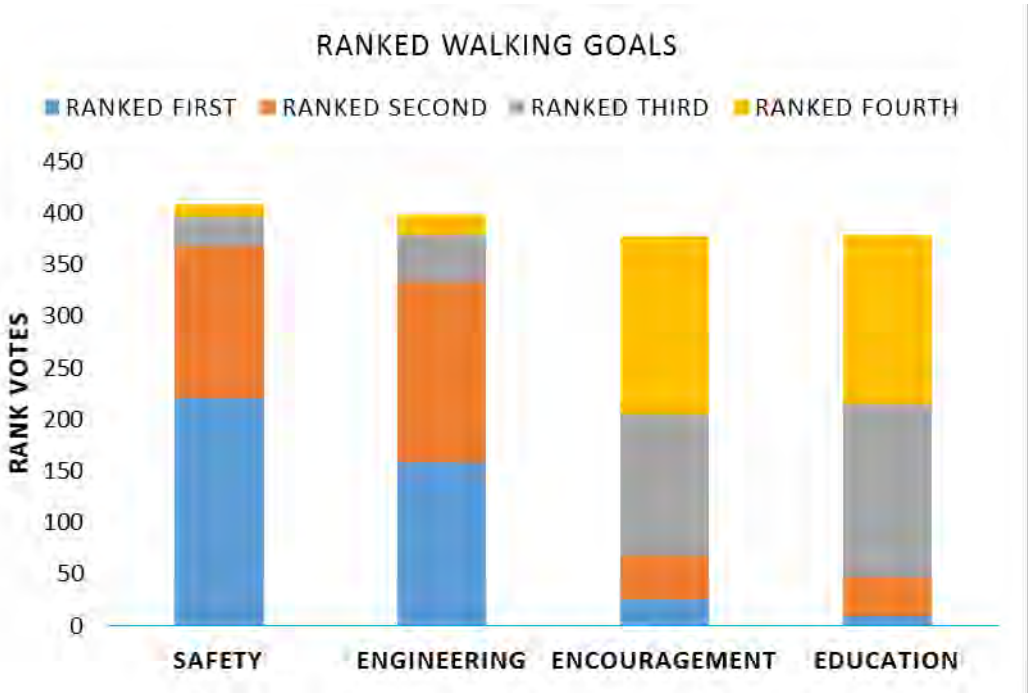


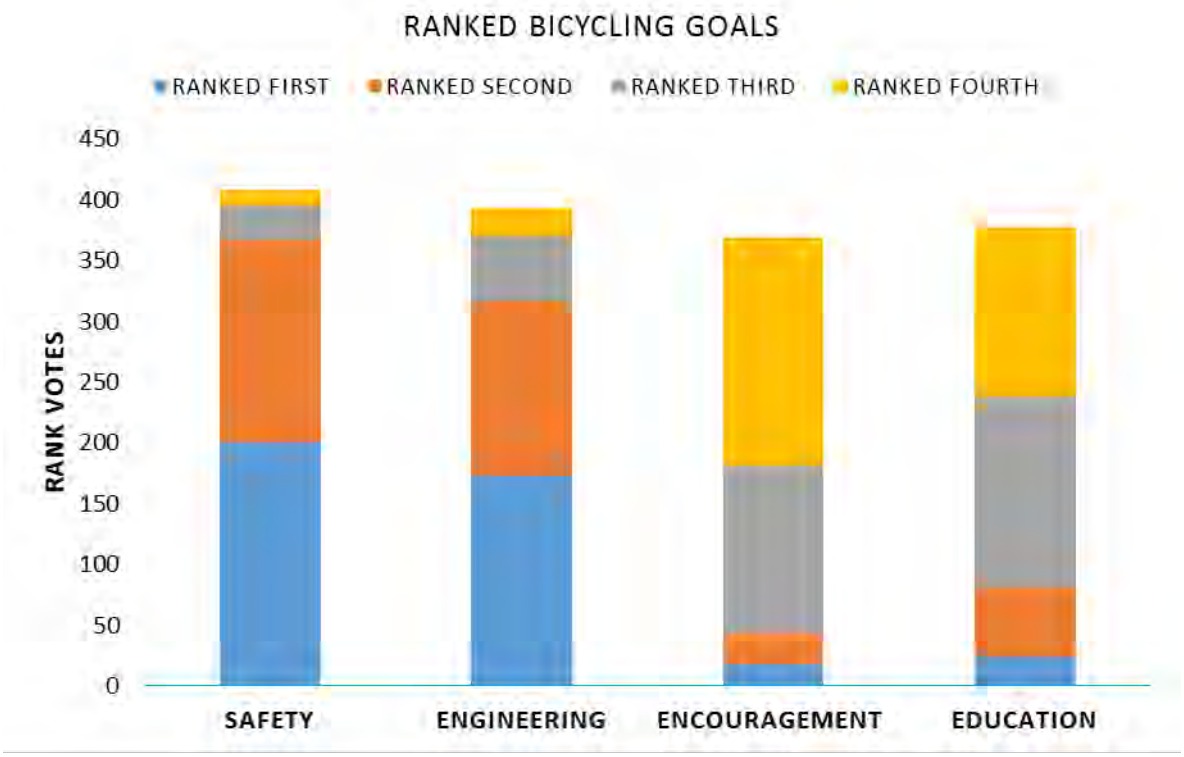
To obtain a general understanding of the public perception on the Plan, the AlexEngage survey assessed satisfaction with the Plan's Visions for Walking and Bicycling in Alexandria (shown below).



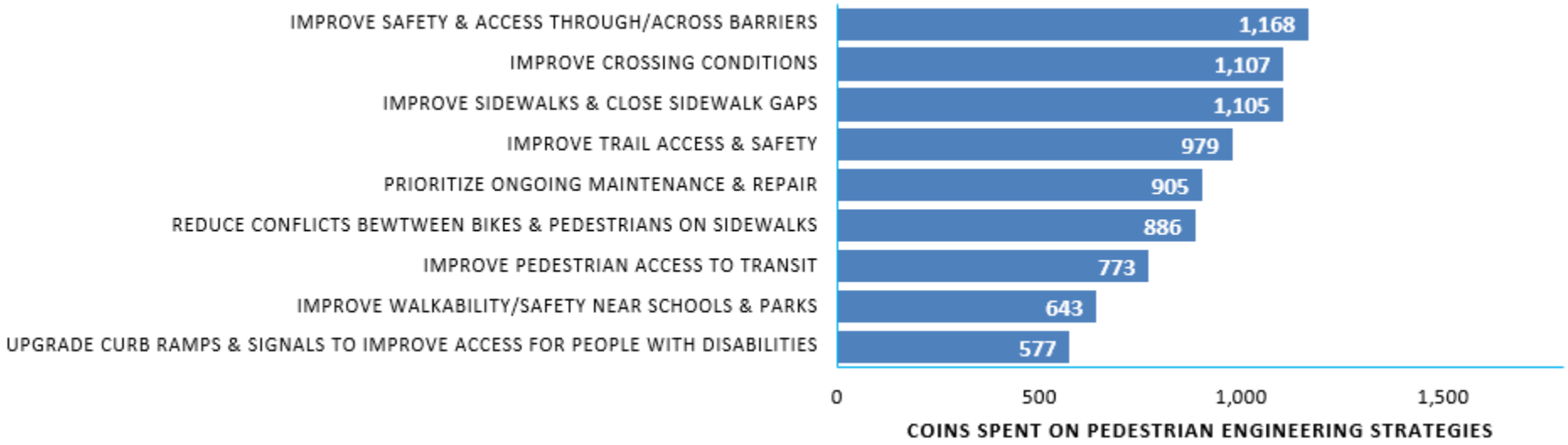


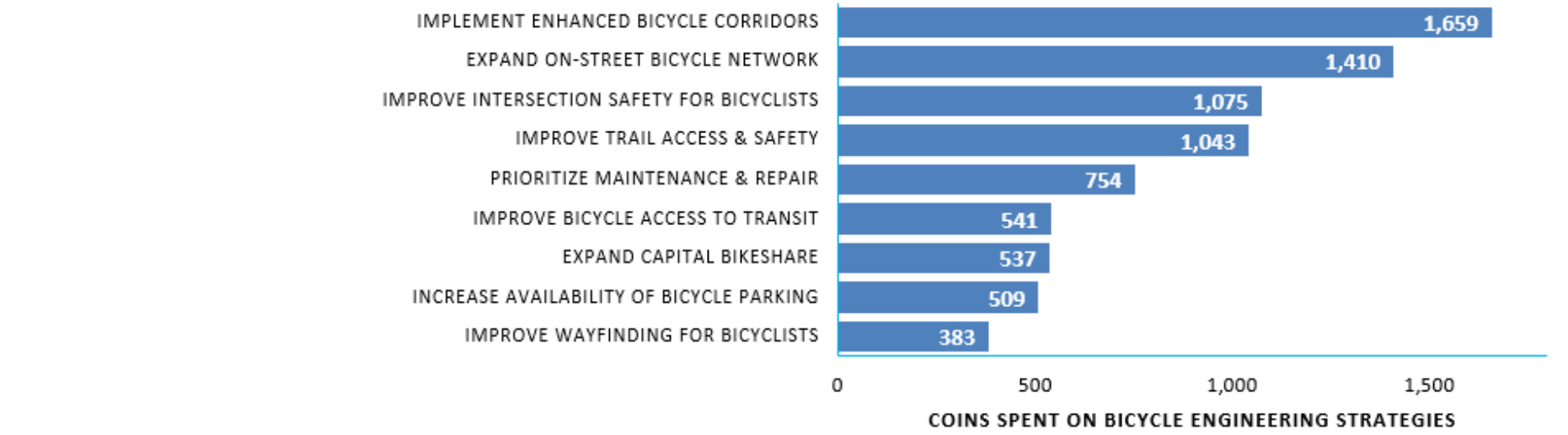
Respondents ranked their goals for both Walking and Bicycling. The four goals—education, encouragement, engineering, and safety—could be ranked in any order, or not ranked at all. The two graphs below depict rankings for both walking and bicycling. For both walking and bicycling, the engineering and safety goals received the most first and second rank votes.





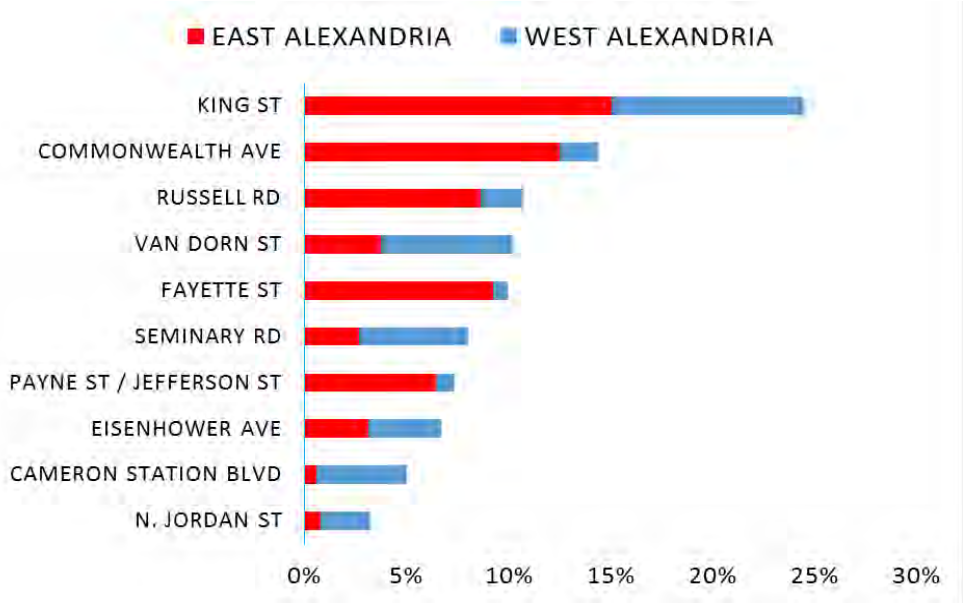
In order to assess trade-offs associated with resource availability, the survey posed two unique questions that provided users with twenty "coins" to spend on items related to the City's pedestrian engineering strategies and twenty "coins" to spend on items related to the City's bicycling engineering strategies. Results follow in the two charts on the next page.


IMPROVE SAFETY & ACCESS THROUGH/ACROSS BARRIERS
1,168
IMPROVE CROSSING CONDITIONS
1,107
IMPROVE SIDEWALKS & CLOSE SIDEWALK GAPS
1,105
IMPROVE TRAIL ACCESS & SAFETY
979
PRIORITIZE ONGOING MAINTENANCE & REPAIR
905
REDUCE CONFLICTS BEWTWEEN BIKES & PEDESTRIANS ON SIDEWALKS
886
IMPROVE PEDESTRIAN ACCESS TO TRANSIT
773
IMPROVE WALKABILITY/SAFETY NEAR SCHOOLS & PARKS
643
UPGRADE CURB RAMPS & SIGNALS TO IMPROVE ACCESS FOR PEOPLE WITH DISABILITIES
577
0
500
1,000
1,500
COINS SPENT ON PEDESTRIAN ENGINEERING STRATEGIES

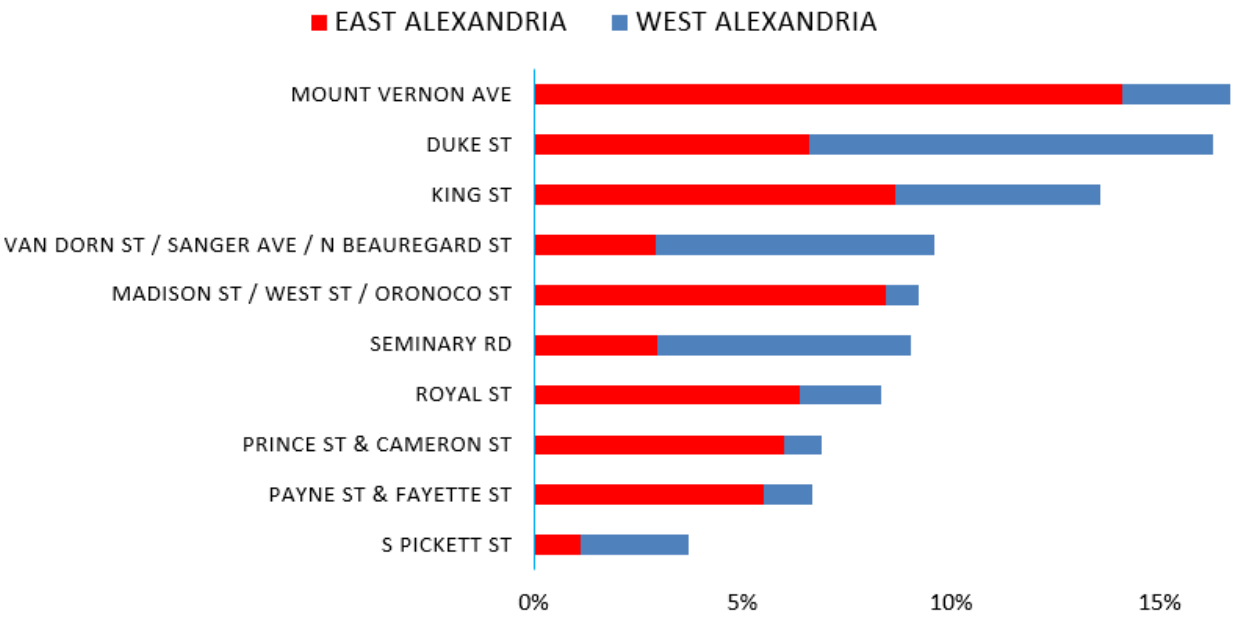

IMPLEMENT ENHANCED BICYCLE CORRIDORS
1,659
EXPAND ON-STREET BICYCLE NETWORK
1,410
IMPROVE INTERSECTION SAFETY FOR BICYCLISTS
1,075
IMPROVE TRAIL ACCESS & SAFETY
1,043
PRIORITIZE MAINTENANCE & REPAIR
754
IMPROVE BICYCLE ACCESS TO TRANSIT
541
EXPAND CAPITAL BIKESHARE
537
INCREASE AVAILABILITY OF BICYCLE PARKING
509
IMPROVE WAYFINDING FOR BICYCLISTS
383
0
500
1,000
1,500
COINS SPENT ON BICYCLE ENGINEERING STRATEGIES

The final set of questions AlexEngage posed to respondents asked users to select their first, second, and third priority sidewalk and on-street bicycle projects. The charts below depict priorities by assigning more weight to respondents' first priorities (weight of 3) and less weight to respondents' third priorities (weight of 1). The result charts sort responses by where respondents live (East or West Alexandria) and also filter out responses from individuals who identified themselves as neither living nor working in Alexandria. As there were more respondents who identified themselves as working or living in East Alexandria, there are naturally greater priority percentages shown in red. Sixty three percent (63%) of respondents identified with East Alexandria, and 37% identified with West Alexandria.

The chart below illustrates that the King Street Priority Sidewalk project is a major concern for both East and West Alexandrians. Commonwealth and Fayette Priority Projects are signifant priorities for invididuals living in East Alexandria. The Van Dorn Street Priority Project is of significant importance for West Alexandrians.



There was a larger spread of preferences across the Plan's identified Priority Bicycle Projects. While Mount Vernon Avenue overwhelmingly received the greatest weighted score, it is not the first, second, or third concern of West Alexandrians. Instead, these individuals identified the Duke Street and Van Dorn Street / Sanger Avenue / N. Beauregard Street Priority Projects as the City's top priorities.



The final AlexEngage question allowed respondents to directly comment on the plan. City staff worked to code these comments, parsing out common themes. A total of 232 respondents—roughly 56% percent of all respondents—provided a comment on the Plan. Of these 232 comments, 215 contained a theme or themes discussed by at least one other respondent, or a theme general enough to create a code. The 17 responses that were not coded related to a specific concern in the City (i.e. a specific intersection or road) and were not easy to classify, or solely expressed an emotional sentiment (i.e. appreciation, frustration) without further clarification.

The table on the following page lists themes pulled from the survey's AlexEngage responses, as well as percentages that reflect how frequently these themes were discussed within the 215 coded comments.

Comment Theme Code	Percent of Commenters who Addressed this Theme
Strategies: Vision Zero	12.56%
Enforcement	11.16%
Prioritize Protected/Separated Bike Lanes	9.77%
Timing and Implementation Questions/Concerns	8.84%
Snow Removal	5.58%
Goals: Bicycle Education	5.12%
Survey Design	5.12%
Sharrows Ineffective	4.65%
Expand Bikeshare	3.72%
Idaho Stop	3.72%
Cost/Benefit Analysis	3.26%
Prioritize Connected Network	3.26%
Goals: Pedestrian Education	2.79%
Elderly/Disabled	1.86%
Goals: Pedestrian Safety	1.86%
Lighting	1.86%
Prioritize Pedestrian Walkways	1.86%
Vehicle Speed	1.86%
Bicycle Parking	1.40%
Goals: Bicycle Safety	1.40%
Signal Timing	1.40%
Bike Lanes Ineffective	0.93%
Missing Priority Project	0.93%
Transitions	0.93%
Alternative Modes (e.g. scooters)	0.47%
Bike Lanes - General	0.47%
Focus on Land Use Patterns	0.47%
Goals: Bicycle Encouragement	0.47%
More Pedestrian Focus	0.47%
No Idaho Stop	0.47%
Parallel Roads	0.47%
Road Repair & Maintenance	0.47%
Wayfinding	0.47%

APPENDIX C:
Progress Report

City of Alexandria

Pedestrian and Bicycle Master Plan Update

Progress Report / Existing Conditions

December 2015

Overview

The City of Alexandria has made significant investments in its pedestrian and bicycle network since the adoption of the 2008 Comprehensive Transportation Master Plan and 2008 Pedestrian and Bicycle Mobility Plan (Mobility Plan). The Mobility Plan includes goals and performance measures, and more than 5,000 recommendations for specific infrastructure improvements to enhance pedestrian and bicycle connectivity and mobility around the City. These recommendations covered a wide range of physical improvements including rebuilding existing sidewalks, intersection crossing improvements, constructing new bicycle lanes, and building new shared use paths.

This document is designed to provide an update on progress made regarding pedestrian and bicycle issues since 2008 and also to summarize current conditions related to walking and bicycling in Alexandria.

I. Progress on the 2008 Mobility Plan Goals and Performance Measures

The City's 2008 Mobility Plan primarily focused on infrastructure recommendations, but included a series of Pedestrian and Bicycle Concept Goals from the Comprehensive Transportation Master Plan. The Concept Goals are presented below, with a summary of the status as of 2014:

Pedestrian Concept Goals

- *Concept Goal #1. Engineering: The City will provide a continuous, connected and accessible network that enables pedestrians—particularly children and those with mobility impairments—to move safely and comfortably between places and destinations.*

  Status: The City has sidewalks on at least one side of the majority of streets and on both sides of many streets. Approximately 27% of the recommended new sidewalks from the 2008 Mobility Plan have been implemented and more than 80 new crosswalks have been installed in the last six years.

- *Concept Goal #2. Encouragement: The City will encourage mobility for all pedestrians by removing barriers to accessibility and promoting walking as a means of improving health and active lifestyles.*

  Status: The City routinely removes barriers to walking. Whenever feasible, the City addresses pedestrian issues identified by the public through *Call.Click.Connect*, where people can ask questions or register comments/complaints about specific intersections or street conditions. The City encourages walking through its Local Motion program, which includes providing walking information to residents, visitors and workers and reaches approximately 135,000 individuals annually. The City is an active participant in Car Free day and Try Transit Week every September. Since 2011, the City's Local Motion program has led a Commuter Challenge every April to have large employers encourage employee commuting by means other than the single occupant vehicle.

- *Concept Goal #3. Education: The City will develop Safe Routes to School Programs and awareness initiatives that address pedestrian safety, rights and responsibilities.*

  Status: Fourteen out of sixteen Alexandria schools participate in the Safe Routes to School program. In 2014, ten schools participated in International Walk to School Day.[1] Other pedestrian safety awareness initiatives are offered by Local Motion, the City's Transportation Demand Management program. Alexandria also participates in and promotes the Metropolitan Washington Council of Governments (MWCOG) StreetSmart Campaign which focuses on pedestrian safety, and provides training for DASH bus drivers on pedestrian safety.

- *Concept Goal #4. Enforcement and Safety:* The City will create a safe pedestrian environment through effective law enforcement, detailed crash analysis and implementation of safety countermeasures.

  Status: Alexandria City Police use citizen input received through the City's *Call.Click.Connect* program to identify locations for targeted enforcement of pedestrian-related traffic laws. The City incorporates crash analyses into its transportation planning projects and uses this data to prioritize projects and determine appropriate street improvements. The City has begun using new pedestrian technology to improve safety at intersections and uncontrolled crossings. Two High Intensity Activated Crosswalk (HAWK) signals have been installed and rapid flashing beacons at seven locations.

Bicycle Concept Goals

- *Concept Goal #1. Engineering:* The City will complete a connected system of primary and secondary bikeways with ample bicycle parking to serve all bicyclists' needs.

  Status: Since the 2008 Mobility Plan, the City has built over 22 miles of bicycle lanes and shared-lane markings, over 6 miles of shared-use paths and installed over 200 bicycle parking spaces on City streets, including three bike corrals.

- *Concept Goal #2. Encouragement:* The City will seek to increase bicycle usage and bicycle-transit connections through targeted outreach and encouragement.

  Status: The City encourages biking through its Local Motion program, which includes providing bicycle and bicycle-transit connectivity information (including bicycle maps) to residents, visitors and workers through brochures and the Local Motion website. The City is an active participant in Car Free day and Try Transit Week every September. Since 2011, the City's Local Motion program has led a Commuter Challenge every April to have large employers encourage employee commuting by means other than the single occupant vehicle.

[1] Based on the number of schools registering their event on the WalkBiketoSchool.org website. (http://walkbiketoschool.org/go/who-walked/2014/VA/Alexandria)

- *Concept Goal #3. Education:* The City will develop and implement targeted Safe Routes to School Programs as well as additional programs for adult cyclists and motorists.

  Status: As stated above, fourteen out of sixteen Alexandria schools participate in the Safe Routes to School program and, in 2014, ten schools participated in International Bike to School Day.[2] The City participates in Bike to Work Day, which has grown from one pit stop in 2008 to four pit stops in 2014, with over 1,000 registered participants. Alexandria also participates in other bicycle safety awareness initiatives are offered by Local Motion and the MWCOG StreetSmarts Campaign, and provides training for DASH bus drivers on bicycle safety. In 2014, the Washington Area Bicycling Association (WABA) held fifteen adult bicycling courses in Alexandria, in comparison to the five classes held in 2008.

- *Concept Goal #4. Enforcement and Safety:* The City will create a safe bicycling environment through effective law enforcement and implementation of bicycle safety enhancements.

  Status: The City incorporates crash analyses into its transportation planning projects and uses this data to prioritize projects and determine appropriate street improvements. Alexandria City Police use citizen input received through the City's *Call.Click.Connect* program to identify locations for targeted enforcement of bicycle-related traffic laws. The City also introduced the first bicycle signal in Virginia on the Mount Vernon Trail in 2010 (At S. Washington Street) and installed a bicycle box to improve safety at the intersection of Commonwealth Avenue and Mount Vernon Avenue in 2013. Every October, the City promotes and holds a *Lights for Bikes* event, where staff, volunteers and local bike shops stationed on trails or at Metrorail stations distribute bicycle lights to bicyclists that need them.

In addition to the activities that specifically respond to the Transportation Master Plan Concept Goals, the City has undertaken numerous other initiatives since 2008 that improve conditions for walking and bicycling. Highlights include:

- Adopted a Complete Streets policy, which stated that the City will make Complete Streets practices a routine part of everyday operations and that every street project will, to the extent possible, incorporate Complete Streets infrastructure.
- Hired a full-time Complete Streets Coordinator.
- Launched eight Capital BikeShare stations in 2012 and added another eight in 2014.
- Revised the bicycle section of the City Code to support improved bicycle safety and to ensure consistency with the Virginia State Code.
- Currently implementing a pedestrian wayfinding system in Old Town.
- Installed approximately 1,200 pedestrian countdown signals.

[2] Based on the number of schools registering their event on the WalkBiketoSchool.org website. (http://walkbiketoschool.org/go/who-walked/2014/VA/Alexandria)

The 2008 Mobility Plan included several performance measures for improvements related to walking and bicycling. The following section documents progress on these performance measures.

Pedestrian Performance Measures

- *The proportion of people walking to work in Alexandria shall increase from 3% to 5% by 2011.*

  Status: According to the U.S. Census, 3.8 percent of Alexandria commuters walked to work in 2013.

- *Working with the Alexandria City Public Schools, the City will establish a system for counting the number of children who walk to school, and the number shall increase 5% every year by 2011.*

  Status: According to 2014 figures from the self-reported student travel tally data from the National Center for Safe Routes to Schools, 30% of students at participating Alexandria schools walked to school.[3]

- *The number and percentage of people who walk to access Alexandria's four Metrorail stops will increase.*

  Status: The table below shows the percent of passengers who walked to access Alexandria's rail stations in 2005 and 2012.

	2007 Metrorail passenger survey	2012 Metrorail passenger survey
Eisenhower Ave	44%	61%
King Street	49%	54%
Braddock Road	69%	62%
Van Dorn	15%	9%

Table 1: WMATA Passenger Station Access Mode - Walk

- *The number of pedestrian-motor vehicle crashes (66 in 2004, 87 in 2005, and 36 through Oct. 1, 2006) will hold constant or decrease through 2011.*

  Status: According to the Alexandria City Police Department, Alexandria has had an average of 64 crashes per year for the past ten years, and had 61 pedestrian crashes in 2014.

- *The proposed sidewalk and shared-use path network will be 50% complete by 2011.*

[3] 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.

Status: The 2008 Mobility Plan included a recommended 18 miles of new sidewalks. The City has implemented 27% of the recommended new sidewalk mileage from the 2008 Plan, and has also added other new sidewalks as part of redevelopment projects (see Figure 1 on Page 9).

- *Improved maintenance will result in a decrease in requests by 50% in 2011.*

  Status: Since 2008, the City has initiated its Call.Click.Connect program, which is an online customer service system. Because this system makes it easier for citizens to make requests, thereby possibly resulting in an increase in requests, this performance measure is no longer applicable.

- *Bi-annual special events in spring and fall will encourage active living and promote walking as a means of transportation and recreation.*

  Status: The City is an active participant in Car Free Day and Try Transit Week every September. Since 2011, the City's Local Motion program has led a Commuter Challenge every April to have large employers encourage employee commuting by means other than the single occupant vehicle.

- *More than 50% of elementary school children will receive pedestrian safety education by 2010.*

  Status: ACPS students currently do not receive pedestrian safety education; however, in the 2015-2016 school year ACPS will begin using Virginia's revised physical education curriculum which includes pedestrian and bicycle safety education.

Bicycle Performance Measures

- *The proportion of people bicycling to work in Alexandria shall increase from 0.5% to 3% percent by 2011.*

  Status: According to the U.S. Census, one percent of Alexandria commuters biked to work in 2013. The City continues to install bicycle parking near transit facilities, and installed 30 new bike parking spaces in 2014 along the new Route 1 MetroWay.

- *Alexandria City Public Schools will begin counting the number of children bicycling to school, and this number shall increase 5% annually through 2011.*

  Status: According to 2014 figures from the self-reported student travel tally data from the National Center for Safe Routes to Schools, 1% of Alexandria students at participating public schools biked to school.[4]

4 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.

- *The number of bicycle-motor vehicle crashes (13 in 2004, 17 in 2005 and 12 through Oct. 1, 2006) will hold constant or decrease through 2011.*

  Status: According to the Alexandria City Police Department, Alexandria has averaged 19 bicycle crashes per year over the past ten years, and had 16 crashes in 2014 (the last full year of data available).

- *The proposed bikeway network will be 50% complete by 2011.*

  Status: An estimated 33% of the recommended bikeway network from the 2008 Mobility Plan has been implemented (see Figure 2 on page 10).[5]

- *The City will begin a log of maintenance requests related to its bikeways network, post the log online for public viewing, and seek to reduce its maintenance backlog by a number to be determined.*

  Status: The City collects maintenance requests via the *Call.Click.Connect* program and the public can view previously submitted requests. The bicycle requests can be made for Complete Streets, bicycle racks, Capital Bikeshare, trails and on-street bicycle facilities. The City has not developed a tracking system for maintenance requests, but is proposing to include a tracking system as part of the Pedestrian and Bicycle Master Plan Update.

- *The City will add at least 500 new bicycle parking racks by 2009. In all new development bicycle parking will be introduced at a rate of 1:10 (at least one bicycle parking space will exist for every 10 vehicular spaces).*

  Status: The City 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 parking spaces since 2008. The updated standards exceed the above goal by requiring more bicycle parking.

- *Bi-annual special events in spring and fall will encourage bicycle use.*

  Status: The City participates in Bike to Work day each spring and does a Bike Light giveaway and bike maintenance event each October. The City is also an active participant in Car Free day every September. Since 2011, the City's Local Motion program has led a Commuter Challenge every April to have large employers encourage employee commuting by means other than the single occupant vehicle.

- *All City-sponsored special events and public recreational facilities will supply plentiful bicycle parking.*

5 This estimate is based on the percent of the proposed bicycle network where a bicycle facility exists as of 2014. An estimated 27% of the proposed bicycle network features the exact facility type (e.g. bike lane, shared lane marking, etc.) that was recommended in the 2008 plan. Also, some of the 2008 recommendations were for the widening of existing trails (e.g. Eisenhower Trail and Holmes Run Trail). Although several places along these trails have been repaved or had other improvements, those recommendations are not shown on Figure 2 as "complete" because the trails were not widened along their entire length, as recommended.

Status: Most City events occur in locations where existing bicycle parking is located. The City works with ACPS and The Parks Department to identify bicycle parking needs and has install over 35 bicycle parking spaces at Parks and Schools in 2014 alone.

- *More than 50% of elementary aged school children will receive bicycle safety education by 2010.*

  Status: Currently, bicycle safety education is not being provided as a standard part of curriculum; however, students at nine ACSP schools received bicycle safety education in 2014 as part of a grant-sponsored bicycle rodeo. Also, in the 2015-2016 school year ACPS will begin using Virginia's revised physical education curriculum which includes pedestrian and bicycle safety education.

Figure 1. Status of 2008 "New Sidewalk" Recommendations

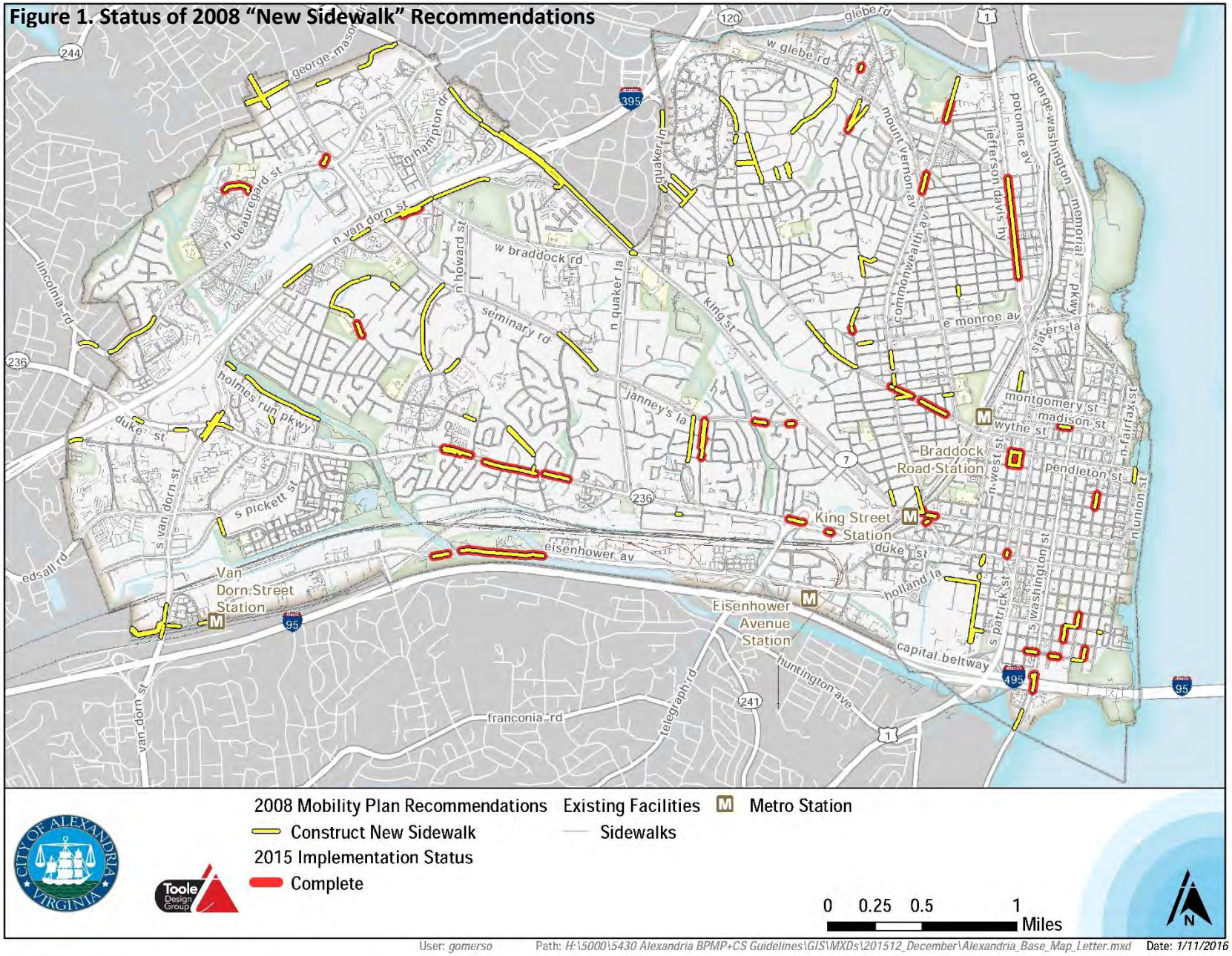
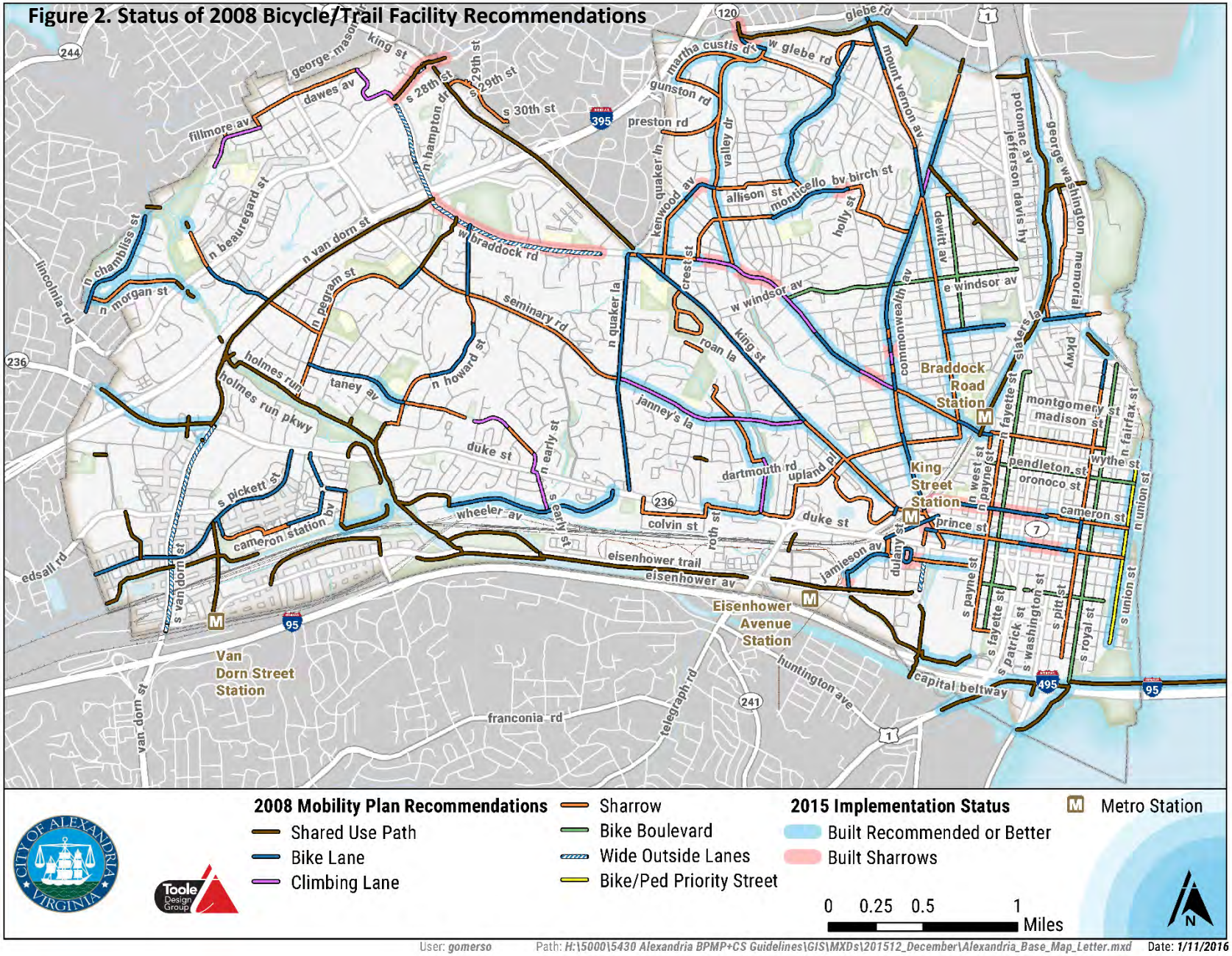


Figure 2. Status of 2008 Bicycle/Trail Facility Recommendations



User: *gomerso* Path: *H:\5000\5430 Alexandria BPMP+CS Guidelines\GIS\MXDs\201512_December\Alexandria_Base_Map_Letter.mxd* Date: *1/11/2016*

II. Existing Conditions

The population within the City of Alexandria has increased by 14 percent since the year 2000 and is projected to keep growing – from 146,294[6] today to over 190,000 by 2040.[7] Anticipating this growth, City leaders are working to expand and diversify the transportation network in ways that help sustain the exceptional quality of life that exists in Alexandria.

This section presents the existing conditions related to transportation in Alexandria, with a particular focus on the pedestrian and bicycle environment. This information will provide a foundation for the Pedestrian and Bicycle Master Plan and the Complete Streets Design Guide.

Travel Modes

According to the 2012 data from the U.S. Census Bureau and the Washington Council of Governments *State of the Commute* report, almost 60 percent of Alexandrians commute via single occupancy vehicle, close to 4 percent walk to work, and about 1 percent bicycle to work. The combined total portion of the population that commutes using sustainable transportation modes (bike, walk and transit) comprises over one third of all commuters. As shown in Figure 3, this average represents slightly more bike/walk/transit commuters than that reported for either the DC region or the Commonwealth of Virginia.[8]

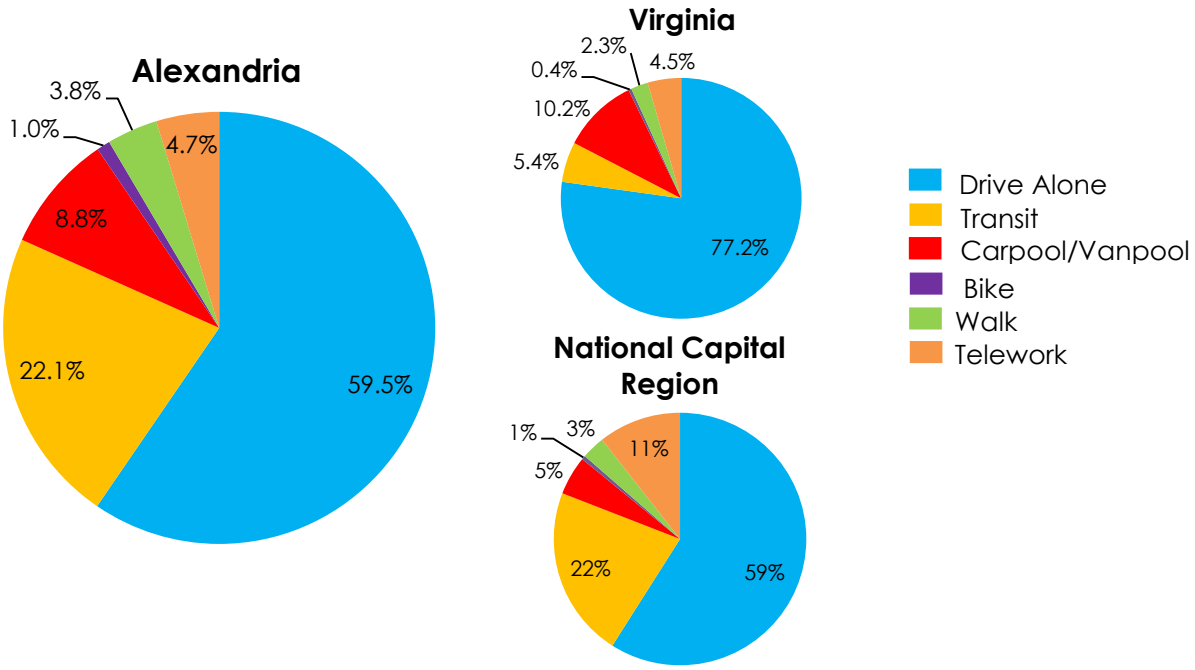


Figure 3 - Commute to Work (City of Alexandria, National Capital Region (DC Metro Area), Virginia)

6 City of Alexandria. Comprehensive Annual Financial Report 2013. Obtained from http://www.apa.virginia.gov/data/download/local_gov_cafr/Alexandria%20CAFR%202013.pdf on June 20, 2014.
7 MWCOG Cooperative Forecast, Summary of Intermediate Population Forecasts Round 8.2, 2013. Obtained at: http://www.mwcog.org/uploads/news-documents/AVhY20130213152355.pdf
8 2008-2012 American Community Survey 5-Year Estimates. S0801 Commuting characteristics by Sex. U.S. Census Bureau.

The percentage of residents driving single occupancy vehicles to work has continued to decrease over the past 10 years. According to data from the U.S. Census, the percentage of people driving to work has decreased by almost 10 percent since 2000. This compares to a 28 percent increase for walking and 87 percent increase in rate of bicycling as noted in Figure 4.[9]

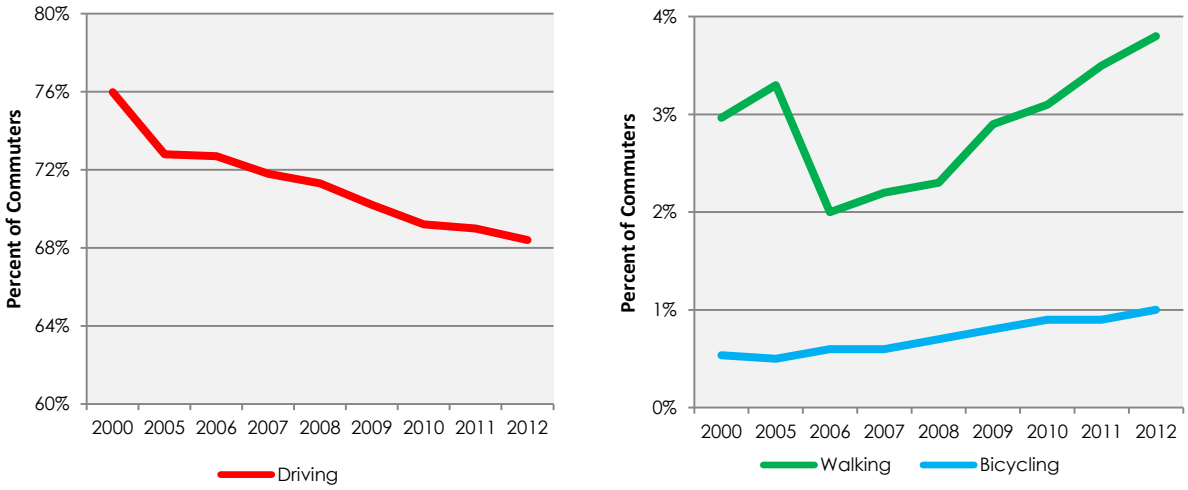


Figure 4 - Driving, Bicycling and Walking to Work (Alexandria Residents)

Nearly half (42 percent) of households in Alexandria own only one car and 6.5 percent of households do not own a car (see Figure 5). It is likely that many of the trips taken by members of these households involve walking and/or bicycling.

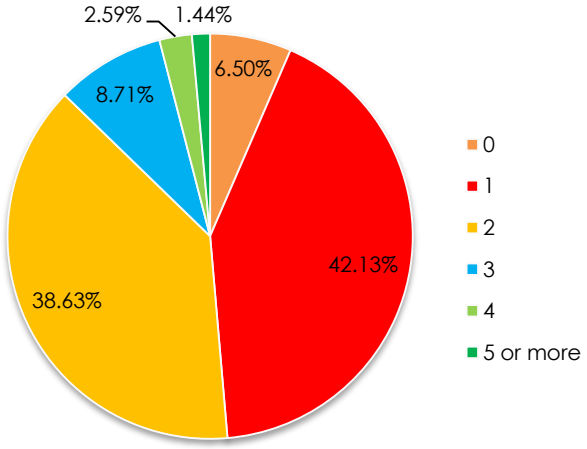


Figure 5 - City of Alexandria Automobiles per Household

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

Capital Bikeshare

The City of Alexandria initiated Capital Bikeshare in September 2012. With eight stations and 80 bicycles, the original system served Old Town and helped link residents and visitors to transit at both Braddock Road and King Street Metrorail Stations. As seen in Figure 6, the Braddock Road and King Street Metrorail stations are the two most heavily used bike share stations in Alexandria.[10]

In August 2014, after two successful years of operations of Capital Bikeshare, the City expanded from eight to 16 stations. The new Capital bikeshare stations serve Del Ray, Carlyle, Arlandria and the Eisenhower Avenue Metrorail Station. Since the launch of the system in 2012, Alexandria residents and visitors have taken over 100,000 rides, and have ridden almost 250,000 miles.[11]

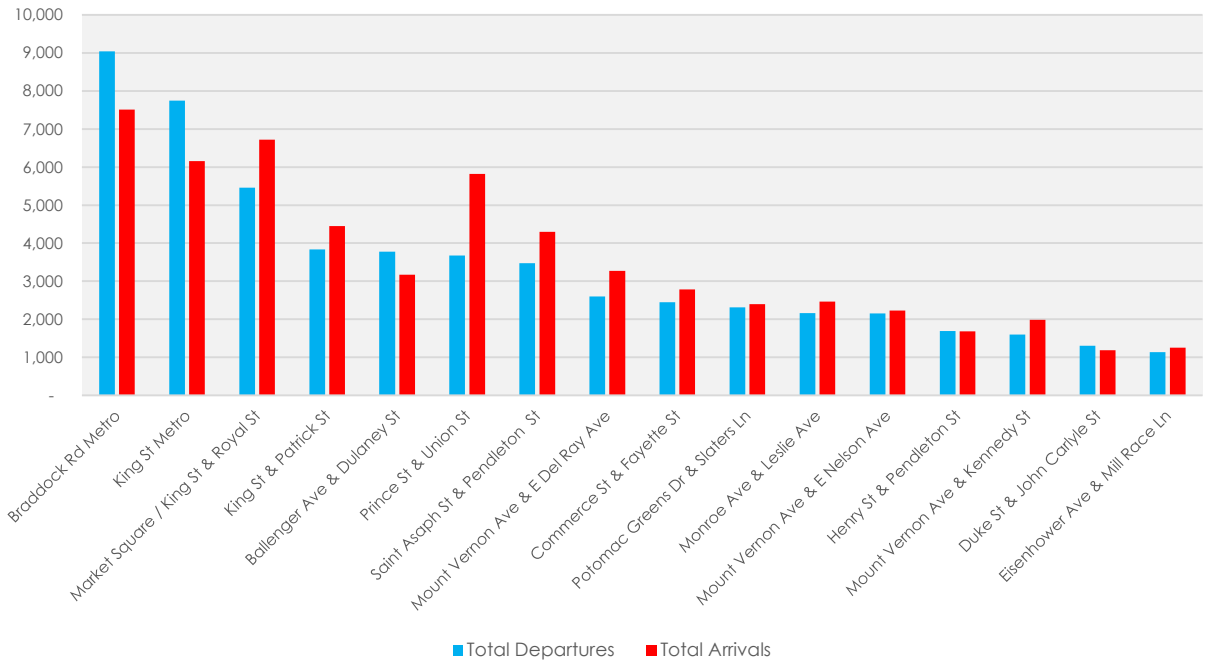


Figure 6 - Total Arrivals and Departures (August 2014-August 2015)

As shown in Figure 7, Capital Bikeshare ridership fluctuates seasonally. It is notable that there are approximately 60 rides per day in January, the coldest month with the lowest annual ridership.

10 Note: Data includes arrivals and departures from for all 16 stations for the months of August 2014 through August 2015.
11 Alexandria Capital Bikeshare Dashboard. Obtained from Hillary Orr. January 2016.

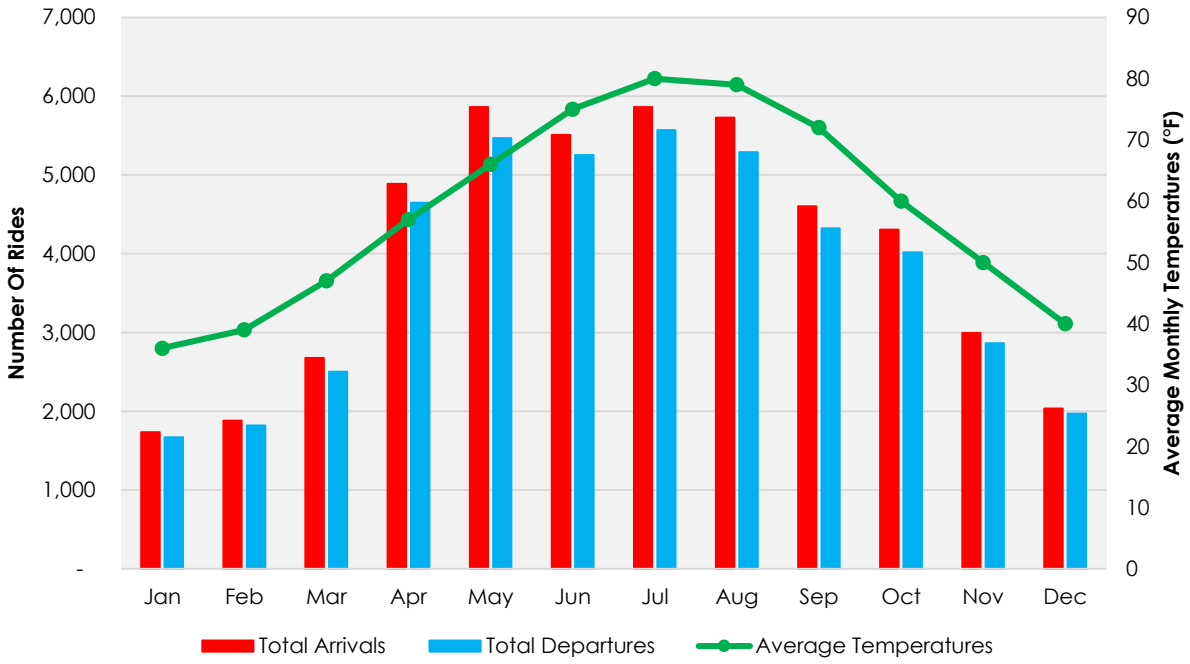


Figure 7 - Ridership Seasonal Variability vs Average Monthly Temperatures

Pedestrian Facilities

The City of Alexandria has an extensive network of pedestrian facilities that include sidewalks, trails and intersection treatments. However, the level of connectivity and comfort provided by the pedestrian network varies between neighborhoods, depending on the urban form, roadway characteristics and other factors.

Pedestrian Facilities

Alexandria has approximately 575 miles of sidewalks which cover an estimated 76% of City streets. Areas without full sidewalk coverage tend to be residential neighborhoods including locations in the North Ridge/Rosemont area and the Taylor Run area. While sidewalk coverage is fairly comprehensive, some sidewalks need repair or feature obstructions like vegetation or other obstacles, which create impediments for pedestrians.

As shown in Table 2, Alexandria has over 29 miles of paved and unpaved multi-use trails that connect parks, neighborhoods, activity centers, transit and other destinations. The major trail systems are the Holmes Run Trail, Four Mile Run Trail, and Mount Vernon Trail. These major trail systems extend into surrounding jurisdictions and handle notable volumes of recreation and transportation trips. The Mount Vernon Trail is discontinuous through Old Town Alexandria, and the Holmes Run Trail currently ends near the Eisenhower Metro Station and does not connect directly to the other two major trail systems.

Table 2 - Miles of Trails by Trail Classification

Trail Classification	Miles of Trails
Shared-Use Path:	**21.02**
Unpaved Nature Trail:	**7.99**
TOTAL	**26.02**

Pedestrian Crash Data

Pedestrian safety – both real and perceived – is an important factor that influences where and how often people walk. Traffic incident data is one way to assess the safety of transportation system users and can be used to help target safety-related programs and investments. Figure 8 displays reported pedestrian crashes between the years of 2005 and 2014 and identifies crash "hot spots" located throughout the City. Locations with concentrations of darker red coloring correspond to higher numbers of pedestrian crashes.

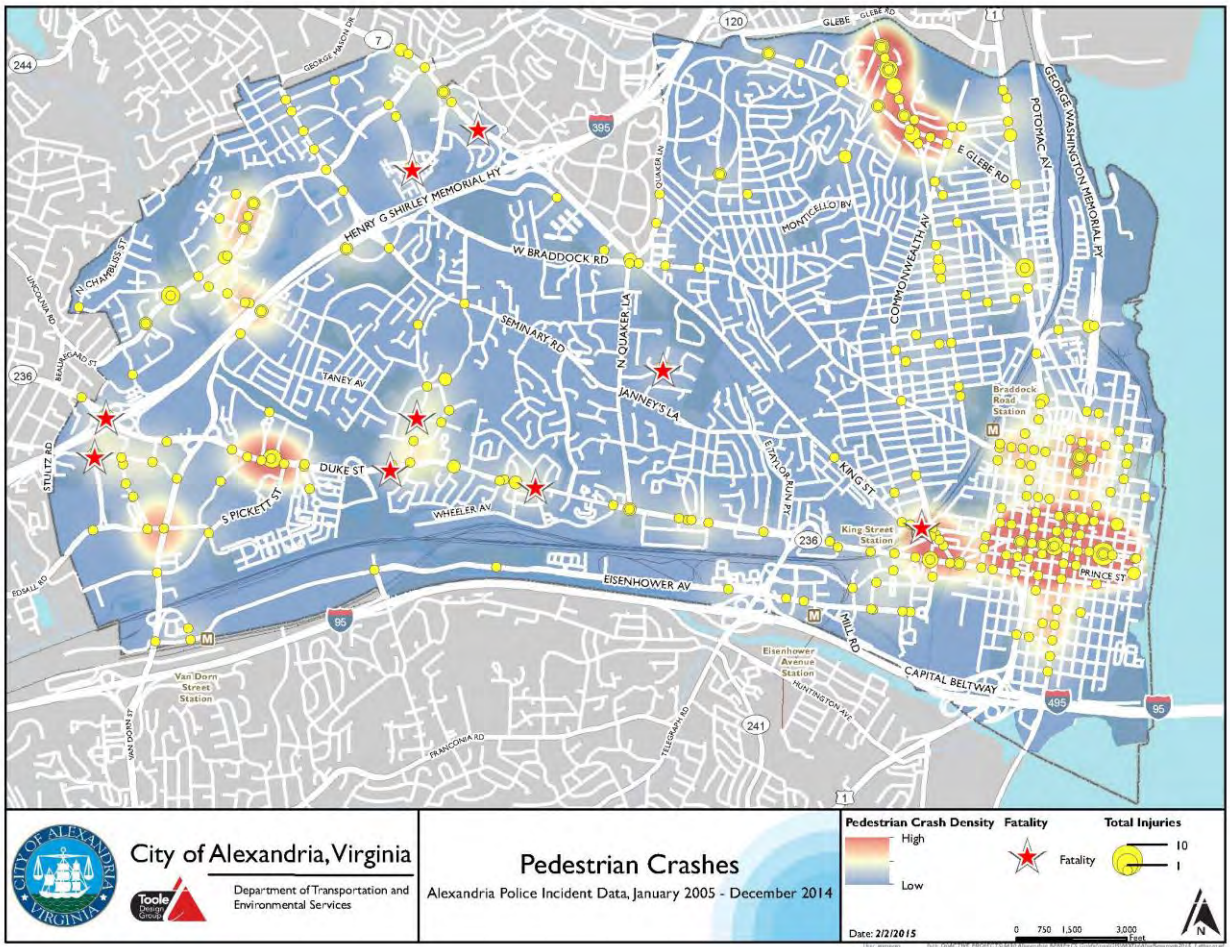


Figure 8 - Reported Pedestrian Crashes (January 2005 – December 2014)

It should be noted that crash concentration alone does not indicate a location is inherently more dangerous than another location. Locations with higher volumes of pedestrians tend to experience higher overall numbers of crashes, but the likelihood that any individual would be involved in a crash (the relative risk) may actually be lower.

As shown in Figure 9, the City has experienced an average of 64 pedestrian crashes per year (2004-2014). During that same 10 year period, there were nine pedestrian fatalities on City of Alexandria streets.[12] Half of all accidents (50 percent) occur Tuesday through Thursday and the majority occur during daylight hours (73 percent) as noted on Figure 10 and 11.

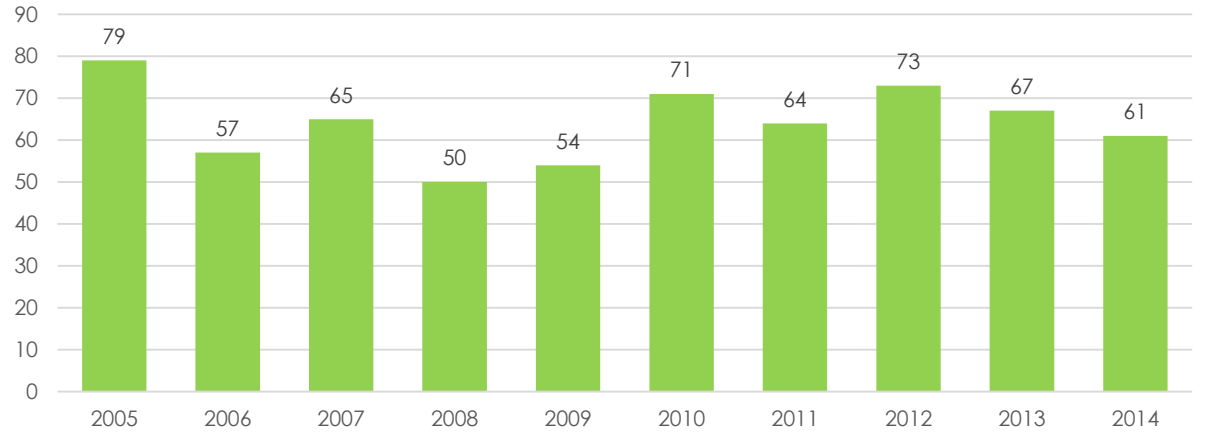


Figure 9 - Reported Pedestrian Crashes (January 2015-December 2014)[13]

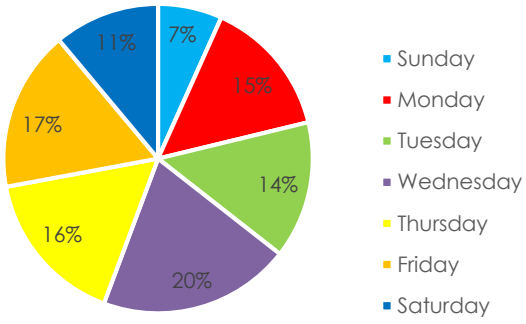


Figure 10 - Reported Pedestrian Crashes by Day

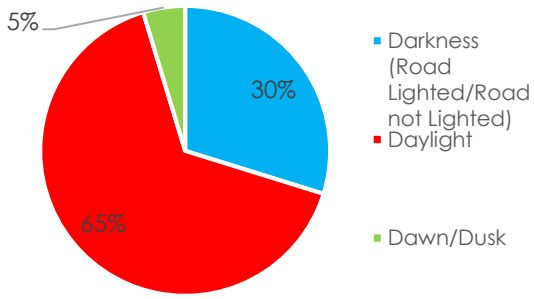


Figure 11 - Reported Pedestrian Crashes by Time of Day

Pedestrian Counts

Pedestrian count data is collected by the volunteers of the Alexandria Bicycle and Pedestrian Advisory Committee (BPAC). These counts are performed annually during the months of January, May, July and September. Counts are completed two times per day (12:00 to 2:00 p.m. and 5:00 p.m. to 7:00 p.m.) on Tuesdays and Saturdays. The counts have been taken in 17 locations throughout Alexandria. Table 3 provides the full list of count locations and the total number of pedestrians for the years of 2011 through 2014. While conducting the counts, BPAC volunteers note the time of day, location, and gender of the pedestrians. During the period of July 2011 through May 2014, the majority of recorded pedestrians were female (54 percent).

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 641 pedestrian related incidents for the ten year period, the true number of incidents may be different as many pedestrian crashes tend to not be reported to police and therefore are not reflected in the data.

13 City of Alexandria Police. Reported Pedestrian Crashes. January 2005 through December 2014.

Count Location	Total Counts
Intersection of Prince Street and Washington Street.	3,343
Mount Vernon Trail – south of intersection with Marina road.	2,900
Mt Vernon Avenue - South of Four Mile Run Trail	2,798
Intersection of Cameron Street and Washington Street.	2,547
Intersection of Commonwealth and Mount Vernon Avenues.	2,328
Holmes Run Trail, adjacent to the Holmes Run Parkway near North Ripley Street.	1,959
Mount Vernon Trail - south of the Woodrow Wilson Bridge	1,858
North Beauregard Street just south of the intersection with King Street	1,661
Mount Vernon Trail – Western entrance to trail at Woodrow Wilson Bridge	1,501
Holmes Run Trail at the intersection of N Pickett/Holmes Run Pkwy	1,317
Off Street trail between Braddock and King Metrorail Stations	1,304
Eisenhower Avenue just west of the SpringHill Suites	1,152
Slaters Lane west of Portner Road	494
Sidewalk/trail on Van Dorn St just N of Metrorail overpass and S of Eisenhower	290
Washington St Bridge Deck	236
MVT East towards Jones Point Park	100
Route 1 Connector	53
TOTAL	25,841

Table 3 – Pedestrian Counts 2011 – 2014 (BPAC Annual Count Data)[14]

Bicycle Facilities

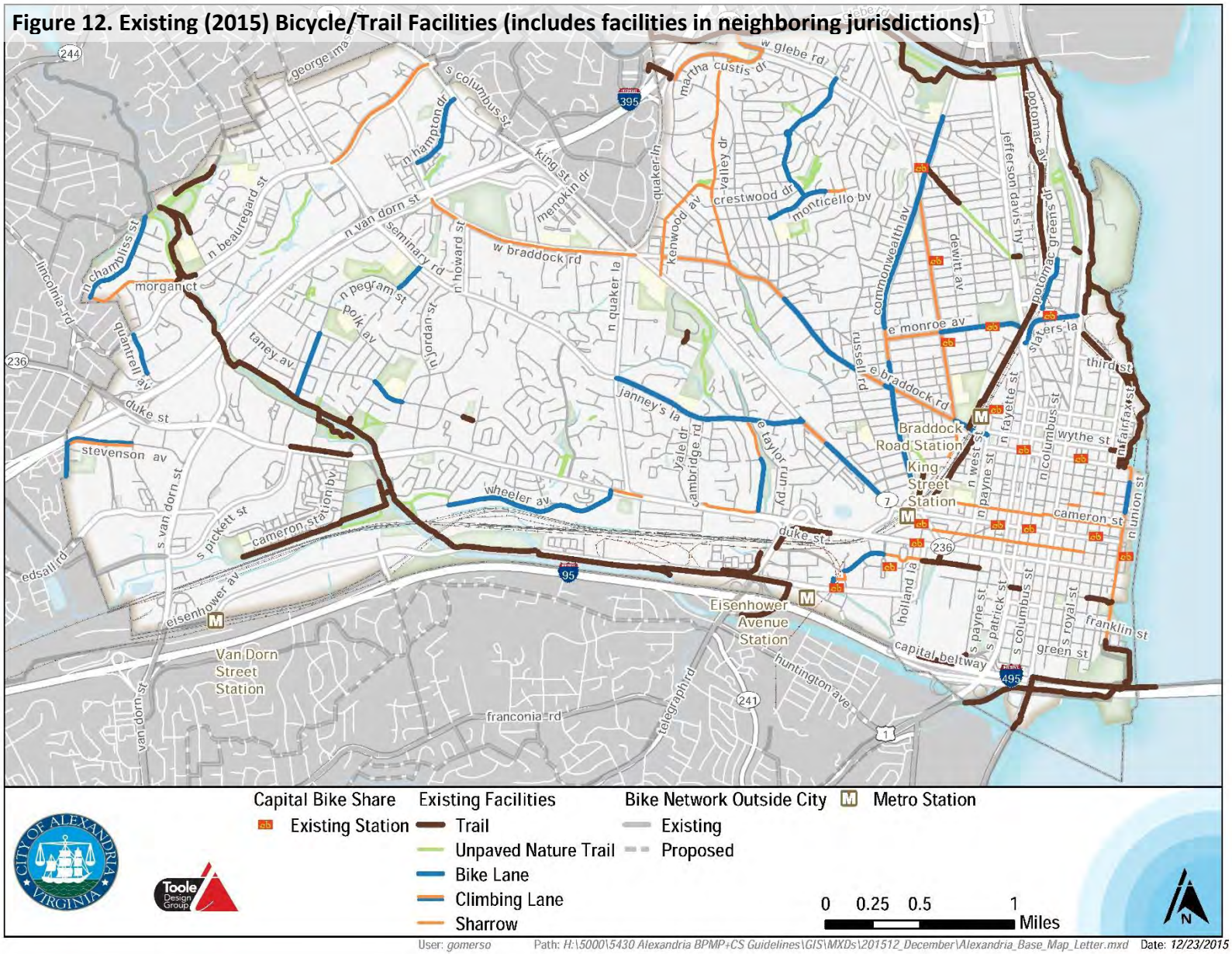
The existing bicycle network in the City of Alexandria consists of on-street facilities (e.g., bike lanes, shared lane markings or sharrows, and signed routes), and off-street sidepaths and multiuse trails. In 2015, the bicycle network consists of a network of approximately 24 miles on-street and 29 miles of off-street facilities (discussed above under Pedestrian Facilities). Figure 12 shows the existing bicycle/trail network and Table 4 documents existing bicycle facilities by type.[15]

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

Table 4 - Bicycle Facilities by Type (2014)

14 It should be noted that the location of some counts changed year to year (although they remained in the same general area), and some locations were dropped and new locations added over the years.
15 The map in Figure 15 includes facilities (existing and planned) in surrounding jurisdictions for easy understanding of regional importance and connectivity.

Figure 12. Existing (2015) Bicycle/Trail Facilities (includes facilities in neighboring jurisdictions)



Bicycle Crash Data

As shown in Figure 13, there were an average of 19 bicycle crashes per year from 2005 through 2014. During that same period there was only one reported bicyclist fatality.[16] Seventy three percent of bicycle crashes occur during daylight hours, and crashes are fairly evenly distributed throughout the days of the week, with Monday through Thursday having higher daily crash volumes than Friday through Sunday. Additional information on the time of day, day and location of accidents is provided in Figures 14-16.

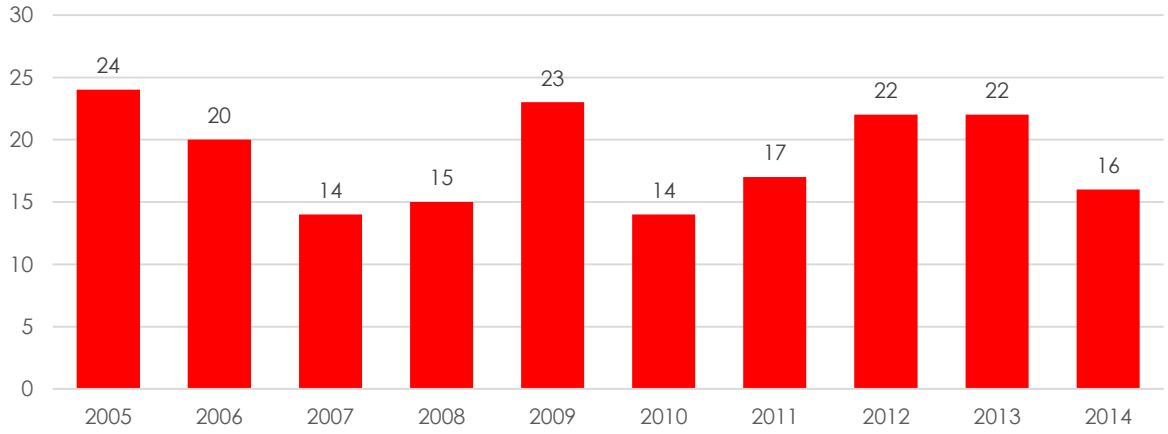


Figure 13 -Reported Bicycle Crashes January 2005 – December 2014[17]

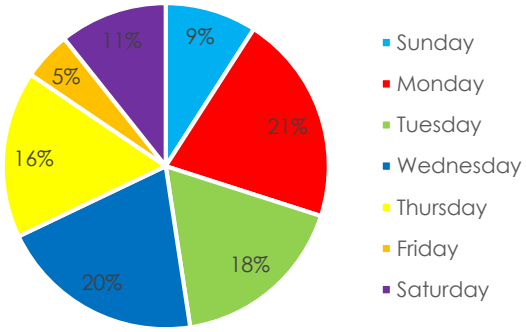


Figure 14 - Reported Bicycle Crashes by Day of the Week

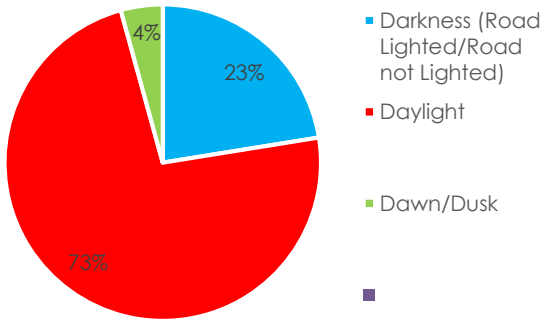


Figure 15 - Reported Bicycle Crashes by Time of Day

16 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 187 bicycle related incidents for the ten year period, the true number of incidents may be different as many pedestrian crashes tend to not be reported to police and therefore are not reflected in the data.

17 City of Alexandria Police. Reported Bicycle Crashes. January 2004 through December 2014.

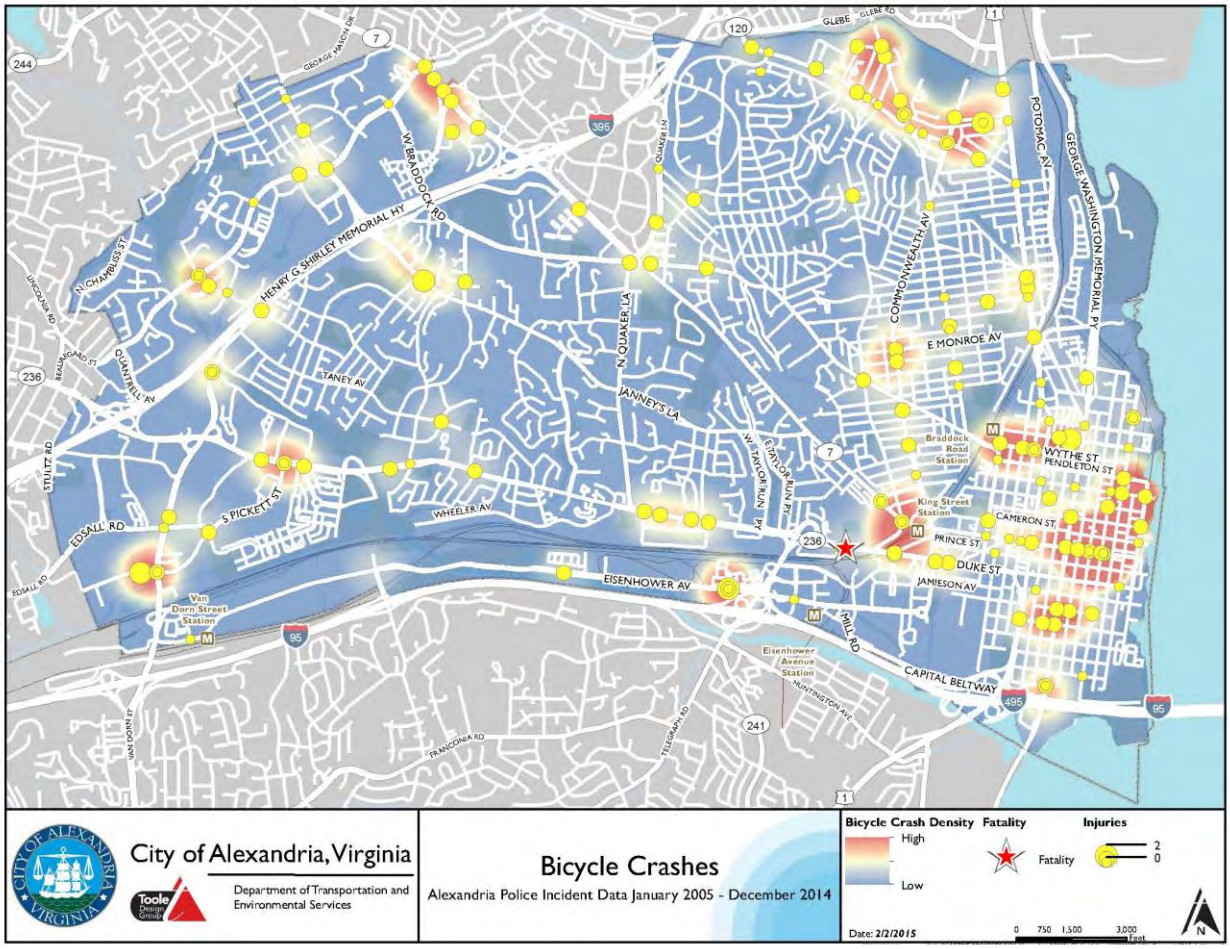


Figure 16 - Reported Bicycle Crashes (January 2005 - December 2014)

Bicycle Counts

Alexandria BPAC volunteers collect bicycle counts at locations throughout Alexandria several times each year. The bicycle counts are collected concurrently with pedestrian counts during the months of January, May, July and September, during the hours of 12:00 to 2:00 p.m. and 5:00 p.m. to 7:00 p.m. Table 5 provides a summary of counts and the geographic locations where data was collected during the years of 2011 through 2014.

The count locations are throughout the City at intersections or other locations with significant bicycle connections and where bicycle activity is expected (e.g. Mt. Vernon Trail).[18]

Seventy one percent of bicyclists observed were male, and there were a higher numbers of bicyclists recorded in the more temperate months of May and September. Finally, as indicated in Table 5 the locations with the most bicycle activity observed were:

1. Mount Vernon Trail – South of the intersection Marina Road.
2. Mount Vernon Trail – South of the Woodrow Wilson Bridge
3. Intersection of Commonwealth Avenue and Mount Vernon Avenue.

18 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.

4. Mount Vernon Trail – Western entrance to trail at Woodrow Wilson Bridge
5. Mt Vernon Ave South of Four Mile Run Trail

Count Location	Total Bicyclists
Mount Vernon Trail - South of the intersection of Marina Road	8,461
Mount Vernon Trail - South of the Woodrow Wilson Bridge	4,603
Intersection of Commonwealth Avenue and Mount Vernon Avenue	1,589
Mount Vernon Trail - Western entrance to trail at Woodrow Wilson Bridge	1,395
Mt Vernon Ave South of 4 Mile Run Trail	1,183
Eisenhower Avenue just west of the Spring Hill Suites	1,160
Mount Vernon Trail East towards Jones Point Park	612
Holmes Run Trail, adjacent to the Holmes Run Parkway near North Ripley Street.	594
North Beauregard Street just south of the intersection with King Street	422
Holmes Run Trail at the intersection of N Pickett/Holmes Run Pkwy	377
Prince Street just west of the intersection with Washington Street.	361
Cameron Street just west of the intersection with Washington Street.	353
Off Street trail between Braddock and King Metrorail Stations	341
Washington St Bridge Deck	262
Slaters Lane just west of Portner Rd	162
Sidewalk/trail on Van Dorn St just N of Metrorail overpass and S of Eisenhower	126
Route 1 Connector	56
TOTAL COUNTS	2,2057

Table 5 - Bicycle Counts by Location (2011-2014)

Safe Routes to School

Safe Routes to School (SRTS) programs are designed to encourage children to bicycle and walk to and from schools safely, and support the improvement of walking and bicycling routes to and from schools. In Alexandria, SRTS programs have included some combination of engineering, encouragement, education, and enforcement activities. Since 1999, the City has continued to set aside a portion of its local budget to implement traffic calming measures to increase safety around schools. More recently, building off of an existing program run by Trails for Youth (a local organization focusing on increasing access to trails and nature), the City hired its first part-time Safe Routes to School coordinator to help manage all activities and programs related to getting to children safely to and from school. Also since 2008, the City has completed SRTS infrastructure improvements focused on pedestrian/bicycle safety near Charles Barrett, Cora Kelly and George Mason Elementary Schools.

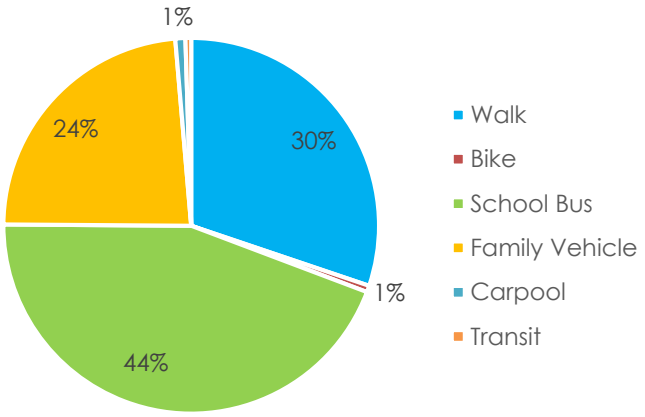


Figure 18 - Student Travel Modes for Participating Schools in Alexandria

Fourteen of the City's 16 elementary and middle schools have participated in SRTS programs in some way. School participation has included events for International Bike to School Day and/or Walk To School Day, and administration of Student/Parent Travel Surveys (described below). Other schools have also received federal and state funding for the implementation of programs that educate and encourage kids to walk and bicycle to school.

In 2014, Alexandria Schools with SRTS programs participated in a voluntary Parent Survey, to help understand student travel to and from school and assess parent/guardian attitudes regarding walking and bicycling to school. This voluntary survey was completed by 4,271 parents in ten elementary and middle schools, and included questions on how students get to and from school. Figure 18 displays the results of the survey based on the various travel modes to and from school.[19]

[19] National Center for Safe Routes to School. Data Central. Parent Survey 2014. Accessed from http://www.saferoutesinfo.org/data-central on December 9, 2014.

APPENDIX D:
Case Study Area Summaries

Note: Each of the six following case studies is written so that it can serve as a standalone document. For this reason, some of the introductory content is repeated at the beginning of each case study.

APPENDIX D:
Case Study Area Summaries

Note: Each of the six following case studies is written so that it can serve as a standalone document. For this reason, some of the introductory content is repeated at the beginning of each case study.

INTRODUCTION

Purpose

Six Case Study Areas were chosen for an analysis of common pedestrian and bicycle infrastructure challenges that exist in Alexandria today. These Case Study Areas were selected because they represent typical themes or issues found throughout the City. Recommendations to mitigate issues identified in a Case Study Area may apply to similar issues found in other parts of the City. These six areas are not the only places where the City will improve pedestrian and bicycle infrastructure. Conversely, these recommendations will inform changes that could be made throughout the City.

The themes and Case Study Areas evaluated as part of this project are included in Table 1 below.

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

Table 1: Case Study Areas by Theme

Study of these diverse Case Study Areas also allows for identification of typical infrastructure issues in Alexandria. While the focus was on pedestrian infrastructure, some localized bicycle issues/improvements have also been noted. Several issues that were found to be common to all of the areas include:

- Non-compliance with ADA standards for curb ramps at intersections and driveways, both in placement and design
- Lack of consistency in type, location and function of pedestrian push buttons
- Narrow and substandard sidewalk widths (standard is five feet)

Non-compliant curb ramp in Alexandria

Fieldwork Approach

Each of the Case Study Areas was visited by a team of project consultant staff. A comprehensive walk-through of the area was conducted to assess existing issues that create an adverse walking or bicycling environment. Some recommendations for infrastructure improvements were made in the field and others were made after further synthesis of field observations.

A number of locations in each area were observed for a period of time to understand how pedestrians move through the existing environment. This allowed team members to develop recommendations that will best accommodate pedestrian travel desire lines. In many instances, further study, analysis and public input are necessary to comprehensively address the issues identified through this effort.

Fieldwork Documentation

The following summaries and maps present specific issues and recommendations for each Case Study Area. At intersections where multiple instances of the same issue exist, e.g. non-compliant curb ramps, only one indication appears on the map in order to maintain legibility.

Project field team observing pedestrian issues and opportunities

CASE STUDY 1:

I-395 / LANDMARK MALL

Theme: Major Barriers and Freeways

City of Alexandria

Case Study Area

N

0 250 500 1,000 Feet

The following section describes the I-395/Landmark Mall Case Study Area. Although this Case Study focuses on the theme of "major barriers and freeways," it is important to note that the 1-395 and Landmark Mall area also represents other themes evaluated through the Case Studies, including "transit access and integration" and "suburban commercial connectors."

The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Overview

Located in western Alexandria, the I-395 and Landmark Mall Case Study Area features mostly multifamily housing and large scale commercial development. Duke Street bisects the area and serves as a main route to I-395, Van Dorn Street, the Landmark Mall and the Plaza at Landmark shopping center. As a result, there are relatively high volumes of vehicles traveling through the area and speeding is a common concern, particularly on Duke Street where the speed limit is 35 MPH. These factors, in conjunction with the current road configuration and auto-oriented development character, contribute to an environment that is inhospitable for pedestrians and bicyclists.

The area is among the more dense neighborhoods in Alexandria and is anticipated to become more populous as future development plans for the Landmark Mall property unfold. The West End Transitway and the Duke Street Transitway, two proposed Bus Rapid Transit (BRT) corridors that are currently being planned, are envisioned to serve this area and will support improved mobility and continued revitalization. Introduction of the BRT routes will increase pedestrian and bicycle activity near stops in the area.

The Plaza at Landmark shopping center, a popular destination for both pedestrians and vehicles

Typical street segment on Duke Street

Intersection at Duke Street and South Walker Street

Goat path along Duke Street

Pedestrian crossing the middle of the on-ramp

Crosswalk lacking ADA ramps

Summary of Issues

Table 2 shows the types and frequency of issues observed during the field work in the I-395/Landmark Mall Case Study Area. As in all the Case Study Areas, sidewalk obstructions and disrepair, crosswalks, and curb ramps are the most prevalent pedestrian infrastructure issues. Sidewalks exist along most, though not all, streets and are typically five feet wide. Similarly, most --but not all-- of the sidewalks have buffers. Other notable issues in this corridor include poor lighting and poor bus stop access, as shown in Figure 1.

Within the Case Study Area, the most challenging corridor for pedestrians is along Duke Street between Beauregard Street and South Van Dorn Street. Sidewalks are missing in many locations, and where sidewalks do exist they are in disrepair or are too narrow to create a comfortable walking environment, given the surrounding context and vehicle speeds. Many pedestrians were observed along Duke Street despite the uncomfortable conditions. Worn paths in the dirt/grass were observed in most locations where the sidewalk is discontinuous, demonstrating a need for more permanent infrastructure. The City is currently completing a sidewalk project along Duke Street from Oasis Drive to Walker Lane, which is a step toward addressing the connectivity issues in this area.

The I-395 and Van Dorn Street on and off ramps are particularly challenging for pedestrians. Many people cross the ramps, often jogging across the ramps to avoid fast moving traffic, and most lack marked crosswalks. Furthermore, sight distance for drivers and pedestrians is limited in most cases, creating more potential for conflicts.

Another important issue in this Case Study Area is the limited pedestrian access to the Landmark Plaza shopping center as well as the Landmark Mall. Although there is a recently restriped crosswalk on Duke Street at South Walker Street, the connecting sidewalks are narrow or in disrepair and there is not an ADA accessible route to the Mall from the nearest bus stop on Duke Street.

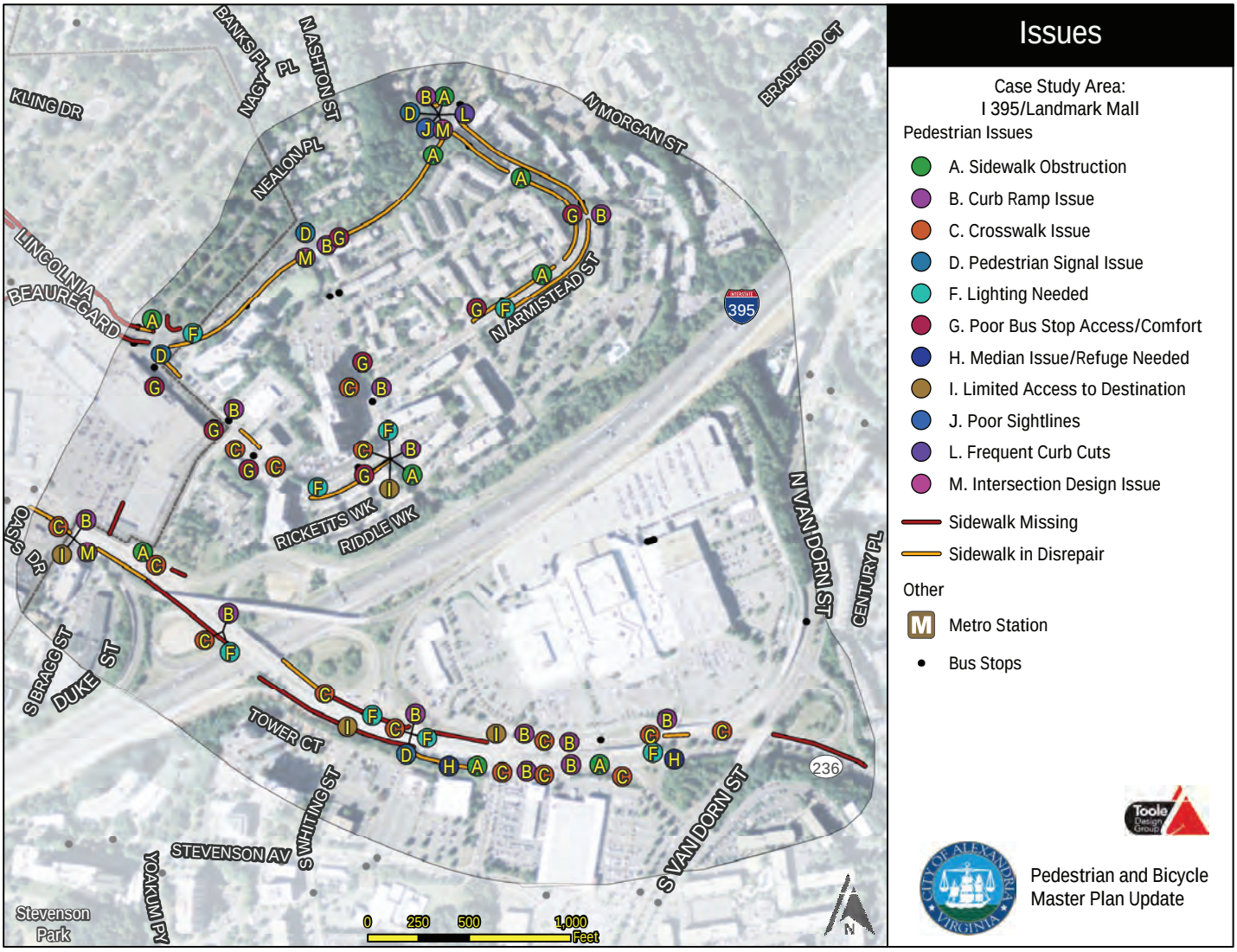


Figure 1: Map of Issues Identified

Issue	Count
Sidewalk in Disrepair	17
Crosswalk Issue	15
Curb Ramp Issue	14
Sidewalk Obstruction	9
Lighting Needed	8
Poor Bus Stop Access/Comfort	8
Sidewalk Missing	8
Pedestrian Signal Issue	4
Limited Access to Destination	4
Intersection Design Issue	3
Median Issue/Refuge Needed	2
Poor Sightlines	1
Frequent Curb Cuts	1

Table 2: Summary of Observed Issues

Crosswalk, signage and continuous sidewalk near highway on/off ramps in Washington, DC

Sidewalk in auto-centric environment

Proposed Recommendations

The I-395 and Landmark Mall area has 94 recommendations including improvements to sidewalks, curb ramps, crossings, lighting, and bus stops, among other issues. Table 3 and Figure 2 provide an overview of the recommendations.

New sidewalks and crosswalks are key to the visibility and comfort of pedestrians in this area, particularly near bus stops. Fifteen new crosswalks and eight new sidewalk segments are recommended, primarily along Duke Street. Most of these improvements are already planned for implementation in late 2015 through the Duke Street Pedestrian Improvements project.

To improve lighting, existing "cobra style" lights on Duke Street could be supplemented with pedestrian-scale street lights. Also, as part of future redevelopment in the area, it will be critical to provide improved ADA accessible routes for bicyclists and pedestrians to access and walk through the Mall site. Finally, the study team recommends continued partnership with Fairfax County to ensure that the infrastructure near the City/County border (in the western portion of this Case Study Area) provides a seamless experience for the pedestrians and bicyclists.

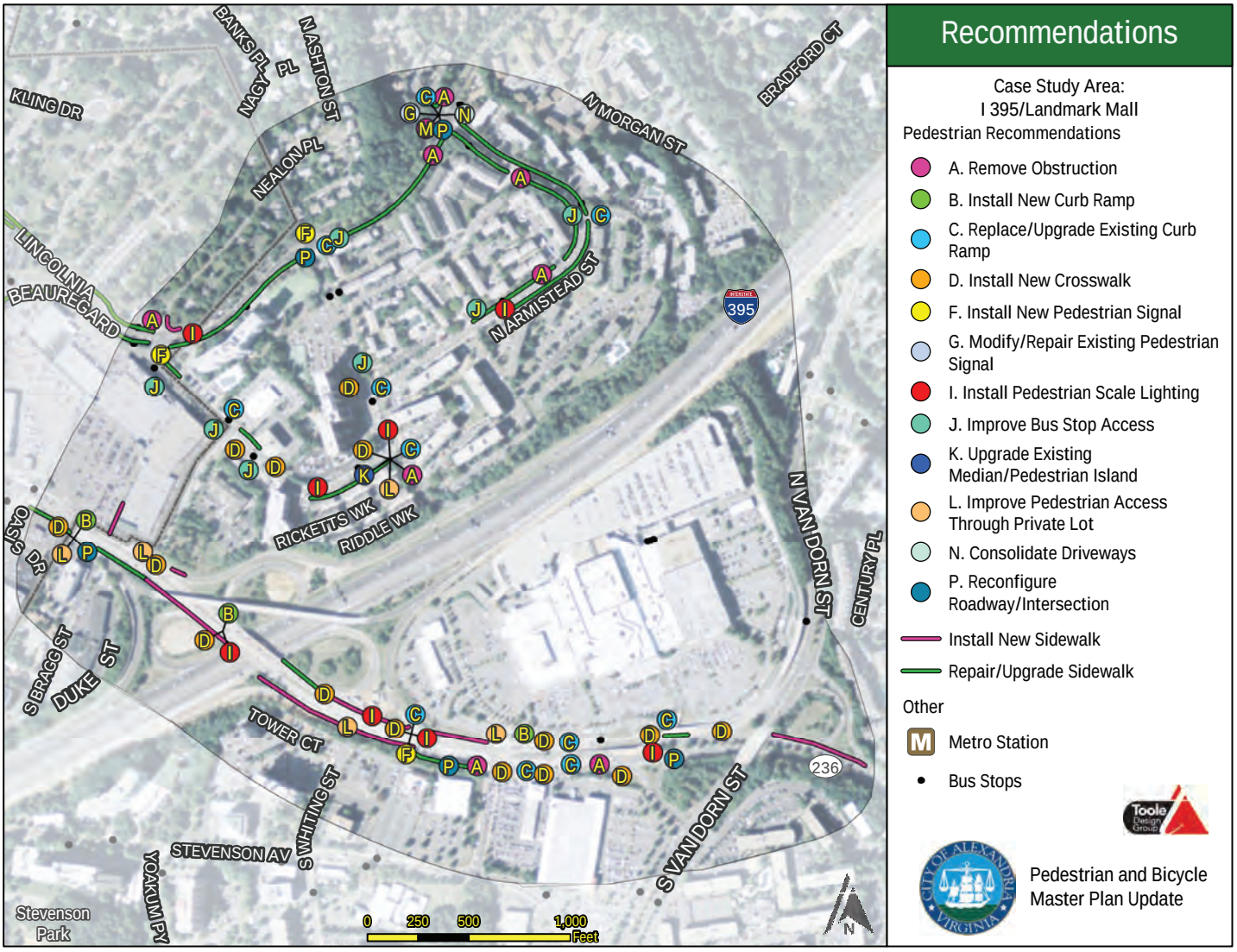


Figure 2: Map of Recommendations

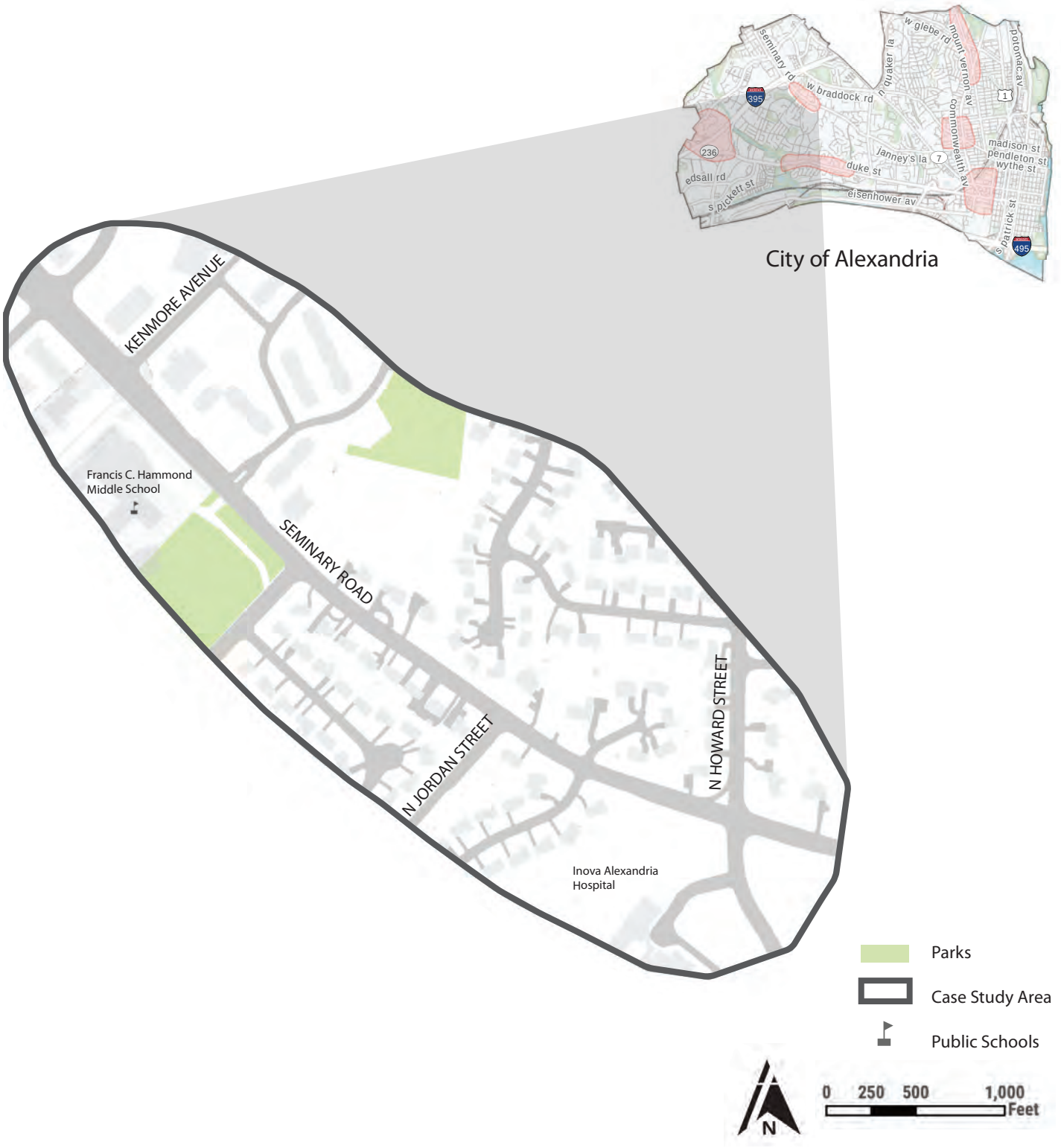
Recommendation	Count
Repair/Upgrade Sidewalk	17
Install New Crosswalk	15
Replace/Upgrade Existing Curb Ramp	11
Install New Sidewalk	8
Remove Obstruction	8
Install Pedestrian Scale Lighting	8
Improve Bus Stop Access	7
Improve Pedestrian Access Through Private Lot	5
Reconfigure Roadway/Intersection	5
Install New Curb Ramp	3
Install New Pedestrian Signal	3
Modify/Repair Existing Pedestrian Signal	1
Upgrade Existing Median/Pedestrian Island	1
Adjust Parking to Improve Sightlines	1
Consolidate Driveways	1

Table 3: Summary of Recommendations

CASE STUDY 2:

SEMINARY ROAD / HAMMOND MIDDLE SCHOOL

Theme: Schools and Neighborhoods



The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "schools and neighborhoods," it is important to note that the Seminary Road/Hammond Middle School area also represents other themes evaluated through the case studies, including "major barriers/freeway interchanges" and "transit access and integration."

Overview

The Seminary Road Case Study Area features a combination of single-family detached housing, multifamily housing, and some commercial development to the north. Seminary Road serves as a major, cross-city route that connects to Hammond Middle School, Inova Hospital, I-395, and Bailey's Crossroads in Fairfax. There is a significant amount of pedestrian traffic near the middle school and hospital, with many people crossing Seminary Road at both signalized and unsignalized locations. There are popular WMATA and DASH bus routes along Seminary Road, leading to increased pedestrian activity.

Hammond Middle School entrance

Residential section of Seminary Road

Crosswalk on Seminary Road at Kenmore Avenue near Hammond Middle School

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

Traffic outside Hammond Middle School blocking the fire station

Edge of street conditions on Seminary Road

Summary of Issues

As in all the Case Study Areas, curb ramps, sidewalk obstruction/disrepair, missing or narrow sidewalks, and crosswalks are key issues in the Seminary Road/Hammond Middle School area. Sidewalks exist on both sides of the streets and vary in width from four and six feet. Sidewalk buffers of between four and six feet exist on some segments of Seminary Road and nearby local streets, but in some instances buffers are narrow given the speed and volume of traffic. Additionally, many sidewalks and curb ramps are not ADA compliant, and several intersections lack marked crosswalks. Other issues in this corridor include poor bus stop access and inaccessible or broken pedestrian signals, as shown in Table 4 and Figure 3.

Within the Case Study Area, one of the most challenging locations for pedestrians is the Seminary Road crossing at Kenmore Avenue. During the project field work, numerous pedestrians were observed crossing mid-block on Seminary Road to access the bus stop and shopping centers 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.

Walkability and pedestrian safety in this Case Study Area is particularly important due to the presence of Hammond Middle School. Alexandria has an active Safe Routes to School program that aims to support increased walking and bicycling to school. Several curb ramps and crosswalks in front of the school need improvement, and the field work team noted a lack of visible signage alerting parents to the school zone, especially at the west end of the school zone. Another challenge in this area is that vehicles back up on Seminary Road in front of Hammond Middle School as parents wait to drop off/pick up their children. This situation blocks the sidewalks and creates the potential for conflicts between the queuing vehicles and other traffic.

Finally, bicycle infrastructure is very limited in this area. Bicyclists were observed riding on both the sidewalks and on Seminary Road, though the traffic volumes are too high for most people to be comfortable riding on the street. Also, the edge of the street creates challenges for bicyclists given the prevalence of storm drain grates and unmaintained gutter seams.

Figure 3: Map of Issues Identified

Issue	Count
Curb Ramp Issue	12
Sidewalk Obstruction	10
Sidewalk in Disrepair	9
Crosswalk Issue	4
Poor Bus Stop Access/Comfort	3
Pedestrian Signal Issue	2
Median Issue/Refuge Needed	1
Intersection Design Issue	1

Table 4: Summary of Observed Issues

Example of recommended pedestrian crossing signal

Example of recommended school zone signage

Proposed Recommendations

There are 41 recommendations that relate to sidewalks, curb ramps, intersections, crossings, signage, and school zone enforcement, as shown in **Table 5** and **Figure 4**. The study team identified 12 priority locations where sidewalks should be repaired or upgraded in order to improve pedestrian safety and comfort. Curb ramps should be replaced or upgraded in 11 locations, primarily adjacent to the school and hospital, to comply with ADA regulations. The team also identified three locations for new crosswalks and one recommended upgrade to an existing crosswalk.

To help with the issue of people crossing mid-block on 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 and Library Lane. Longer term, the City could evaluate the potential for a new traffic signal or pedestrian activated signal at Seminary and Howard; however, the close proximity to the adjacent signal at Library Lane may make this infeasible.

To improve pedestrian access and safety near Hammond Middle School, additional highly-visible school zone signage is recommended. School officials should also increase enforcement of school drop off/pick up zones to minimize backups on Seminary Road.

Last, pedestrian signal timing at the intersection of Seminary Road and Howard Street at the Inova Hospital should be addressed to better accommodate all types of pedestrians, including seniors and people with disabilities. The current pedestrian crossing phase does not extend the length of the parallel automobile green phase, so it could be lengthened.

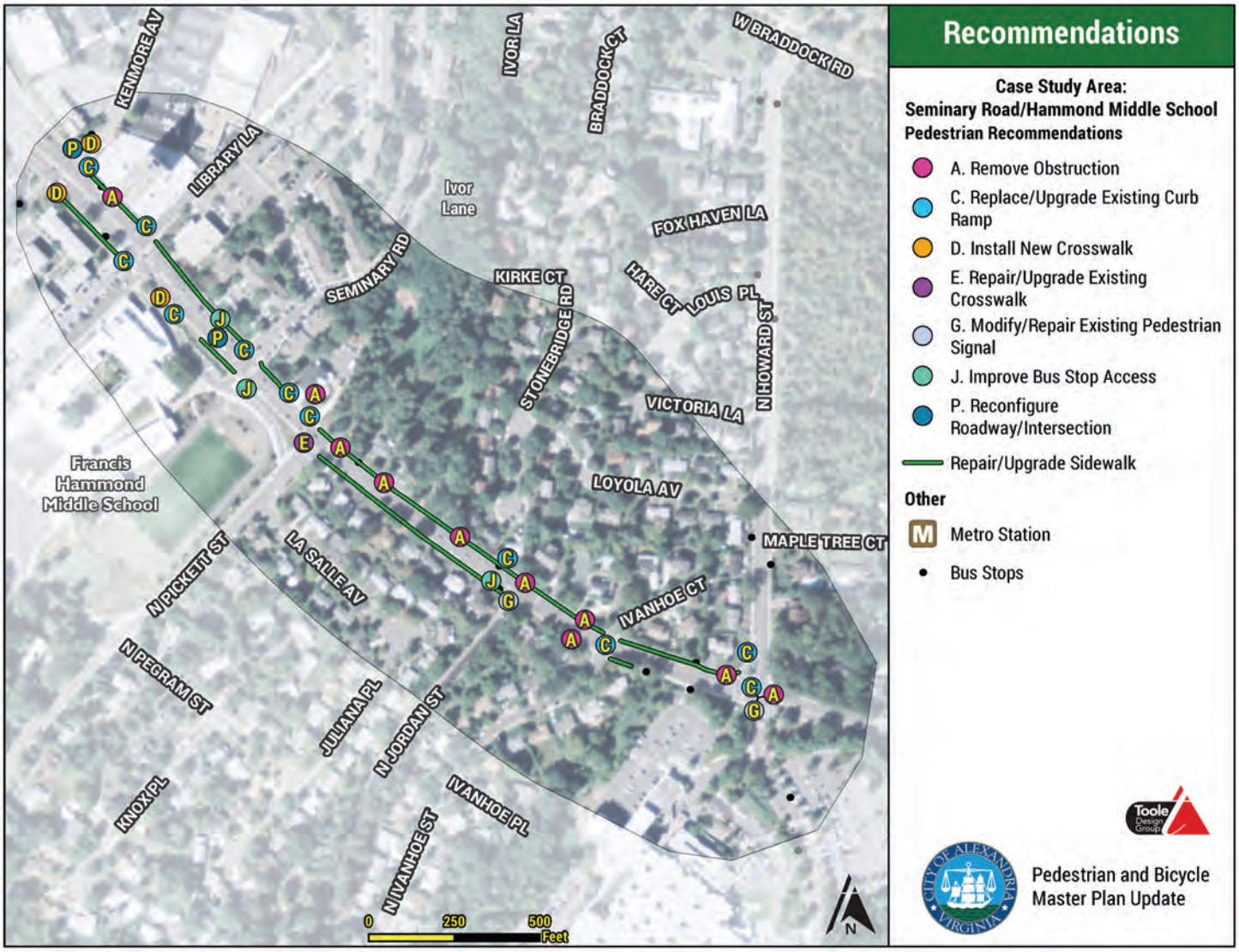


Figure 4: Map of Recommendations

Recommendation	Count
Replace/Upgrade Existing Curb Ramp	11
Remove Obstruction	10
Repair/Upgrade Sidewalk	9
Install New Crosswalk	3
Improve Bus Stop Access	3
Modify/Repair Existing Pedestrian Signal	2
Reconfigure Roadway/Intersection	2
Repair/Upgrade Existing Crosswalk	1

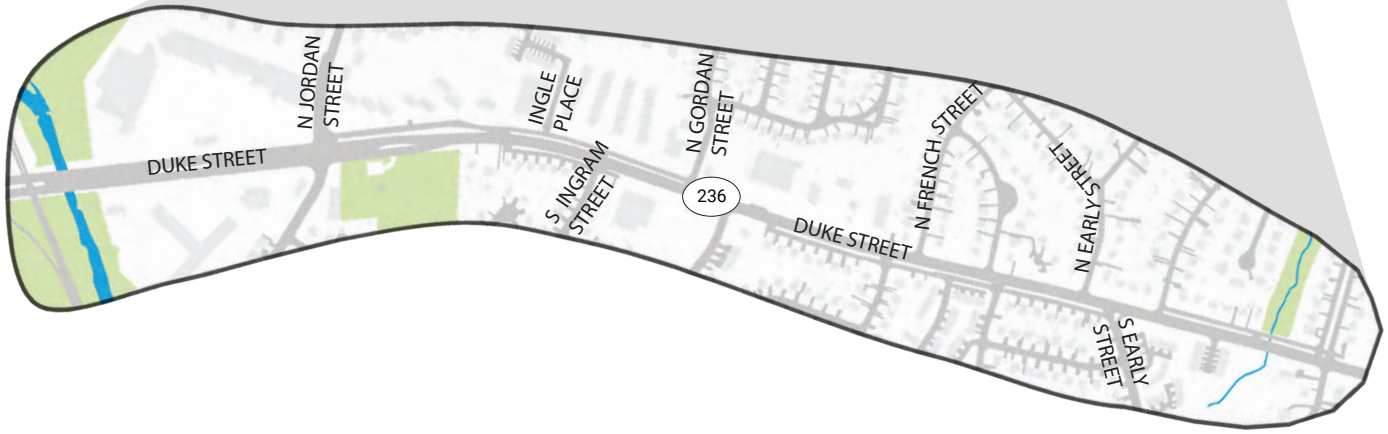
Table 5: Summary of Recommendations

CASE STUDY 3:

DUKE STREET CORRIDOR

Theme: Suburban Commercial Connectors

City of Alexandria



Parks

Case Study Area

The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "suburban commercial connectors," it is important to note that the Duke Street Corridor area also represents other themes evaluated through the case studies, including "transit access and integration."

Overview

This Case Study Area is a mixed commercial and residential district centered around Duke Street, a major east-west connection within Alexandria and into Fairfax County. Duke Street carries among the highest vehicle volumes in the City, and vehicles often exceed the posted 35 MPH speed limit. The roadway includes four to six travel lanes, including center turn lanes in some locations. There are local access roads — one on the north side of Duke Street between Jordan Street and Gordon Street, and one on the south side between Gordon Street and Early Street. Duke Street features several active WMATA and DASH bus lines and is planned as a future Transitway Corridor. Furthermore, this corridor experiences some of the highest transit ridership in the City.

Local access road adjacent to Duke Street

Movement of traffic to and from local access road

Driveways along local access road

Sidewalk obstruction and curb ramp issue

Non-ADA compliant bus stop

Student crossing mid-block across Duke Street to local access road

Summary of Issues

As shown in Table 6 and similar to other Case Study Area, curb ramps, crosswalks, sidewalk obstruction/disrepair, and missing or narrow sidewalks are key issues in the Duke Street Corridor. Other issues in this corridor include poor bus stop access/comfort and poor lighting, as shown in Figure 5. Sidewalks exist on both sides of the street in some, but not all locations and vary in width between five and six feet. However, the sidewalks are not buffered from traffic in many locations, and multiple driveways and access roads create conflict points for pedestrians. Additionally, many sidewalks and curb ramps are not ADA compliant. Several bus stops lack shelter, seating, and curb ramp access from the adjacent side sidewalk.

Sidewalks on the south side of Duke Street along the access road are discontinuous and difficult to navigate for nearly the entire length from Early Street to Gordon Street. Curb ramps at all intersections and driveways in this segment are not ADA compliant.

The most problematic segment of the Case Study Area is Duke Street between Ingle Place and Gordon Street. This segment has a two-way access road on the north side of Duke Street, and the vehicle lane configuration leads to numerous potential conflict points with other vehicles, pedestrians, and bicyclists. Another issue with this segment is that there is no pedestrian accommodation at the intersection of Duke Street at Ingram Place. The nearest signal with crosswalks, pedestrian signal heads, and curb ramps is 400 feet away, making it difficult for pedestrians to safely cross in this portion of the corridor. Additionally, there is poor access to the existing bus stops in this segment due to narrow sidewalks on the south side of Duke Street.

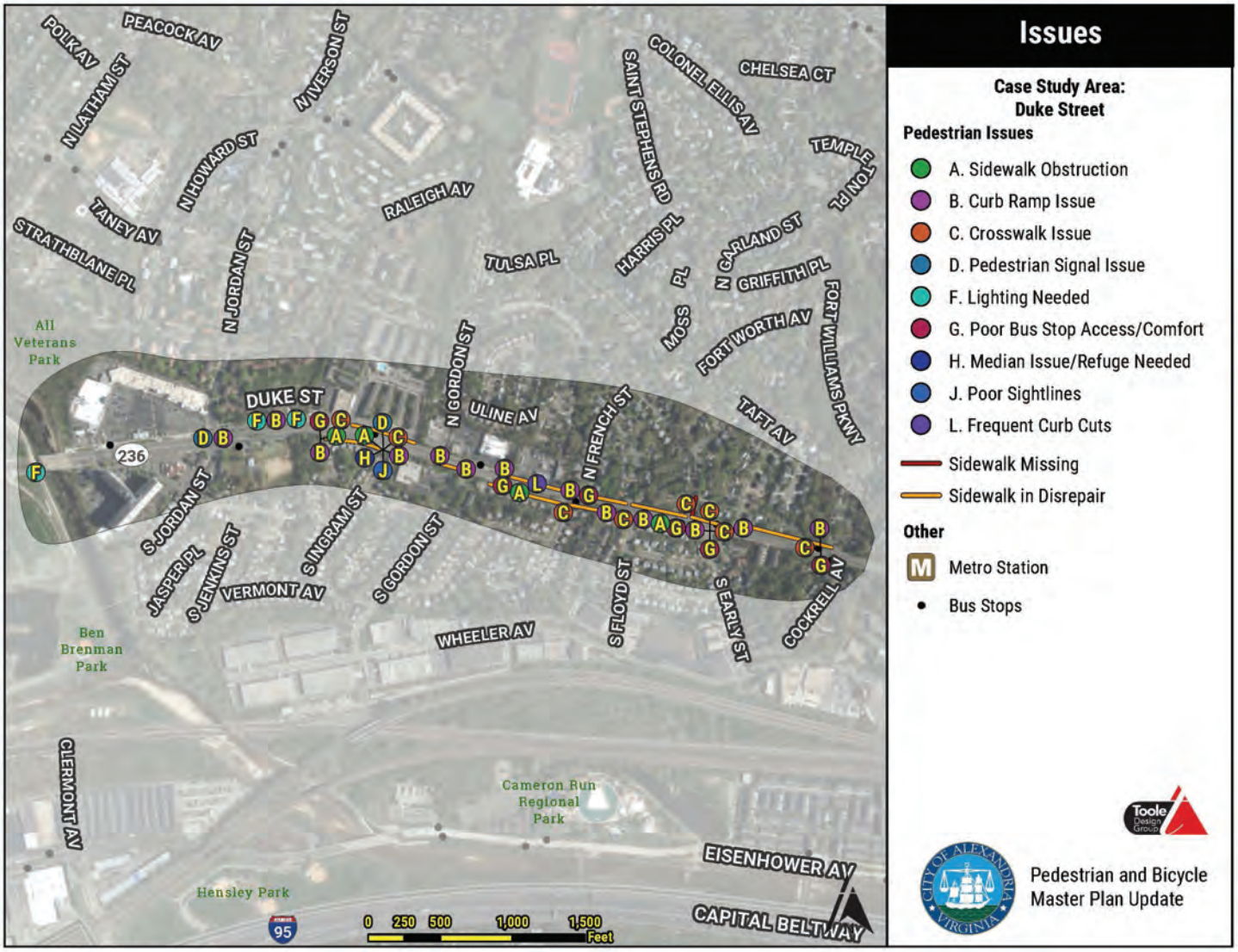


Figure 5: Map of Issues Identified

Issue	Count
Curb Ramp Issue	13
Sidewalk in Disrepair	10
Crosswalk Issue	8
Poor Bus Stop Access/Comfort	6
Sidewalk Obstruction	4
Lighting Needed	3
Pedestrian Signal Issue	2
Median Issue/Refuge Needed	1
Poor Sightlines	1
Frequent Curb Cuts	1

Table 6: Summary of Observed Issues

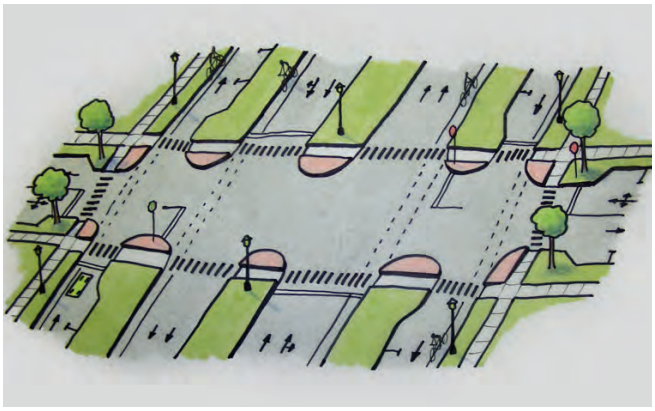


Illustration of crosswalk treatments on local access roads

Example of accessible bus stop

Proposed Recommendations

As shown in Table 7, there are 49 recommendations for this area including improvements to sidewalks, curb ramps, intersections, crossings, and the overall street configuration. Sidewalks should be upgraded at targeted points to provide pedestrians a continuous, safe, and comfortable walking environment. Similarly, curb ramps need to be replaced or upgraded in nine locations along the corridor to comply with ADA requirements. There are six locations where the study team recommended new crosswalks, and one existing crosswalk needs to be upgraded, as shown in Figure 6.

To reduce potential conflicts between modes, the portion of the access road between Ingle Place and Gordon Street should be evaluated for a possible conversion from two-way to one-way, and/or a relocation of the access road entrances and exits.

Over the longer term and in concert with the Transitway project, more significant pedestrian and bicycle improvements should be made along the entirety of Duke Street. An enhanced bicycle facility, such as a buffered bike lane, protected bicycle lane, or sidepath, would provide a low stress option for bicyclists, and wider sidewalks with buffers would improve comfort for those traveling on foot. A two foot frontage zone, six foot sidewalk, and six foot buffer are recommended minimums for a commercial corridor like Duke Street.

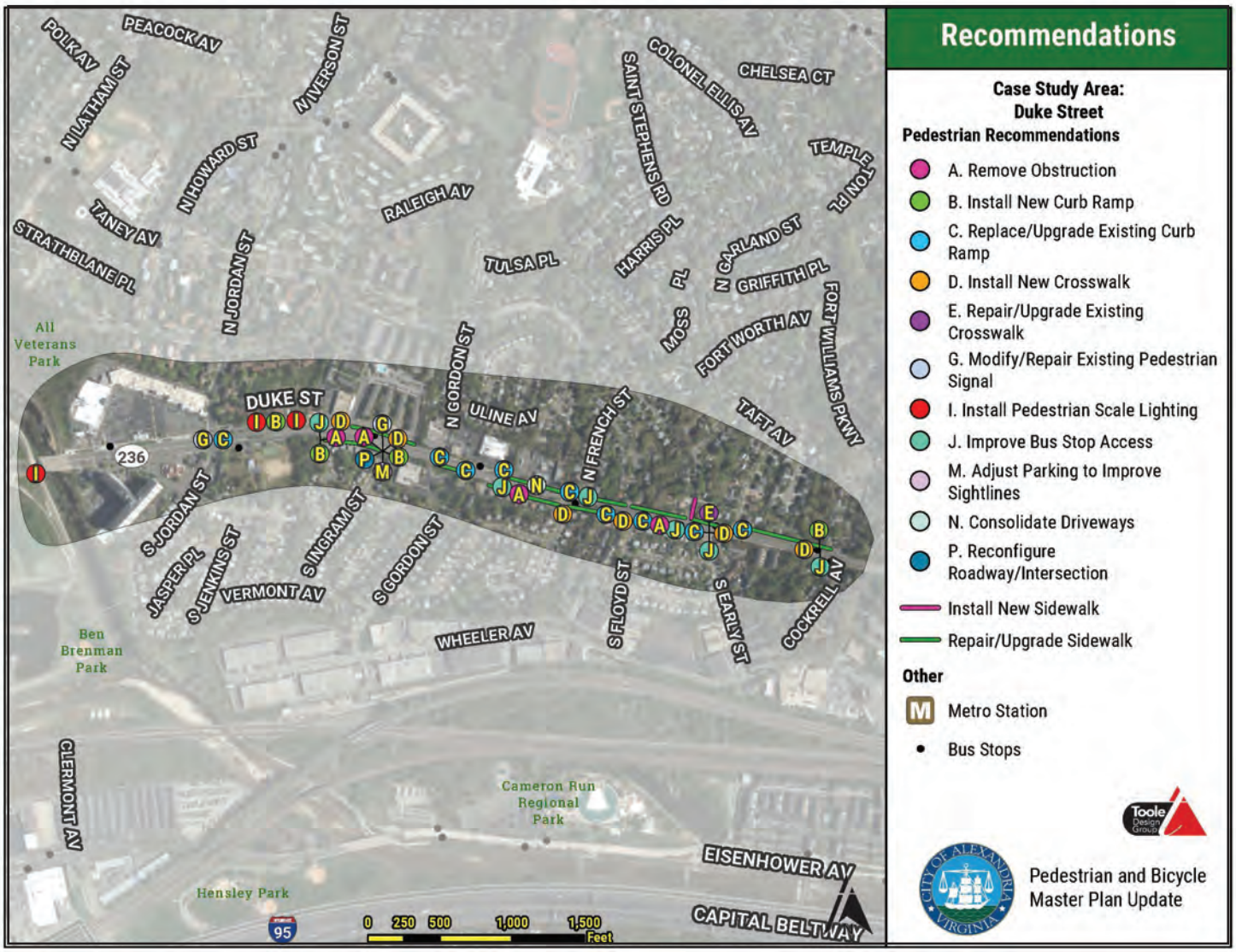


Figure 6: Map of Recommendations

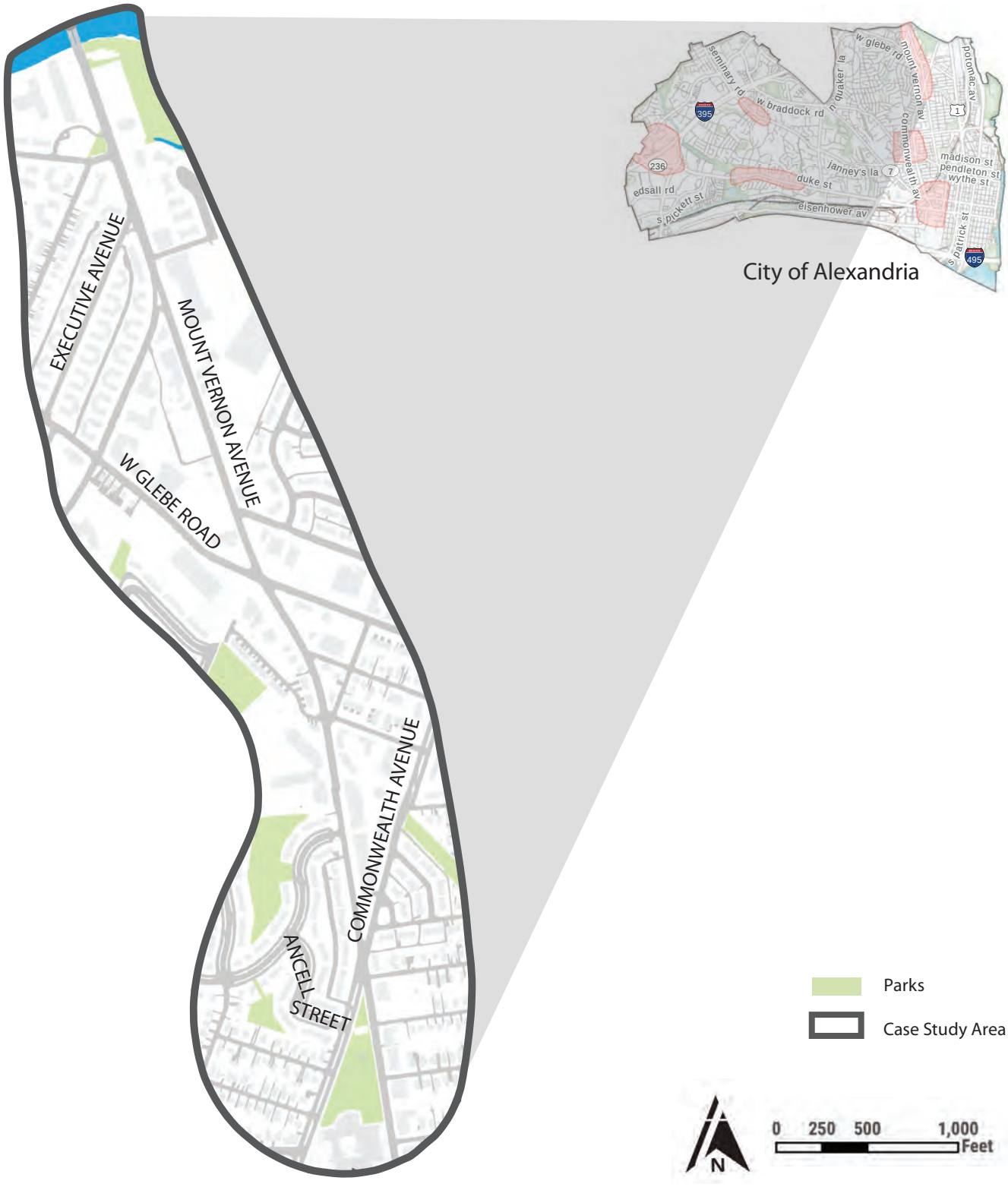
Recommendation	Count
Repair/Upgrade Sidewalk	11
Replace/Upgrade Existing Curb Ramp	9
Install New Crosswalk	6
Improve Bus Stop Access	6
Remove Obstruction	4
Install New Curb Ramp	4
Install Pedestrian Scale Lighting	3
Modify/Repair Existing Pedestrian Signal	2
Repair/Upgrade Existing Crosswalk	1
Adjust Parking to Improve Sightlines	1
Consolidate Driveways	1
Reconfigure Roadway/Intersection	1

Table 7: Summary of Recommendations

CASE STUDY 4:

MOUNT VERNON AVENUE / FOUR MILE RUN

Theme: Neighborhood Main Streets



The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "neighborhood main streets," it is important to note that the Mount Vernon Avenue/Four Mile Run area also represents other themes evaluated through the case studies, including "schools and neighborhoods" and "trail/roadway transitions."

Overview

The Mount Vernon Avenue/Four Mile Run Case Study Area features mostly residential development, with more commercial development on Mount Vernon Avenue between Four Mile Run and Herbert Street. As a result, this commercial road segment is auto-oriented, especially near the intersection with West Glebe Road. The Case Study Area has relatively low traffic volumes and speeds, which makes the streets fairly comfortable for pedestrians and bicyclists. Roadway widths vary throughout the Case Study Area, with Mount Vernon Avenue dropping from four to two travel lanes south of Bruce Street. The Four Mile Run Trail intersects Mount Vernon Avenue in the northern section of this Case Study Area, emphasizing the importance of pedestrian and bicycle access along this active corridor. There are several private redevelopment projects planned in the Case Study Area, which will result in increased density and commercial activity in the corridor.

Pedestrian environment near Mount Vernon Avenue at Glebe Road

Roadway and sidewalk adjacent to Colasanto Park

Newly installed rapid flashing beacon on Mount Vernon Avenue at Herbert Street

Group of kids crossing mid-block across Commonwealth Avenue to Ancell Street

Obstructed pedestrian crossing signal button and signage on Mt. Vernon Avenue

Sidewalk obstruction on a local street near the Mt. Vernon Commercial District

Summary of Issues

While the Mount Vernon Avenue/Four Mile Run corridor is relatively pedestrian-friendly overall, there are some issues that were identified by the study team. As in all the Case Study Areas, curb ramps, sidewalk obstruction/disrepair, missing or narrow sidewalks, and crosswalks are the main issues throughout the area (see Table 8). Sidewalks exist on both sides of the street in most areas, though they are missing and/or narrow in several locations. Sidewalk widths range from five to six feet, and many segments also have a sidewalk buffer. However, many sidewalks and curb ramps are not ADA compliant. Other leading issues include inaccessible or broken pedestrian signals and lack of signage, as shown in Figure 7.

A Rectangular Rapid Flash Beacon (RRFB) crossing was recently installed on Mount Vernon Avenue at Herbert Street, which makes the frequency of marked crossings reasonable for pedestrian travel. However, access to and from Four Mile Run Trail is challenging due to insufficient wayfinding signage.

There are a few intersections in the Case Study Area that present particular challenges for pedestrians crossing the street. There is currently no crosswalk on Kennedy Street at Ancell Street, despite the fact that many families in this area frequently visit the Goat Hill Park playground on the north side of Kennedy Street, and Colasanto Park at the end of Ancell Street on Commonwealth Avenue. The Neighborhood Parks Improvement Plan included a recommended crosswalk to improve access to Goal Hill Park. Additionally, there is no crosswalk on Commonwealth Avenue at Ancell Street leading to Colesanto Park.

Mount Vernon Avenue at West Glebe Road is a wide intersection with long crossing distances, which is uncomfortable for pedestrians and bicyclists. Mount Vernon Avenue at Russell Road is less problematic, but there is a long right-turn only lane adjacent to the sidewalk, which encourages fast vehicle turning movements that can make it difficult for pedestrians to cross.

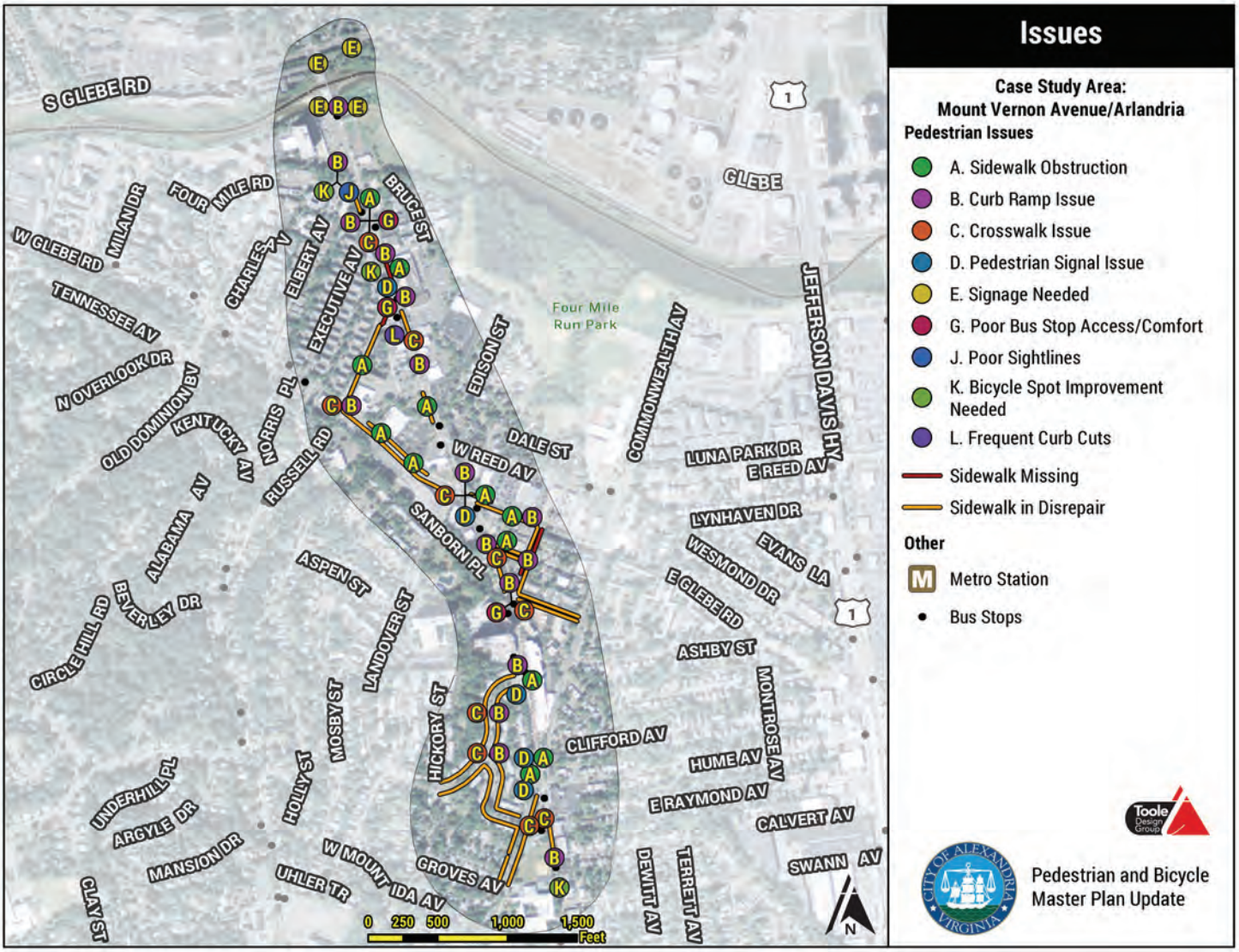


Figure 7: Map of Issues Identified

Issue	Count
Sidewalk in Disrepair	24
Curb Ramp Issue	16
Sidewalk Obstruction	12
Crosswalk Issue	10
Pedestrian Signal Issue	5
Signage Needed	4
Sidewalk Missing	4
Poor Bus Stop Access/Comfort	3
Bicycle Spot Improvement Needed	3
Poor Sightlines	1
Frequent Curb Cuts	1

Table 8: Summary of Observed Issues

Using bulb-outs to narrow an intersection

Active neighborhood commercial district with improved crossings

Proposed Recommendations

There are 79 recommendations for this Case Study Area, including improvements to sidewalks, curb ramps, intersections and crossings, and pedestrian signals (see Table 9). Recommendations focus on widening sidewalks, adding sidewalk buffers, minimizing obstructions, and making sidewalks ADA-compliant. Sidewalks should be upgraded in many locations to provide pedestrians a continuous, safe, and comfortable walking environment. New sidewalks should be built on Russell Road and Helen Street, as shown in Figure 8.

Curb ramps need to be replaced or upgraded in 13 locations in the Case Study Area to comply with ADA requirements. The study team identified five existing crosswalks that need improved, and five locations that need new crosswalks. Five locations need pedestrian signal modifications, including signal relocations for ADA access and nonfunctional signal repairs.

The intersection of Mount Vernon Avenue at West Glebe Road is recommended for bulb outs in order to shorten crossing distances for pedestrians. Additionally, the study team recommended further study to potentially remove the right turn slip lane on Mount Vernon Avenue at Russell Road, in order to slow vehicle traffic and shorten pedestrian crossing distances.

Last, improved wayfinding and advisory signage near the Four Mile Run Trail will improve access to and visibility of the trail, which is an important community asset. The study team recommended signs alerting drivers to an increased presence of pedestrians and bicyclists in the area, as well as wayfinding signs oriented towards trail users. There are currently plans to develop a wayfinding plan for Four Mile Run Park, so it will be key to partner with the Department of Recreation, Parks and Cultrual Activities to develop and implement this plan.

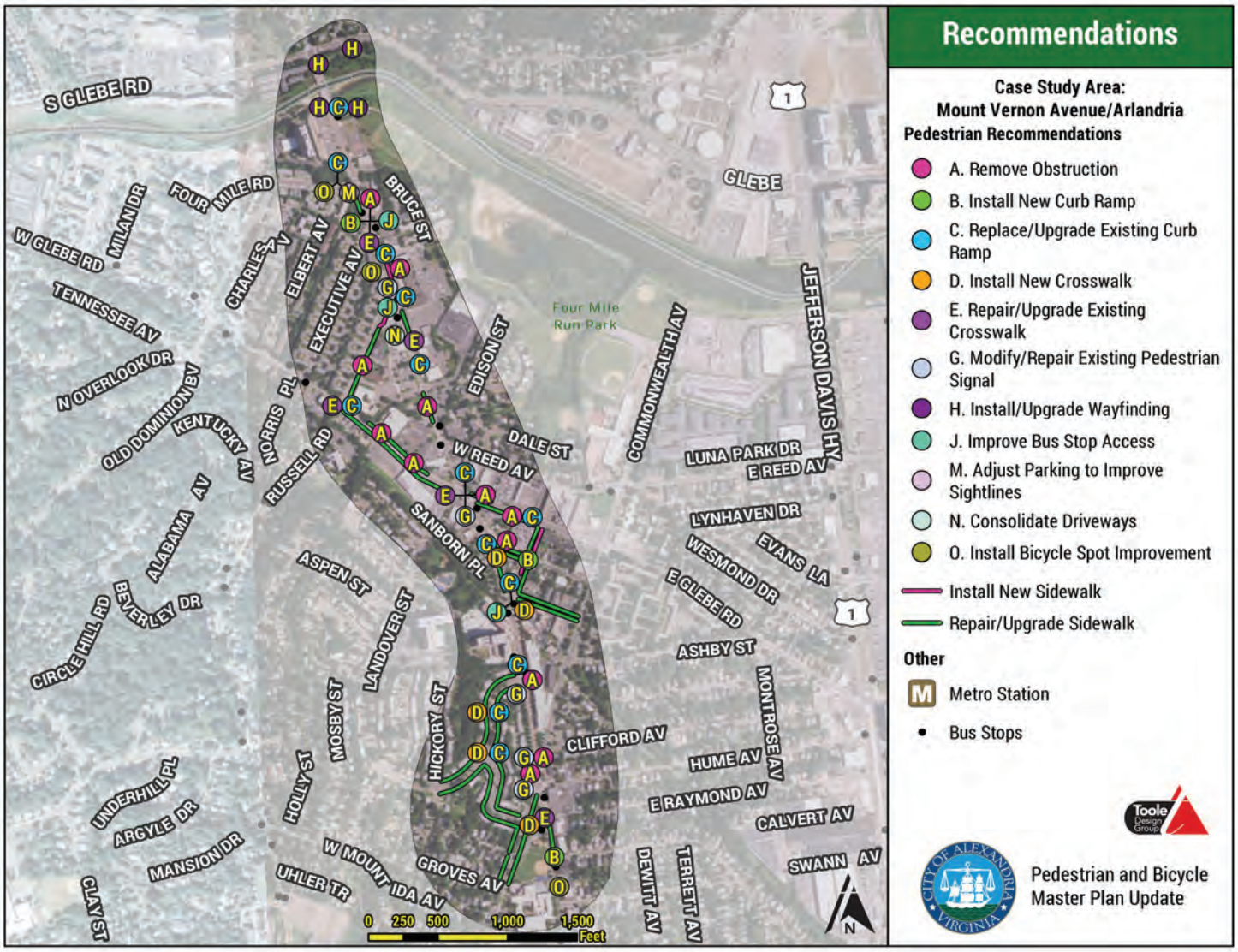


Figure 8: Map of Recommendations

Recommendation	Count
Repair/Upgrade Sidewalk	23
Replace/Upgrade Existing Curb Ramp	13
Remove Obstruction	12
Install New Crosswalk	5
Repair/Upgrade Existing Crosswalk	5
Modify/Repair Existing Pedestrian Signal	5
Install/Upgrade Wayfinding	4
Install New Sidewalk	4
Install New Curb Ramp	3
Improve Bus Stop Access	3
Install Bicycle Spot Improvement	3
Adjust Parking to Improve Sightlines	1
Consolidate Driveways	1

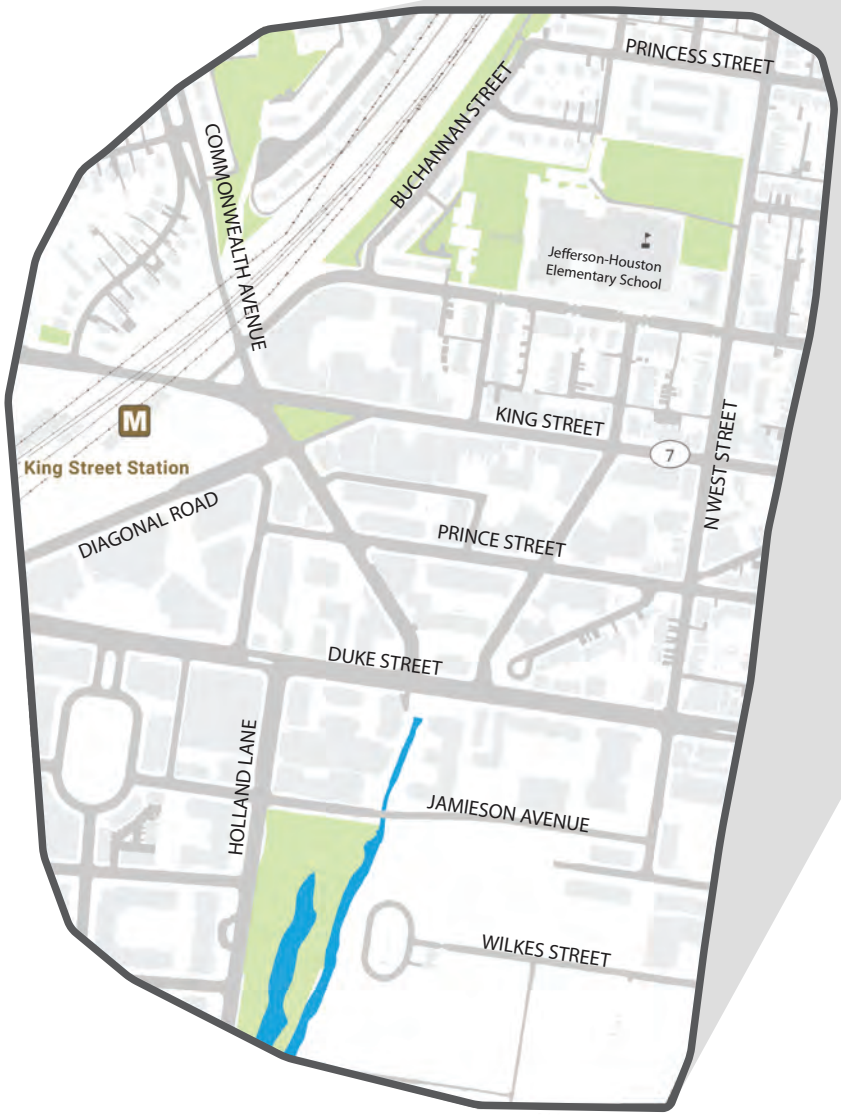
Table 9: Summary of Recommendations

CASE STUDY 5:

KING STREET STATION

Theme: Transit Access and Integration

City of Alexandria



Parks

Case Study Area

Public Schools

N

0 250 500 1,000 Feet

The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "transit access and integration," it is important to note that the King Street Station area also represents other themes evaluated through the case studies, including "major barriers/freeway interchanges."

Overview

The King Street Station Case Study Area includes a variety of development types, such as retail development on King Street, office development on Duke Street, and residential development mixed in throughout. This area plays a crucial role in transit and freeway access for the surrounding area, as the King Street Metrorail station carries thousands of people daily, and Duke Street (VA-236) serves as a major east-west connector route to I-495 and VA-611 (Telegraph Road). There is also significant pedestrian traffic between Alexandria Union Station and the Metrorail station as riders transfer between rail systems. Except for King Street and Duke Street, the Case Study Area has relatively low traffic volumes and speeds, relatively wide sidewalks, and many trees, which makes the streets fairly comfortable for pedestrians. Roadway widths vary throughout the Case Study Area. King Street and Duke Street have four to five lanes, while many of the other roads are two lanes.

The City currently has a project underway to improve access and circulation at the King Street Metrorail station. While the project will include a number of pedestrian and bicycle enhancements, it is focused on the station property itself. For this reason, the field work for this project focused on improving connections to the station from surrounding areas.

King Street Metro Station

Capital Bikeshare station King Street Metro

Vehicle and bike route signage on Holland Lane at Duke Street

Missing and non-ADA compliant curb ramps

Challenging intersection near King Street Metro

Person crossing Cameron Street to access the walking path

Summary of Issues

While the neighborhood surrounding King Street Station is relatively walkable, there are still opportunities to improve the pedestrian environment. As shown in Table 10, curb ramps are a particular issue in this area. Curb ramp designs in Old Town vary greatly, and many of the existing curb ramps are not compliant with national accessibility standards. While sidewalks exist on both sides of the street in most areas, there are a few gaps and/or narrow conditions, as well as many instances of obstacles or maintenance issues on existing sidewalks (see Figure 9).

Smaller, spot issues exist throughout the Case Study Area, especially regarding the frequency and quality of crossings. Crosswalks are missing in a few key locations, such as King Street at Sunset Drive, where there is a playground, and Cameron Street near Buchanan Street, where there is an entry point to a walking path. Similarly, corridors like King Street lack pedestrian signals except for at major signalized intersections like Henry Street, Patrick Street, and near the King Street Metro Station.

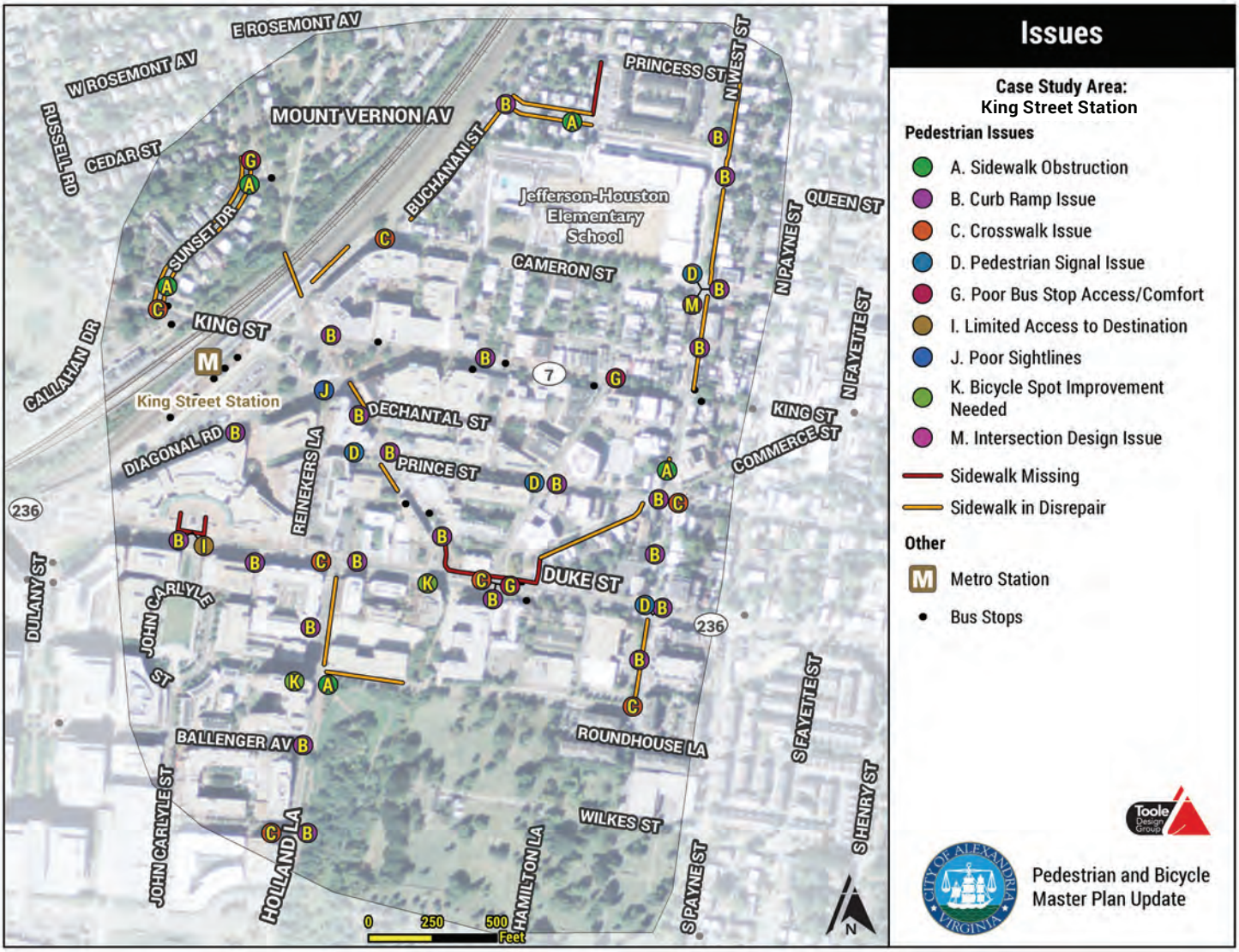


Figure 9: Map of Issues Identified

Issue	Count
Curb Ramp Issue	23
Sidewalk in Disrepair	17
Crosswalk Issue	7
Sidewalk Obstruction	5
Sidewalk Missing	5
Pedestrian Signal Issue	4
Poor Bus Stop Access/Comfort	3
Bicycle Spot Improvement Needed	2
Limited Access to Destination	1
Poor Sightlines	1
Intersection Design Issue	1

Table 10: Summary of Observed Issues

ADA compliant sidewalk/curb ramp


Example of recommended crosswalk and pedestrian signal

Proposed Recommendations

Table 11 provides an overview of the 69 recommendations that the study team made for the King Street Station Case Study Area, including improvements to sidewalks, curb ramps, crosswalks, and bus stops. Even though this area is relatively pedestrian-friendly, sidewalks should be repaired or upgraded in 17 locations to make pedestrians safer and more comfortable. Recommendations focus on widening the sidewalks, making them ADA compliant, and providing a buffer between pedestrians and vehicles. New sidewalks are recommended in five locations, as shown in **Figure 10**.

As mentioned above, curb ramps are a priority. They should be replaced or upgraded in twenty locations throughout the Case Study Area to comply with ADA regulations. New curb ramps are necessary near Duke Street at Commerce Street.

New crosswalks in five targeted locations will help reduce the frequency of people crossing mid-block and improve pedestrian safety and comfort. Additionally, pavement striping, vehicle signage, and pedestrian signals will help make pedestrians more visible, comfortable, and safe.

Last, pedestrian-oriented wayfinding is critical in the King Street Metrorail Station Area. The city is currently in the process of implementing a wayfinding plan for Old Town, which will include this area. Prominent and clear signage is needed to direct people to and from the Metro entrances, particularly around the tunnel at Dulany Street. Similarly, the area is non-intuitive to navigate for bicyclists. Shared lane markings and bike route signage will help link people from this important hub to nearby trails and other destinations.

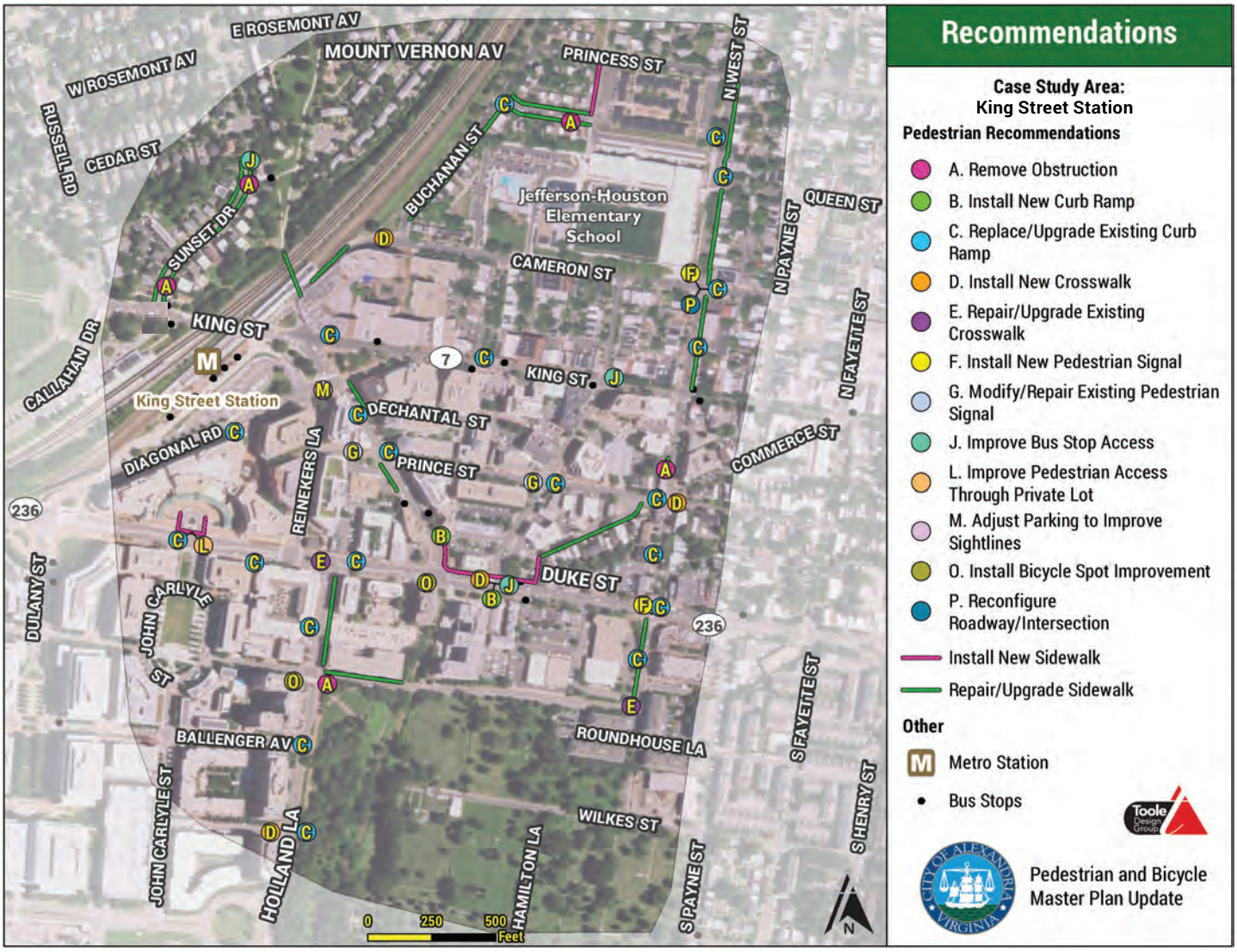


Figure 10: Map of Recommendations

Recommendation	Count
Replace/Upgrade Existing Curb Ramp	21
Repair/Upgrade Sidewalk	17
Install New Sidewalk	5
Remove Obstruction	5
Install New Crosswalk	5
Improve Bus Stop Access	3
Install New Curb Ramp	2
Repair/Upgrade Existing Crosswalk	2
Install New Pedestrian Signal	2
Modify/Repair Existing Pedestrian Signal	2
Install Bicycle Spot Improvement	2
Improve Pedestrian Access Through Private Lot	1
Adjust Parking to Improve Sightlines	1
Reconfigure Roadway/Intersection	1

Table 11: Summary of Recommendations

CASE STUDY 6:

COMMONWEALTH AVENUE/BRADDOCK ROAD

Theme: Schools and Neighborhoods

City of Alexandria

Parks

Case Study Area

N

0 250 500 1,000 Feet

The following section describes a sub-area of Alexandria that has characteristics similar to many other places in the City. The recommendations for this Case Study Area can inform efforts to improve pedestrian and bicycle safety and comfort in areas throughout the City with comparable issues and needs.

Although this Case Study focuses on the theme of "schools and neighborhoods," it is important to note that the Commonwealth Avenue/Braddock Road area also represents other themes evaluated throughout the case studies, including "neighborhood main streets."

Overview

The Commonwealth Avenue/Braddock Road Case Study Area is a predominantly residential area, with a mix of single-family homes, townhouses, and apartments, as well as some commercial uses at the intersection of Commonwealth and East Monroe avenues. Two schools flank the study area, Maury Elementary School on Russell Road and George Washington Middle School on Mount Vernon Avenue. There are multiple churches in the study area.

The Case Study Area has low traffic volumes (based on 2014 counts, 6,300 average annual daily traffic on Monroe Street; 6,100 on Commonwealth Avenue, 7,200 on East Braddock Road ; 7,500 on Russell Road) and low traffic speeds, which makes most streets fairly comfortable for pedestrians and bicyclists.

Roadway widths vary throughout the Case Study Area. Russell Road, Braddock Road, and Commonwealth Avenue north of Oak Street each have one through lane and one parking lane in each direction. South of Oak Street, Commonwealth Avenue has one through lane and one parking lane in each direction in addition to a median with street trees. Most side streets have parking on both sides and a single traffic lane where drivers must yield to vehicles coming in the opposing direction. Both Commonwealth Avenue and Braddock Road have shared-lane markings, which direct bicyclists and drivers to share the road.

Residential character of the study area

Existing sidewalk on Alexandria Avenue and Russell Road

Missing crosswalks and curb ramps on residential areas

Installing “No Turn on Red” signs


Missing crosswalk at intersection of Russell Road and Braddock Road


Utility post obstructing existing sidewalk

Summary of Issues

The Study Team identified a number of barriers to walkability in the Commonwealth Avenue/Braddock Road Case Study Area As in the other Case Study Areas, the primary issues include curb ramps, sidewalks with obstructions or in disrepair, missing or narrow sidewalks, and unmarked crosswalks. Sidewalks are present on both sides of the street in most areas, though they are typically substandard width. Sidewalk widths range from four to six feet, and many segments also have a sidewalk buffer. However, many sidewalks and curb ramps are not ADA compliant. In addition, many crosswalks are unmarked, and several that are marked lack high-visibility striping. Many bus stops in the area lack shade or seating for riders.

Some intersections in the Case Study Area present major challenges for pedestrians crossing the street. There are no marked crosswalks across Commonwealth Avenue between the signalized intersections at Braddock Road and Monroe Avenue. Additionally, there are no marked crosswalks on Braddock Road between Russell Road and Commonwealth Avenue, a major pedestrian route to the Braddock Road Metrorail station, or at Russell Road and Nelson Avenue.

Following a pedestrian fatality at this intersection in 2015, the City made a number of changes that aim to improve safety in the area. The City installed “No Turn on Red” signs and a leading pedestrian interval at the signal, which will allow pedestrians to start crossing before vehicles enter the intersection.

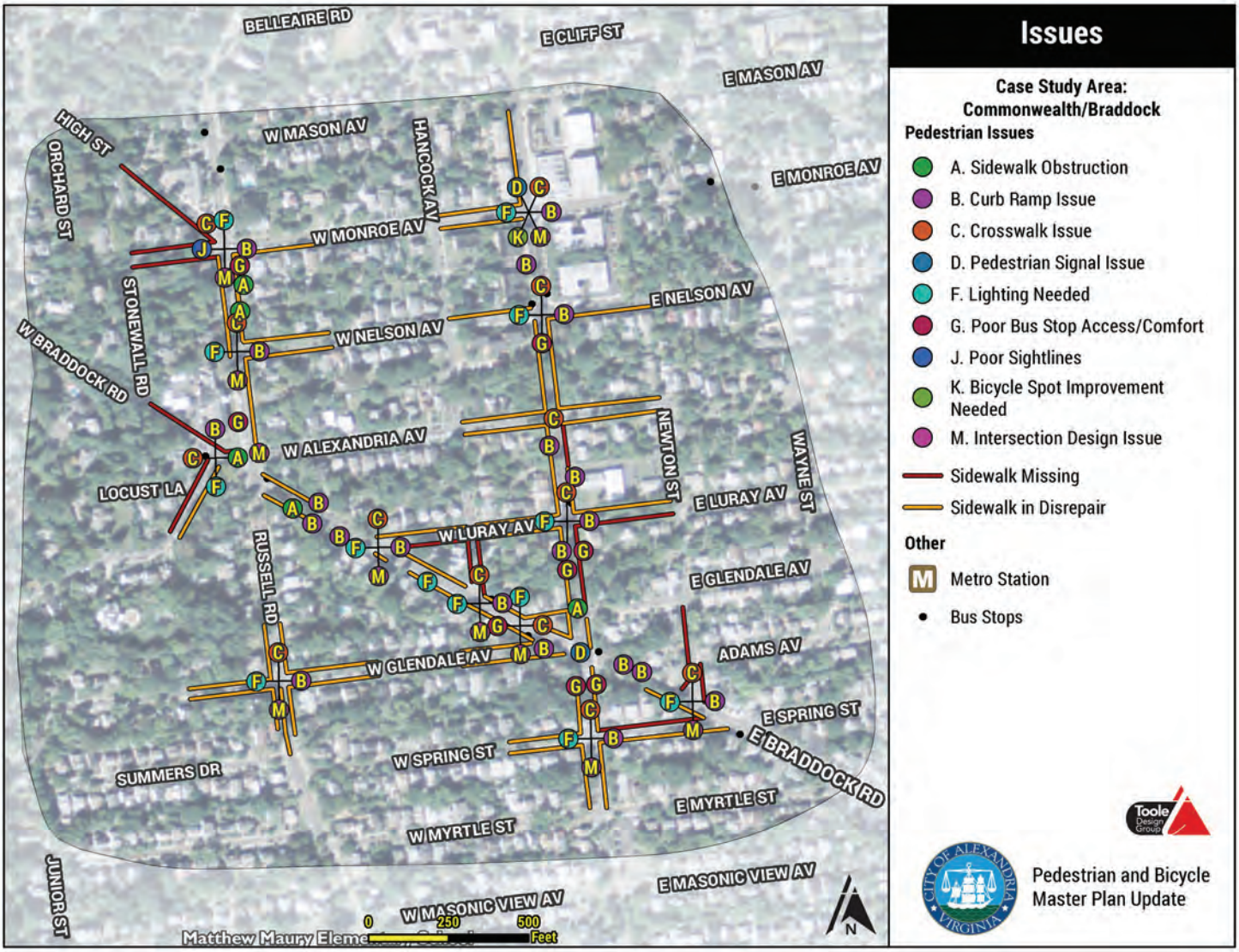


Figure 11: Map of Issues Identified

Issue	Count
Sidewalk in Disrepair	53
Curb Ramp Issue	21
Sidewalk Missing	16
Lighting Needed	13
Crosswalk Issue	12
Intersection Design Issue	11
Poor Bus Stop Access/Comfort	8
Sidewalk Obstruction	5
Pedestrian Signal Issue	2
Poor Sightlines	1
Bicycle Spot Improvement Needed	1

Table 12: Summary of Observed Issues

Missing sidewalk near Commonwealth Avenue and Glendale Avenue

Example of recommended crosswalk and pedestrian signal

Proposed Recommendations

Table 13 provides an overview of the recommendations that the study team made for the Commonwealth and Braddock Case Study Area. There are 167 recommendations for this Case Study Area, including improvements to sidewalks, lighting, curb ramps, and crosswalks. Recommendations focus on widening sidewalks, installing pedestrian-scale lighting, reinstalling curb ramps that are ADA accessible and aligned with the intersection, and minimizing obstructions. In many locations, sidewalks should be upgraded to provide pedestrians a safe and comfortable walking environment. New sidewalks are recommended in 16 locations, including sections of Commonwealth Avenue and on side streets including Luray Avenue and Monroe Avenue.

At unsignalized locations where a marked crosswalk is recommended, an engineering study should be performed to evaluate the appropriateness of a marked crosswalk and the potential need for additional crossing enhancements, such as a pedestrian crossing island.

Curb ramps are recommended for upgrade or replacement in eight intersections to comply with ADA requirements. Forty eight crosswalks that need to be improved or striped were identified. Driveways are recommended to be made ADA compliant in 23 locations, while vegetation maintenance is needed on sidewalks in numerous locations.

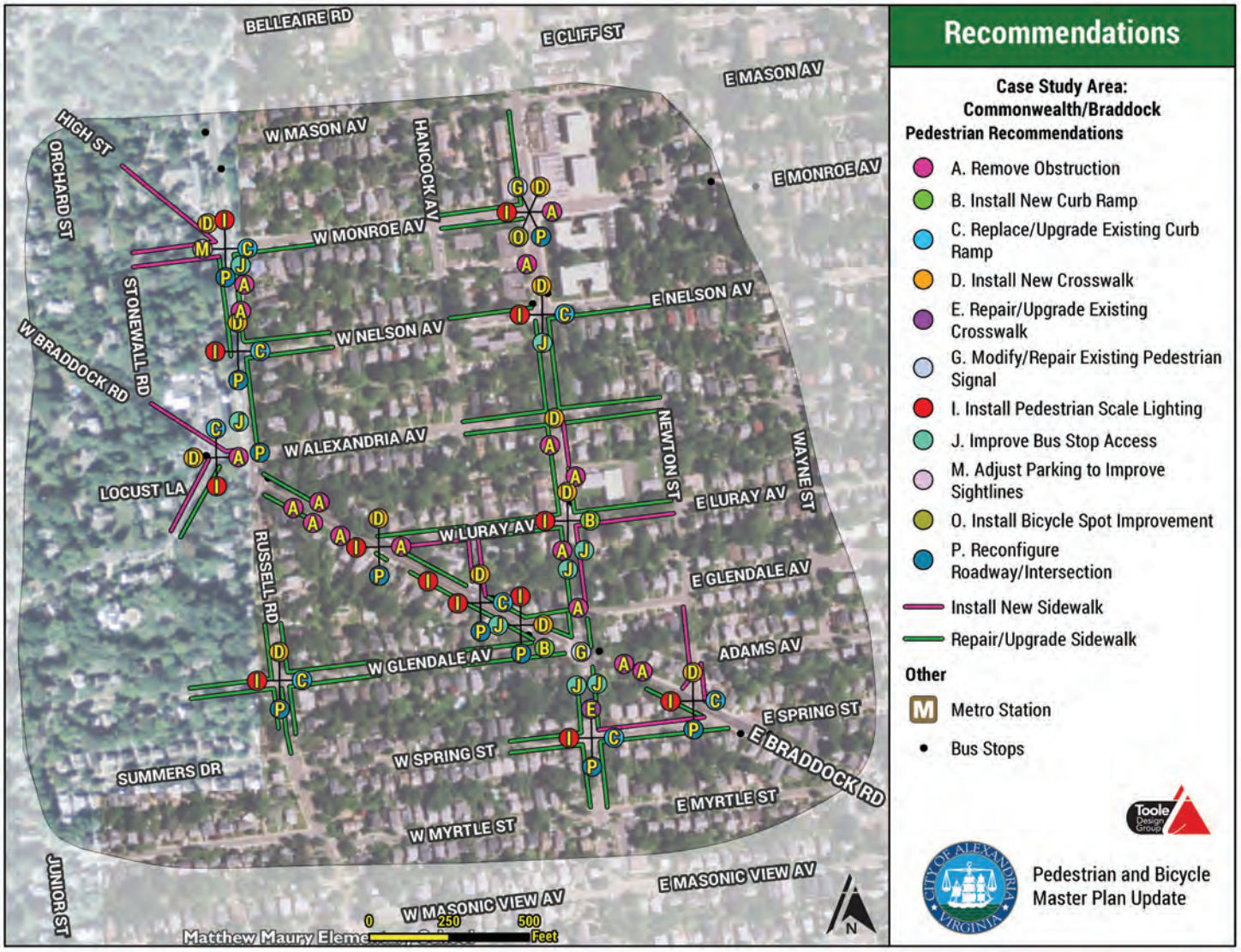


Figure 12: Map of Recommendations

Recommendation	Count
Repair/Upgrade Sidewalk	48
Consolidate Driveways	23
Remove Obstruction	16
Install New Sidewalk	16
Install Pedestrian Scale Lighting	13
Install New Crosswalk	12
Reconfigure Roadway/Intersection	10
Replace/Upgrade Existing Curb Ramp	8

Recommendation	Count
Improve Bus Stop Access	8
Upgrade Existing Median/Pedestrian Island	6
Modify/Repair Existing Pedestrian Signal	2
Install New Curb Ramp	2
Repair/Upgrade Existing Crosswalk	1
Install Bicycle Spot Improvement	1
Adjust Parking to Improve Sightlines	1

Table 13: Summary of Recommendations

APPENDIX E:

Matrix of Funding Sources

Pedestrian and Bicycle Funding Programs for Alexandria, VA

Program	Revenue Source	Purpose	Non-Motorized Project Eligibility	Eligible Applicants/ Project Sponsors	Non-Local/Local Share	Typical Funding	Next application deadline	Information	Link to additional information/application
Federal									
Surface Transportation Block Grant Program Set Aside [Formerly the Transportation Alternatives Program]	Federal	To support bicycling and walking (as well as other activities, such as stormwater mitigation and vegetation management)	Pedestrian & Bicycle Facilities, Rails-to-Trails, Safe Routes to School activities, Recreational Trail activities	Local governments; Regional transportation authorities; Transit agencies; Natural resource or public land agencies; School districts, local education agencies, or schools; Tribal governments	80% Federal/ 20% Local Share	$40,000 - $970,000	Next deadline not yet announced. The deadline to submit for FY 2017 was November 1, 2015.	VA project examples: http://trade.railstotrails.org/project_examples; VA State profile: http://trade.railstotrails.org/state_profile?state_id=51	http://www.virginiadot.org/business/prenhancegrants.asp
Surface Transportation Block Grant Program [Formerly the Regional Surface Transportation Program (RSTP)]	Federal	To provide flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.	Bicycle transportation and pedestrian walkways, and ADA sidewalk modification, any Transportation Alternatives Program activity	Project selection for RSTP funds is made by the local MPO	80% Federal/ 20% Local Share	Varies	City submits funding request. Last submitted 11/19/2014	http://www.fhwa.dot.gov/map21/factsheets/stp.cfm	https://www.alexandriava.gov/uploadedFiles/tes/2014-11-19%20%20Agenda%20Item%206-%20RSTP-CMAQ%20Request.pdf
Congestion Mitigation and Air Quality Improvement (CMAQ) Program	Federal	To improve air quality and relieve congestion.	Non-recreational bicycle transportation and pedestrian improvements that provide a reduction in single-occupant vehicle travel.	Areas that do not meet the National Ambient Air Quality Standards (NAAQS) for ozone, carbon monoxide, or particulate matter-nonattainment areas-and for areas that were out of compliance but have now met the standards-maintenance areas	80% Federal/ 20% Local Share	Varies	City submits funding request. Last submitted 11/22/2014	http://www.epa.gov/airquality/greenbook/	https://www.fhwa.dot.gov/map21/guidance/guidecmaq.cfm
Highway Safety Improvement Program (HSIP): Bicycle and Pedestrian Safety Program (BPSP)	Federal	To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.	Bicycle and pedestrian safety infrastructure projects are eligible, as long as they are consistent with Virginia's Strategic Highway Safety Improvement Program (HSIP), are support by crash data, comply with Title 23, and are based on the state's safety goals. Projects on all public roads are eligible.	Projects are typically selected by the state safety office.	90% Federal/ 10% Local Share	Varies	Initital project ideas were due August 1, 2015 and final project priorities were due September 1st, 2015. Final lists will be submitted for review by November 1, 2015.	Framework for Selection and Evaluation of Bicycle and Pedestrian Safety Projects in Virginia http://vtrc.virginiadot.org/PubDetails.aspx?PubNo=08-R8; BPSP Proposed Safety Improvement Form http://www.virginiadot.org/business/FY2016-17BPS_Proposal_Form.xls; Local assistance newsletter: http://www.virginiadot.org/VDOT/Business/asset_upload_file226_74839.pdf	http://www.fhwa.dot.gov/map21/guidance/guidehsip.cfm;

Program	Revenue Source	Purpose	Non-Motorized Project Eligibility	Eligible Applicants/ Project Sponsors	Non-Local/Local Share	Typical Funding	Next application deadline	Information	Link to additional information/application
Section 402: State and Community Grant Program	Federal	The Section 402 program provides grants to states to improve driver behavior and reduce deaths and injuries from motor vehicle-related crashes.	Improve pedestrian and bicycle safety (non-construction projects)	Projects are typically developed in conjunction with the State Highway Safety Office	Typically 100% Federal -- reimburses cost	Varies. $3.3M in total funding for VA in FY15	FY 2016 date not announced yet. Most recent deadline was 2/28/2015.	The program is jointly administered by the National Highway Traffic Safety Administration (NHTSA) and the Federal Highway Administration (FHWA) at the federal level and by the State Highway Safety Offices (SHSO) at the state level.	https://www.dmv.virginia.gov/webdoc/pdf/hsp_ffy2015.pdf
TIGER	Federal	To support innovative projects, including multimodal and multijurisdictional projects which are difficult to fund through traditional Federal programs. Successful TIGER projects leverage resources, encourage partnership, catalyze investment and growth, fill a critical void in the transportation system or provide a substantial benefit to the nation, region or metropolitan area in which the project is located.	Highway or bridge projects eligible under title 23, United States Code (including bicycle and pedestrian related projects) -- as of 2015	State, local and tribal governments, including U.S. territories, transit agencies, port authorities, metropolitan planning organizations (MPOs), and other political subdivisions of State or local governments.	80% Federal/ 20% Local Share. Larger local share indicates local priority.	$100K (for planning) - >$20M	TBD	http://www.transportation.gov/tiger	
Metropolitan & Statewide and Nonmetropolitan Transportation Planning	Federal - Federal Transit Agency	Provides funding and procedural requirements for multimodal transportation planning in metropolitan areas and states that is cooperative, continuous, and comprehensive, resulting in long-range plans and short-range programs of transportation investment priorities.	Planning for bicycle facilities in a state or metropolitan transportation network.	Eligible grant recipients include the fourteen Metropolitan Planning Organizations (MPOs) that cover Virginia, the Washington Metropolitan Area and parts of Tennessee (Bristol and Kingsport).	80% Federal/ 20% Local Share	Varies	Typically May 1	http://www.drpt.virginia.gov/media/1093/program-application-guidelines.pdf	https://olga.drpt.virginia.gov/
Community Development Block Grant Program (CDBG)	Federal	This U.S. Department of Housing and Urban Development (HUD) program, under the "Entitlement Communities" program area, provides annual grants to larger cities and urban counties to develop viable communities by providing decent housing, a suitable living environment, and opportunities to expand economic opportunities, primarily for low- and moderate-income people.	Examples include commercial district streetscape improvements, sidewalk improvements, safe routes to school, and neighborhood-based bicycling and walking facilities that improve local transportation options or help revitalize neighborhoods.	City	Varies	Varies	TBD	http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs	
Federal-Aid Highway Programs (general information)	Federal		Eligibility for all federal funds: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm						

Program	Revenue Source	Purpose	Non-Motorized Project Eligibility	Eligible Applicants/ Project Sponsors	Non-Local/Local Share	Typical Funding	Next application deadline	Information	Link to additional information/application
State									
HB-2	State	To improve the transparency and accountability of project selection as well as provide improved stability in the Six-Year Improvement Program.	Construct sidewalk; Construct shared use path; Improve pedestrian/bike crossing (at grade); Improve pedestrian/bike crossing (grade separated); Add/Construct bike lane; Paved Shoulder (min 4 foot ride-able surface); Bike/Pedestrian Other	Regional entities, Metropolitan Planning Organizations (MPOs) and Planning District Commissions (PDCs); public transit agencies; counties; and cities and towns that maintain their own infrastructure.	no local share	Varies	September 30, 2015.	http://www.virginiahb2.org/faqs.html#howtoapply	http://hb2app.virginiahb2.org/#/
VDOT Safe Routes to School Travel Plan and Program Grants	Federal SAFETEA-LU Funds	To support local Safe Routes to School program activities.	SRTS education, encouragement, evaluation and enforcement programs.	City, School Division	80/20% local	$5,000 - $100,000	Most recent due date was March 31, 2015.	http://www.virginiadot.org/programs/srsm_school_travel_plans_and_grants.asp	
Revenue Sharing Program	State (State gas tax)	To construct, reconstruct, improve or maintain the highway systems within such county, city, or town.	Improvements to existing pedestrian/bicycle facilities, or construction of new bicycling/walking facilities.	Application for program funding must be made by resolution of the governing body of the jurisdiction requesting the funds.	50/50	Up to $1M are funded first, larger projects are funded thereafter. Total locality request may not exceed $10M.	October 30, 2015.	http://www.virginiadot.org/business/local-assistance-access-programs.asp#Revenue_Sharing	http://www.virginiadot.org/business/resources/local_assistance/Fiscal_Year_2017_Revenue_Sharing_Program-Call_for_ApplicationsUnsignedForWebpage.pdf
For more information on use of Virginia state and federal funds, se VDOT's Locally Administered Projects (LAP) Manual									http://www.virginiadot.org/business/resources/local_assistance/LAD_LA
Regional									
HB 2313	State gas revenue	Support regional and local transportation projects.	NVTA Regional Transportation Projects are funded with Regional Revenues (commonly referred to as 70% revenue). In order to qualify for Regional Revenue Funding: Projects must be in the NVTA's Long Range Transportation Plan (TransAction 2040); Highway Projects must be rated and evaluated as part of HB 599; Mass Transit projects must increase capacity	Project must be in NVTA TransAction 2040 jurisdiction	No local match required.	Varies	Call for projects for FY2017 was anticipated in the latter half of calendar 2015.	http://www.thenovaauthority.org/PDFs/Fact%20Sheets/HB%202313%20Funding%20Fact%20Sheet.Revised%208.6.15.pdf	http://www.thenovaauthority.org/funding.html
TLC Technical Assistance	Regional and federal	Provides focused consultant assistance to local jurisdictions working on creative, forward-thinking and sustainable plans and projects	Technical Assistance, Transportation Alternatives Program activities, Regional Peer Exchange Network, Station Access database	Any local Transportation Planning Board (TPB) member jurisdiction in the National Capital Region is eligible to apply.	No local match required. Local match demonstrates local commitment to project.	Up to $420K total for technical assistance, typical awards are between $30,000-$80,000 with local matches preferred	Next deadline not yet announced. Applications for FY 2016 TLC technical assistance were due Wednesday, June 3, 2015.	http://www.mwcog.org/transportation/activities/tlc/about/default.asp	http://www.mwcog.org/transportation/activities/tlc/program/application.asp

Program	Revenue Source	Purpose	Non-Motorized Project Eligibility	Eligible Applicants/ Project Sponsors	Non-Local/Local Share	Typical Funding	Next application deadline	Information	Link to additional information/application
Local									
City of Alexandria FY 2016 -- 2025 Capital Improvement Program	Unrestricted City funds ($924.5 million), Restricted City funds ($312.5 million), State and Federal grants ($33.6 million)	To support both the capital projects that the City intends to pursue, and to plan for the anticipated levels of financing needed to fund these capital projects over the 10-year period.	An expenditure of more than $10,000 that acquires, expands, repairs, or rehabilitates a physical asset with a useful life of at least three years and typically much longer than three years.	City	na	$50K-$1.3M	N/A	See "Transportation & Transit Infrastructure Summary" on page 208.	https://www.alexandriava.gov/uploadedFiles/budget/info/budget2016/FY16_25_Proposed_CIP_Full_Document.pdf
Developer proffers / contributions	Local private funds	The State of Virginia uses a system of proffer payments to finance roads since it is illegal to finance roads and other public facilities with impact fees in the State. A proffer is a voluntary offer by a developer to abide by certain development conditions. The best-known type of proffer is a 'cash proffer'. Cash proffers are funds offered by developers at the time of rezoning to help defray capital facilities costs associated with the development.	Any capital project voluntarily funded or provided as part of developer conditions.	N/A	na	Varies	N/A	http://www.virginiadot.org/vtrc/main/online_reports/pdf/15-r2.pdf	http://alexandriava.gov/uploadedFiles/planning/info/APA%20Calculating%20Developer%20Contributions%20-%20Value%20Capture%20Clinic.pdf

APPENDIX F:
Methodology

Bicycle Network Development and Project Prioritization Methodology

This Appendix describes the planning and analytic processes that led to the development of the future bicycle network presented in the Pedestrian and Bicycle Chapter of Alexandria's Transportation Master Plan. Further, it explains the methodology leading to the prioritization and ranking of the recommended bicycle and pedestrian projects. The Appendix is divided into two sections:

Network Development: which describes the process used to develop the final proposed bicycle facility network.

Project Prioritization: which catalogues the criteria used to rank the proposed bicycle and pedestrian facility recommendations by level of importance to their respective networks.

Network Development

Following a review of the 2008 Transportation Master Plan bicycle infrastructure recommendations, the Study team used a multi-step approach to develop the recommended network of bicycle facilities. This included an analysis of comments received via the online crowdsourcing map and public meetings, compilation of planned facilities from past City studies and Small Area plans, a development of a draft network of roadways connecting regional/local destinations and neighborhoods, an examination of traffic volumes, a desktop review of numerous roadways, and a field assessment of existing roadway characteristics.

A draft study network of roadways was developed to help focus the fieldwork on those roadways connecting i) regional destinations (e.g., Old Town Alexandria, Mark Center, Landmark Mall); ii) citywide activity centers (e.g., Del Ray Commercial District); and iii) neighborhood destinations such as schools, parks and smaller shopping districts. Public input was critical to the identification of key destinations that needed to be linked by the future bicycle network

The Study Team then reviewed the most updated traffic count data from VDOT's Traffic Engineering Office,[1] and conducted a desktop review of the selected roadways to further distill the study network. This helped the study team recognize which areas of the City experience the highest volumes of automobile traffic (and may have an effect on bicycle modeshare), and which streets exhibit the highest potential for reconfiguration allowing for the implementation of bicycle friendly facilities.

The Study Team then conducted fieldwork using the refined network and focused on capturing roadway characteristics (ex. lane widths), any issues or barriers (ex. railroad tracks, rivers, highways), and potential opportunities to enhance the connectivity between neighborhoods and activity centers. Larger issues with roadways having an impact on bicyclist safety and comfort such as limited right of way, conflict points, and configuration of lanes were also noted. Other issues affecting bicyclists recorded included traffic conditions, posted speed limits, perceived speeding and lack of yielding. Finally, locations where connectivity could be enhanced with small improvements were noted for spot improvements.

Field work inputs, data analyses and public input were all synthesized to develop the final recommended bicycle network. The final recommendations were then divided into three generalized facility group types: enhanced bicycle corridors, shared roadways, and trails. This was deliberately done to allow for some flexibility for future design decisions to be made on a case-by-case basis. These three facility groups are

[1] The most recent Annual Average Daily Traffic Data available was for 2012.

explained in Section 3 of this Chapter. The draft recommended network was vetted with the Project Management Team, the Technical Advisory Committee, the Ad Hoc Advisory Committee, several City Commissions, and the public. Revisions were made based on the input of these groups, many focused on ensuring a continuous experience for bicyclists and compatibility with other City plans (i.e. the Eisenhower West Small Area Plan).

Project Prioritization

Following the development of the pedestrian and bicycle project recommendations, each project was ranked to help prioritize its implementation. All projects were prioritized using the 10-step method developed for National Cooperative Highway Research Program (NCHRP) Report 803: *Pedestrian and Bicycle Transportation Along Existing Roads – ActiveTrans Priority Tool Guidebook*. All bicycle and trail projects were derived from the final bicycle network. Sidewalk projects were primarily composed of features from the 2008 Bicycle and Pedestrian Master Plan, with some additional projects from the Case Study Area fieldwork.

The prioritization process used a combination of factors and variables to rank each project:

- **Factors** were defined as broad categories that represent important themes related to the pedestrian and bicycle environment. Such factors included:
    - *Existing and Potential Demand*: Recognizes the areas of the City where the greatest demand and greatest needs are for bicycle and pedestrian infrastructure.
    - *Geography*: Assigns a higher score to projects on the west side of the city, in order to help ensure geographic equity.
    - *Connectivity:* Does the proposed project provide a continuous connection between regional and local activity centers?
    - *Safety:* Could the implementation of the project address safety concerns including the number of bicycle and pedestrian crashes?
- **Variables** were defined as measurable characteristics related to each factor and may include features of roadways, households, neighborhoods or other data. The full list of variables can be found in the tables below.

To help rank the proposed projects, each factor received an individual weight. The weights were recommended by the project team using best practices on project prioritization, and refined by numerous stakeholders including City staff, the Project Management Team, Ad Hoc Advisory Committee Members, Technical Advisory Committee Members, and the General Public. The final sets of factors, variables and weights are provided in the table on the following page.

Bicycle, Trail and Sidewalk Project Prioritization Factors, Variables and Weights			
Factor	**Variable**	**Search Distance**	**Weight**
Existing & Potential Demand	Population Density	N/A	**3**
	Future Population	N/A	
	Employment Density	1/4 mile	
	Bicycle Mode Share	N/A	
	WikiMap Comments ("Place I ride," "Place I want to ride")	# along project corridor	
	Attractors (libraries, community centers, parks, schools)	1/2 mile	
	Transit (Metro & BRT stations)	1/2 mile	
	Transit (bike share stations, bus stops)	1/4 mile	
Geography	Project Serves Western Alexandria	Y/N	**3**
Connectivity*	Connections to Existing Bicycle Facilities	# of connections	**2**
Safety	WikiMap Comments ("Barrier to biking")	# per mile	**2**
	Crashes (bicycle crashes and fatalities)	# within 100 feet of project	
*This Factor was only used on the Bicycle and Trail projects, and was not relevant to the Sidewalk projects.			

APPENDIX G:

Project Prioritization Results

Project Prioritization Results: On-Street Bicycle

Project ID#	Project Length (Miles)	Priority Rank	Description
84	1.877885	1	MADISON from MOUNT VERNON TRAIL to N WEST ST, ORONOCO from N UNION ST to N WEST ST, PENDLETON from N UNION ST to MOUNT VERNON TRAIL, UNION from ORONOCO ST to PENDLETON ST, WEST from ORONOCO ST to MADISON ST
97	1.6967642	2	ROYAL from JONES POINT DR to BASHFORD LA
8	4.1811781	3	VAN DORN from Southern City Limits to SANGER AVE, ESSEX CT from SANGER AV to FUTURE SANGER AV, FUTURE SANGER AV from ESSEX CT to N BEAUREGARD ST, N BEAUREGARD ST from N MORGAN ST to Northern City Limits
91	4.5995678	4	DUKE from REINEKERS LA to Western City Limits
86	2.086846	5	DAINGERFIELD from KING ST to PRINCE ST, PRINCE from to S UNION ST, PRINCE from DAINGERFIELD RD to S ALFRED ST, PRINCE from S ALFRED ST to S COLUMBUS ST, CAMERON from N COLUMBUS ST to COMMONWEALTH AV, CAMERON from N UNION ST to N WASHINGTON ST, CAMERON from N WASHINGTON ST to N COLUMBUS ST, WASHINGTON from CAMERON ST to CAMERON ST
75	2.1027066	6	FAYETTE from DUKE ST to PENDLETON ST, FAYETTE from DUKE ST to WILKES ST, FAYETTE from PENDLETON ST to WYTHE ST, FAYETTE from WILKES ST to JEFFERSON ST, FAYETTE from WYTHE ST to N HENRY ST, HENRY from SLATERS LA to N FAYETTE ST, JEFFERSON from S FAYETTE ST to S PAYNE ST, PAYNE from to ROUNDHOUSE LA, PAYNE from JEFFERSON ST to S PAYNE ST, ROUNDHOUSE from S FAYETTE ST to S PAYNE ST, SLATERS from SLATERS LA to N HENRY ST
2	1.3436616	7	PICKETT from DUKE ST to S PICKETT ST
56	1.7768286	8	KING from JANNEY'S LA to MENOKIN DR
27	1.5342417	9	SEMINARY from N QUAKER LA to N VAN DORN ST
71	1.6057323	10	MOUNT VERNON from E BRADDOCK RD to W GLEBE RD
24	1.1668854	11	FUTURE STREET from DERBY CT to RAYBURN AV, DERBY from SANGER AV to FUTURE SANGER , RICHENBACHER from N PEGRAM ST to N VAN DORN ST, SANGER from N VAN DORN ST to DERBY CT
32	0.7291354	12	TANEY from TANEY AVENUE PARK to N HOWARD ST, TANEY from N GORDON ST to TANEY AVENUE PARK , TANEY from N LATHAM ST to N PEGRAM ST
31	1.0672412	13	HOLMES RUN from EASTERN END to N PEGRAM ST, PEGRAM from HOLMES RUN PY to N PICKETT ST
95	1.4578321	14	COLUMBUS from CHURCH ST to QUEEN ST, COLUMBUS from PRINCESS ST to POWHATAN ST, COLUMBUS from QUEEN ST to PRINCESS ST
65	2.441256	15	RUSSELL from KING ST to MOUNT VERNON AV
11	0.5964981	16	HOLMES RUN from N PICKETT ST to N VAN DORN ST
52	1.1703046	17	KING from DAWES AV to N QUAKER LA
15	1.9067716	18	EISENHOWER from S VAN DORN ST to EISENHOWER AV
13	0.9462316	19	BRENMAN PARK from CAMERON STATION BV to SOMERVELLE ST
77	0.1486247	20	COMMONWEALTH from KING ST to COMMONWEALTH AV
18	0.5942512	21	LINCOLNIA from LINCOLNIA RD to GLOUCESTER RD
74	0.2480526	22	JEFFERSON DAVIS from SLATERS LA to POTOMAC AV, POTOMAC from JEFFERSON DAVIS HY to MAIN LINE BV
100	0.2240011	23	ABINGDON from BASHFORD LA to SLATERS LA
72	0.8102688	24	BERNARD from POWHATAN ST to PORTNER RD, MONROE from COMMONWEALTH AV to MAIN LINE BV, PORTNER from BERNARD ST to SLATERS LA, POTOMAC GREENS from SLATERS LA to MASSEY LA, POWHATAN from FIRST ST to BERNARD ST, SLATERS from PORTNER RD to SLATERS LA
26	0.9446993	25	SEMINARY from FAIRBANKS AV to SEMINARY RD, SEMINARY from KENMORE AV to FAIRBANKS AV
62	0.6388464	26	GLEBE from COMMONWEALTH AV to OLD DOMINION BV
6	0.5071433	27	CAMERON STATION from CAMERON STATION BV to S PICKETT ST
42	0.4599204	28	TRAIL from BACKLICK RUN TRAIL to CLERMONT AV, CLERMONT from EISENHOWER AV to CITY LIMITS
76	0.4891589	30	CALLAHAN from KING ST to DUKE ST, KING from CEDAR ST to COMMONWEALTH AV
104	0.5979074	31	GLEBE from COMMONWEALTH AV to POTOMAC AV
21	1.9965017	32	CHAMBLISS from N CHAMBLISS ST to N CHAMBLISS ST
67	2.0579324	33	CUSTIS from DEWITT AV to E DEL RAY AV, CUSTIS from JEFFERSON DAVIS HY to POTOMAC AV, DEL RAY from E CUSTIS AV to JEFFERSON DAVIS HY, DEWITT from E HOWELL AV to E CUSTIS AV, HOWELL from DEWITT AV to E HOWELL AV, HOWELL from E HOWELL AV to POTOMAC AV, HOWELL from POTOMAC AV to E HOWELL AV, WINDSOR from W BRADDOCK RD to DEWITT AV
3	0.9828346	34	REYNOLDS from DUKE ST to EDSALL RD, STEVENSON AV from S WHITING ST to S REYNALDS ST
48	0.5576207	35	BRADDOCK from N VAN DORN ST to N BEAUREGARD ST
94	0.4278032	36	WILKES from S PATRICK ST to S FAYETTE ST, WILKES from S PATRICK ST to S PATRICK ST, WILKES from S ROYAL ST to S ALFRED ST
22	0.8131188	37	DRAKE,, HARWICH from SANGER AV to HARWICH CT, RAYBURN from to N BEAUREGARD ST, RAYBURN from DRAKE CT to READING AV, READING from N BEAUREGARD ST to RAYBURN AV, SANGER from DERBY CT to SANGER AV
1	0.806953	38	EDSALL from S PICKETT ST to EDSALL RD
17	0.1462258	39	HOLMES RUN from N RIPLEY ST to N VAN DORN ST
30	0.9580126	40	VAN DORN from SANGER AV to KENMORE AV
36	0.5078376	41	EARLY from WHEELER AV to DUKE ST, GORDON from DUKE ST to WHEELER AV
50	1.0972905	42	BRADDOCK from N QUAKER LA to N VAN DORN ST
29	1.3302334	43	KENMORE from SEMINARY RD to N VAN DORN ST, MENOKIN from N VAN DORN ST to KING ST, VAN DORN from KENMORE AV to MENOKIN DR
66	0.5642565	44	MOUNT VERNON from W GLEBE RD to FOUR MILE RUN TRAIL
90	0.5286219	45	MILL from MILL RD to TELEGRAPH RD
113	0.3453762	46	FUTURE ST from S PICKETT ST to EISENHOWER AV

Project Prioritization Results: On-Street Bicycle

Project ID#	Project Length (Miles)	Priority Rank	Description
25	0.3524671	47	MARK CENTER from SEMINARY RD to N BEAUREGARD ST
54	0.4997216	48	28TH from S COLUMBUS ST to KING ST, 30TH from KING ST to S COLUMBUS ST, 30TH from S 30TH ST to S COLUMBUS ST, COLUMBUS from S 28TH ST to S COLUMBUS ST, COLUMBUS from S COLUMBUS ST to S 30TH ST
16	0.3241004	49	RIPLEY from DUKE ST to HOLMES RUN PY
112	0.4209058	50	NICKY LN from RAYBURN AV to N BEAUREGARD ST, MARK CENTER from N BEAUREGARD ST to N BEAUREGARD ST
10	0.7456936	51	FUTURE SOUT OF LANDMARK MALL from S PICKETT ST to DUKE ST
114	0.193086	52	BRENMAN PARK from SOMERVELLE ST to BRENMAN PARK DR
93	0.082356	53	DULANY from JAMIESON AV to DUKE ST
89	0.8924626	54	EISENHOWER from EISENHOWER AV to STOVALL ST, HOLLAND from HOLLAND LA to EISENHOWER AV, STOVALL from EISENHOWER AV to EISENHOWER AV
33	1.1271282	55	JORDAN from DUKE ST to HOLMES RUN PY, JORDAN from DUKE ST to SEMINARY RD
14	0.1596627	56	SOMERVELLE from BRENMAN PARK DR to BACKLICK RUN TRAIL
34	0.9289348	57	HOWARD from N JORDAN ST to W BRADDOCK RD
23	0.1270021	58	(FUTURE) SANGER from DERBY CT to HENRY G SHIRLEY MEMORIAL HY, (FUTURE) SANGER from DERBY CT to HENRY G SHIRLEY MEMORIAL HY, DERBY from to SANGER AV (FUTURE)
28	0.4029134	59	RESIDENTIAL ACCESS RD S OF KENMORE AV from SEMINARY RD to N VAN DORN ST
49	0.6548405	60	Hoof's Run Park & Green Way from E WALNUT ST to E ROSEMONT AV
7	0.2044195	61	FUTURE ST from S PICKETT ST to EDSALL RD
92	0.4198196	62	DUKE from HOLLAND LA to REINEKERS LA, HOLLAND from HOLLAND LA to DUKE ST, REINEKERS from DIAGONAL RD to DUKE ST
57	2.0349002	63	ALLISON from OLD DOMINION BV to VALLEY DR, CREST from W BRADDOCK RD to DOGWOOD DR, GUNSTON from VALLEY DR to MARTHA CUSTIS DR, MARTHA CUSTIS from PRESTON RD to GUNSTON RD, PRESTON from VALLEY DR to N QUAKER LA, SUMMIT from CAMERON MILLS RD to DOGWOOD DR, WOODBINE from CREST ST to KENWOOD AV
40	0.6501488	64	EARLY from DUKE ST to N EARLY ST, GORDON from DUKE ST to TANEY AV, TANEY from N EARLY ST to N GORDON ST, GORDON from DUKE ST to TANEY AV, TANEY from N EARLY ST to N GORDON ST
63	0.5447233	65	EDISON from W REED AV to EDISON ST, EDISON from W REED AV to EDISON ST, REED from COMMONWEALTH AV to MOUNT VERNON AV, UNKNOWN from MOUNT VERNON AV to W GLEBE RD, REED from COMMONWEALTH AV to MOUNT VERNON AV
43	0.7625497	66	FORT WILLIAMS from DUKE ST to SEMINARY RD
79	0.6106925	67	WALNUT from W WALNUT ST to MOUNT VERNON AV
88	0.209179	68	PERSHING from STOVALL ST to TELEGRAPH RD, PERSHING from STOVALL ST to TELEGRAPH RD, STOVALL from PERSHING AV to EISENHOWER AV
118	0.1513441	69	WEST from DUKE ST to JAMIESON AV, WEST from PRINCE ST to DUKE ST
68	1.1804201	70	JEFFERSON PARK TRAIL from E RAYMOND AV to E CURTIS AV, MOUNT IDA from COMMONWEALTH AV to RUSSELL RD, STEWART from MOUNT VERNON AV to RANDOLPH AV, SWANN from RANDOLPH AV to SWANN AV, UHLER from COMMONWEALTH AV to MOUNT VERNON AV
60	0.4200919	71	TENNESSEE from OLD DOMINION BV to MARTHA CUSTIS DR
101	0.3372306	72	ABINGDON from SLATERS LA to CONNECTOR EAST OF CARPENTER RD
116	0.1835279	73	GLEBE from MARTHA CUSTIS DR to CITY LIMITS
64	0.237134	74	COMMONWEALTH from FOUR MILE RUN PARK TRAIL to LUNA PARK DR
99	0.3713514	75	BASHFORD from N ROYAL ST to POWHATAN ST
51	0.1856462	76	BRADDOCK from KENWOOD AV to N RADFORD ST, BRADDOCK from N RADFORD ST to N QUAKER LA
59	1.3368181	77	CAMERON MILLS from FONTAINE ST to TENNESSEE AV
82	0.8999704	78	DEWITT from E CUSTIS AV to HUME AV, DEWITT from E CUSTIS AV to HUME AV, DEWITT from E GLENDALE AV to E MONROE AV, DEWITT from E MONROE AV to E HOWELL AV, HUME from DEWITT AV to TURNER RD, DEWITT from E GLENDALE AV to E MONROE AV, DEWITT from E MONROE AV to E HOWELL AV
45	0.4904794	79	CAMBRIDGE from ROTH ST to VASSAR RD, CAMBRIDGE from ROTH ST to VASSAR RD, CAMBRIDGE from VASSAR RD to JANNEY'S LA, ROTH from DUKE ST to DUKE ST
78	0.179536	80	BRADDOCK from W GLENDALE AV to RUSSELL RD
96	0.3164666	81	JONES POINT from MOUNT VERNON TRAIL to S ROYAL ST
108	0.329499	82	REED from E REED AV to POTOMAC AV, REED from POTOMAC AV to E REED AV N, REED from POTOMAC AV to E REED AV S
61	0.3136608	83	FOUR MILE from MOUNT VERNON AV to OLD DOMINION BV, OLD DOMINION from W GLEBE RD to FOUR MILE RD
81	0.7939584	84	E GLENDALE AV from MOUNT VERNON AV to MAINLINE BV, LESLIE AV from E GLENDALE AV to E MONROE AV, E LURAY from MOUNT VERNON to LESLIE AV
46	1.2377188	85	CHINQUAPIN from KING ST to KEY DR , KEY from N QUAKER LA to ROAN LA, FRANCIS HAMMOND from JANNEY'S LN to KEY DR
117	3.024472	86	TRAIL from FOUR MILE RUN PARK TRAIL to FOUR MILE RUN TRAIL (ARLINGTON CO)
109	1.4867973	87	FUTURE WESMOND FROM JEFFERSON DAVIS HY to POTOMAC AV, FUTURE DIAMOND AV from JEFFERSON DAVIS HY to EASTERN SIDE OF POTOMAC AV TRAIL, FUTURE LINCOLN AV from JEFFERSON DAVIS AV to POTOMAC AV, FUTURE CRESCENT from JEFFERSON DAVIS HY to FUTURE WATER ST, FUTURE WATER ST from FUTURE CRESCENT to FUTURE WESMOND, FUTURE MAINLINE BV from CRESCENT to E GLEBE RD
39	0.4680373	88	COLVIN from ROTH ST to S QUAKER LA, QUAKER from DUKE ST to LUCKETT STADIUM TRAIL
47	0.6572054	89	QUAKER from SEMINARY RD to W BRADDOCK RD
102	0.4472555	90	CARPENTER from CONNECTOR TRAIL EAST OF CARPENTER to POTOMAC GREENS DR, POTOMAC GREENS from HAWKINS WY to CARPENTER RD
98	0.186762	91	PITT from BELLVUE PL to BASHFORD LA, PITT from BELLVUE PL to BASHFORD LA, PITT from SECOND ST to N PITT ST, SECOND from N ROYAL ST to N PITT ST, PITT from SECOND ST to N PITT ST
107	0.4352	92	EVANS from EVANS LA to EVANS LA

Project Prioritization Results: On-Street Bicycle

Project ID#	Project Length (Miles)	Priority Rank	Description
69	0.4665743	93	E MOUNT IDA AV from MOUNT VERNON AV to E CURTIS AV
58	0.7985601	94	FERN from KENWOOD AV to N QUAKER LA, KENWOOD from FERN ST to KING ST, QUAKER from FERN ST to PRESTON RD, KENWOOD from FERN ST to KING ST, QUAKER from FERN ST to PRESTON RD
70	0.2837426	95	SWANN from SWANN AV to POTOMAC AV
106	0.4022192	96	TRAIL from MOUNT VERNON TRAIL to EVANS LA

Project Prioritization Results: Sidewalk

Project ID#	Project Length (Miles)	Priority Rank	Description
8	1.643386783	1	King St from S 28th to N Quaker
10	0.657093912	2	N Van Dorn from Kenmore past Fort Ward Park
15	0.576591287	3	S Payne St, Jefferson St
13	0.083038817	4	Cameron Station
44	0.092406692	5	N Fayette
12	0.203021827	6	Eisenhower Ave
23	0.47104107	7	N Jordan St
38	0.071686917	8	Russell Rd from Cedar to King St
34	0.271591179	9	Seminary Rd
36	0.127292627	10	Commonwealth from Glendale to W Nelson
14	0.31681924	11	S Van Dorn near Duke St
32	0.169995126	12	N Van Dorn between Wycklow and Maris
46	0.071394962	13	N Union St
11	0.550625222	14	Farrington from City Limits to Metro Road
28	0.102109483	15	Duke Street between 395 and S Van Dorn
27	0.102844288	16	Duke St near N Van Dorn
43	0.044232098	17	Dewitt Ave
24	0.411898526	18	N Pegram St, Polk Ave
26	0.427552731	19	Taney Ave
31	0.397872282	20	N Beauregard St
17	0.110414818	21	Franklin St and Green St in Old Town
33	0.086963145	22	N Howard St
42	0.104088117	23	E Spring Ave
49	0.303439239	24	Dawes Ave
19	0.357277774	25	Kenwood, Crestwood, Oakcrest, Dogwood
48	0.791022083	26	N Rosser St, Colfax Ave
2	0.313585992	27	Russell Rd and Executive Ave from Kentucky Ave to W Glebe
39	0.151898634	28	Russell Rd from W Bellefonte to W Mason, W Monroe from Russell to Hancock
30	0.056672286	29	Stevenson Ave
7	0.085189147	30	N Quaker Ln north of Preston Rd
16	0.099989984	31	S Washington St
21	0.138115319	32	Cambridge Rd
20	0.306399192	33	W Braddock
47	0.131785368	34	Commonwealth Ave east of Four Mile Run Park
5	0.236942042	35	Cameron Mills from Chalfonte to Allison
22	0.216640424	36	Yale Dr
1	0.362116698	37	Old Dominion from Beverly Circle to W Glebe
6	0.224982458	38	Gunston Rd from Valley Dr to Eldon Dr
40	0.168523012	39	Russell Rd from W Del Ray to W Curtis
35	0.02027765	40	Colvin St
41	0.038407768	41	Valley Dr from Fordham to W Braddock
4	0.19030455	42	Enderby Dr from Wellington to Cameron Mills
3	0.163835369	43	Old Dominion and Edgehill from Allison to Beverly

Project Prioritization Results: Trail

Project ID#	Project Length (Miles)	Priority Rank	Description
12	0.5320704	1	HOLMES RUN TRAIL (South side of Holmes Run between Ripley Street and N Pickett Street
110	0.9046095	2	BACKLICK RUN TRAIL from Armistead L. Boothe Park to Western City Limits
87	0.8364477	3	OLD CAMERON RUN TRAIL from STOVALL ST to HOOF'S RUN
38	0.235891	4	TRAIL from WHEELER AV to S QUAKER LA
73	0.4269832	5	TRAIL from E ABINGDON DR to POTOMAC AV TRAIL
9	0.2737261	6	TRAIL from DUKE ST to N VAN DORN ST
105	0.2443018	7	FORT WARD PARK TRAIL from N VAN DORN ST to W BRADDOCK RD
83	0.0613432	8	TRAIL from POTOMAC AVE to MOUNT VERNON TRAIL, TRAIL from JEFFERSON DAVIS HY to POTOMAC AV
103	0.1604969	9	LESLIE AV from SIMPSON STADIUM PARK BASE BALL FIELDto DUNCAN AV
80	0.1308068	10	TRAIL from POTOMAC AV to CARPENTER RD