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Executive Summary

Goal

The City of Alexandria is working to reduce dependence on private automobiles and provide citizens with transportation choices. One way to accomplish this goal is to improve access for persons with disabilities, pedestrians, and bicyclists. This Plan provides a blueprint for 10 years of on-the-ground safety, mobility and connectivity improvements. Implementation of this Plan will make walking and bicycling more attractive transportation choices in the City.

Planning Context and Focus

This detailed citywide study focused on 120 miles of heavily used roadways and the existing bikeways and trails network. It builds on the policy-level recommendations in the 2008 Transportation Master Plan. The recommendations in this Plan will be incorporated into small area plans, site plans and the City's Neighborhood Traffic Calming, Safe Routes to School and other capital improvement projects. This Plan furthers the goals of the Community Pathways initiative and the Spin City 2009 effort to become a bicycle-friendly community.

Public Involvement Opportunities

The first Public Meeting for this Plan was held in March 2007 and nearly 500 people completed an online survey and a paper survey on DASH buses. The project team met with key City-recognized committees including the Commission on Persons with Disabilities and the Traffic & Parking Board. City representatives also met with Civic Associations and Community Organizations. The Transportation Alternatives eNewsletter was used to distribute updates and a final Public Meeting was held in December 2007.

Implementation and Funding

This plan includes more than 5,000 recommendations for specific improvements to enhance connectivity for pedestrians and bicyclists. The field data collection effort for this Plan was one of the most comprehensive efforts of its kind undertaken in the United States and resulted in a list of improvements totaling over \$36 million - *not including* bridges or tunnels. The dollar figure is used for planning purposes only. The City expects many of the recommendations in this Plan to be implemented over time as part of regular maintenance or existing capital improvement programs. Some will be made using more than \$4.5 million in existing grants set aside for pedestrian and bicycle improvements. Development proposals and associated streetscape projects also offer excellent opportunities for improvements.

The assessment was one of the most comprehensive efforts of its kind undertaken in the United States

Terms and Language

Some of the terms used in this Plan may be unfamiliar to readers. A detailed description of pedestrian and bicycle facilities is provided in the appendix.

Maps and Graphics

The maps in this document are included in 8½ inch by 11 inch format. The full size versions of these maps are available on the City's website at <http://www.alexandriava.gov/localmotion>.

Project Support and Implementation

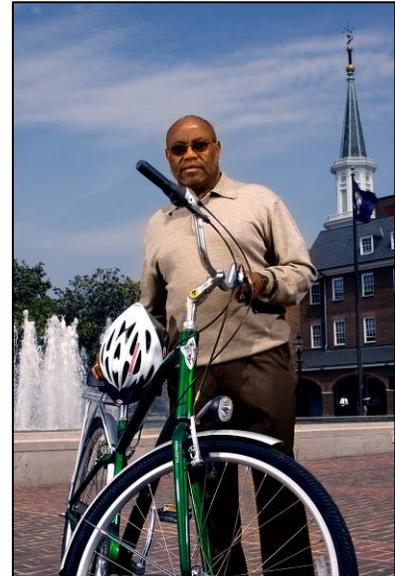
This project is funded by a State Transportation Planning pilot grant from the Virginia Department of Transportation and the Northern Virginia Regional Commission.



OVERVIEW

Walking and bicycling are fundamental to the character and livability of Alexandria, Virginia. City residents and visitors have walked along the streets of Old Town for more than 350 years. Today, the King Street and Mount Vernon Avenue commercial areas thrive on pedestrian traffic. People access public transit, parks, neighborhood trails, and community centers throughout the City by walking and bicycling; students walk and bicycle to schools in all neighborhoods. With over one million visitors every year, the Mount Vernon Trail is one of the region's most popular multi-use trails, and thousands of pedestrians and bicyclists travel on Union Street on typical summer weekends. Alexandria is approximately five miles from the Potomac River to its western boundary with Fairfax County, and three miles across from north to south; a perfect size for making trips by bicycle.

The City of Alexandria Pedestrian and Bicycle Mobility Plan celebrates this history of walking and bicycling. It builds on the policy-level recommendations in the 2008 Comprehensive Transportation Master Plan and provides a blueprint for physical improvements to make walking and bicycling more attractive transportation choices in Alexandria. Most of the recommendations in this Plan will likely be implemented as a part of upcoming projects (e.g., roadway repaving, streetscape improvements, regular maintenance, corridor reconstruction, small area plans, site plans, private sector development, etc.). The recommendations can also be incorporated into existing City programs and initiatives, such as Safe Routes to School, Community Pathways and the Spin City 2009 effort to become a bicycle-friendly community.



Mayor William D. Euille
Photo Credit: Ernest E. Clark

This Plan includes more than 5,000 recommendations for specific infrastructure improvements to enhance pedestrian and bicycle connectivity and mobility. These recommendations cover a wide range of physical improvements, from rebuilding existing sidewalks, to marking new bicycle lanes, to building new multi-use paths. A summary of this Plan's infrastructure improvement recommendations is included below.

Summary Pedestrian and Bicycle Recommendations

- 17.5 miles of new sidewalks and 11.8 miles of reconstructed sidewalks
- Removal of 274 sidewalk obstructions
- 645 new marked crosswalks and 672 re-striped crosswalks
- 251 new pedestrian countdown signals and 243 new pedestrian pushbutton signals
- 418 new accessible curb ramps and 464 reconstructed accessible curb ramps
- 148 bus stop improvements
- 13 new and 2 reconstructed pedestrian and bicycle overpasses/underpasses
- 10.1 miles of new shared-use paths and 3.54 miles of reconstructed shared-use paths
- Removal of 68 shared-use path surface obstructions and 10 clear width obstructions
- 16.3 roadway centerline miles of new bicycle lanes
- 3.7 roadway centerline miles of new climbing lanes for bicycles
- 16.4 roadway centerline miles of new shared lane markings for bicycles

- 12.31 miles of shared use pathways alongside roads

As noted, one of the ways that the recommendations in this Plan can be implemented is through the City's existing programs and internal funding mechanisms. For this reason, all of the recommendations in this Plan have been placed into one of the following five categories: Safe Routes to School, Access to Transit, Community Pathways, On-Road Bicycle Facilities, and Off-Road Facilities. These groupings were made based on the type and location of recommendations and their proximity to important community facilities such as schools and transit stops. By classifying recommendations by the City's existing programs, this Plan provides guidance on how each individual recommendation could potentially be funded and implemented over time.

A primary goal of this Plan is to provide a detailed roadmap to implementing the policy level recommendations in the 2008 Transportation Master Plan. Towards this end, this Plan also prioritizes all recommendations into short, medium, and long-term categories to enable the City to make informed and strategic decisions about how to effectively allocate resources over time. The

prioritization of recommendations in this Plan accounts for a range of factors, including existing conditions, potential demand, safety, and public input.

The geographic areas where short-term priority projects congregate together provide a logical way to group recommendations. In many cases, clusters of projects can be accomplished under single contracts in order to ensure efficiency. Implementing clusters of projects is also particularly beneficial in enhancing overall connectivity in an area. Additionally, grouping short-term projects into clusters allows them to be easily included in the City's Capital Improvement Program (CIP) and Transportation Improvement Plan (TIP). Inclusion in the CIP and TIP is an important pre-requisite to the funding of infrastructure improvement projects.

The City of Alexandria is working to reduce dependence on private automobiles and provide Alexandrians with a variety of transportation choices. One way to accomplish this goal is to improve access for persons with disabilities, pedestrians, and bicyclists. By providing an extensive set of infrastructure improvement recommendations and grouping them together by



City of Alexandria crossing guard directing children across the street. Photo Credit: City of Alexandria

the City's existing funding programs and relative priority, this Plan provides a blueprint for pedestrian and bicycle improvements. The implementation of these recommendations will result in safer conditions for pedestrians and bicyclists and make walking and bicycling more attractive transportation choices in Alexandria.



CHAPTER 1: INTRODUCTION

This Plan provides detailed recommendations for infrastructure improvements that will create more accessible and convenient conditions for pedestrians and bicyclists in Alexandria. The Plan focuses on specific “on the ground” infrastructure improvements that support the policy-level recommendations in the 2008 Comprehensive Transportation Master Plan. This chapter provides information on the general context for this Plan and an overview of the chapters that follow.

2008 Comprehensive Transportation Master Plan

One of the guiding principles of the Transportation Master Plan is that “Alexandria will provide quality pedestrian and bicycle accommodations.” This Plan includes specific recommendations to support the Transportation Master Plan’s goal of making walking and bicycling more attractive transportation choices. The pedestrian and bicycle transportation goals of the Transportation Master Plan that are supported by this Plan are included in Figures 1 and 2.

This Plan includes recommendations for infrastructure, such as new sidewalks, crosswalks, pedestrian signals, accessible transit stops, bicycle lanes, and shared-use paths. While the focus of the Plan is on infrastructure, it is essential for the City to also have programs and policies that support pedestrian and bicycle activity. This includes education about how to use pedestrian and bicycle facilities more safely, encouragement for people to walk and bicycle more frequently, and enforcement of safer pedestrian, bicycle, and driver behavior.

The Transportation Master Plan includes detailed recommendations for programs and policies that support pedestrians and bicyclists. For example, the Transportation Master Plan recommends pedestrian and bicycle facilities as a part of all roadway reconstruction projects and major new development projects. This Plan supports the goals, objectives, actions and strategies in the Transportation Master Plan.

Figure 1: City of Alexandria Pedestrian Transportation Goals

PEDESTRIAN

Overall Goal: Walking will be the safest, most convenient and enjoyable way to get around in Alexandria.

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.

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.

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

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.

(Source: 2008 City of Alexandria Comprehensive Transportation Master Plan)



Federal and State Policies

This Plan is also consistent with Federal and State policies and regulations. Over the past 15 years, many policies and plans have been developed at the national and state levels to ensure that communities are designed to support walking and bicycling. Below is a description of the policies that are most relevant to this Plan.

Federal Policies

Federal transportation policies (through the Intermodal Surface Transportation Efficiency Act of 1990 as well as subsequent transportation bills) strongly support the inclusion of pedestrian and bicycle facilities in transportation projects, and have supplied a consistent source of funding for these activities for the past fifteen years.

The Federal Highway Administration (FHWA) Virginia Division Office established a Bicycle and Pedestrian Policy in 2001. This policy supports including pedestrian and bicycle facilities in all new and reconstructed federal-aid transportation projects except under specific circumstances.

This policy states that it will assist VDOT by sharing technologies, helping with planning activities, and promoting the safety aspects of walking and bicycling. The FHWA Division policy also states: "Bicycle and pedestrian facilities should be funded at the same federal-state ratio as the typical highway improvement," and "Federal participation will be withdrawn on any major project that severs an existing bicycle or pedestrian route, unless an alternate route exists or is provided."

Americans with Disabilities Act (ADA)

People with disabilities are more likely to be pedestrians than other adults because some physical limitations can make driving difficult. For this reason, the U.S. Government established the Americans with Disabilities Act (ADA) in 1990. Its implementing regulations, issued by the Department of Justice (DOJ) in 1991, require that all new and altered facilities - including sidewalks, street crossings and related pedestrian facilities in the public right-of-way - be accessible to and usable by people with disabilities. The Americans with Disabilities Act Accessibility Guidelines (ADAAG) provide the necessary guidance for the design and construction of pedestrian facilities.

Figure 2: City of Alexandria Bicycle Transportation Goals

BICYCLE

Overall Goal: Make bicycling an integral part of the transportation system in Alexandria.

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.

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

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.

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

(Source: 2008 City of Alexandria Comprehensive Transportation Master Plan)



State Policies

As detailed below, this Plan is also consistent with State plans and policies spearheaded by the Virginia Department of Transportation and the Department of Conservation and Natural Resources.

Virginia Department of Transportation

On March 18, 2004 the Commonwealth Transportation Board adopted a new state policy for integrating pedestrian and bicycle accommodations into roadway projects (often termed “incidental” improvements - bikeways and sidewalks that are built as part of new roadway construction or roadway reconstruction). This policy essentially reverses previous VDOT policies which required a great deal of public and political support in order for bikeways and sidewalks to be *considered* for inclusion in transportation projects.

The new policy states that *“VDOT will initiate all highway construction projects with the presumption that the projects shall accommodate bicycling and walking.”* The policy provides a number of factors under which additional emphasis will be placed on the need for such facilities, essentially requiring bikeways and sidewalks whenever a roadway project occurs in an urban or suburban area. The policy provides several exemptions under which facilities are not required. This policy also pertains to operations and maintenance, including hazard elimination projects and signal installation.

The complete version of VDOT’s *Policy for Integrating Bicycle and Pedestrian Accommodations* can be found on the VDOT website at www.virginiadot.org in the Program section under Bicycling and Walking.

VDOT has also established standards for the physical layout of roadways through its Roadway Design Manual. The 2005 version of this manual has incorporated the VDOT Policy for Integrating Pedestrian and Bicycle Accommodations (see above). Several sections of the manual describe in detail how pedestrians and bicyclists should be included in roadway projects. It describes various methods of accommodating pedestrians and bicyclists and includes standards for sidewalks, buffers between sidewalks and roadways, curb ramps, and pedestrian tunnels, as well bicycle lanes, paved shoulders, wide outside lanes, and shared use paths.

Virginia Department of Conservation and Natural Resources

This Plan is also clearly in line with statewide recreation goals, as set forward in the recommendations of the Virginia Department of Conservation and Recreation’s (DCR) *2002 Virginia Outdoors Plan*. DCR identified the need to provide *“transportation alternatives, specifically trails for walking, hiking and cycling and to connect people with destinations.”*



Accessible street crossing.
Photo Credit: Toole Design Group

Coordination with Transit

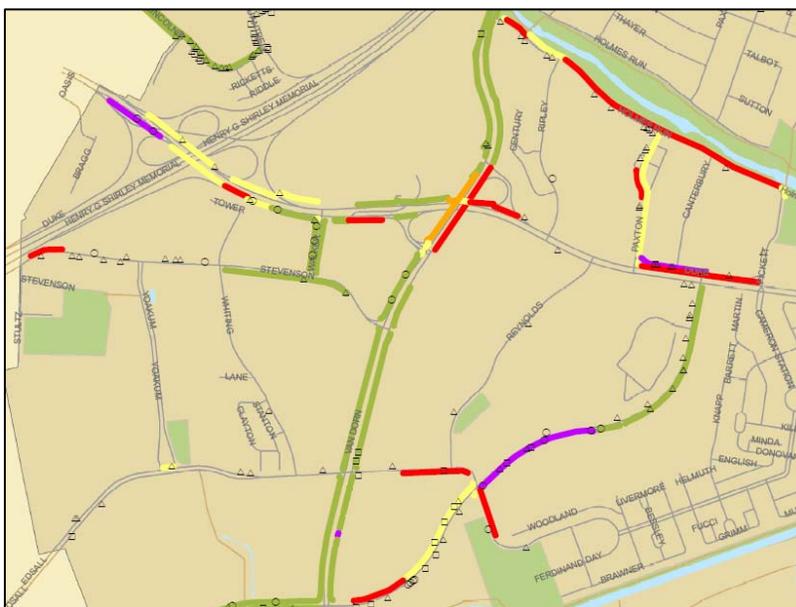
The pedestrian and bicycle infrastructure improvements recommended in this Plan will help the City achieve its goal for public transportation as outlined in the Transportation Master Plan: “Ensure that people can travel into, within, and out of the City of Alexandria by providing a mass transit system that combines different modes of travel into a seamless, comprehensive, and coordinated effort.” Sidewalks, shared-use paths, and bikeways make it safer and easier for transit customers to reach buses and trains. Benches, shelters, and bicycle parking at transit stations and stops make access more convenient and comfortable. A functional non-motorized transportation infrastructure is critical to making the Alexandria transit system successful. This Plan supports the Transportation Master Plan’s goal of a seamless, comprehensive and coordinated mass transit system.

A Note about the Graphics in this Document

This Plan provides a detailed set of location-specific infrastructure improvement recommendations throughout Alexandria. These recommendations are included within this Plan and also in Geographic Information Systems (GIS) databases. It is difficult to graphically display every single recommendation in this document because the quantity of information makes it difficult to discern distinct items on a citywide map. Therefore, the recommendation maps in this Plan necessarily present a generalized, and therefore less detailed, version of the full list of recommendations.

A sample of just the sidewalk recommendations for a small area of the City is included in Figure 3 on this page. The GIS data includes a comprehensive accounting of all recommendations developed as part of this planning process. The City is incorporating this data into its site review and development process. It should continue to develop systems for utilizing the data in its GIS format. This process is discussed in detail in Chapter 6. Note that the maps in this document are included in 8½ inch by 11 inch format; however, the full size versions of these maps are available on the City’s website at <http://www.alexandriava.gov/localmotion>.

Figure 3: Sample Recommendation Map



Plan Overview

Chapter 2 outlines the planning process for this Plan, including public involvement, field data collection and data analysis. Chapter 3 discusses existing conditions, with a focus on key factors that most directly impact the walking and bicycling environment in the City, such as

conditions walking along and crossing roads. It also presents selected additional pertinent information such as existing and potential demand for pedestrian and bicycle facilities and locations with high numbers of reported pedestrian and bicycle crashes.

Chapter 4 presents recommendations for pedestrian and bicycle infrastructure improvements. It divides these recommendations into the City’s existing programs and funding categories.

Chapter 5 reorganizes the recommendations into short, medium and long-term priority categories to guide the City’s efforts over time. It describes the methodology for prioritizing recommendations and outlines the short-term recommendations. It then presents a strategy for geographically organizing short-term recommendations into priority areas to facilitate implementation. Chapter 6 discusses strategies for most effectively utilizing the data generated through this planning process.



Bicyclists on the Mount Vernon Trail in Alexandria
Photo Credit: Richard Nowitz/ACVA

“THE CITY WILL BECOME BICYCLE-FRIENDLY BY MAKING ROUTINE ACCOMODATIONS FOR BICYCLISTS ON ‘COMPLETE’ STREETS AND PATHWAYS THAT ENABLE SAFE TRAVEL FOR ALL USERS”

“THE CITY WILL MAKE WALKING A PART OF PEOPLE’S EVERYDAY LIVES BY PROVIDING PLEASANT, SAFE AND ACCESSIBLE CONNECTIONS THAT ENCOURAGE AND REWARD THE CHOICE TO WALK”

2008 City of Alexandria Comprehensive Transportation Master Plan



CHAPTER 2: PLANNING PROCESS

This Plan has been developed through public outreach, detailed field data collection, and thorough data analysis. This chapter presents an overview of each of these elements of the planning process to provide context for the information to follow.

Public Outreach

Alexandria residents provided significant input throughout the planning process for this Plan. Public meetings were held to gather ideas for pedestrian and bicycle facility improvements and to obtain feedback on draft Plan recommendations. Nearly 40 people attended the first public meeting on March 22, 2007. At the meeting, participants were asked to provide feedback on specific locations in the City that need pedestrian and bicycle improvements. A second public meeting was held on December 6, 2007 to review recommendations and provide additional feedback. This information will be incorporated into the final Plan to the extent possible (see Appendix C: Public Meeting Summaries for additional information).

A questionnaire distributed online and on the City's DASH transit buses was also utilized to gather further information from the public. The online questionnaire was available throughout March 2007 to give citizens an opportunity to provide input (see Appendix C: Questionnaire Summary).

Nearly 500 overall responses to the online and DASH transit bus questionnaires were received. Responses to the questionnaire informed the recommendations in this Plan and are highlighted in the following chapter. Additional information about the plan was distributed to residents through the City's Transportation Alternatives eNewsletter and the Pedestrian and Bicycle Program website.



Alexandria citizens identify pedestrian and bicycle infrastructure improvements at March 2007 public meeting.
Photo Credit: Toole Design Group

A City working group provided feedback at key points in the planning process. The project team coordinated with various City departments, including the Transit, Maintenance, and Engineering Divisions of the Transportation and Environmental Services Department, Planning and Zoning, DASH, RPCA, and others. In addition, the project team met with key City-recognized committees, including the Ad Hoc Transportation Task Force, Commission on Persons with Disabilities, the Park and Recreation Commission, and the Traffic & Parking Board. City representatives also met with civic associations and community organizations, including the Del Ray Citizens Association (Traffic Committee), the Brookville-Seminary

Citizens Association and the Holmes Run Park Committee.

Field Data Collection

Extensive field work was conducted throughout Alexandria to document existing conditions for walking and bicycling and to identify opportunities to improve pedestrian and bicycle facilities. This analysis included pedestrian crossing conditions, on-road bicycling conditions, and potential locations for future greenways. The project team's pedestrian infrastructure assessment was one of the most comprehensive field data collection efforts of its kind undertaken in the United States. The map on the following page shows the areas where data were collected in the field. Measurements were collected on the following:

- 110.3 road centerline miles (220.6 counting both sides of the road)
- 147.3 miles of existing sidewalks
- 1,517 existing crosswalks
- 15 miles of multi-use trails
- 60.9 miles road evaluated for Bicycle Level of Service

Utilizing a global positioning system (GPS), field data collectors gathered objective measurements of pedestrian and bicycle facilities throughout the City, including sidewalk width, surface type, surface condition, obstructions, and buffer type; crosswalk type, surface condition, and lanes crossed; crosswalk traffic control type and pedestrian signal type; curb ramp accessibility (general estimate); driveway crossing accessibility (general estimate); bus stop accessibility (general estimate); and many other factors (see Appendix E: Field Data Collection Items).

Objective field measurements were also taken to assign Bicycle Level of Service (Bicycle LOS) grades to a 70-mile on-road bicycle network and assess the conditions of 14 miles of multi-use trails. Bicycle LOS grades were calculated using a scientific model developed by the Florida Department of Transportation and used throughout the country on similar planning studies. The "A" (highest rating) through "F" (lowest rating) scale represents the comfort level that a typical bicyclist experiences riding on a roadway segment (see Appendix F: Bicycle Level of Service Model Description). Multi-use trail measurements included width, surface type, condition, and obstructions.



Field data collection efforts as part of the Pedestrian and Bicycle Mobility Plan.
Photo Credit: Toole Design Group

In addition to developing an inventory of the City's existing pedestrian and bicycle infrastructure, the project team also made preliminary recommendations for multi-use trail and on-road bicycle facility improvements. These recommendations were reviewed along

Figure 4: DATA COLLECTION MAP



with other data sources to develop the final Plan recommendations.

Data Analysis

Once the field data collection was complete, the raw data was converted into Geographic Information Systems (GIS) database format for further review and analysis. Converting the data into GIS allowed the project team to better analyze large amounts of spatial information.

Several adjustments were made to improve the accuracy of the field data, including removing duplicate lines and points, changing infrastructure characteristics in the database that did not match other existing data, and filling in blank database entries. The cleaned GIS data was then used to generate a list of potential pedestrian facility recommendations. As noted, these include more than five thousand spot recommendations and recommendations along nearly one hundred eighty miles of sidewalks, roads and trails in Alexandria.

For bus stop recommendations, the GPS data gathered in the field was used to supplement a detailed bus stop inventory conducted by DASH in spring 2007. Measurements and preliminary recommendations for the multi-use trail and on-road bicycle facilities were made in the field by leaders of the project team.



Bicyclist riding in an existing bicycle lane in Alexandria
Photo Credit: Toole Design Group

The following chapter briefly discusses existing conditions for walking and bicycling in Alexandria. It focuses on attributes that play a key role in shaping the pedestrian and bicycle environment in the City.

CHAPTER 3: EXISTING CONDITIONS

Walking and bicycling are fundamental to the character and livability of Alexandria, Virginia. This chapter briefly discusses the range of pedestrian and bicycle environments in the City. It outlines key characteristics that impact the comfort of walking and bicycling in different areas of the City.

Overview

The City of Alexandria has a full range of pedestrian and bicycle environments. The King Street and Mount Vernon Avenue commercial areas thrive on pedestrian traffic and thousands of pedestrians and bicyclists travel on Union Street on many weekends of the year. People access public transit, parks, neighborhood trails, and community centers throughout the City by walking and bicycling and students walk and bicycle to schools in all neighborhoods. With over one million visitors per year, the Mount Vernon Trail is one of the region's most popular multi-use trails.

Many areas of the City have pedestrian-friendly characteristics, such as well-connected sidewalk networks and on-street parking that serves as a barrier between motor vehicles and those on foot. There are also areas in the City, for example along stretches of Duke Street, where traffic volumes and speeds are high, the sidewalk network is more disconnected and roads are difficult to cross. Sidewalks do not exist in many West End developments. Curb ramps are missing from some crosswalks; crosswalks have worn away in some locations; a number of signalized intersections do not indicate when it is safe for pedestrians to cross. There are a number of bus stops without concrete pads or connections to local sidewalk networks to serve pedestrians with disabilities.

Likewise, the experience bicycling in Alexandria depends largely on location. There are many comfortable neighborhood streets, existing bike lanes, and bicycle parking facilities throughout the City. However, there are also barriers to bicycle travel. Multi-lane roadways such as Duke Street, Quaker Lane, and Van Dorn Street are difficult for bicyclists to travel along or cross. Fewer than three miles of City roadways have bicycle lanes.

Figures 5 through 8 on the following pages provide information on the reason people walk and bicycle in Alexandria and the issues that they face. This information was gathered from the public via the online survey. A detailed account of existing conditions for walking and bicycling in Alexandria is included in the data collection maps and public meeting notes included in the appendix of this Plan.



Pedestrians crossing Mount Vernon Avenue in an existing crosswalk. Photo Credit: City of Alexandria

Figure 5: Percent of Respondents Walking for Specific Purposes at Least 1 Day Per Week

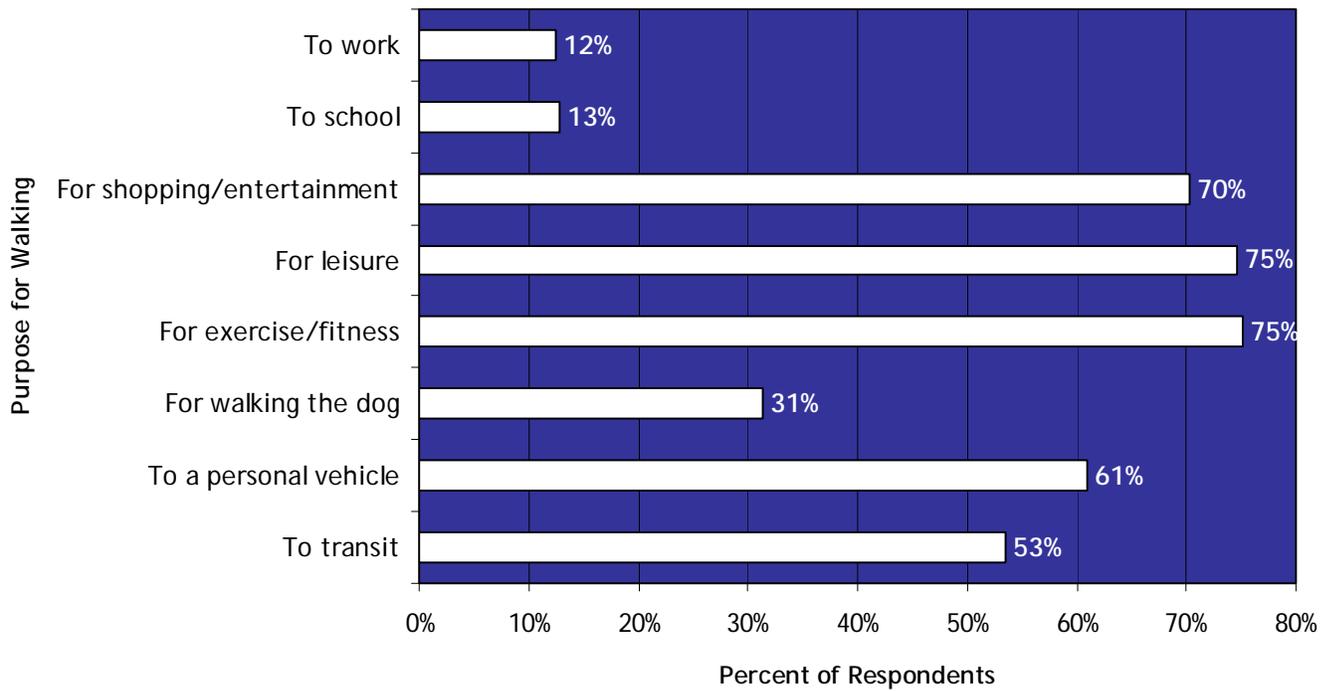


Figure 6: Most Critical Issues for Pedestrians

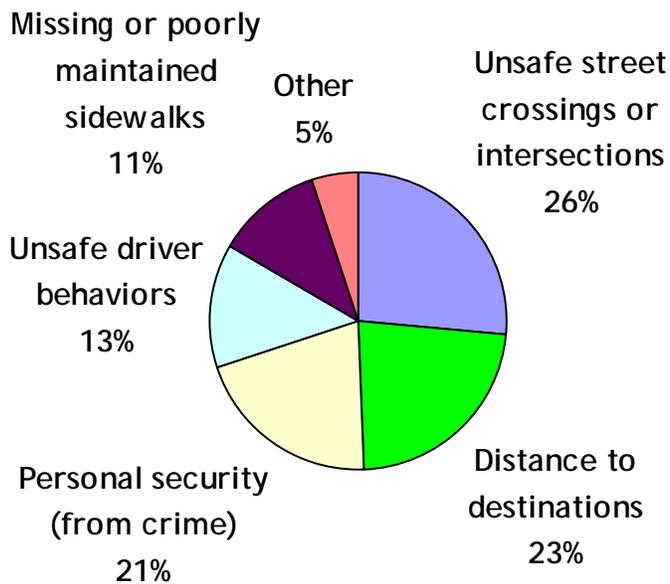


Figure 7: Percent of Respondents Bicycling for Specific Purposes at Least 1 Day Per Week

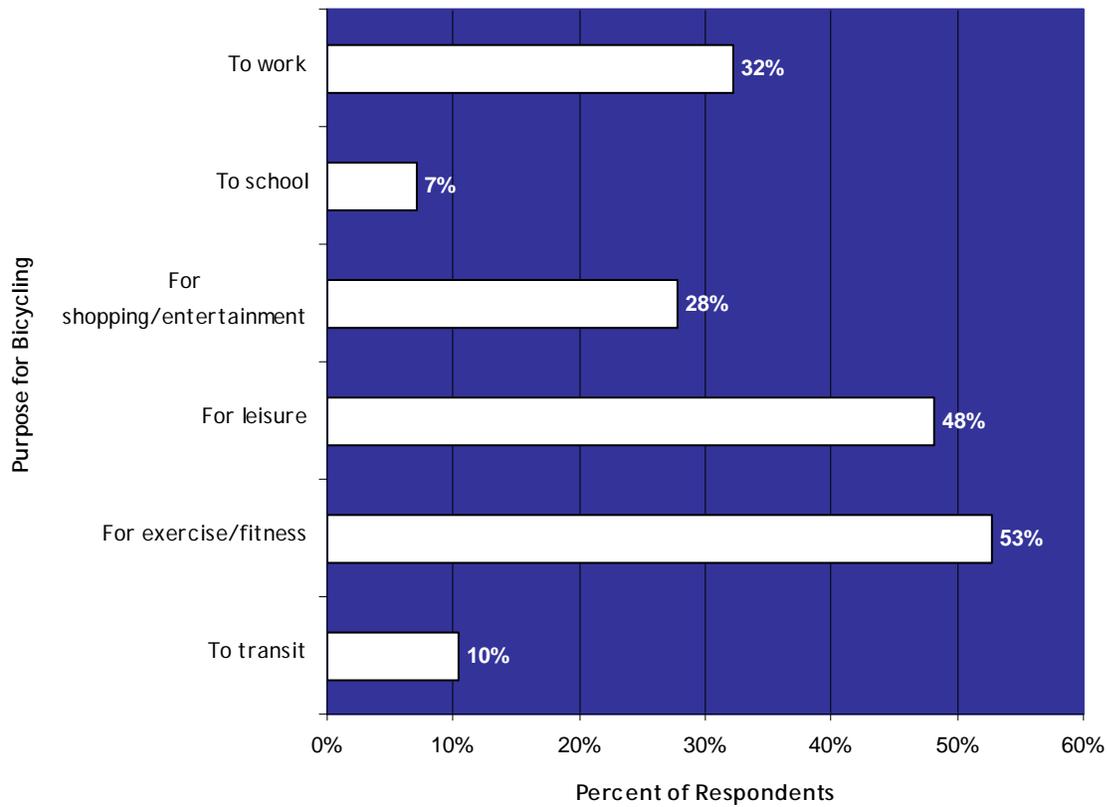
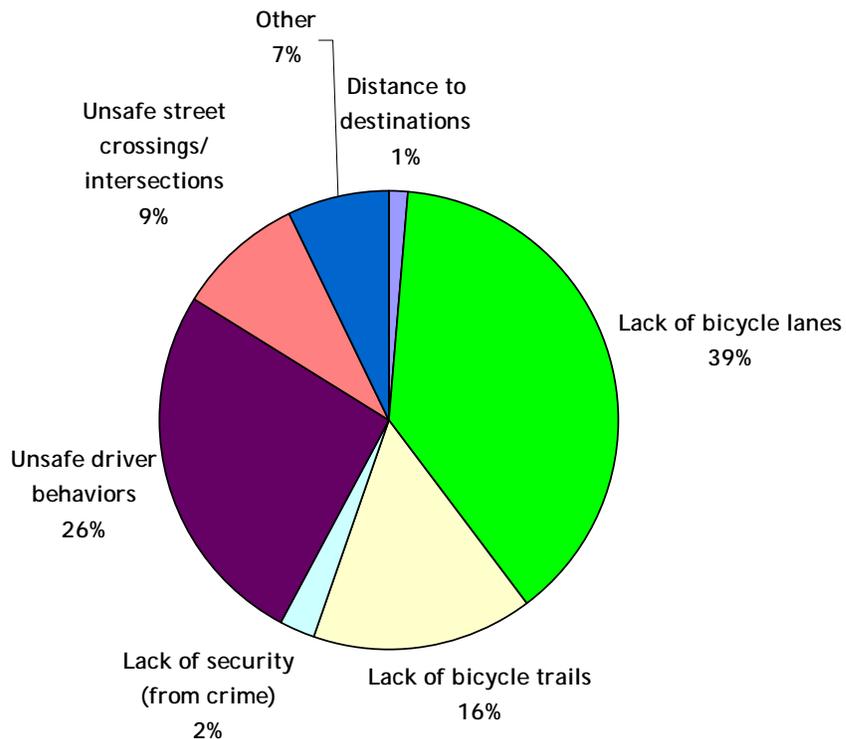


Figure 8: Most Critical Issues for Bicyclists in Alexandria



The maps on the pages that follow include some of the most critical information on existing conditions for pedestrians and bicyclists in Alexandria. They document conditions walking along roads and crossing roads in the City and the relative comfort of riding a bicycle on different roads. For these reasons, the data in these maps were used to prioritize recommendations in this Plan, as detailed in Chapter 6. The following maps are included in the pages that follow:

Potential Pedestrian and Bicycle Activity

Potential pedestrian and bicycle activity is an important aspect of existing conditions because it shows where non-motorized facility improvements have the potential to serve the greatest number of users. General estimates of potential pedestrian and bicycle activity were derived using a point system, as shown in Figures 9 and 10. The point system for estimating pedestrian and bicycle activity at each location is presented in the two sections below. A more detailed explanation is included in Appendix I.



Existing shared lane marking on Union Street
Photo Credit: City of Alexandria

Proximity to Trip Attractors

The presence of trip attractors was used as an indicator of potential pedestrian and bicycle activity. A pedestrian and bicycle potential score was developed based on proximity to locations in Alexandria that are likely to generate pedestrian and bicycle trips. A weighted score for each type of trip attractor was created under the assumption that certain facilities (such as Metrorail stops) would generate more pedestrian and bicycle activity than others (such as a park access point). The following trip attractors were accounted for in the prioritization model:

- Metrorail stations
- Bus stops
- Proposed transit corridors as outlined in the 2008 Transportation Master Plan
- Schools
- Major park access points
- Recreation centers
- Commercial areas
- Existing and proposed multi-use trails
- Existing and proposed bicycle routes and facilities

A detailed discussion of trip attractors is included in Appendix I.
Population and Employment Density and Automobile Ownership

Population and employment forecasts for 2025 from the Metropolitan Washington Council of Governments (MWCOCG) and household automobile ownership from the 2000 US Census were also used as an indicator of potential pedestrian and bicycle activity. Recommended project locations with greater future population and employment density were assigned more points. US Census block groups with lower automobile ownership were given more points. Population, employment, and automobile ownership data were divided into five categories, and points assigned for each category. A detailed discussion of these factors is included in Appendix I.

Walking Along the Roadway

A pedestrian's experience walking along roads in Alexandria is a critical element of the existing pedestrian and bicycle environment. A point system was used to approximate pedestrian comfort walking along the roadway. The Walking Along the Roadway score that was developed accounts for the following factors: Presence, width and condition of sidewalk; Traffic volume and speed; High speed corridors; Presence of a buffer between the road and sidewalk; Presence of on-street parking. A more detailed explanation of the Walking Along the Roadway score is provided in the appendix. Figure 11 shows the Walking Along the Roadway scores for roads in Alexandria.



Children crossing the street on Walk to School Day
Photo Credit: City of Alexandria

9. POTENTIAL PEDESTRIAN ACTIVITY MAP



10. POTENTIAL BIKE ACTIVITY MAP



11. WALKING ALONG THE ROADWAY MAP



Crossing the Roadway

A pedestrian's experience crossing roads in Alexandria is also a critical element of the existing pedestrian environment. A point system was used to approximate the difficulty of street crossings for both pedestrians and bicyclists. The score is meant to reflect a person's experience crossing roads on foot in Alexandria. The score incorporates the following variables, and weighs each by its relative importance: Condition of crosswalk; Presence of crosswalk; Number of travel lanes crossed; Average Daily Traffic; Speed; High speed corridors; Presence of a median; Signal type; Presence of a signal. Figure 12 shows the Crossing the Roadway Conditions on roads in Alexandria.

Reported Crashes

Locations where there are a high number of pedestrian and bicycle crashes are also an important element of existing conditions for bicyclists and those on foot. Figures 13 and 14 show areas in the City that have a high number of pedestrian and bicycle crashes. These are referred to as crash "hot spots." GIS crash density analysis was used to identify these areas with higher concentrations of police-reported pedestrian and bicycle crashes. It is important to note that police-reported collisions provide an indication of safety problems, but most pedestrian and bicycle crashes are not reported to police¹. Similarly, the presence of crashes does not necessarily reflect an engineering shortcoming.

Bicycle Level of Service Model (Bicycle LOS Model)

The *Bicycle Level of Service Model (Bicycle LOS Model)* provides another key indicator of existing conditions for bicyclists in Alexandria. The Bicycle LOS model is an evaluation of bicyclist perceived safety and comfort with respect to motor vehicle traffic while traveling in a roadway corridor. It identifies the quality of service for bicyclists that currently exists within the roadway environment. It is a framework that transportation professionals use to describe existing conditions (or suitability) for a mode of travel in a transportation system. The *Bicycle Level of Service Model* is based on the proven research documented in *Transportation Research Record 1578* published by the Transportation Research Board of the National Academy of Sciences. The Bicycle LOS score resulting from the final equation is pre-stratified into service categories "A", "B", "C", "D", "E", and "F" ("A" is best, and "F" is worst). Figure 15 shows the Bicycle Level Service grades for roads in Alexandria.

The following chapter presents recommendations for infrastructure improvements throughout Alexandria to make walking and bicycling more comfortable and convenient. These recommendations represent a blueprint for implementing the pedestrian and bicycle policies and objectives outlined in the Transportation Master Plan.

¹ Stutts, J.C. and W.W. Hunter. "Police-reporting of Pedestrians and Bicyclists Treated in Hospital Emergency Rooms," Transportation Research Record No 1635, Transportation Research Board, 1998. P. 88-92. This study of a sample of cases collected at eight hospital emergency rooms in three states, showed that only 56 percent of the pedestrians and 48 percent of the bicyclists were successfully linked to cases reported on their respective state motor vehicle crash files. This study looked at only the most serious crashes (involving emergency room treatment). We can assume that less-severe crashes were accurately reported at an even lower rate.



12. ROADWAY CROSSING CONDITIONS MAP



13. PEDESTRIAN CRASH DENSITY MAP



14. BICYCLE CRASH DENSITY MAP



15. BICYCE LEVEL OF SERVICE MAP



CHAPTER 4: RECOMMENDATIONS

This chapter includes recommendations for infrastructure improvements that will make walking and bicycling in Alexandria more convenient and accessible. The recommendations in this section are aimed at creating an interconnected network of greenways, sidewalks, bikeways, and safe roadway crossings that encourages people to walk and bike for recreation and transportation. As previously noted, these recommendations are fully supported by the City of Alexandria's Comprehensive Transportation Master Plan.

Recommendations were generated through public input, field data collection, and data analysis. Note that these recommendations are only for the areas that the project team studied. Specific facility types that are recommended are outlined in Figure 16. Descriptions of these facility types are included in Appendix G. The recommendations presented in this chapter are grouped into the following existing City programs and initiatives: Safe Routes to School, Access to Transit, Community Pathways, On-Road Bikeways, and Off-Road Bikeways.

Plan Outcomes

This Plan includes comprehensive, citywide recommendations for pedestrian and bicycle facilities in Alexandria including:

Pedestrian Facilities

- 17.5 miles of new sidewalks
- 11.8 miles of reconstructed sidewalks
- Removal of 274 sidewalk clear width obstructions
- 645 new marked crosswalks
- 672 re-striped crosswalks
- 3 new median islands
- 251 existing signalized crossings with new pedestrian countdown signals
- 243 new accessible pedestrian pushbuttons
- 418 new accessible curb ramps
- 464 reconstructed curb ramps
- 579 reconstructed sidewalks at driveway crossings
- 148 bus stop improvements, including adding 117 benches and 31 shelters and benches
- Adding a full traffic signal or pedestrian activated signal at 2 mid-block intersections
- 13 new pedestrian and bicycle overpasses/underpasses

Figure 16: Facility Types

Facility Recommendations

Pedestrian Facilities

- Sidewalks
- Marked crosswalks
- Curb ramps
- Median crossing islands
- Curb extensions
- Raised crosswalks
- Pedestrian crosswalk signals

Bicycle Facilities

- Bicycle lanes
- Climbing lanes
- Shared lane markings
- Shared-use paths
- Sidepaths
- Bicycle boulevards
- Shared roadways
- Bridge facilities
- Bicycle turning pockets
- Bicycle boxes

Transit Access Facilities

- Concrete pads
- Benches
- Shelters

Pedestrian and Bicycle Facilities

- Shared-use paths (multi-use trails)
- Overpasses and underpasses
- Signalization improvements
- Warning signs



-
- 2 reconstructed pedestrian and bicycle overpass/underpasses

Shared-Use Path Facilities

- 10.1 miles of new shared-use paths
- 3.54 miles of reconstructed shared-use paths
- Removal of 68 shared-use path surface obstructions and 10 clear width obstructions

On-Road Bicycle Facilities

- 16.3 roadway centerline miles of new bicycle lanes
- 3.7 roadway centerline miles of new climbing lanes
- 16.4 roadway centerline miles of new shared lane markings
- 2.5 roadway centerline miles of bicycle boulevards (plus 3.9 miles of long-term bicycle boulevards)
- 7.3 roadway centerline miles of wide outside lanes
- 9.06 roadway centerline miles of shared roadway
- 12.31 miles of side paths
- .92 miles of pedestrian/bicycle priority streets

As detailed above, this Plan provides recommendations for infrastructure improvements throughout Alexandria. Some of the recommendations are made at a specific location or “point” in the City. Other recommendations were made along an entire stretch (referred to as a “line” recommendation) of road. The point and line recommendations included in this Plan are outlined below.

Total Point Recommendations

- 2,137 obstructions
- 23 bicycle intersection improvements
- 597 driveway recommendations
- 255 bus stop recommendations
- 882 curb ramp improvements
- 1,320 crosswalk recommendations (counting each leg, or segment, separately)
- 632 signal recommendations (counting each leg, or segment, separately)

Total Point Recommendations: 5,846 (including all point recommendations)

Total Line Recommendations

- 79.2 miles of sidewalk recommendations (including long-term buffer recommendations)
- 61.8 miles of on-road bicycle recommendations
- 38.05 miles of off-road recommendations

Total Line Recommendations: 179.05 miles

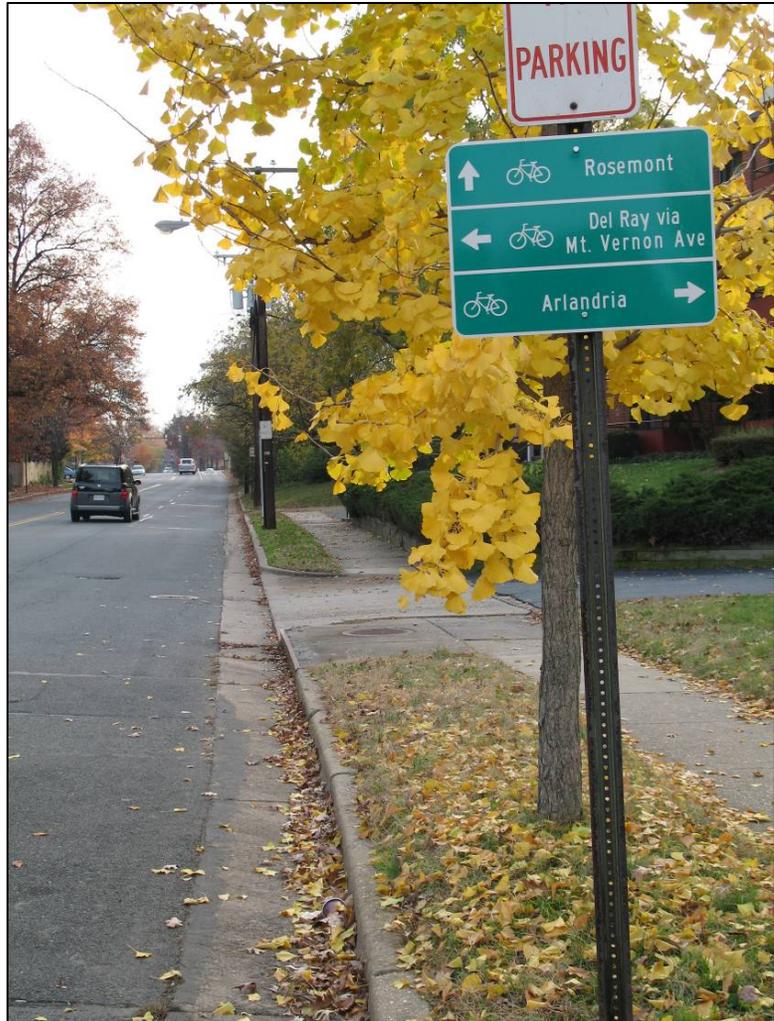


Evaluation of Recommendations

The pedestrian and bicycle facility recommendations in this Plan are the result of a planning-level analysis. Each of these recommended improvements will require a more detailed project-level review. Additional traffic and transit analysis will be needed in some cases to determine the optimum design for specific locations. Like other public projects, neighborhood involvement will also be an important part of the evaluation and implementation process. Some locations shown on maps may be determined, after more detailed analysis, to require different or more costly improvements and therefore may become longer-term projects. However, for every project, the first assumption will be that the facilities, as shown in this Plan, will be implemented.

Program Recommendations

The facility recommendations described above were divided into five existing City of Alexandria programs to facilitate implementation. These programs include Safe Routes to School, Access to Transit, Community Pathways, On-Street Bikeways, and Off-Street Bikeways. The groupings were made based on the geographic criteria outlined below.



Existing directional bicycle route sign in Alexandria
Photo Credit: City of Alexandria

- *Safe Routes to School:* Recommendations within ¼ mile of a school
- *Access to Transit:* Recommendations with 1/16 mile of a bus stop, 1/8 mile of a future transit corridor, or ½ mile of Metrorail stop
- *Community Pathways:* Recommendations that will strengthen Alexandria's non-motorized transportation infrastructure, which were not included in the categories above
- *On-Street Bikeways:* Recommendations within the road
- *Off-Street Bikeways:* Recommendations outside of the road travelway

Recommendations were grouped by program to provide guidance on how individual improvements could potentially be implemented over time. It is important to note that in many cases, a single recommendation could potentially qualify for a number of different programs. For example, one intersection could be close to a school (and so could be included in the Safe Routes to School program) and also near a transit facility (and so could be included in the Access to Transit program).



Bus stop at the King Street Metrorail Station
Photo Credit: Toole Design Group

Decisions on how to fund specific improvements must be made on an individual basis. The information presented below is meant to inform this process. The estimated cost of implementing recommendations within each of the five programs is included in Table 1. Maps of these program area recommendations are included after each program area description.

Table 1: Estimated Pedestrian and Bicycle Mobility Plan Costs

Program	Total
Safe Routes to School	\$4,324,820
Access to Transit	\$12,333,352
Community Pathways	\$1,306,848
On-Road Bicycle Facilities	\$2,489,330
Off-Road Trails (not including bridges and tunnels)	\$15,645,337
Total (All Programs)	\$36,099,688

The programs included in Table 1 are described briefly in the pages that follow. A summarized list of the specific infrastructure improvements included within each of these program areas and an accompanying map is also provided in the pages that follow. Note that the program area maps show a generalized picture of the recommendations. For details on the specific recommendations, consult the maps in the appendix and the GIS data.

Safe Routes to Schools Program

The City’s Safe Routes to Schools program takes a comprehensive approach to improving pedestrian and bicycle safety and encouraging more students to walk and bicycle to school. This plan focuses on specific pedestrian facility improvements within ¼-mile of all schools in the City. It is important to note that federal Safe Routes to School program eligibility criteria covers projects within a 2-mile radius of schools. Because this geography would cover nearly the entire City, a smaller area was chosen.

The physical infrastructure improvements detailed in Table 2 will complement education, enforcement, and encouragement efforts being done through partnerships between the City, school system, and other organizations. A map showing the type and location of these physical improvements is included on the following page.



Walk to School Day event at Barrett Elementary School
Photo Credit: Britt K. Leckman/Barrett Elementary PTA

Table 2: Safe Routes to Schools Recommendations

Recommendation Type	Number or Total Length of Recommendations
Bus Stop Improvement	0
Median Improvement	0
Stripe Crosswalk	144
Restripe Crosswalk	230
Curb Ramp Improvement	191
Driveway Improvement	192
Address Obstruction	723
Construct Sidewalk	3.94
Reconstruct Sidewalk	3.48
Improve Landscaping	0.09
Signal Improvement	159

17. SAFE ROUTES TO SCHOOL MAP



Access to Transit Program

It is critical for the City to provide safe and convenient facilities for customers to walk and bicycle to transit stops and stations. Therefore, the success of existing rail and bus systems, as well as future dedicated transit corridors as outlined in the Transportation Master Plan, in Alexandria depends on the non-motorized facility improvements recommended in this Plan.

Access to Transit improvements include pedestrian facilities within 1/16-mile (330 feet) of all conventional bus stops, 1/8-mile (660 feet) of all future bus rapid transit routes, and 1/2-mile of all Metrorail Stations. Improvements to benches and shelters at bus stops are also included in this program. DASH and Metro bus boarding data were used to select high-use bus stops for these specific improvements. A map showing the type and location of the physical improvements outlined in Table 3 is included on the following page.



Existing bus stop in Alexandria
Photo Credit: Toole Design Group

Table 3: Access to Transit Recommendations

Recommendation Type	Number or Total Length of Recommendations
Bus Stop Improvement	255
Median Improvement	3
Stripe Crosswalk	372
Restripe Crosswalk	401
Curb Ramp Improvement	565
Driveway Improvement	292
Address Obstruction	1064
Construct Sidewalk	11.82
Reconstruct Sidewalk	7.9
Improve Landscaping	0.62
New Signal HAWK or Full	2
Signal Improvement	463

18. ACCESS TO TRANSIT MAP



Community Pathways Program

The Alexandria City Council passed a resolution creating the Community Pathways program in 2006 to focus on people, neighborhoods, parks, schools, recreation areas and trails. The program encompasses policy changes and initiatives that will strengthen Alexandria's non-motorized transportation infrastructure. Improving pedestrian safety is a major component of the Community Pathways program.

The recommendations for Community Pathways improvements in this Plan are for pedestrian facilities in neighborhood commercial centers and residential neighborhoods. They include non-motorized transportation improvements that were not already included in another program, but that are critical to the cohesion of Alexandria's neighborhoods. Note that all pathways in the City were not surveyed as part of this Plan and that many of the recommendations included in the other programs in this chapter (e.g. Safe Routes to School, Access to Transit, etc.) could also be implemented through the Community Pathways program.



Existing multi-use path near Pendleton Street. Photo Credit: Toole Design Group

A map showing the type and location of the physical improvements outlined in Table 4 is included on the following page.

Table 4: Community Pathways Recommendations

Recommendation Type	Number or Total Length of Recommendations
Bus Stop Improvement	0
Median Improvement	0
Stripe Crosswalk	129
Restripe Crosswalk	41
Curb Ramp Improvement	126
Driveway Improvement	95
Address Obstruction	350
Construct Sidewalk	1.8
Reconstruct Sidewalk	0.57
Improve Landscaping	0.04
Signal Improvement	8

19. COMMUNITY PATHWAYS MAP



On-Street Bikeways Program

The On-Street Bikeways component of this Plan includes recommendations for more than 60 miles of new on-road bicycle facilities. New bicycle lanes, climbing lanes, shared lane markings, and other on-road facilities are essential for creating a continuous bikeway network that provides access to all destinations in the City. Because Alexandria is a built, urban environment, it is not possible to connect all activity centers with separated bicycle and pedestrian trails. On-road bicycle facilities are recommended to complete connections between trails and make connections to schools, parks, employment centers, transit hubs, and other destinations.



Photo rendering of bicycle lanes on Old Dominion Boulevard. Photo Credit: City of Alexandria

Roadway crossings are critical to the connectivity of the bicycle network. Recommended crossing improvements include new traffic signals, curb extensions, median crossing islands, bicycle turn pockets, and bicycle boxes. The facility types that are recommended for roadway segments and intersections are based on a variety of factors, including existing right-of-way, surrounding land uses, number of travel lanes, travel lane width, traffic volume and speed, traffic composition, presence of on-street parking, and pedestrian activity. Note that this Plan does not recommend the removal of any on-street parking. In many cases, on-road bicycle facilities can be created by narrowing or removing travel lanes in corridors with extra motor vehicle capacity. Often, these facilities can be added for a minimal cost as a part of a roadway repaving or reconstruction project. The on-street bicycle improvements outlined in Table 5 will help Alexandria achieve and surpass the goals of its Spin City 2009 initiative. A map showing the type and location of these physical improvements is included on the following page.

Table 5: On-Street Bikeway Recommendations

Recommendation Type	Total Length
Bicycle Lanes	14.895
Bike Boulevard	2.51
Bike Ped Priority Street	0.92
Climbing Lane	3.77
Sharrow	16.11
Shared Roadway	9.06
Long Term Bicycle Boulevard	3.9
Wide Outside Lanes	4.44
Unknown Improvement	0.795
Bicycle Intersection Improvement	31



20. ON STREET BIKEWAYS



Off-Street Trails Program

Off-street trails, or shared-use paths, are located in their own corridors, separated from motor vehicle traffic. These facilities provide a high-quality experience for pedestrians and bicyclists.

While this Plan recommends several new sections of off-street trails and several new pedestrian and bicycle bridge connections, most of the Off-Street Trails Program improvements include widening existing trails, removing clear width obstructions (e.g., potholes, root damage, overgrown trees and bushes, etc.), and repaving trail surfaces. The Off-Street Trails Program also includes sidepaths, which are wide sidewalks that are intended for shared pedestrian and bicycle use. A map showing the type and location of the physical improvements outlined in Table 6 is included on the following page.



A “fair weather” crossing on the Holmes Run Greenway near Dora Kelley Park. Photo Credit: City of Alexandria

Table 6: Off-Street Trails Recommendations

Recommendation Type	Total Length
Construct Shared Use Path	10.11
Construct Sidepath or Widen Existing Sidewalk	8.105
Construct Overpass/Underpass	1.34
Reconstruct Shared Use Path	3.54
Reconstruct Overpass/Underpass	0.09

This chapter outlined the types and numbers of facility recommendations that have been made as a part of this planning process. It then divided these recommendations into groups based on five specific existing City of Alexandria programs. This was meant to provide guidance on how individual improvements could potentially be implemented over time. The following chapter takes the same comprehensive list of infrastructure recommendations and prioritizes them based on their relative importance. It then introduces a recommended timeline for implementation based on the prioritization methodology.

21. OFF STREET TRAILS MAP



CHAPTER 5: IMPLEMENTATION

This Plan provides a comprehensive list of pedestrian and bicycle infrastructure improvement recommendations throughout the City. This chapter introduces a strategy for prioritizing these improvements. By grouping the recommendations into short, medium, and long-term categories, this Plan enables the City to make informed and strategic decisions about how to effectively allocate resources over time. The prioritization of recommendations accounts for a range of factors, including existing conditions, potential demand, safety, and public input.

Pedestrian and Bicycle Program Funding

In the previous chapter, pedestrian and bicycle facility recommendations were classified into specific categories based on the City's existing pedestrian and bicycle programs. Other opportunities for implementing recommendations include

upcoming improvement projects (e.g., roadway repaving, streetscape improvements, corridor reconstruction, etc.), road maintenance programs, site review, and redevelopment projects. The Transportation Master Plan includes a summary of funding sources available for the implementation of pedestrian and bicycle programs and infrastructure.

As noted, this chapter divides recommendations into short-term, medium-term, and long-term categories. These categories are described in detail below. Generalized cost estimates were developed for each type of facility improvement (see Appendix A: Generalized Cost Estimates). The estimated costs of all the recommendations in each program and phasing category are included in the appendix (see Appendix B: Estimated Pedestrian and Bicycle Mobility Plan Costs).

Most facility recommendations will be implemented through the program categories identified in this Plan. However, the City should also take advantage of implementation opportunities as they become available. For example, if the City is undertaking a roadway improvement project as part of its normal maintenance program, it may be advantageous to make a recommended roadway crossing improvement during that effort even if the recommended improvement has been identified through the Safe Routes to School program in this Plan. In this case, the City would improve road crossing conditions sooner and save the additional costs of retrofitting in the future. Therefore, the costs shown in this Plan are an approximation of the total cost of implementation.



Bicyclists walking bikes along the sidewalk in Alexandria
Photo Credit: Richard Nowitz/ACVA

The prioritization of recommendations in this Plan accounts for a range of factors, including existing conditions, potential demand, safety, and public input. The process for prioritizing recommendations is described below.

The costs shown in this Plan are an approximation of the total cost of implementation.

Prioritization of Recommendations

As part of the study process for this Plan, information was collected on 110 road centerline miles, 147 miles of existing sidewalks, and 15 miles of multi-use trails. A Bicycle Level of Service (BLOS) rating was developed for 60 miles of Alexandria's roads and more than 1,500 existing crosswalks were analyzed. Through this data collection and analysis process, the following recommendations were developed for specific locations in Alexandria:

- 2,137 obstruction recommendations
- 23 bicycle intersection recommendations
- 597 driveway recommendations
- 255 bus stop recommendations
- 822 curb ramp recommendations
- 1,320 crosswalk recommendations
- 632 traffic signal recommendations

In addition to the above recommendations, many recommendations were developed along roads and sidewalks, including the following:

- 79 miles of sidewalk recommendations
- 62 miles of on-road bicycle recommendations
- 38 miles of off-road recommendations

A method was developed to prioritize these recommendations into short, medium and long-term categories. This prioritization strategy accounts for the potential demand for pedestrian and bicycle facilities, as well as other important variables, such as the location of pedestrian and bicycle crashes, bus ridership, and public input. Figure 22 on the following page shows graphically the methodology used for prioritizing recommendations. This methodology is described briefly on the following pages, and more extensively in Appendix I.

The first step in this process was to evaluate pedestrian and bicycle demand. This was accomplished by developing a pedestrian and bicycle potential score based on proximity to locations in Alexandria that are likely to generate pedestrian and bicycle trips. A weighted score for each type of trip attractor was created under the assumption that certain facilities (such as Metrorail stops) would generate more pedestrian and bicycle activity than others (such as a park access point). The following trip attractors were accounted for in the prioritization model:

- Metrorail stations
- Bus stops
- Proposed transit priority corridors
- Schools
- Major park access points
- Recreation centers



22. METHADODOLOGY GRAPHIC



- Commercial areas
- Existing and proposed multi-use trails
- Existing and proposed bicycle routes and facilities

The model used the potential pedestrian and bicycle demand score to prioritize all recommendations, under the assumption that trip attractors are good indicators of places that people need to be able to access on foot and by bicycle, and that improvements in these areas should be prioritized over other areas. The pedestrian potential score was used to evaluate the following categories of pedestrian recommendations:



Bicyclist traveling the wrong way down the road
Photo Credit: Toole Design Group

- Obstructions
- Signals
- Driveways
- Curb ramps
- Crosswalks
(in conjunction with the Crossing the Roadway score)
- Sidewalks (in conjunction with the Walking Along the Roadway score)
- Bus stops

The bicycle potential score was used to evaluate the following categories of bicycle recommendations:

- Intersections for bikes
- Construct bike facilities

A second level of analysis was utilized to evaluate and prioritize crosswalk and sidewalk recommendations. The “Crossing the Roadway” score described in Chapter 3 was developed to prioritize crosswalk recommendations as it is meant to reflect a person’s experience crossing roads on foot in Alexandria. The score incorporates the following variables, and weighs each by its relative importance:

- Condition of crosswalk
- Presence of crosswalk
- Number of travel lanes crossed
- Average Daily Traffic
- Speed
- High speed corridors
- Presence of a median
- Signal type

- Presence of a signal

The “Crossing the Roadway” score was added to the “Pedestrian Potential” score to prioritize crosswalk recommendations. The relative importance of the two scores was assumed to be equal when they were added together.

Similarly, the “Walking Along the Roadway” score described in Chapter 3 was developed to prioritize sidewalk recommendations as it is meant to reflect the pedestrian experience walking along a road in Alexandria. The score incorporates the following variables:

- Presence, width and condition of sidewalk
- Traffic volume and speed
- High speed corridors
- Presence of a buffer between the road and sidewalk
- Presence of on-street parking

The “Walking Along the Roadway” score was added to the Pedestrian Potential score and their importance, relative to each other, was assumed to be equal.

The Pedestrian Potential, Bike Potential, Crossing the Roadway, and Walking Along the Roadway scores were used to prioritize all recommendations in this Plan. By attaching a numeric score to each recommendation, it was possible to evaluate the importance of each recommendation relative to each other. This was accomplished using the quantile method within GIS software to create ten categories with approximately the same number of recommendations in each. Recommendations with a score of one were considered to be the least important and recommendations with a score of ten are considered to be the most important.

As noted in Table 7 below, the score of each recommendation was used to assign it into the short, medium, or long-term category. Recommendations with a score of ten are considered to be short-term priorities, recommendations with a score of eight and nine are considered to be medium-term priorities, and recommendations with scores of one to seven are considered to be long-term priorities. The priority scores accounts for existing conditions, as well as potential demand for pedestrian and bicycle facility improvements.

Table 7: Priority Score and Phasing Categories

Priority Score	Phasing Category
10	Short-Term
8-9	Medium-Term
1-7	Long-Term



A final level of analysis was conducted to incorporate the following information into the priority scoring methodology.

- *Public input gathered through the online survey and the DASH bus survey:* Locations that were noted frequently by respondents to the online and DASH bus survey as needing pedestrian and/or bicycle improvements were incorporated into the prioritization strategy. If a particular location was noted three or more times, its prioritization score was automatically changed to a ten, automatically making it a short-term priority.



Pedestrians walking along the sidewalk in Old Town.
Photo Credit: Toole Design Group

- *Pedestrian and bicycle crash hot spots:* Locations where there are a high number of pedestrian and bicycle crashes were considered to be a unique circumstance. The scores of recommendations within these crash “hot spot” areas were automatically changed to a ten, indicating that they should be considered short-term priorities.
- *Bus ridership:* Locations along bus routes in Alexandria that have high ridership were also considered to be particularly important. A list of the top fifty bus routes with the highest bus ridership was identified and recommendations in the vicinity of these routes were automatically changed to short-term priorities.

Using the methodology described above, all of the recommendations in this Plan were assigned a priority score and this score was used to determine whether the recommendation should be considered a short, medium, or long-term priority. The short-term projects in the Plan (those with a score of ten out of ten) are dispersed throughout the City. The areas where short-term priority projects congregate together provide a logical way to group recommendations. In many cases, clusters of projects can be accomplished under single contracts in order to ensure efficiency. Implementing clusters of projects is also particularly beneficial in enhancing overall connectivity in an area. Additionally, grouping short-term projects into clusters allows them to be easily included in the City’s Capital Improvement Program (CIP) and Transportation Improvement Plan (TIP), which is an important pre-requisite to the funding of infrastructure improvement projects. Figure 23 on the following page shows short-term priority areas. The short-term priority areas are indicated below:

- Del Ray/Potomac Yard/Braddock Road
- Duke Street/Taylor Run
- Eisenhower Avenue East
- Fairlington/Bradlee
- Four Mile Run/Arlandria

23. PRIORITY AREAS MAP



- Holmes Run
- King/Beauregard
- King Street Metro Area
- Landmark
- Mark Center
- Mt. Jefferson
- Old Town North
- Old Town South
- Sanger/Lynbrook
- Seminary/N Van Dorn
- Van Dorn Metro

The estimated cost of implementing all short-term recommendations within these high priority areas is outlined in Table 8.

Table 8: Cost Estimates for Recommendations within the High Priority Project Areas

Project Area	Total Cost
Del Ray/Potomac Yard/Braddock Road	\$ 1,323,464.39
Duke Street/Taylor Run	\$ 624,894.28
Eisenhower Avenue East	\$ 864,650.05
Farlington/Bradlee	\$ 1,055,837.37
Four Mile Run/Arlandria	\$ 831,692.63
Holmes Run	\$ 942,739.6
King/Beauregard	\$ 354,955.03
King Street Metro Area	\$ 645,867.15
Landmark	\$ 1,687,875.23
Mark Center	\$ 110,168.69
Mt. Jefferson	\$ 488,976.43
Old Town North	\$ 897,764.07
Old Town South	\$ 757,774.29
Sanger/Lynbrook	\$ 64,684.65
Seminary N Van Dorn	\$ 641,238.45
Van Dorn Metro	\$ 1,033,253.25
Total Cost	\$ 12,325,835.56

A complete list of the short-term recommendations included in each of the high priority areas identified above is included in Appendix B. Also in the Appendix are cost estimates for completing these short-term recommendations. Table 9 outlines the total cost of implementing the short-term projects by program (e.g. Safe Routes to School, Access to Transit, etc.).



Table 9: Estimated Pedestrian and Bicycle Mobility Plan Costs

Program	Short-Term	Medium-Term	Long-Term	Total
Safe Routes to School	\$1,680,074	\$375,823	\$2,268,923	\$4,324,820
Access to Transit	\$4,080,367	\$1,944,613	\$6,308,372	\$12,333,352
Community Pathways	\$120,597	\$144,321	\$1,041,930	\$1,306,848
On-Road Bicycle Facilities	\$820,599	\$361,787	\$1,306,944	\$2,489,330
Off-Road Trails	\$5,624,198	\$5,372,642	\$4,648,497	\$15,645,337
Total (All Programs)	\$12,325,836	\$8,199,186	\$15,574,666	\$36,099,688

Performance Measures

The Transportation Master Plan includes lists of actions, strategies and performance measures to improve pedestrian and bicycle transportation in Alexandria. These will help the City benchmark its progress in implementing the Plan’s recommendations. Key performance measures from the Transportation Master Plan are included in Figure 24 on the following page.

In order to track whether and to what extent it is meeting the performance measures in the Transportation Master Plan, the City should collect more data on pedestrian and bicycle activity. Pedestrian and bicycle counts can be used in annual reports, to demonstrate the positive effects of the pedestrian and bicycle program, and to justify further spending on pedestrian and bicycle transportation. The City should conduct pedestrian and bicycle counts on trails and streets, including both on and off-road facilities. It should conduct counts and behavioral observations before and after a pedestrian or bicycle facility is installed. Additionally, the City should conduct neighborhood travel diaries or surveys to learn more about the types of pedestrian and bicycle trips. New counting technology will enable the City to conduct these counts in a cost efficient and timely manner.

This Plan provides recommendations for thousands of infrastructure improvement projects throughout Alexandria. This chapter introduced a strategy for prioritizing these recommendations by grouping them into short, medium, and long-term categories. In doing so, this Plan enables the City to make informed and strategic decisions about how to effectively allocate resources over time. The following chapter provides a strategy for effectively utilizing the data developed as a part of this planning process.



Figure 24: City of Alexandria Pedestrian and Bicycle Performance Measures

Pedestrian

- The proportion of people walking to work in Alexandria shall increase from 3% to 5% by 2011.
- 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.
- The number and percentage of people who walk to access Alexandria's four Metrorail stops will increase (Of all survey respondents, 1,370 people (or 75%) walked to the Eisenhower Avenue station; 5,260 people (or 62%) walked to the King Street station; 2,700 people (or 61%) walked to the Braddock Road station; and 580 people (or 15%) walked to the Van Dorn Street station during the month of April 2005). Other modes of access include bus and connecting rail, drop-offs or drove and parked¹.
- 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.
- The proposed sidewalk and shared-use path network will be 50% complete by 2011.
- Improved maintenance will result in a decrease in requests by 50% in 2011.
- Bi-annual special events in spring and fall will encourage active living and promotion walking as a means of transportation and recreation.
- More than 50% of elementary school children will receive pedestrian safety education by 2010.

Bicycle

- The proportion of people bicycling to work in Alexandria shall increase from 0.5% to 3% percent by 2011¹.
- Alexandria City Public Schools will begin counting the number of children bicycling to school, and this number shall increase 5% annually through 2011.
- 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.
- The proposed bikeway network will be 50% complete by 2011.
- 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.
- 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).
- Bi-annual special events in spring and fall will encourage bicycle use.
- All city-sponsored special events and public recreational facilities will supply plentiful bicycle parking.
- More than 50% of elementary aged school children will receive bicycle safety education by 2010.

Baseline data for each of the pedestrian and bicycle performance measures should be established during 2008. The City will prepare an annual report to Council to summarize progress made on each of the performance measures.

(Source: City of Alexandria Comprehensive Transportation Master Plan)



CHAPTER 6: DATA UTILIZATION

One of the most important products of this planning effort is the extensive amount of data and thousands of detailed recommendations that have been generated. The large number of recommendations resulted from this Plan's objective of identifying physical improvements at specific locations throughout the City.

The recommendations in this Plan should guide and inform the City's pedestrian and bicycle planning activities in the coming years. This can best occur if the City develops a focused and proactive strategy for using, managing and updating the data from this Plan in its original GIS format.

The program and priority maps in this document necessarily present a generalized, and therefore less detailed, version of the full set of recommendations. It is difficult to graphically display every single recommendation because the sheer quantity of information makes it difficult to discern distinct items on a citywide map. During implementation, it will be critical for the City to ensure that recommendations included in the GIS data guide its efforts. In order to do so, the City will need to

develop procedural mechanisms for incorporating Plan recommendations from the GIS database into day-to-day activities

so that this information can inform a range of initiatives across numerous City departments, from repaving roads to ongoing road maintenance.

GIS data should be made available to City staff in a format that allows them to search, query and export information. This could be helpful, for example, during the plan review process. The City's plan reviewers should consult the needs list in the GIS data to identify potential opportunities to implement recommendations from this Plan. Additionally, GIS data could help to identify improvements recommended in this Plan that could be completed as a part of a routine repaving project. In order for this



Existing bicycle parking in Alexandria
Photo Credit: City of Alexandria

to work, the City will need to develop a sharable GIS platform available at every planner's work station. It will be critical for the City to develop a mechanism to ensure that the GIS information is updated regularly.

Until such a platform is available, the City should develop a series of hard-copy map books that City staff can reference as projects are considered and planned. The map books should provide all recommendations in this Plan across the entire City, at a scale that is legible. The map books should be organized into a series, with each set providing information on separate categories of recommendations. For example, one set of map books could provide information on all crosswalk and curb ramp recommendations. These map books should be kept in a location that is accessible by all City staff. A sample cover of such a map book is included as Figure 25 and a sample page is included as Figure 26.

The City should develop procedures for ensuring that City staff, including plan reviewers, public works staff and maintenance staff regularly reference the map books to inform their projects and programs. Completed projects should be noted on the hard copy maps and this information should be regularly entered back into GIS. If this is done regularly, the map books could provide a viable way to ensure that the GIS information developed as part of this planning process remains accurate over time.

By utilizing maps books in the short-term, while at the same time developing and instituting a long-term strategy for managing the GIS database developed as part of this planning process, the City can ensure that opportunities to implement the recommendations in this Plan are identified and incorporated in a timely manner.



25. MAP BOOK MAP 1



26. MAP BOOK MAP 2



CHAPTER 7: CONCLUSION

Implementing the infrastructure improvement recommendations in this Plan will improve pedestrian and bicycle access and mobility in Alexandria. These physical improvements will make walking and bicycling in the City more comfortable and convenient. In doing so, these improvements will help the City meet the pedestrian and bicycle goals outlined in the Transportation Master Plan.



Students participating in a bicycle safety rodeo hosted by the Washington Area Bicycle Association at George Mason Elementary School
Photo Credit: Melynda Wilcox/George Mason Elementary School PTA