Fairfax County Bicycle Master Plan

May 2014

COUNTY OF FAIRFAX 1742 VIRGINIA

bikefairfax bikesafe.bikesmart.

Toole Design Group

CAMBRIDGE SYSTEMATICS

Fairfax County Bicycle Master Plan

prepared for

Fairfax County Department of Transportation

with support from

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Acknowledgments

The Fairfax Bicycle Master Plan was prepared by the Fairfax County Department of Transportation. Guidance and support for the development of this Plan was also provided by a Bicycle Advisory Committee and several stakeholder groups. This Bicycle Advisory Committee provided guidance for both phases of this project: Phase 1: Greater Tysons Corner Area Bicycle Master Plan and Phase II: Fairfax County Bicycle Master Plan.

Bicycle Advisory Committee

Sharon Baum, Town of Vienna

Peter Christenson, Fairfax County Trails and Sidewalks Committee

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Brett Coffee, Springfield District

Michael Coyle, Sully District

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Mark Thomas, County Chairman Sharon Bulova

Bruce Wright, FABB

Jeff Palmer, Spokes Etc.

Erik Backus, George Mason University

Dennis Frew, Citizen Representative

Focus Groups

Five focus groups were conducted to gather input and provide guidance on policy matters. Representation of the agencies and organizations involved in the focus group is listed below.

Bicycling and Economic Development

American Diabetes Association, ADA Tour de Cure

Fairfax Advocates for Better Bicycling

Fairfax County Chamber of Commerce

Paul's Ride for Life

Virginia Department of Transportation

School Transportation

Fairfax Advocates for Better Bicycling

Fairfax County Public Schools

George Mason University

Kilmer Middle School

Vienna Elementary School

Wolf Trap Elementary School

Public Health and Biking

Department of Neighborhood and Community Services

Fairfax Advocates for Better Bicycling

Fairfax County Executive Office

Northern Virginia Health Kids Coalition, Inova Health System

Northern Virginia Regional Commission

Trails for Youth

Bicycling Safety Education

Fairfax Advocates for Better Bicycling

Fairfax County Public Schools

Fairfax Police Department, Operational Support Bureau Traffic Division/Traffic Safety

George Mason University

Graham Road School

Inova Health System

Spokes Etc.

Wolf Trap Elementary School

Law Enforcement

Fairfax Advocates for Better Bicycling

Fairfax Police Department, Operational Support Bureau Traffic Division/Traffic Safety

George Mason University Police Department

Northern Virginia Regional Commission

Virginia Department of Transportation

Virginia State Police

Stakeholder Interviews

Two technical stakeholder interviews were conducted to gain insights and inform the development of the recommendations included in this Plan. The participants in these interviews are listed below.

Fairfax Park Authority

Elizabeth Cronauer

Sandra Stallman

Virginia Department of Transportation

Randy Dittberner, P.E., PTOE

Fatemeh Allahdoust

Rob Wilson

Khalil Askaryar

Dic Burke

Tom Folse

Mary Lou Pagano

Municipalities

Within the County there are cities and towns with councils, administrations, and in some cases independent planning authorities. Implementing the Bicycle Master Plan will involve coordination with these entities to improve connectivity and expand the bicycle network. To discuss challenges and opportunities, meetings were held with city and town administrators and staff. Participating agencies and departments are listed below.

Town of Clifton

Town Planning Commission

Town of Herndon

Community Development

Public Works

Town of Vienna

Planning and Zoning

Public Works

City of Fairfax

Community Development and Planning

Public Works, Transportation Division

City of Falls Church

Development Services

Table of Contents

Acknowledgments ..... **i**

Executive Summary **1**
- Introduction 1
- Fairfax County Bicycle Master Plan Vision and Goals 2
- Bicycling Conditions 3
- The Bikeway Network 3
- Bicycle Policy Recommendations 3
- Bicycle Program Recommendations 5
- Implementation 5

1.0 Introduction **7**
- 1.1 Overview of the Plan 7
- 1.2 Project Background and Context 7
  - Framework for the Plan 8
  - Phase I: Tysons 9
  - Phase II: Countywide 10
- 1.3 Benefits of Bicycling 11
- 1.4 Vision, Goals, and Objectives 13
  - The Vision 13
  - The Goals 13
  - The Objectives 14
- 1.5 The Planning Process 14
  - Plan Review 14
  - Field Data Collection and Data Analysis 15
  - Public Outreach 15
  - Stakeholder Involvement 15
  - Outreach for Phase I: Tysons 16

2.0 Bicycling Conditions **17**
- 2.1 The Bicycling Experience 17
- 2.2 Who is Involved in Bicycling 17
- 2.3 Physical Conditions 18
  - Landscape and Development Patterns 18
  - General Roadway Characteristics and On-Road Facilities 19
  - Trail Characteristics and Facilities 20
  - Barriers to Bicycle Travel 21

3.0 The Recommended Bikeway Network 23
3.1 Planning the Bikeway Network 23
Planning at Bicycle Trip Scale 23
Criteria for Creating a Network 24
3.2 Classifications for Bicycle Facility Recommendations 26
Bicycle Lanes 27
Buffered Bike Lanes 27
Shared-Lane Markings 28
Climbing Lanes 28
Striped Paved Shoulders 29
Shared Roadways 29
Shared Roadways with Safety Treatments 30
Shared-Use Paths 31
Cycle Tracks 32
Grade Separation 32
Bicycle Links 33
Trail Access Improvements 33
Transit Station Improvements 34
Interchange Improvements 35
Intersection Improvements 36
3.3 Policy Roads 37
3.4 The Recommended Bikeway Network Maps 40
3.5 Bicycle Facility Summary Table 51

4.0 Bicycle Policy Recommendations 53
4.1 Principles 53
4.2 On-Road Facility Selection and Design 54
Recommendations 55
4.3 Intersection and Interchange Policy Recommendations 56
4.4 New Facilities and Accommodations 59
Shared Roadways with Safety Treatment 59
Recommendations 60
Cycle Tracks 60
Recommendations 61
4.5 Transportation Trails 61
Policy, Facility Design, and Program Recommendations 63

5.0 Bicycle Program Recommendations 65
5.1 Develop An Encouragement Program – "Bike Fairfax" 65
Potential Structure of Bike Fairfax 66
5.2 Bicycle Safety Education 67
Recommendations 68
Additional Education Initiatives to Consider 69
5.3 School Transportation 69
Transportation Challenges 70
Recommendations 72
Additional School Transportation Recommendations for Consideration 72
5.4 Law Enforcement 73
Recommendations 75
Background Information 75
5.5 Maintenance of Facilities 77
Recommendations 78

6.0 Implementation 79
6.1 Strengthen the FCDOT Bicycle Program 79
Recommendations 80
6.2 Bicycle Facility Implementation Policy 81
6.3 Interagency and Interjurisdictional Coordination 82
Recommendations 83
6.4 Funding 84
Recommendations 86
6.5 Performance Measures 87

List of Tables

Table 3.1 Facility Selection and Design Table for Policy Roads 38
Table 3.2 Bicycle Facility Summary Table 51
Table 5.1 Fairfax County – Bicycle Crash Data Example 67
Table 5.2 Law Enforcement Issues Summary 74

List of Figures

Figure 1: Bicycle lane concept 27
Figure 2: Buffered bike lane concept 27
Figure 3: Shared lane marking concepts 28
Figure 4: Climbing lane concept 28
Figure 5: Striped paved shoulders concept 29
Figure 6: Shared roadways concept 29
Figure 7: Shared roadways with safety treatment concepts 30
Figure 8: Two concepts for shared-use pathways 31
Figure 9: Cycle track concept 32
Figure 10: Grade separation concept 33
Figure 11: Grade-separated rendering 33
Figure 12: Bicycle link concept 33
Figure 13: Rolling tray rendering 33
Figure 14: Trail crossing concept 34
Figure 15: Rendering of covered bicycle parking at a transit station 34
Figure 16: Rendering of bicycle lockers at a transit station 35
Figure 17: Concept drawings for bicycle facility improvements at interchanges 36
Figure 18: Concept of intersection improvement 36
Figure 19: Bikeway Network Map – Braddock District 41
Figure 20: Bikeway Network Map – Dranesville District 42
Figure 21: Bikeway Network Map – Hunter Mill District 43
Figure 22: Bikeway Network Map – Lee District 44
Figure 23: Bikeway Network Map – Mason District 45
Figure 24: Bikeway Network Map – Mount Vernon District 46
Figure 25: Bikeway Network Map – Providence District 47
Figure 26: Bikeway Network Map – Springfield District 48
Figure 27: Bikeway Network Map – Sully District 49
Figure 28: Bikeway Network Map – Tysons 50

Executive Summary

Executive Summary

Introduction

The Fairfax County Bicycle Master Plan (the Master Plan) is a planning initiative of the Fairfax County Department of Transportation (FCDOT). The Master Plan was developed through a two-part bicycle transportation planning process initiated by the FCDOT's Bicycle Program staff. Part One focused on bicycle transportation issues in Tysons. Part Two addressed the full County. The reason for structuring the planning process in two parts was to ensure that bicycle transportation planning for Tysons could be integrated in to the Tysons Urban Center Comprehensive Plan Amendment (2010).

The Fairfax County Bicycle Master Plan supports the 2011 Transportation Policy Plan, and Board of Supervisors' goal, which states, in part:

> *"A keystone policy for future planning and facilities includes achievement of a multimodal transportation system to reduce excessive reliance upon the automobile. Regional and local efforts will focus on planning and developing a variety of transportation options. Sidewalks, trails, and on-road bicycle routes should be developed as alternate transportation facilities leading to mass transit, high-density areas, public facilities, and employment areas."*

The purpose of the Fairfax County Bicycle Master Plan is to provide policies, programs, and physical facility recommendations that support the associated comprehensive plan amendments (see below) and can serve as a guide for county leadership, planning and engineering practitioners, bicycling advocates, and all citizens of Fairfax County. Project components developed as part of the Bicycle Master Plan process include the following:

- **Comprehensive Plan Amendments,** including: a) updated language for the County Transportation Policy Plan; b) minor changes to the Countywide Trails Plan map (2002); c) changes to *Appendix 3: Bicycle and Trail Classification and Definitions*; and d) a new *Appendix 5: Bicycle Master Plan Overview*.
- **The Fairfax County Recommended Bikeway Network Map** covers the entire county and is referred to throughout the Master Plan as the *Bicycle Network Map*. This map provides the long-term vision for a connected network of bikeways and will guide the selection of bicycle facilities as a part of ongoing and future road improvement projects and private developments.
- **The Master Plan** narrative includes a detailed discussion of the recommended Bikeway Network, and a set of policy, programmatic, and implementation recommendations.

The following pages highlight key elements of each chapter in the Fairfax County Bicycle Master Plan:

Fairfax County Bicycle Master Plan Vision and Goals

The Master Plan articulates the vision, goals and objectives for bicycling in Fairfax County. The vision for bicycling in Fairfax County is:

> *Meeting the safety, access, and mobility needs of bicyclists today, while encouraging more people to bicycle in the future…making Fairfax County bicycle friendly and bicycle safe.*

In order to attain this vision, the Master Plan includes the following goals:

1. Develop a safe and connected network of on-road and off-road (shared-use paths and trails) bicycle route options, and other supporting infrastructure, that serve all communities and destinations. This network will consist of shared-use paths, select sidewalks, park trails, neighborhood streets, and collector, arterial, and primary roadways as well as signed routes, bicycle parking facilities, and integration with public transit.
2. Plan, develop, design, construct, and maintain new facilities and accommodations, and upgrade existing facilities to safely and comfortably serve all bicyclists from 8 to 80+ years of age when cycling for transportation or recreation purposes.
3. Increase bicycle use for transportation, especially for non-commute trips, which account for approximate 75 percent of all transportation trips.
4. Establish and track annual progress towards goals for bicycle travel demand and provision of bicycling infrastructure as identified in the Plan.
5. Increase actual bicycling safety and the perception of safety for bicycling on roads and trails in Fairfax County.

The goals are supported by 11 related objectives, as described in Section 1.3: Vision, Goals, and Objectives of the Plan.

The planning process included public involvement, engagement with the offices of County Supervisors, coordination with agency staff and other stakeholders, review of existing plans and field investigation, and compiling of geographic-based data.

Broad public outreach was conducted as part of plan development. The outreach included: a series of eight public meetings in different areas of the County in fall 2011 through spring 2012, a pre-workshop planning meeting held in each of the eight outreach areas involving Supervisor staff and Supervisor District representatives on the Trails and Sidewalks Committee, and two countywide public meetings held in spring 2012. Stakeholder involvement also included: regular meetings with a Bicycle Advisory Committee (BAC) formed specifically for the Master Plan development process; a series of focus group meetings covering economic impacts, biking and health, bike safety education, school transportation, and law enforcement issues; and technical outreach meetings with key stakeholders, including the Virginia Department of Transportation (VDOT) and the Fairfax County Park Authority. For the Tysons Plan (Phase I), a Tysons-specific outreach plan accompanied the planning process.

Bicycling Conditions

Since the turn of the century the County has seen an increase in bicycling activity on county trails, sidewalks, and roads; and residents are bicycling more for both recreation and transportation.[1] The County has many qualities that make it a great place for bicycling, but there are substantial challenges as well. There is great potential for improving and expanding bicycling facilities, optimizing the project programming and implementation process, and enhancing the overall environment for cycling. Physical conditions have a pronounced effect on an individual's choices about where and when to ride. Throughout the planning process, physical conditions were evaluated and considered from four perspectives, including: landscape and development patterns; roadway conditions; trail conditions; and barriers to bicycle travel. These conditions ultimately informed the recommended Bikeway Network, and the policy and program recommendations.

The Recommended Bikeway Network

The Bikeway Network includes both existing bikeways (more than 350 miles) and proposed bicycling improvements (more than 1,100 miles). Recommended facilities include bicycle lanes and other on-road bicycle facilities and treatments, shared use paths, cycle tracks, bicycle/pedestrian bridges and underpasses, intersection improvements, trail access improvements, and other accommodations that will make bicycling a more realistic option throughout the County, and will serve the needs of current and potential future cyclists. It is anticipated that the network will be completed over a period of several years.

Specific facility types are recommended for specific roadway segments (as indicated on the Bicycle network Map). These recommendations are a direct response to existing conditions and user needs. They also are based on national standards and guidelines, VDOT standards and policies, proven best practices, and the experiences of other jurisdictions in the Washington DC region and around the country.

Bicycle Policy Recommendations

The Master Plan proposes a Bicycle Facility Development Policy that is organized into the following categories: principles, on-road facility selection and design, intersection and interchange policy recommendations, new facilities and accommodations, and transportation trails. Brief summaries of the policy topics are included with a selection of key recommendations. Full descriptions of the topics and all recommendations are included in Chapter 4 of the Master Plan.

Principles - The Master Plan includes a set of seven principles that will help govern the decision making process with regard to implementing Bicycle Network improvements and help ensure that each incremental project is viewed as a contributor to the overall

[1] Bicycling mode share for work commute trips has increased from 0.1 percent (Census 2000) to 0.3 percent (Census 2010).

goal of improving bicycling conditions for bicycle travel in Fairfax County. Key principles include the following:

- The bicycle facility recommendations shown on the Bikeway Network Maps typically represent the facility type that should be installed if action to improve bicycling conditions is to be taken within a five year period from plan adoption.
- Evaluate every roadway development project and land development proffer for its contribution toward achieving the goal of creating a connected network that is safe and functional for bicyclists from ages 8 to 80+.
- While flexibility is needed in bikeway design, flexibility should not be used by developers or transportation agencies for the purposes of providing "lowest cost" facilities at the expense of cyclist safety and comfort and/or network continuity and connectivity.

On-Road Facility Selection and Design – The Master Plan offers general principles governing on-road facility selection and design. Key recommendations include the following:

- In general, bicycle accommodation with some type of striping or markings (i.e., bike lanes, striped/paved shoulders, or shared lane markings in wide outside lanes) are preferred over unmarked wide outside lanes.
- When sections of primary arterial roads are resurfaced or reconstructed in revitalization areas, and other areas seeking a traditional main street or urban downtown setting, they should be retrofitted with bicycle facility striping or pavement markings appropriate to the context.

Intersection and Interchange Policy Recommendations – Improving bicyclists' safety and providing accommodations at intersections and interchanges is critical for the County to reach its goals for increased levels of bicycling. The recommendations in this section are also intended to improve safety for motorists. A selection of recommendations from this section includes:

- VDOT should implement bicycle detection (or bicyclist accessible actuation) at all signalized intersections in the designated Bikeway Network, unless they provide green time for each leg on a routine traffic signal cycle (to ensure that bicyclists are able to get a green signal to cross major roadways).
- VDOT should coordinate with the NVRPA and Fairfax Park Authority to ensure clear, consistent and effective safety treatments at signalized and unsignalized mid-block trail/roadway crossings along the W&OD and other major trails.

New Facilities and Accommodations – The network of bicycle facilities recommended in this Master Plan is composed primarily of treatments found the AASHTO Guide for the Development of Bicycle Facilities and VDOT's design guidelines and policies; however, there are two treatments recommended in the Master Plan for a variety of locations that are not yet included in the AASHTO or VDOT guidance, but are being implemented in locations around the Washington, DC region and the country. They are shared roadways with safety treatment and cycle tracks. Additional information on the design and recommended application of all bicycle treatments is included in Chapter 4.

Transportation Trails – Fairfax County's trail and off-road network has over 1,000 miles of multi-modal pathways; however many cyclists seeking to travel for transportation purposes avoid using some or all of the trails along their route due to lack of continuity and connectivity, unsafe path conditions and/or trail conditions that dictate significant speed reductions. To address this issue, the Master Plan identifies a select set of trails, both existing and proposed, for inclusion in the Bicycle Network as Transportation Trails. This designation will enable the county to begin prioritizing existing trails for maintenance and capital improvements and investments in new trails that will serve both transportation and recreation needs. A selection of recommendations from this section is listed below:

- Where sidepaths (a shared use path adjacent to a roadway) are provided along roads where *there are no on-street facilities*, they should be provided on both sides of the street.
- As funding is made available, Transportation Trails should be considered a priority for upgrades, treatments, and management policies that will increase their safety and functionality for transportation use.

Bicycle Program Recommendations

The Master Plan establishes program recommendations that fall into five program categories, including: Develop an Encouragement Program; Bicycle Safety Education; School Transportation; Law Enforcement; and Maintenance. These recommendations are included in Chapter 5 of the Plan.

Implementation

Two topic areas are identified as essential to Master Plan implementation, which are summarized below. As part of the Master Plan, Fairfax County has set aggressive yet achievable targets for Master Plan implementation and overall performance for the ten year period 2015-2024. A summary of each section within Chapter 6 is included below with a selection of key recommendations.

Bicycle Program – Since the early 2000s, the FCDOT has increased its emphasis on bicycling, walking and access to transit by providing staff to address infrastructure and other needs in these areas. To strengthen the FCDOT bicycle program to support implementation of the Master Plan, four key issues should be addressed: staffing, funding, public participation, and division of labor. Several actions are recommended, over a period of five years, to support Master Plan goals, including:

- Continue to expand the number of full-time employees staffing the Bicycle Program.
- Allocate an annual budget dedicated to bicycle planning and programming initiatives, and small scale capital projects.
- Establish a permanent Countywide Bicycle Advisory Committee that reports to the Board of Supervisors through the Transportation Advisory Commission.
- Establish a bike parking installation program.

Bicycle Facility Implementation Policy – The VDOT State Bicycle Policy Plan (adopted 2011) addresses a wide range of bicycle transportation and roadway design issues.

During the planning process the consultant team conducted a series of meetings with VDOT staff to better understand these existing policies and practices and VDOT staff attended every BAC meeting and public workshop. As a result the Plan includes a set of recommendations for modifications to current VDOT policy and practice that are consistent with the recommendations made in the new State Bicycle Policy Plan. A selection of recommendations from this section is included below:

- As a part of every resurfacing project, VDOT and Fairfax County should consult the Bikeway Network Plan for potential upgrades to bicycling conditions.
- Fairfax County will identify and prioritize stand-alone shoulder paving projects to be undertaken primarily for bikeway improvements; VDOT should consider paving such shoulders independent of repaving the entire street.
- At select locations identified in the plan, to enable use of the Shared Lane Marking, VDOT will conduct studies necessary to consider speed limit reductions to 30 or 35 mph.

Coordination – The Master Plan discusses how coordination is needed regarding the Bikeway Network development and makes recommendations to achieve these ends.

- Within and between FCDOT and VDOT, improved coordination is needed between capital project managers, right-of-way staff, road designers, traffic engineers, pedestrian and bicycle facility planners, resurfacing program managers and roadway maintenance staff, to ensure that the safety and travel needs of bicyclists are met in all aspects of the project development and implementation process, as well as the ongoing maintenance of public transportation infrastructure.
- To ensure network continuity, FCDOT should coordinate bicycle facilities, street design, signed bike routes and other bicycle transportation related activities with the other political jurisdictions within and surrounding Fairfax County.

1 Introduction

1.0 Introduction

1.1 OVERVIEW OF THE PLAN

The Master Plan is organized into six chapters. Following the introduction and background explained in Chapter 1, Chapter 2 provides an overview of the context for the planning effort, briefly describing existing conditions and identifying barriers to bicycle travel in Fairfax County.

Chapter 3 introduces the Bikeway Network with sections on the planning approach and criteria for developing network recommendations. Each of the facilities recommended in the Bikeway Network is presented with a definition and a brief description on its contribution to the Network. The chapter includes the Bicycle Network Map and a summary of facilities organized by supervisor district.

Subarea public meeting
Source: Toole Design Group

During the planning process several policy briefs were developed to address topics related to bicycle transportation policy, programming and implementation. Each policy brief defines the topic, includes a brief summary of the relevant issues and concludes with recommendations. The policy briefs were adapted into the content presented in Chapters 4, 5, 6:

- Chapter 4 includes the policy briefs that comprise bicycle transportation policy recommendations for the county.
- Chapter 5 includes policy briefs that comprise recommendations for the bicycle program.
- Chapter 6 addresses implementation of the bicycle program.

1.2 PROJECT BACKGROUND AND CONTEXT

The Fairfax County Bicycle Master Plan is a planning initiative of Fairfax County and is managed by the FCDOT Bicycle Program staff of the Fairfax County Department of Transportation (FCDOT).

In 2006, the Fairfax County Board of Supervisors approved the comprehensive bicycle initiative, a program committed to making Fairfax County bicycle friendly. The four primary components of this initiative include:

a) Creating a county bicycle route map (as of March 2014 three editions have been published);

b) Establishing a full-time staff position devoted to bicycle facility coordination, planning, and implementation;

c) Examining roads and streets that may accommodate on-road bike lanes with minimal reconstruction; and

d) Establishing a pilot program for an interconnected bicycling network.

FCDOT believed that the best way to undertake components c) and d) above was to create a comprehensive, countywide bicycle transportation master plan. Development of the Fairfax County Bicycle Master Plan began in 2010.

Framework for the Plan

The Fairfax County Bicycle Master Plan was designed to address bicycling as a means of transportation throughout the County; for access to bus and rail transit, for commuting to work and school, and for daily transportation needs. It also addresses recreational bicycling to the extent that it takes place on roads and trails that also are used for bicycle transportation. The Master Plan addresses the five Es of bicycling: Engineering, Education, Encouragement, Enforcement, and Evaluation.

The scope of the Master Plan includes consideration of both on-road and off-road bicycling facilities and accommodations. In Fairfax County, bicyclists are legally allowed to ride on all roads except limited-access highways, whether or not the road has a designated bicycle facility. Bicyclists also are permitted to ride on sidewalks.

The Transportation section of the Fairfax County Comprehensive Plan acknowledges that the design and function of a transportation system has the ability to influence growth patterns and lead to more efficient land use in the County. The Comprehensive Plan also states: "roadway improvements cannot be relied upon to provide unlimited transportation capacity for the future, measures to bring about less demand for roadway capacity should be a focus of the County's Comprehensive Plan. It will be impossible to meet travel demand solely by roadways."

The 2013 Fairfax County Transportation Policy Plan, a component of the County Comprehensive Plan, identifies 13 objectives and supporting policies that provide the framework for the future development of the County's transportation system in the face of changing community characteristics and continued population and employment growth. The Fairfax County Bicycle Master Plan supports the 2011 Transportation Policy Plan, and Board of Supervisors' goal, which states, in part:

> *A keystone policy for future planning and facilities includes achievement of a multimodal transportation system to reduce excessive reliance upon the automobile. Regional and local efforts will focus on planning and developing a variety of transportation options. Sidewalks, trails, and on-road bicycle routes should be developed as alternate transportation facilities leading to mass transit, high-density areas, public facilities, and employment areas.*

The purpose of the Master Plan is to provide policies, programs, and physical facility recommendations to aid in the implementation of Comprehensive Plan Amendment PA 2013-CW-T2, as may be adopted by the Board of Supervisors, and serve as a guide for county leadership, planning and engineering practitioners, bicycling advocates, and all citizens of Fairfax County. When implemented, the investments in bicycling infrastructure and programs will make Fairfax County more livable and can help the County and its residents achieve the many benefits of bicycling.

Bicycles parked at Springfield Metro Station
Source: Toole Design Group.

Development of the Master Plan was divided into two distinct steps: Phase I being a bicycle planning effort undertaken for Tysons; and Phase II being a planning effort that addressed bicycling countywide.

Phase I: Tysons

Phase 1 focused solely on the greater Tysons area because of the need for a Tysons Bicycle Plan due to the adoption of the Tysons Urban Center Comprehensive Plan Amendment in 2010, the Silver Line (Metrorail extension), and the numerous rezoning applications.

The Phase I: Greater Tysons Corner Bicycle Master Plan[2] was completed in April 2011 and published as a separate document. This document has been adapted and integrated as part of this Master Plan and is available as a stand-alone reference.[3]

The Phase I document provides detailed bicycle facility, policy, and program recommendations. The goal of the plan is to identify opportunities for integrating bicycling for transportation into redevelopment activities and roadway and trail development initiatives. Enabling bicycling as a transportation choice in Tysons will support transit use and help make greater development densities possible without leading to significantly more traffic congestion. Supporting bicycling as a convenient way to access the new Metrorail stations also will help the Fairfax community maximize its return on investment in the Silver Line. These four new Metrorail stations provide either no or minimal vehicle parking, further supporting both bicycling and walking as viable transportation choices.

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[2] During the planning process this area was known as Tysons Corner. As of 2014 it has become more commonly known as Tysons.

[3] The Greater Tysons Corner Area Bicycle Master Plan can be found online here: http://www.fairfaxcounty.gov/fcdot/bike/tysonsbikeplan/tysons_final_bike_master_plan.htm.

Phase II: Countywide

The Fairfax County Bicycle Master Plan provides a strategic and multidimensional approach for making bicycle travel a viable transportation alternative for County residents and visitors. It addresses the same bicycling issues taken up in the Tysons phase on a countywide scale.

This Master Plan provides detailed bicycle infrastructure recommendations and describes how bicycle planning and design can be integrated into all transportation improvements and private-sector developments. It identifies and prioritizes both on- and off-road bicycle facilities and provides recommendations for bike parking and other support facilities. The Master Plan provides detailed policy and program recommendations that address bicycle safety education, enforcement, and encouragement programs, as well as linkages to public health, economic development, and school transportation. It includes planning and implementation recommendations that address stakeholder and agency coordination. In short, it will foster a culture of bicycle acceptance and use that is widespread.

Project components developed as part of the Fairfax County Bicycle Master Plan process include the following:

- **Comprehensive Plan Amendment PA 2013-CW-T2** including: a) updated language for the Transportation element of the Policy Plan volume of the Comprehensive Plan, 2013 Edition, Amended through 3-4-2014; b) revisions to the Countywide Trails Plan map (2002) to eliminate bicycle route recommendations that are shown on the Fairfax County Bikeway Network Maps; c) revision of the Transportation element of the Policy Plan volume of the Comprehensive Plan, 2013 Edition, Amended through 3-4-2014 *Appendix 3: Trail Classification to include Bicycle Classifications and Definitions*, and d) addition of a new *Appendix 5: Bicycle Master Plan Overview*.
- **The Fairfax County Recommended Bikeway Network Map**. This map covers the entire county and is referred to throughout the Master Plan as the Bicycle network Map. The map provides the long term vision for a connected network of bikeways and will guide the selection of bicycle facilities as a part of ongoing and future road improvement projects and private developments.
- The Master Plan narrative which includes a detailed discussion of the recommended Bikeway Network, and a set of policy, programmatic and implementation recommendations which are organized by topic.
- The **Fairfax County Bicycle Master Plan Phase 1: Greater Tysons Corner Area**. The document created during phase one of the planning process is considered a supportive and complementary document to the Master Plan. The Quadrant Maps in the Master Plan includes facility recommendations made in the Tysons Plan.
-

1.3 BENEFITS OF BICYCLING

Bicycle transportation will be an integral element of Fairfax County's future mobility, economic development, public health and environmental sustainability. Walkability and bikeability are important in attracting employers, employees and new residents. An investment in bicycling is an investment in safety, public health, a clean environment, quality of life and economic development that positively impacts all residents, bicyclists and non-bicyclists alike.

Benefits are organized below by theme: safety, congestion reduction, improved air quality and reduced energy consumption, reduced transportation costs, expanded transportation choice, recreational opportunities for enjoyment and health, improved economic competitiveness, and the encouragement and facilitation of mixed-use Transit Oriented Development (TOD).

Enhancing safety for all County residents: Improving the safety of current and future bicyclists in Fairfax County is a fundamental and core element of the Fairfax County Bicycle Master Plan. Safe, clear and consistent accommodations for cyclists enhance safety for all road users, for example, by reducing speeding, delineating roadway space, and encouraging safe interactions between all modes. Physical improvements to roadways including on-road bicycle facilities, bicycle detectable traffic signals, improved and expanded bicycle parking, improved signage combined with education, encouragement and outreach will support and reinforce bicycling as a viable transportation mode. Research undertaken by the Alliance for Biking and Walking shows that areas with more bicycling trips per capita have a lower frequency of bicycle/motor vehicle crashes[4]. As bicyclists are encountered more frequently on roadways, motorists become more accustomed to sharing the road with them.

Addressing transportation congestion: In Fairfax County, approximately one-third of all daily trips are less than three miles in length, a distance easily covered by bicycle in 15 to 20 minutes. Most of these trips are made by automobile, in part due to a lack of safe walking and bicycling facilities. Improved bicycling conditions can play a role in mitigating automobile traffic congestion by providing residents with the option to travel by bicycle. There is little difference in the time it takes to make a short trip by bicycle or by car. Improvements to the on-road bikeway network also have the potential to alleviate bicycle congestion along major shared use paths such as the Washington and Old Dominion Trail (W&OD) and Mount Vernon Trail.

Improving air quality and reducing energy consumption: Increased levels of bicycling can play an important role in reducing fuel consumption, air pollution and carbon emissions. By substituting a bicycling trip for some of these short auto trips, for example to the nearby grocery store, the library, or workplace, residents can reduce the amount of pollutants generated by automobiles. Short trips can have high levels of per-mile

[4] *Bicycling and Walking in the United States Benchmarking Report 2010*. Washington, D.C.: Alliance for Bicycling and Walking, 2010. Print.

emissions, as research shows that an estimated 60 percent of the pollution created by automobile emissions is emitted in the first few minutes of operation.

During summer months, Fairfax County has experienced days where the health-based Clean Air Act standard for ozone has been exceeded. Drivers in densely developed areas tend to experience more congestion, operate at low speeds, and experience extended periods of idling, all of which contribute to inefficient operating conditions for motor vehicles.

Reducing transportation costs: Bicycling offers a lower-cost transportation option, which is particularly important in a time when fuel costs are highly variable. The cost of owning and operating a bicycle for transportation is estimated to be less than four percent of the average cost of car ownership and use. Every motor vehicle mile shifted to bicycle results in a significant cost saving for the individual, which can make a big difference given increasingly tight household budgets.

In 2007, all Fairfax Connector Buses were equipped with front mount bike racks

Source: FCDOT

Providing transportation options: Improving bicycle conditions in Fairfax County will expand transportation choices for the entire community. It will allow those with cars to opt to travel by bike if they so choose, as well as to provide another option for those without access to automobiles. Many people in Fairfax County are dependent on nonauto modes of travel, including children, students, low-income households, people with disabilities, and people who cannot drive for health reasons.

Expanding recreational opportunities for enjoyment and health: The most recent Needs Assessment Study conducted by the Fairfax County Park Authority found that 65 percent of the respondents use trails. Creating a countywide network of bikeways will increase the opportunities for close-to-home and affordable recreation opportunities for people of all ages, and enhance access to the County's many public parks, trails, and other recreational venues. These include the W&OD Trail, Mount Vernon trail, Cross-County Trail, and mountain bike parks at Lake Fairfax, Laurel Hill, Wakefield, and Fountainhead Regional Park. Recreational bicycling also fulfills residents' needs for improving and maintaining their health through routine exercise. The Center for Disease Control and Prevention recommends 30 minutes of moderate physical activity daily. Expanded and improved bicycle facilities and associated support programs will encourage and promote bicycling as transportation, recreation, and exercise.

Improving economic competitiveness: The Fairfax County economy is largely based on companies and government agencies that provide knowledge or information-based services. These firms compete globally for highly educated and skilled workers, who make quality of life a critical criterion when deciding where to live and work. As a result, firms deciding where to locate or expand their activities are increasingly concerned about the lifestyle and amenities that their locale can offer. The transportation and recreational options that a robust bikeway network provides can

enhance the attractiveness of Fairfax County, and subsequently increase competitiveness, for these highly mobile firms and their employees.

Encouraging and facilitating mixed-use transit-oriented development (TOD): Investing in bicycle infrastructure and programs will enable Fairfax County to capitalize on its investments in mixed-use transit oriented development. For example, a cohesive and integrated network of on- and off-road bikeways throughout Tysons will enable residents living three miles or less away to access the new Silver Line stations without having to drive to and park at the station. This can increase ridership at the station, while obviating the need to build structured parking garages, Kiss N' Ride lots, and other costly automobile-oriented infrastructure around stations. Over time, shifting the way that people access the stations will influence road designs that in turn will encourage more people to bike, walk and use transit; thereby completing a positively reinforcing cycle.

1.4 VISION, GOALS, AND OBJECTIVES

In the fall of 2011, Fairfax County Department of Transportation Bicycle Program staff and the Bicycle Advisory Committee were charged with developing a vision to provide a concise statement of objectives, policies, and guidelines for implementing the County's goals for improving bicycling as a transportation option as they relate to the future development pattern of the built environment in Fairfax County.

The Vision

The vision statement for bicycling in Fairfax County is:

> *Meeting the safety, access, and mobility needs of bicyclists today, while encouraging more people to bicycle in the future…making Fairfax County bicycle friendly and bicycle safe.*

The Goals

In order to attain this vision, the following goals are established:

1. Develop a safe and connected network of on-road and off-road bicycle route options (shared-use paths and trails), and other supporting infrastructure, that serve all communities and destinations. This network will consist of shared-use paths, select sidewalks, park trails, neighborhood streets, and collector, arterial and primary roadways as well as signed routes, bicycle parking facilities and integration with public transit.
2. Plan, develop, design, construct, and maintain new facilities and accommodations, and upgrade existing facilities, to safely and comfortably serve all bicyclists from 8 to 80+ years of age when cycling for transportation or recreation purposes.
3. Increase bicycle use for transportation, especially for non-commute trips, which account for approximate 75 percent of all trips.
4. Establish and track annual progress towards goals for bicycle travel demand and provision of bicycling infrastructure as identified in the Fairfax County Bicycle Master Plan.

5. Increase actual bicycling safety and the perception of safety for bicycling on roads and trails in Fairfax County.

The Objectives

The goals are supported by the following objectives:

1. Improve safety for bicyclists and transportation system users.
2. Make bicycle travel a viable transportation choice expanding the numbers and variety of people bicycling for transportation.
3. Convert short (less than three miles) single-occupancy vehicle trips to bicycle trips.
4. Enhance bicycle access and connectivity countywide and to neighboring jurisdictions in the Washington metropolitan region.
5. Encourage healthy lifestyles and physical activity through regular bicycle use for transportation and recreation.
6. Ensure that all elements of bicycling are routinely accommodated in the planning and project development, design, right-of-way, and construction phases.
7. Support congestion mitigation and emission reductions. Increase conservation of energy resources and reduce carbon footprint.
8. Encourage public/private partnerships.
9. Foster widespread acceptance of bicyclists as rightful and respected users of the road and encourage the development of bike culture in Fairfax County.
10. Implement the Fairfax County Bicycle Parking Guidelines in order to insure adequate, safe, and convenient bicycle parking for both public and private buildings/sites.
11. Enhance recreational opportunities and promote bicycle oriented tourism.

1.5 THE PLANNING PROCESS

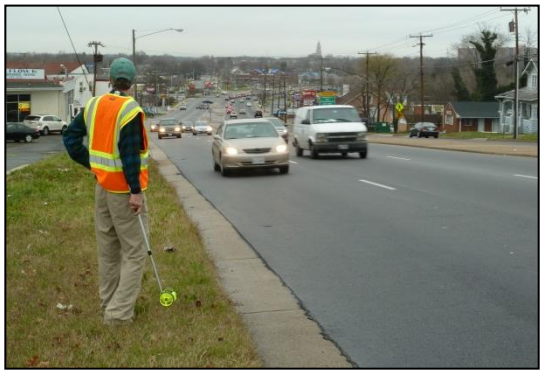
The planning process included a variety of activities including review of existing plans, engagement with the offices of Fairfax County Board of Supervisors, engagement with agency staff and other stakeholders, field investigation, compiling GIS data, and involving the public. A Bicycle Advisory Committee (BAC) was formed specifically for this project and consisted of 26 members including representation from the Chairman of the Board of Supervisor's office, each of the nine supervisory districts within Fairfax County, the Towns of Herndon, Clifton, and Vienna, representation from various departments and agencies, industry representatives, advocacy groups, and citizen representation. This section provides a brief summary of planning activities.

Plan Review

A review of existing plans, policies, maps, as well as visions and goals already established for the County.

Field Data Collection and Data Analysis

An analytical process used to identify recommended improvements that integrated local knowledge with the expertise of professional bicycle transportation planners and engineers who conducted field observations on over 1,000 miles of roadway and trail. Local knowledge was gathered from the project's Bicycle Advisory Committee (BAC), county and Virginia Department of Transportation (VDOT) staff, existing planning documents and maps, the bicycling public, and the general public at special forums and meetings held throughout the County.



Field work conducted on multilane road
Source: Toole Design Group.

Field observations were gathered via automobile (windshield survey), on bicycle, and on foot. Measurements of existing roadway cross-sections were taken in the field as well as using web-based aerial photography. This data was supplemented by roadway data gathered previously, in 2008, for the purposes of creating the County's first comprehensive bicycle route map.

Public Outreach

Extensive public outreach was conducted as part of plan development. This outreach included the following:

- Eight subarea public meetings were held from fall 2011 through spring 2012.
- A pre-workshop planning meeting was held in each of the eight outreach areas involving Supervisor staff and Supervisor District representatives on the Trails and Sidewalks Committee.
- Four countywide public meetings were held: two in spring 2012 and two in summer 2014.

Stakeholder Involvement

In addition to public outreach, thematic meetings were held throughout the planning process focusing on special topics. This included the following:

- A BAC was specifically formed for this project and met throughout the duration of the process.
- A series of focus group meetings were conducted covering the following topics: economic impacts, biking and health, bike safety education, school transportation, and law enforcement issues.
- Technical outreach meetings were held to engage stakeholders such as VDOT and the Fairfax County Park Authority.

Outreach for Phase I: Tysons

Key elements of the Tysons bicycle network planning process included the following:

- A BAC was established for the project to provide additional guidance and ongoing citizen and agency input throughout the development of the Phase I Plan.
- A public meeting was held in September 2010 to present and gather feedback on the draft bicycle network, bicycle access improvements to future Silver Line stations, and corridor and spot improvements. Feedback from a second public meeting held in February 2011, after the draft Phase I Plan was made available to the public also is incorporated into the Master Plan.
- Additional stakeholder input was gathered through one-on-one and small group meetings with a range of stakeholders.
- The project team engaged and gathered input from various committees throughout the development of the Phase I Plan, including the Tysons Metrorail Station Access Management Study (TMSAMS), Fairfax Transportation Advisory Commission (TAC), Fairfax County Trails and Sidewalks Committee, and the Planning Commission's Transportation Committee.
- The project team and members of FABB participated in a bicycle tour of Tysons in October 2010 to supplement its understanding of existing biking conditions and to discuss proposed recommendations.

2 Bicycling Conditions

2.0 Bicycling Conditions

In line with most jurisdictions in the greater Washington, D.C. metropolitan region, during the first decade of the 21st century, Fairfax County has experienced a significant increase in bicycling.[5] Increased bicycling activity is seen on county trails as well as roads and residents are bicycling more for both recreation and transportation.

2.1 THE BICYCLING EXPERIENCE

As with other suburban jurisdictions in Northern Virginia, Fairfax has a number of qualities that make it a great place for bicycling. The County's extensive network of shared-use paths and mountain bike parks are major draws, and trails like the Washington and Old Dominion Rail Trail (W&OD) and Mount Vernon Trail attract hundreds of thousands of cyclists annually. At the same time, the County's Interstates and major highways can make it hard to bicycle from one neighborhood to the next. Six-lane arterials with 45- to 55-mile per hour traffic present a challenge to even the most skilled and confident riders. Nonetheless, public desires to stay healthy and active, drive less, and enjoy the County's neighborhoods and parks are continually motivating more residents and visitors to bicycle more in Fairfax County.

Bike lane on George Mason University campus
Source: Toole Design Group.

2.2 WHO IS INVOLVED IN BICYCLING

In Fairfax County, cycling involves every sector of the community, from children to the elderly, from Mason Neck to Great Falls. People of all incomes, backgrounds, and educational levels are choosing to bicycle, including construction or service industry workers who ride to their jobs; corporate lawyers who commute by bike to Washington, D.C.; and elementary and middle schools students who ride to school in Vienna, Reston, or Burke.

[5] Bicycling mode share for work commute trips has increased from 0.1 percent (Census 2000) to 0.3 percent (Census 2010).

Families, youth, young adults and novice cyclists of every age are attracted to cycling on stream valley trails such as along Cub Run, Sugarland Run, Long Branch, Accotink Creek, Burke Lake, and South Run.

Many employers have bike commuter support groups and offer rides for employees. Mountain bicyclists are active in many parks in Fairfax County, including Wakefield Park (FCPA) and Fountainhead Regional Park (NVRPA). Parks like these attract cyclists from other counties as well as local residents, many of whom choose to access the parks by bike rather than driving.

Fairfax County bicyclists (including those in Fairfax City and Falls Church) support more than 30 bicycle shops, not counting the big box department store retailers. More than six bicycle clubs sponsor regular rides in the County while the annual Tyson Grand Prix bicycle race attracts thousands of riders.

Advocacy for bicycling is led by the Fairfax Advocates for Better Bicycling and the Washington Area Bicyclist Association. The Virginia Bicycling Federation, a coalition of groups and individuals that are active at the state level as well as BikeWalk Virginia have a presence throughout Northern Virginia including Fairfax County. The Mid-Atlantic Outdoor Recreation Enthusiasts (MORE) are the leading mountain bicycling support group active in Fairfax County. Vienna, Reston, Herndon, and Fairfax City all have active bicycling advisory groups that encourage bicycling, organize Bike-to-Work Day events, and advocate for road and trail improvements.

Group ride in Springfield
Source: Fairfax Advocates for Better Bicycling.

2.3 PHYSICAL CONDITIONS

Physical conditions have a great effect on bicycling and largely determine who will ride and where. This section summarizes general bicycling conditions on a countywide level. The general landscape, development patterns, roadway conditions, trail conditions and barriers to bicycle travel are considered. This assessment is based upon field observations, map study by the project team (staff and consultants) and input from the Bicycle Advisory Committee (BAC) and public workshop participants.

Landscape and Development Patterns

Fairfax County straddles the fall line that divides the piedmont region from the coastal plain. As such it is crisscrossed by numerous streams that drain both north and south into the Potomac River. This creates a relatively hilly landscape with only a few areas of

plateaus, ridges, or other highlands that are relatively level. The natural areas (mostly park lands) and older communities are fairly heavily forested. The largest wetland areas include Huntley Meadows, Fort Belvoir, and parts of Mason Neck.

The County is more densely developed on its eastern half where the Fairfax communities of McLean, Annandale, Bailey's Crossroads, Springfield, Franconia and Mount Vernon border Arlington, Falls Church, and Alexandria. Vienna and Herndon are older communities which originally developed along the Washington and Old Dominion Railroad line. Tysons is a largely commercial area offering a high density of office employment in a classic suburban setting bordered on two sides by limited-access highways.

Reston is a 20th century-planned community. Fairfax City is in the middle of the County, but is politically autonomous.

The greater Clifton and Great Falls areas are mostly comprised of low-density residential development. The suburban residential developments around Chantilly, Centerville, Fair Lakes, Burke, and West Springfield are low to medium density, with curvilinear street patterns and many cul-de-sacs. These neighborhoods are dotted with schools, parks, and churches. The Lorton/Laurel Hills area is one of the newest residential neighborhoods in the County.

These neighborhoods are served by a variety of neighborhood, community, and regional retail/commercial centers.

General Roadway Characteristics and On-Road Facilities

Most commercial and retail development, as well as multifamily residential is aligned along the historic cross-county arterials, such as U.S. 1, Braddock Road, U.S. 50, Centerville Road, Little River Turnpike, VA 7, U.S. 29, Old Dominion Drive, Columbia Pike, and VA 123. These roadways carry large volumes of traffic and generally do not have bicycle accommodations along them.

Newer cross-county roadways such as the Fairfax Parkway, Reston Parkway, and southern portions of West Ox Road are designed with access controls, reverse frontage, and limited intersections. Many sections of these roadways have parallel trails along one side.

Most local residential streets are not laid out in a grid and do not connect with the adjacent development. In parts of Herndon, Vienna, and Springfield there is a semblance of a grid, but it is not extensive. Neighborhood-to-neighborhood connectivity is typically dependent upon collector and minor arterial roadways which may or may not be bicycle friendly depending on traffic volumes, right-of-way width, the era in which the roadway was initially built, and the nature of more recent upgrades.

Multilane road with relatively narrow shoulder
Source: Toole Design Group.

As of 2014, roadways (or segments of roadways) with bicycle lanes include the following:

- Dranesville Road north of Herndon;
- Soapstone Drive;
- Lawyers Road;
- Wakefield Chapel Road;
- Westmoreland Street;
- Gallows Road;
- Huntsman Boulevard;
- Lorton Road;
- Telegraph Road;
- Beulah Street;
- Old Chesterbrook Road;
- Old Courthouse Road;
- Courthouse Road;
- River Birch Drive;
- Oak Street;
- Sully Park Circle; and
- Lewinsville Road.

Trail Characteristics and Facilities

Fairfax County has an extensive park trail system that includes paved shared-use paths, crushed stone paths, hiking trails, and mountain bike trails. The Cross-County Trail traverses the entire county from the Potomac River to Mason Neck, and many sections are paved and useful as transportation trails. The W&OD Trail is one of the premier rail trails in the nation, attracting more than 2 million visits a year. The W&OD Trail is heavily used by bicycle commuters due to its connectivity between Herndon and Reston and Arlington and Washington, D.C. Also, the W&OD Trail's level grade and separated crossings of major highways like I-495 make it a popular trail for transportation and recreation.

Bicyclist using fair-weather crossing
Source: Toole Design Group.

The County also has many miles of sidepaths (asphalt shared-use paths built in the right-of-way adjacent to roadways). Many of these sidepaths are too narrow to serve both pedestrians and bicyclists; others are built to meet the absolute minimum width (6 to 8 feet). Only the newest sidepaths, such as along Ox Road in Springfield, are built to 2012 standards for width (10 feet). A fair amount of the sidepath system has deteriorating surfaces due to age and weathering. Roadway crossings are typically not designed for bicycle safety.

This Bicycle Network plan identifies shared use paths that are most important for bicycle transportation and overall network connectivity. These are covered in more detail under Bicycle Policy Recommendations in Chapter 4. These transportation trail recommendations can be used by the county to prioritize investments in trail rehabilitation projects that will serve both transportation and recreational purposes.

Barriers to Bicycle Travel

Barriers to bicycle travel take various forms, including:

- Interstate and state limited-access highways, including I-66, I-495, I-95/I-395, VA 28, and VA 267 (Dulles Toll Road);
- Railroads, including the Norfolk Southern Line to Manassas and the CSX Line to Richmond, due to infrequent crossing locations;
- Major streams and creeks such as Difficult Run, Holmes Run, Cub Run, Pohick Creek, and Accotink Creek, due to steep and heavily forested ravines or large protected wetlands,

Multilane arterial
Source: Toole Design Group.

- Rivers such as the Potomac River on the north and eastern boundaries of the County, the Occoquan River to the south, and Bull Run; and
- Dulles Airport on the west.

In addition to these major barriers, the large arterial roads that crisscross the County (such as VA 7, U.S. 50, and U.S. 29) can create barriers to bicycling because they are both difficult to cross and difficult to travel along.

Barriers to bicycling have a major impact on the viability of bicycle use for daily transportation because, when faced with the options of going far out of one's way to reach an accessible bicycle route or bicycling across multiple six- or eight-lane arterial roads, people may be compelled to drive instead.

Barriers do not have the same impact on recreational bicycle trips because they are discretionary and routes and destinations are somewhat flexible. However, barriers do reduce overall recreational route options and encourage many people to drive to their favorite bicycling areas rather than bicycle there.

Following is a sample of important community linkages for which bicycle travel is limited or precluded:

1. Access to Tysons is severely limited, especially from neighborhoods to the west, north and east.
2. The W&OD Trail has emerged as a vital bicycle transportation link between Herndon and Reston to the west and Vienna, Tysons, Arlington, Alexandria and Washington, DC to the east, because it is the only viable crossing of the Difficult Run.
3. The Burke and West Springfield neighborhoods south of the Norfolk Southern Railroad and west of Accotink Creek are cut off from Fairfax City, central Fairfax County, Orange Line Metro Stations, Annandale and the Franconia-Springfield Metro Station and the surrounding commercial town center.

4. The Mount Vernon area is cut off from the Franconia/Springfield area by Huntley Meadows and Fort Belvoir.
5. The Centreville/Chantilly area is isolated from much of the rest of the county because of barriers created by US 50, I-66 US 29 and Rocky Run.
6. The Fairfax Center Area including Fair Oaks Mall and the County Government Center are in the center of the County, yet hard to access by bicycle from most of the surrounding neighborhoods, including Fairfax City, which is only 1.5 miles away.
7. Annandale, which is inside the Beltway, is largely cut off from the other parts of the county to the west and south; the W&OD Trail being the only good crossing to the west.
8. Vienna and Fairfax City are separated by I-66 and linked only by one circuitous route through a series of parks and residential developments.

Barriers to bicycle travel can be addressed in a variety of ways, including the following:

- Prioritizing improvements along roads that cross limited-access highways at locations where there is not an interchange;
- Improving bicycling conditions and ramp crossings (on-road, off-road, or both) through interchanges;
- Providing grade-separated bicycle and pedestrian crossings (bridges, underpasses, or tunnels) of highways, railroads, streams, and rivers to make crossing safe and direct;
- Improving at-grade crossings of major arterials that are not limited-access;
- Providing wayfinding bike route signs along neighborhood routes that lead to preferred crossing locations or provide other options for circumventing barriers.

It should be noted that progress is being made to address many of these barriers. The FCDOT, the Fairfax County Park Authority, and the Virginia Department of Transportation have begun including both pedestrian and bicycle facilities on new and rehabilitated bridges. New bridges spanning small streams and short extensions of sidewalks and trails that historically have isolated neighborhood from neighborhood are being added countywide in order to eliminate these barriers.

Trail crossing in Centreville
Source: Toole Design Group.

New Wolftrap Road bike-pedestrian bridge connecting neighborhoods
Source: FCDOT

3 The Bikeway Network

3.0 The Recommended Bikeway Network

Chapter 3 discusses how a recommended bicycle route network and set of roadway and trail improvements were identified as part of this planning process. The proposed network includes bikeway facilities, treatments and other infrastructure components that address current bicycling conditions in the county, including barriers to bicycling, development of transportation trails, on-road bikeways and integration with existing and future development patterns and land uses. The planning process resulted in the facility recommendations identified on the Bikeway Network Maps including the criteria used to select streets and trails for inclusion in the Bicycle Network.

A description of the bicycle facilities and treatments included in the Bikeway Network is provided using the Bicycle Facility Design Toolbox developed for the project. It defines each facility type, describes types of conditions where it is most applicable, describes the role it plays in the overall network, and discusses the extent to which it is recommended throughout the county.

3.1 PLANNING THE BIKEWAY NETWORK

The Bicycle Network includes both existing bikeways (353 miles) and proposed bicycling improvements (1,130 miles). Recommended facilities include bicycle lanes, other on-road bicycle facilities, shared-use paths, cycle tracks, bicycle/pedestrian bridges and underpasses, intersection improvements, trail access improvements, and other accommodations that will make bicycling more feasible and safer. The Bikeway Network will make bicycling throughout the County a more realistic option for a wider range of people in meeting their daily travel needs.

As indicated on the Bikeway Network Map, specific facility types are recommended for specific roadway segments. These recommendations are a direct response to existing conditions and user needs. They also are based on national standards and guidelines, Virginia Department of Transportation (VDOT) standards, proven best practices, use of emerging designs and technologies, and the experiences of other jurisdictions in the Washington metropolitan region.

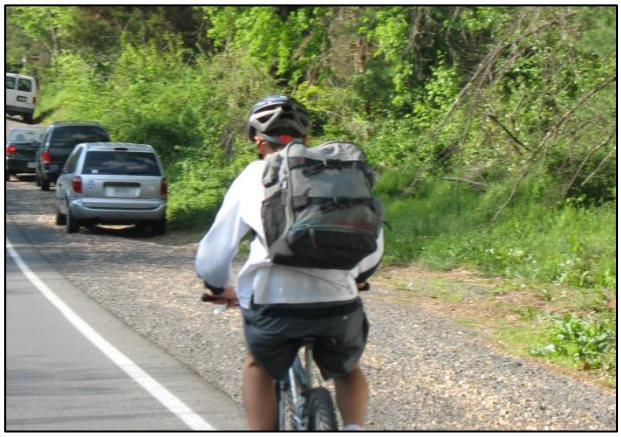
> **Bicycle Facility:** a general term denoting improvements and provisions to accommodate or encourage bicycling, including bicycle parking and storage facilities, and shared roadways not specifically defined for bicycle use.
>
> *AASHTO Guide for the Development of Bicycle Facilities 2012*

Planning at Bicycle Trip Scale

Similar to other counties in the Washington, D.C. metropolitan region, Fairfax County is a large jurisdiction that features many different types of neighborhoods and districts.

Development patterns in Fairfax include: a) areas of high density and mixed land uses; b) areas of low and medium density that are predominantly residential with suburban street layouts; c) areas of light industrial and commercial use; and d) low-density residential and rural landscapes. The opportunities and needs for cyclists are not the same throughout these varied environments. Bicycle trips, especially those made for transportation, are typically local trips, meaning they are usually three to five miles in length.[6] For these reasons, this planning process divided the County into the following nine subareas, which were used to focus fieldwork activities, facilitate public outreach, and address bicycling at the local level:

1. Great Falls/McLean
2. Tysons[7]
3. Herndon/Reston
4. Centreville/Chantilly
5. Central Fairfax
6. Annandale
7. Clifton
8. Burke/Springfield
9. Mt. Vernon



Cyclist riding on road with narrow shoulder
Source: Toole Design Group.

One public workshop was conducted in each subarea. A single fieldwork team was assigned to each subarea as well, allowing them to become familiar with important local destinations and assess conditions and needs at the neighborhood level.

It is important to note that the boundaries of the subareas do not correspond to the supervisory districts but were generally drawn based upon known barriers to bicycle travel and a general understanding of the natural and cultural boundaries between various neighborhoods and communities. They do not align with formal planning areas or supervisor districts. The subareas were established primarily for fieldwork planning and public outreach purposes and are not intended to be used for future planning purposes.

Criteria for Creating a Network

As has been noted, the recommended Bicycle Network is designed to meet the needs of people already riding as well as the needs of potential and future cyclists. The BAC

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[6] Some bicycle commuters make much longer trips, 5 to 15 miles; however, it is expected that the majority of new, future bicyclists in Fairfax County will be making shorter trips.

[7] As mentioned in earlier sections of the Plan, the evaluation of existing conditions and needs for improving bicycling in Tysons was developed separately in the Tysons Corner Bicycle Master Plan project completed in 2010. For the purpose of the countywide planning effort, Tysons was considered a subarea but public meetings and fieldwork were completed during Phase I of the project.

placed a high value on developing a network that will serve the needs and comfort of a variety of cyclists, including children and senior cyclists, novice and experienced cyclists, regular and occasional commuters; students, visitors, tourists, and recreational riders.[8]

Source: Toole Design Group.

As the bicycling population grows in Fairfax County, it is important to recognize that some cyclists will only venture onto busier roads if they are provided with a facility that clearly delineates space in which they can operate, or offers a significant degree of separation from traffic. Some cyclists will avoid roadways with high speeds and heavy volumes, regardless of the accommodations. Some will seek only quiet local streets, and some experienced cyclists will actually prefer arterials because arterial traffic is given priority at minor intersections and arterials typically provide the most direct route.

To address the goals of comfort needs for all cyclists, this plan recommends both improving arterial and collector roadways to accommodate bicyclists, and providing trails, sidepaths, and parallel routes along local streets.

Streets and trails were selected for inclusion in the recommended Bikeway Network to create direct, convenient, and logical connections throughout Fairfax County. The Bikeway Network includes streets and trails that cyclists currently use as well as streets they would like to use.

Dividing the County into subareas, enabled field data collectors to study three important factors at the same time:

- Specific road segments and their bicycling conditions;
- The location of important destinations and their bicycle accessibility; and
- Potential alternative routes on low-volume streets.

Citizens who participated in the public meetings provided insights into motorist behavior, bicyclist behavior, desire lines to key destinations, favored and challenging routes to specific destinations, gaps in the network and locations of unsigned trails and neighborhood links that were not widely known.

Roadways were evaluated based on total roadway width, number of travel lanes, lane width, road surface, speed limit, presence of a shoulder and surface conditions, surrounding land uses, evaluation of existing bicycle facilities (if present) and overall bicycling conditions. Public and staff input was central to fieldwork efforts, which also

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[8] The BAC used the phrase "from 8 to 80" to suggest that in the long run, riders of all ages and abilities should feel comfortable and welcome to bicycle in Fairfax County.

included mapping and verifying the extent of recent bikeway and trail improvements and noting projects that were under construction. Trails were evaluated based on surface material, surface condition, terrain and grades, width, access, connectivity and navigability. Throughout this study, the professional judgment of the consulting team conducting the fieldwork played an important role in making recommendations.

In general, the recommended Bikeway Network is intended to encourage maximum use and comfort, while fostering safe and responsible riding. While bicycling is legal on all public streets and roads (other than limited-access highways) this Master Plan establishes route development priorities to guide decisions about the types of roadway and trail improvements that are recommended. Specifically, the routes selected for the recommended Bikeway Network were chosen using the following criteria:

- Routes that facilitate bicycle access to important destinations and create overall connectivity are recommended.
- Improvements along various routes are recommended where they will benefit the greatest numbers of people, and/or reduce or eliminate the deterrent effect of poor and unsafe existing conditions.
- Non-arterial routes that parallel arterials are included in the network as alternatives that may serve one set of cyclists, while an improvement on a parallel arterial will serve others.
- Arterial roads and corridors identified as part of the Bikeway Network have recommendations for both on-road and off-road facilities, to ensure that these routes offer appropriate options for all types of cyclists.
- Wayfinding signs are frequently needed to help cyclists find and follow routes that may be preferred for cycling but need guidance to get through neighborhoods built with curvilinear street patterns, to provide guidance to the destinations served by the route and to help cyclists find the best intersections for crossing major arterials, or the bridges and tunnels that provide access across major highways.

3.2 CLASSIFICATIONS FOR BICYCLE FACILITY RECOMMENDATIONS

The bicycle facility recommendations shown on the Quadrant maps are organized by facility type or other classification category to assist map readers. The following section defines each facility type, discusses their application and how they help cyclists, and explains generally where in the County they are located.

It should be noted that most of the major arterial highways upon which bicyclists are not prohibited have been classified as Policy Roads. On the Quadrant maps, a single pre-determined bicycle facility type is not indicated for Policy Roads. The types of facilities that are appropriate on Policy Roads vary based upon the roadway's design and the nature and design of roadside land uses. Policy Roads and the process that should be used to design streets to be comfortable for bicyclists are explained in Section 3.3.

Bicycle Lanes

Definition: Bicycle lanes are pavement markings (lane stripes, directional arrow (optional), and bicycle symbol) that designate a portion of the roadway for the preferential or exclusive use of bicycles. They vary in width from four to six feet; however, the VDOT standard is five feet (four feet if adjacent to a gutter pan).

Contribution to the Bikeway Network: Bicycle lanes are the most prevalent facility recommendation in the countywide bicycle network. This recommendation is found in every portion of the County and is applicable on a wide variety of roadway types, including collectors and minor arterials. Based upon an assessment of existing conditions and the potential for future development along each roadway segment, a variety of actions may be employed to achieve bicycle lanes, including:

- Adding striping and bicycle symbols to existing pavements without impacts to motor vehicle travel;
- Reducing lane widths for motor vehicle travel lanes;
- Eliminating one or more motor vehicle travel lanes;
- Reducing on-street parking capacity; or
- Widening the roadway.

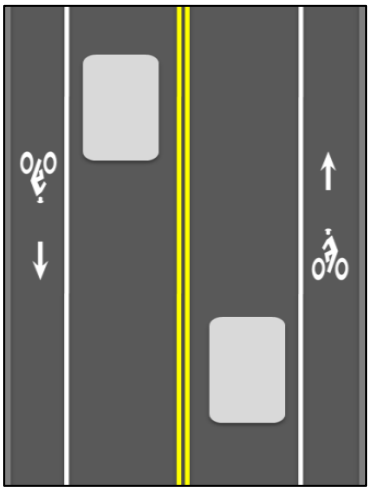


Figure 1: Bicycle lane concept
Source: Toole Design Group.

In general, many streets and roadways throughout Fairfax County were found to have excess pavement width available to reallocate to bicycle lanes.

Buffered Bike Lanes

Definition: Buffered bicycle lanes are standard bicycle lanes with the addition of a striped buffer zone between a bike lane and the adjacent travel lane. Buffered bicycle lanes provide cyclists added comfort and safety where traffic speeds are higher, 35 to 45 miles per hour. They are recommended along arterials and major arterials, or other high-speed roads where adequate pavement width can be made available for these wider facilities, typically 8 to 11 feet.

Contribution to the Bikeway Network: In addition to buffered bicycle lanes indicated along road segments throughout the County, this facility will be appropriate along many Policy Roads which tend to have higher speeds and more available right-of-way. Opportunities for buffered bicycle lanes are evenly distributed around all parts of the County.

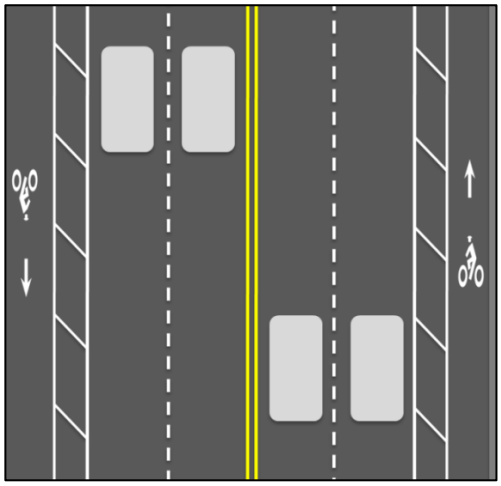


Figure 2: Buffered bike lane concept
Source: Toole Design Group.

Shared-Lane Markings

Definition: Shared-lane markings (sharrows) are pavement markings that help position bicyclists in the most appropriate location to ride in order to safely share the travel lane with motor vehicles. The markings also provide a visual cue to motorists that bicyclists have a right to use the street, and that the limited space available in the marked travel lane must be shared by motorists and bicyclists.

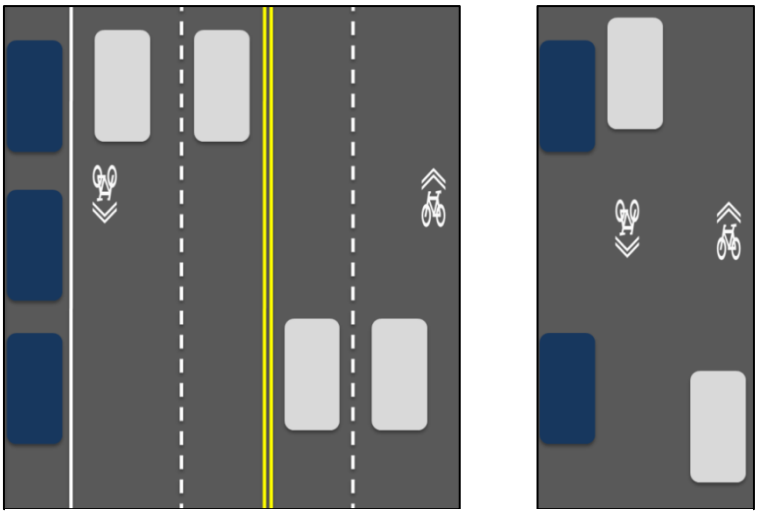


Figure 3: Shared lane marking concepts
Source: Toole Design Group.

Contribution to the Bikeway Network: While shared lane markings are recommended in some locations, especially on collector roadways with more than 4,000 motor vehicles per day, bicycle lanes may be more appropriate. This treatment should be viewed primarily as a retrofit facility that is used when climbing lanes or bicycle lanes are not feasible, rather than a facility type that is optimal in its own right. Shared lane markings should only be considered an optimal treatment on residential collector streets where low traffic volumes make bicycle lanes unnecessary and the placement of shared lane markings can help cyclists avoid traveling in the door zone of parked cars.

Climbing Lanes

Definition: A climbing lane incorporates two facilities on the same roadway segment; a standard bike lane (climbing lane) is provided on the uphill direction to accommodate slow moving bicyclists and a shared-lane marking is provided in the downhill direction, where bicyclists can typically travel at speeds close to motor vehicles.

Contribution to the Bikeway Network: Climbing lanes are typically recommended when:

- The slope of the road segment is significant (greater than three percent) creating a long or steep incline in one direction, or the roadway has an undulating profile over a significant distance, going up and down across a number of stream drainages; and
- There are factors that limit the opportunity to have bicycle lanes in both directions, such as the need to retain parking, the overall limit of curb-to-curb pavement width, or roadside conditions that make roadway widening costly or infeasible.

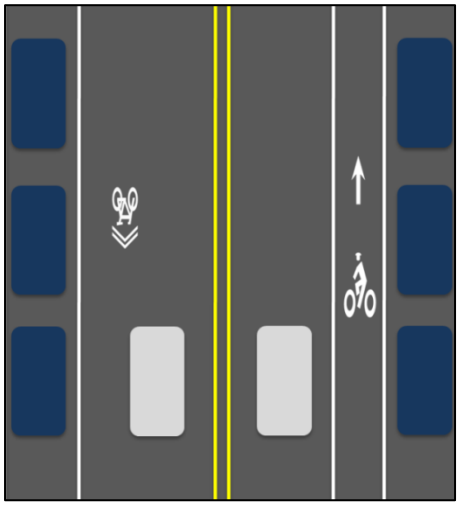


Figure 4: Climbing lane concept
Source: Toole Design Group.

These conditions are found most frequently along collector roadways that traverse large residential developments, especially in the Sully, Springfield, Braddock, and Mason Districts.

Striped Paved Shoulders

Definition: Striped and paved shoulders should be at least three feet wide to provide enough space outside of a travel lane to be beneficial and safe for bicyclists.

Contribution to the Bikeway Network: In Fairfax County, striped and paved shoulders are typically the best treatment along uncurbed roadways (open section) that serve lower density residential communities and pass through undeveloped landscapes. Volumes of bicyclists are typically lower in these settings and bicycle use may be more oriented to recreational and fitness riding than daily transportation. Striped shoulders provide a variety of benefits to all roadway users, whereas designated bicycle lanes are for the exclusive or preferred use by cyclists, which may be unwarranted in these locations. Striped and paved shoulders are also recommended in locations where it appears that roadway widening to achieve 5-foot bicycle lanes on both sides may be too costly or infeasible, and only low volumes of cyclists are expected. In these situations research has shown that three to four feet of striped paved shoulder is more beneficial to the cyclist than simply creating a wide outside lane for cyclists and motorists to share.

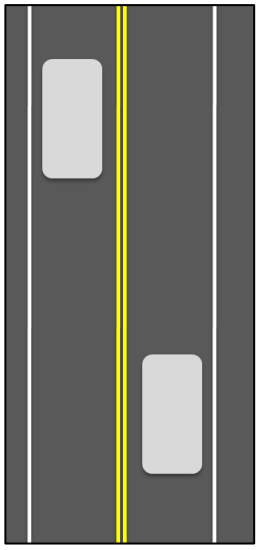


Figure 5: Striped paved shoulders concept
Source: Toole Design Group.

Shared Roadways

Definition: While all on-road bicycle facilities require some level of roadway sharing amongst bicyclists and motorists, the shared roadway is a discrete bikeway type indicating that no special striping, marking or signs are necessary to improve conditions for cyclists.

Contribution to the Bikeway Network: Shared roadways are typically recommended along low-volume residential streets that have been selected for the Bicycle Network because of their contribution to local or countywide route connectivity. Bicycle route signs may be all that is needed to help cyclists understand how these streets can be useful to make a variety of connections while avoiding major arterials or high-traffic roadways.

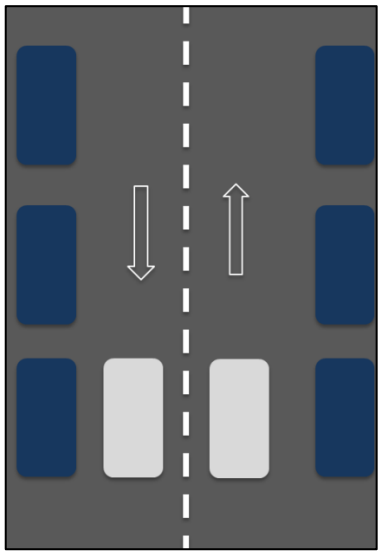


Figure 6: Shared roadways concept
Source: Toole Design Group.

Shared Roadways with Safety Treatments

Definition: Special treatments that are installed along specific sections of narrow, hilly, and/or curving roadways to enhance bicyclists' safety. See below for greater detail.

Contribution to the Bikeway Network: While not a formal bicycle facility type, this treatment is an important one for the Fairfax County Bicycle Network. It is typically recommended along two-lane roadways that lack curb and gutter and have travel lanes of 10 to 12 feet wide, with little or no shoulder. Road sections traverse steep inclines and frequent curves where sight distances are limited. Speed limits may range from 35 to 50 miles per hour except for situational postings at sharp curve or other locations with very poor sight distances. Adjacent land uses are predominantly residential and densities are usually low. The potential to widen these roads is low due to high costs, engineering and environmental issues, lack of right-of-way, and/or the development restrictions resulting from zoning status and/or other factors.

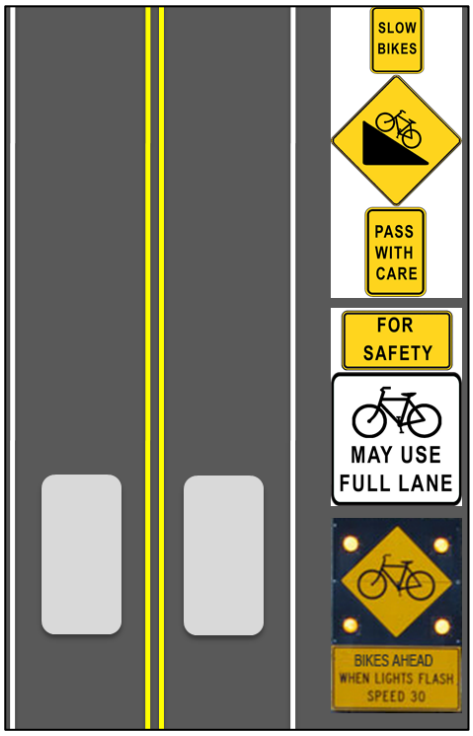


Figure 7: Shared roadways with safety treatment concepts

Source: Toole Design Group.

To address these conditions the shared roadway with safety treatment may include any of the following design elements:

- Adding one or more short shoulder sections on the uphill section of road (not a continuous shoulder) to provide select locations for a slowly moving cyclist to pull over to the right without stopping and let motorists that may be waiting behind them pass. The bicyclist can then safely merge back into the travel lane where the shoulder ends.
- Installing special signs that alert motorists that they may suddenly come upon slow moving cyclists in the middle of a travel lane, due to limited sight lines and the significant speed differential between a cyclist on a hill and a motor vehicle.
- Installing special signs to remind motorist to pass cyclists with care due to narrow travel lanes and lack of shoulders.
- Installing bicyclist-actuated flashing lights and signs at the base of long, curving, uphill road segments to warn motorists that bicyclist may be present, moving slowing due to steep grades, and hard to see due to curves.

Despite the less than optimal bicycling conditions in many locations throughout the County, hilly and curvy roads remain popular for recreational cyclists, especially in the Great Falls and Clifton areas. Other key locations with these conditions include roads that cross the Difficult Run stream valley and key connecting roads in the Providence, Dranesville, Mason, Lee, and Mount Vernon Districts. In these areas alternative routes

with better cycling conditions may not exist or may add considerable distance to one's trip. In some locations the shared roadway with safety treatment may only be needed along a single segment of road that links other road segments that have adequate or easily improvable bicycling conditions. Examples include:

- Hunter Mill Road and Lawyers Road between Reston and Vienna;
- Beulah Road and Old Courthouse Road between Tyson/Vienna and Great Falls/ Wolf Trap; and,
- Waples Mill/Fox Mill Roads and Oakton Road between Reston/Chantilly and Vienna/Fair Lakes/Fairfax City.

Shared-Use Paths

Definition: Shared-use paths include paved and crushed stone paths and trails that are to be used by both pedestrians and bicyclists. In Fairfax County, these paths are found in a variety of settings, including stream valley trails, rail trails, trails in developed park and recreation facilities, trails around lakes and reservoirs, sidepaths along major roadways, and connected trail systems in residential communities.

Contribution to the Bikeway Network: Recommendations for new and upgraded shared-use paths are distributed throughout the County. Trail system expansion and upgrade recommendations are geared to closing key gaps, improving access to major trails from their surrounding neighborhoods, improving trail linkages to rail transit stations, and otherwise maximizing the utility of the trail system for transportation. Frequently, the trail system provides the only, or best, crossing of a major barrier to cycling, such as the I-495, I-95 and I-66, U.S. 29, Little Hunting Creek, Difficult Run, and other stream valleys.

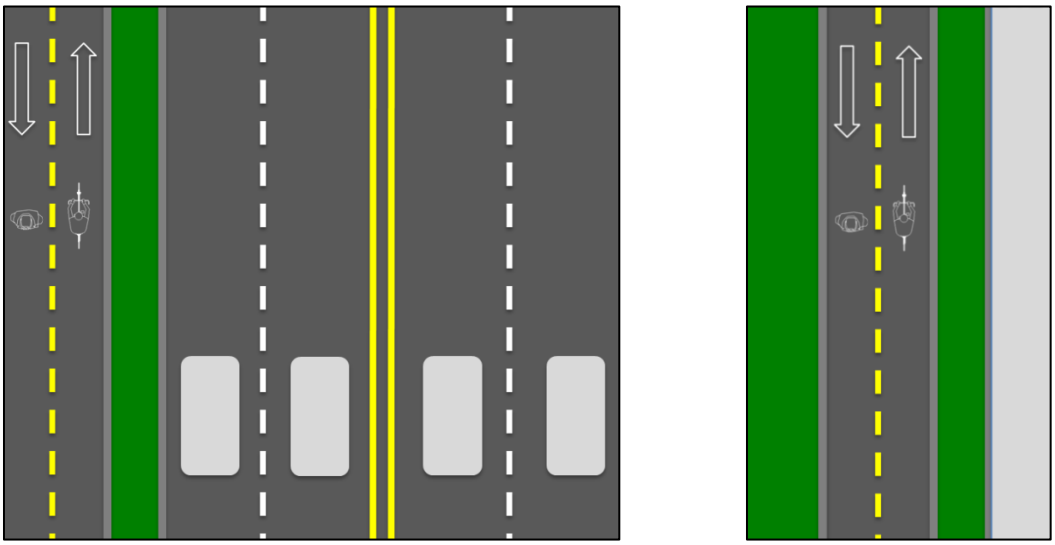


Figure 8: Two concepts for shared-use pathways

Source: Toole Design Group.

Recommendations for upgraded sidepaths along major roadways focus on providing a smooth surface on which to ride or walk that is devoid of bumps and potholes, adding

the standard 5-foot buffered separation from travel lanes and increasing the sidepath width (10 feet preferred, 8 feet minimum).

In addition to the 125 miles of specific shared-use path recommendations, Policy Roads represent key locations where shared-use paths will be the optimum facility, such as along VA 7, both east and west of Tysons.

Cycle Tracks

Definition: A cycle track is a bicycle facility that is physically separated from both the roadway and the sidewalk. A cycle track may be constructed at the roadway level using roadway space or at the sidewalk level using space adjacent to the road. Cycle tracks separate bicyclist from motor vehicle traffic using a variety of methods, including curbs, raised concrete medians, bollards, on-street parking, large planting pots/boxes, landscaped buffers (trees and lawn), and other methods. Cycle tracks that are adjacent to the sidewalk should provide a vertical separation between the bicyclists and pedestrian as well as a different surface/color treatment to delineate the bicycle from the pedestrian space. Cycle tracks can be one-way for bicyclists, and as such, should be provided on each side of a road; or two-way and installed on one or both sides of the road.

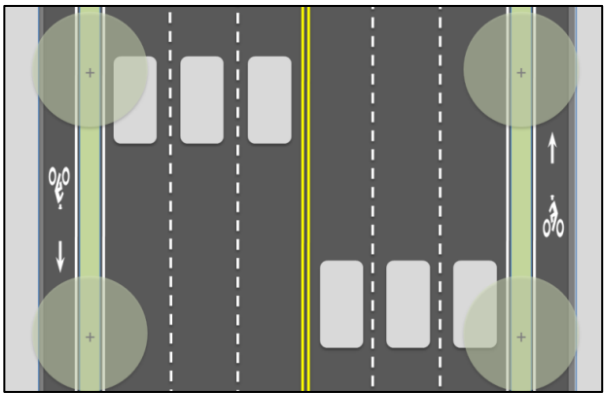


Figure 9: Cycle track concept
Source: Toole Design Group.

Contribution to the Bikeway Network: Cycle tracks provide cyclists with a higher level of comfort relative to motor vehicle traffic. They are typically appropriate on large multilane arterials where higher vehicle speeds and volumes exist. They also may be appropriate on high-volume but low-speed streets where pedestrian volumes also may be significant, such as in a commercial downtown or main street setting.

In Fairfax County, cycle tracks are facilities that are most appropriate for certain Policy Roads especially in mixed-use areas and along road segments that serve high-density development. In these areas, such as along VA 7 and VA 123 in Tysons, along U.S. 1 in Mount Vernon, and along Policy Roads through Bailey's Crossroads, Seven Corners, and Annandale, separation from both pedestrians and high-speed/high-volume motor vehicle traffic is important for bicyclists' safety and comfort.

Grade Separation

Definition: Grade separations include bicycle/pedestrian bridges, tunnels, or underpasses. They are necessary for crossing railroads, streams and rivers and other features of both the built and natural landscape. They are the preferred way to address bicycling barriers created by major highways.

Contribution to the Bikeway Network: Six of the new grade separation recommendations identified in this plan are relatively small in nature and can be

achieved through routine engineering and design efforts at modest or low cost. Approximately 26 are major facilities that will need to be planned and budgeted for in strategic fashion. Grade separations provide a significant safety, convenience, and efficiency benefit for both bicyclists and pedestrians, for recreational uses and transportation trips.

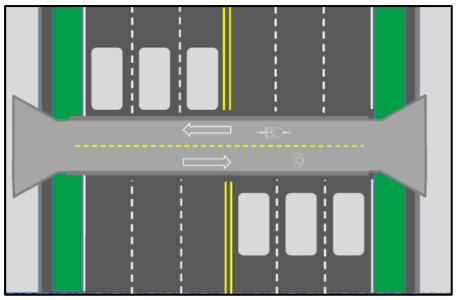


Figure 10: Grade separation concept
Source: Toole Design Group.

Figure 11: Grade-separated rendering
Source: Toole Design Group.

Bicycle Links

Definition: Bicycle Links are spot improvements such as the following:

- Installing short path segments;
- Installing new or improved curb ramps to serve wheeled users;
- Modifying fencing, bollards or other barriers to improve access for all types of cycling equipment while preserving the lack of access for motor vehicles;
- Improving access through/around school or other parking lots; or
- Installing stairways with bicycle rolling trays for locations with steep grades.

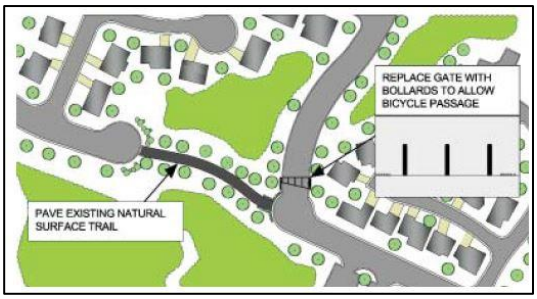


Figure 12: Bicycle link concept
Source: Toole Design Group.

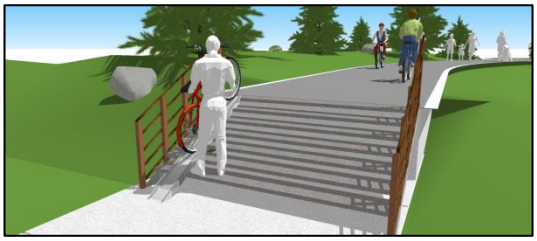


Figure 13: Rolling tray rendering
Source: Toole Design Group.

Contribution to the Bikeway Network: These types of spot improvements are distributed throughout the County, however many are clustered in and around Tysons due to the need to improve access to the new Silver Line Metrorail stations and this major employment and retail hub.

Trail Access Improvements

Definition: This class of spot improvement is similar to bicycle links, however the purpose is always to improve access to or along the County's major paved trail and pathway systems. Trail access improvements can include the following actions:

- Constructing short path segments;
- Paving short unpaved path segments;
- Repairing damaged pathway segments;
- Upgrading existing paths that connect neighborhoods and trail systems;
- Installing small bridges or culverts to cross-feeder streams; also conversion of fair weather stream crossings to all weather crossings;
- Installing curb ramps; and
- Installing rolling trays along stairways that provide trail access.

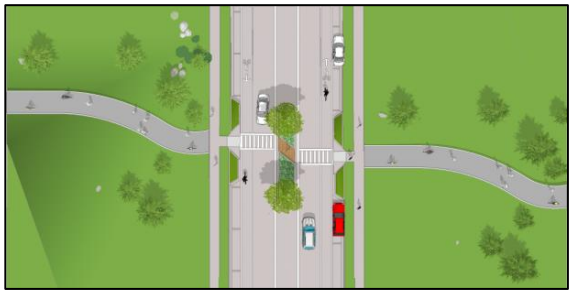


Figure 14: Trail crossing concept
Source: Toole Design Group.

Contribution to the Bikeway Network: Recommendations for trail access improvements are found throughout the County, but are especially concentrated in the northeast, northwest, and southwest quadrants.

Transit Station Improvements

Definition: Recommendations to improve bicycle access to rail transit stations and park-and-ride lots address issues such as the quantity, quality, and security of bicycle parking, as well as on-road and off-road access issues in and around station areas.

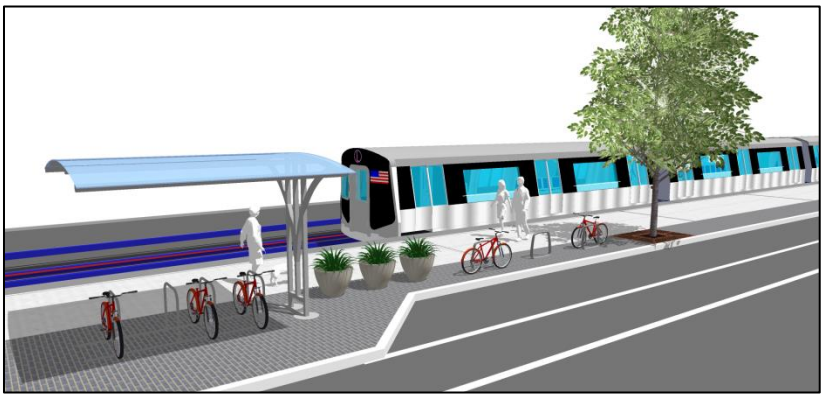


Figure 15: Rendering of covered bicycle parking at a transit station
Source: Toole Design Group.

Contribution to the Bikeway Network: Recommendations for transit station improvements are found throughout the County. Examples of recommended improvements include the following:

- Installing bicycle parking racks or lockers – this may be installing equipment where none exists or adding equipment to increase service capacity;
- Replacing equipment that is damaged or unusable, or moving equipment to a more convenient location;
- Installing covered bicycle parking to replace or complement uncovered bike parking equipment;

- Installing new equipment to offer a higher grade of security;
- Installing high-capacity, high-security bike parking similar to the Wiehle-Reston East Metrorail Station Bikeroom, WMATA's Bike-and-Ride Centers, or a multiservice, staffed, bicycle parking station;

Figure 16: Rendering of bicycle lockers at a transit station
Source: Toole Design Group.

- Improving access to the station with short path improvements, crosswalks, curb ramps, on-road bikeways along station access roads or through parking lots, or other facilities to enhance safety and accommodation for cyclists; and
- Install bicycle wayfinding signage and include distance and/or times to the destination.
- Providing pedestrian and bicycle railroad crossing accommodations to facilitate rail station access from both sides of the tracks.

Interchange Improvements

Definition: Interchange improvements include on-road or off-road improvements to enhance safety for cyclists that must cross free-flow on- and off-ramps. These improvements can include enhanced crosswalks, installation of curb ramps, warning signs for motorists, and/or installation of green bicycle lanes through the potential conflict zones.

Contribution to the Bikeway Network: Improvements are recommended at a majority of the locations where Bicycle Network roadways, including Policy Roads, pass through interchanges with limited access or other major highways.

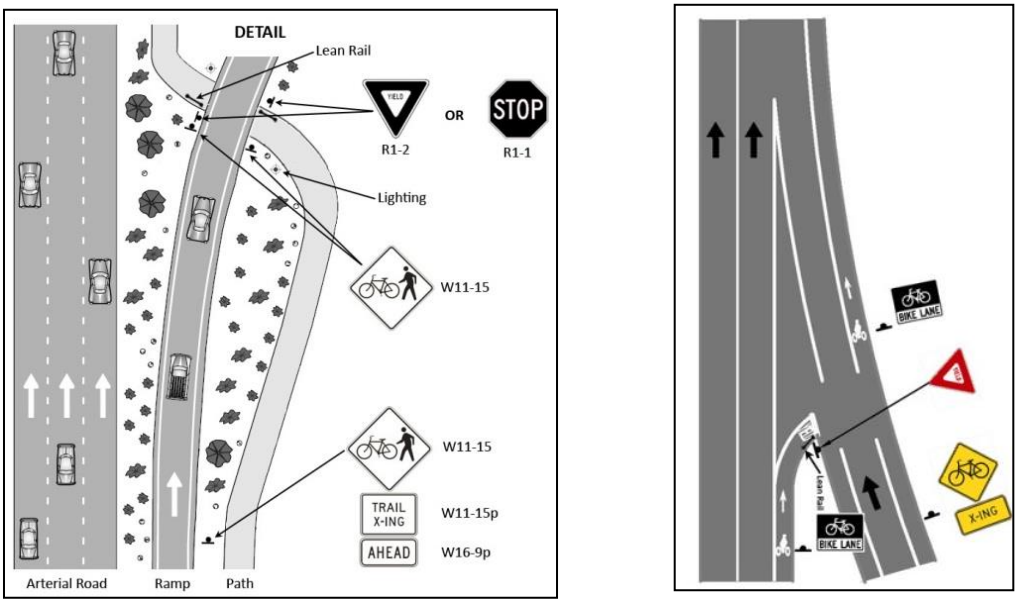


Figure 17: Concept drawings for bicycle facility improvements at interchanges
Source: Toole Design Group.

Intersection Improvements

Definition: Intersection improvements include a wide range of treatments, including on-road bicycle lanes through intersections, installation of new or upgraded facilities for midblock trail crossings, enhancement of trail crossings through already signalized intersections, bicycle boxes for left turn movements, and queue boxes for two-stage left turns.

Contribution to the Bikeway Network: There are 436 locations along the Bicycle Network where on-road treatments may be warranted, many of these are standard signalized intersections. Typically, improvements at intersections should be made at the time that on-road bicycle facilities are installed; however, they also can be made independently.

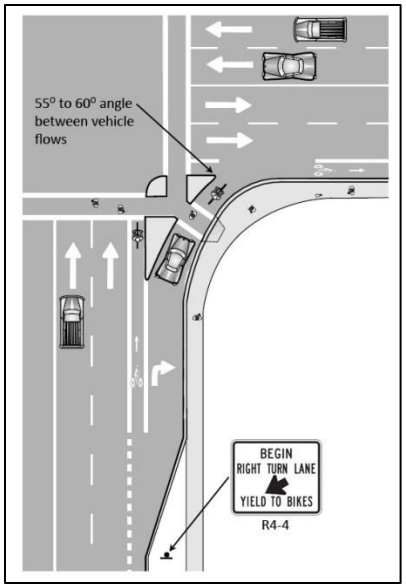


Figure 18: Concept of intersection improvement
Source: Toole Design Group.

There are 60 locations where transportation trails cross arterial or collector roadways and improvements for bicycle and pedestrian trail traffic are needed. It should be noted that many intersections in Fairfax County are deficient in some way, such as a lack of crosswalks marked on each leg of the intersection, signal actuators that do not detect bicyclists or are convenient for cyclists to activate, or a lack of curb ramps to enable safe navigation. It also is important to note that due to the practice of laying out minor neighborhood streets so that they are offset where they meet arterial roads, and the practice of using medians to prohibit crossings between signalized intersections, many Bicycle Network crossings must be improved simply to make it legal and possible to cross at the location that is most logical and convenient.

3.3 POLICY ROADS

This plan identifies a set of primary arterial roadways that are considered part of the Bicycle Network as "Policy Roads." On the Bicycle Network Map, these roads may not have specific bicycle facility recommendations because the facilities selected for these roads must be made in conjunction with other roadway planning and land development factors.

In general, these roads are multilane highways and/or have relatively high speeds (40 to 55 miles per hour). Other than the limited-access highways in the County, they carry the largest volumes of daily traffic, including buses and trucks. They also have a wide range of characteristics that other roads in the county usually do not have, such as large interchanges, service roads, guardrails, lengthy merge lanes, and/or intersections with multiple right and/or left turn lanes. These roads traverse a wide variety of land use contexts. In most cases, these roads provide the most direct connection to and between major destinations in the County. Future upgrades to these roads will be driven primarily by traffic management needs and opportunities and needs created by major development or redevelopment in the corridor.

Safe bicycle travel will need to be accommodated on these roads as they are considered to be part of the Bicycle Network. Selection of facility or facility combinations should be coordinated with other key planning decisions made regarding the roadway's capacity and operation and the development that occurs along it; specifically the type and configuration of the development and the size and type of roadway selected. At the time of developing the Bicycle Master Plan, these choices are difficult to predict. As a result, guidance contingent on these other factors has been developed.

Recommendations:

- Transportation planners and engineers at FCDOT, VDOT, and developers should use the maps and Table 3.1 to determine how best to accommodate safe bicycle travel on a select set of roads designated as Policy Roads. Facility and design recommendations in Table 3.1 include options which are contingent upon the choices that will be made regarding overall roadway and corridor design, adjacent and surrounding land uses, and development form.
- Project reviewers should refer Table 3.1 when identifying the appropriate bicycle facility type for a Policy Road.

Table 3.1 Facility Selection and Design Table for Policy Roads

Predominant Development Character Adjacent to Road and in Road Service Area	Predominant Policy Road Zoning Categories	Condition 1: Facility Recommendation	Condition 2: Facility Recommendation
Residential – Low Density	R-A through R-E; R-1 through R-8; PDH, PRC	Housing faces street with frequent driveways: • Sidewalks and standard or buffered bike lanes depending on speed limit. Where curb and gutter and sidewalks are not provided, a three- to six-foot striped/paved shoulder (depending on speed limits) may be sufficient for cyclists and pedestrians.	Housing does not front on main road; predominantly oriented to and accessed by side streets: • Eight-foot shared-use paths on both sides of the road, and – Minimum six-foot shoulders if speed limit is ≥40 miles per hour; or – Minimum three-foot shoulders if speed limit is <40 miles per hour. • On two-lane open sections, where paths are not feasible due to terrain, forest cover and/or right-of-way constraints, shoulders may be the only bicycle accommodation.
Residential – Medium to High Density	R-12 to R-30; PRM. PDH, PRC	If service roads are present or planned: • On-road bike lanes or shared-lane markings in service road. • Ensure that service roads are connected with curb ramps and trail segments.	Without service roads: • Speed limit of 25 miles per hour – standard bike lanes or shared-lane markings. • Speed limit of 30 or 35 miles per hour – standard bike lanes. • Speed limit >35 miles per hour – cycle tracks or buffered bike lanes.
Mixed Commercial and Residential	A mix of any of the commercial, residential, industrial, and/or mixed-use zoning categories.	Using the principles for Bikeway Network development set forth in this Plan, and applicable Plan guidance regarding facility selection (including applicable guidance provided in this table) planners and engineers may provide a mix of facility types as conditions change over the course of the roadway segment. Issues that should be considered in facility selection and design include making best use of existing facilities, the need to upgrade existing facilities, availability of right-of-way, roadway geometry, presence of transit service, character and speed of traffic, character and conditions of the road edge and existing/planned land uses immediately adjacent to each roadway segment. Providing continuity for bicycle travel is required and transitions between facility types must be well designed. Bicyclists and pedestrians must be accommodated on both sides of the road.	

Predominant Development Character Adjacent to Road and in Road Service Area	Predominant Policy Road Zoning Categories	Condition 1: Facility Recommendation	Condition 2: Facility Recommendation
Commercial	C-1 through C-9; PDC, PTC; I-1 through I-6	If service roads are present or planned: • On-road bike lanes or shared-lane markings in service road. • Ensure that service roads are connected with curb ramps and trail segments.	Without service roads: • Where short-term on-street parking is provided, consider bike lanes or shared-lane markings (risk for ‘‘dooring’’ is a key factor). • Speed limit of 25 miles per hour – standard bike lanes or shared-lane markings. • Speed limit of 30 or 35 miles per hour – standard bike lanes. • Speed limit >35 miles per hour – cycle tracks or buffered bike lanes.

3.4 THE RECOMMENDED BIKEWAY NETWORK MAPS

The Fairfax County Recommended Bikeway Network Map covers the entire county and is referred to throughout the Master Plan as the Bicycle Network Map. The map provides the long-term vision for a connected network of bikeways and will guide the selection of bicycle facilities as a part of ongoing and future road improvement projects and private developments. Due to the size of the map, it can be viewed on the FCDOT website.

On the following pages, figures 19 – 28 show the Recommended Bikeway Network Maps by each of the Supervisor Districts plus Tysons.

Figure 19: Recommended Bikeway Network Map – Braddock District

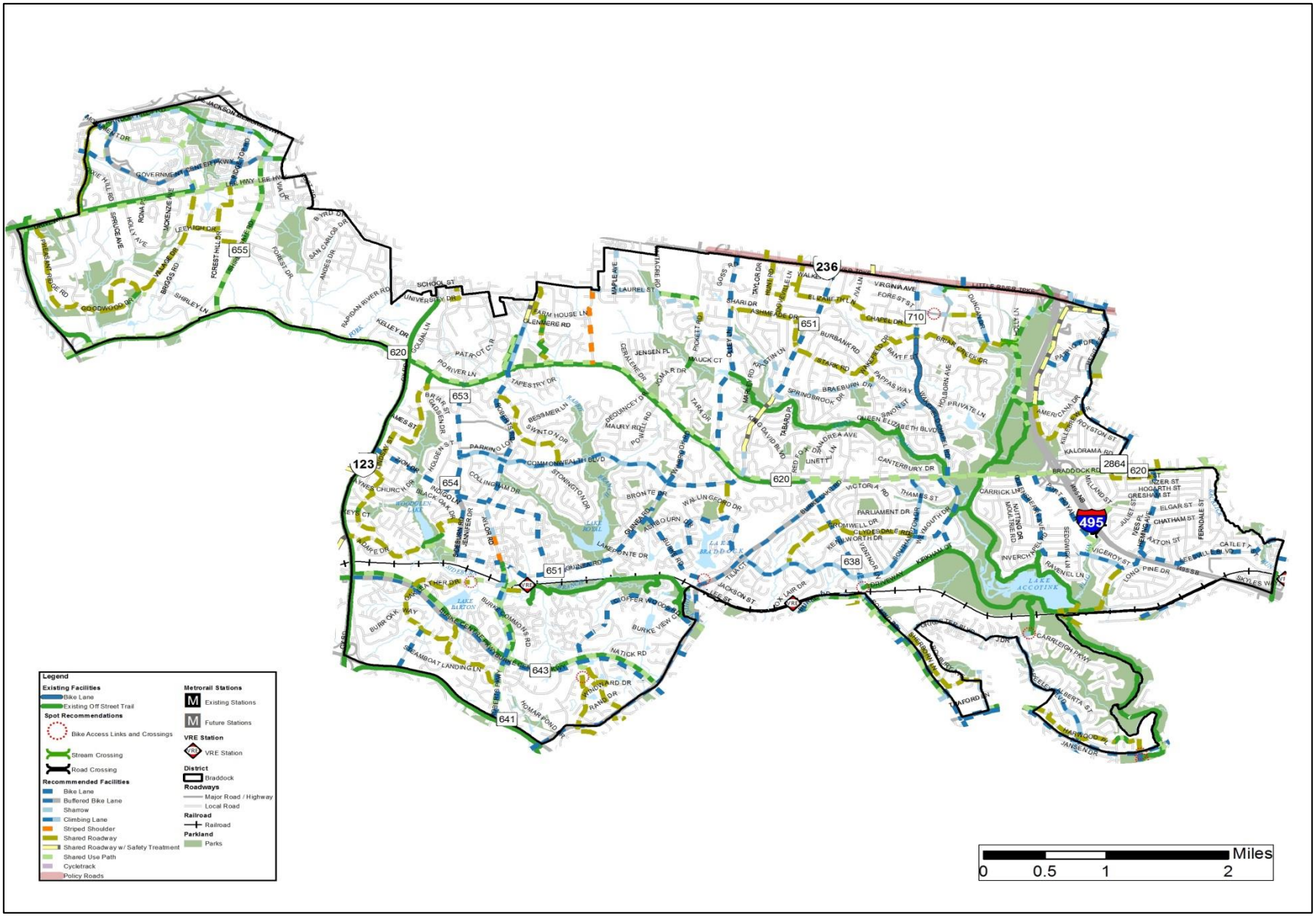


Figure 20: Recommended Bikeway Network Map – Dranesville District

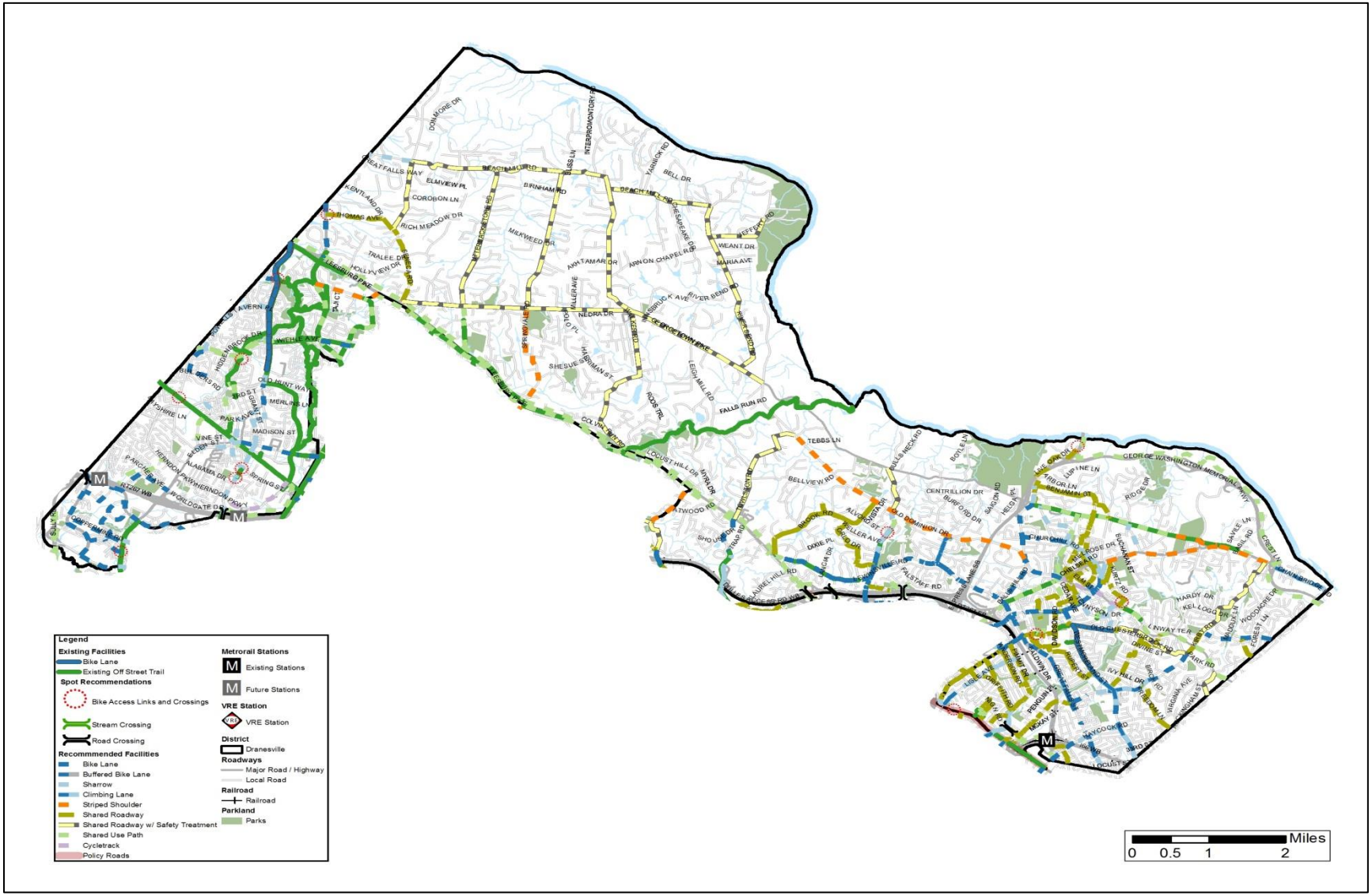


Figure 21: Recommended Bikeway Network Map – Hunter Mill District

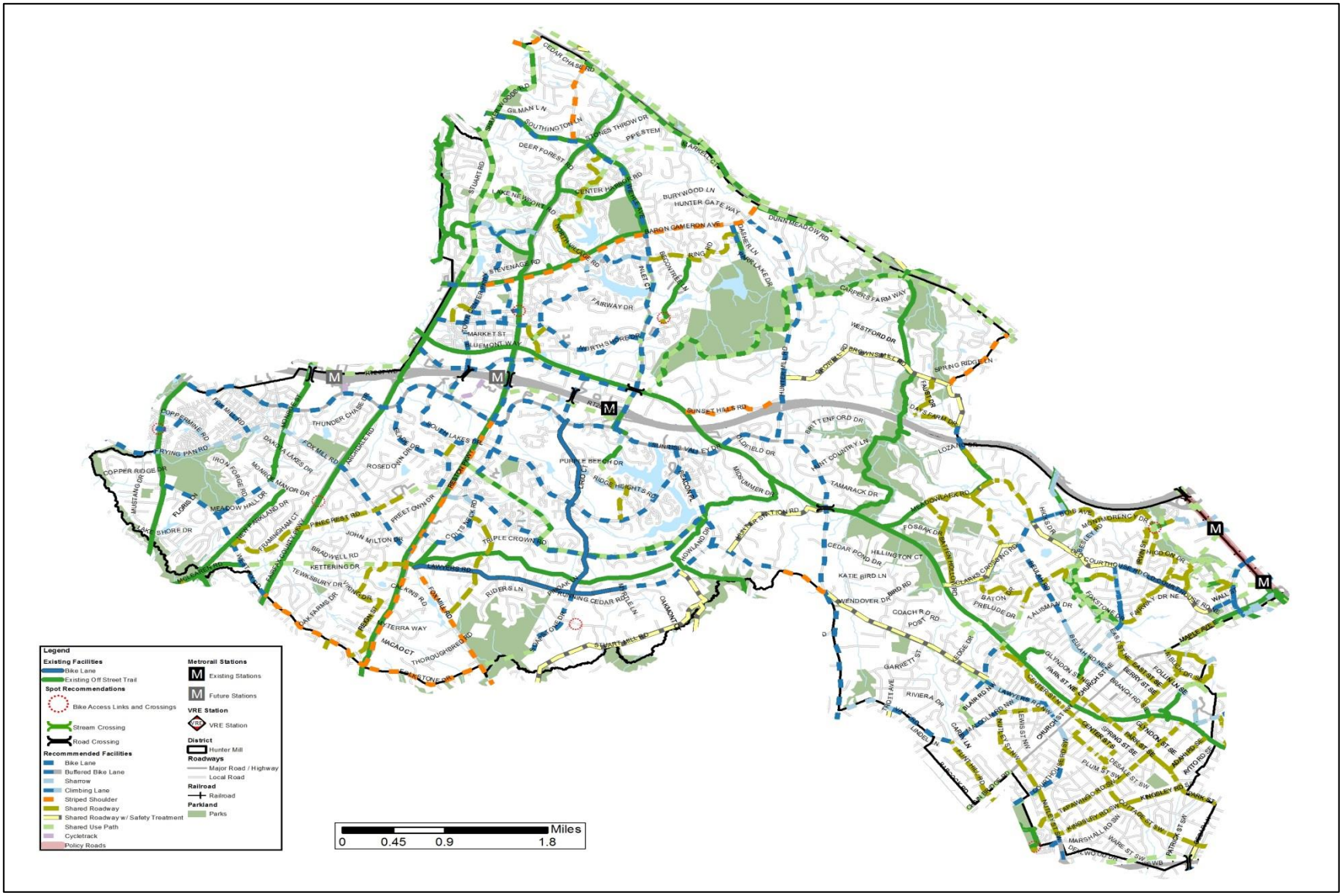


Figure 22: Recommended Bikeway Network Map – Lee District

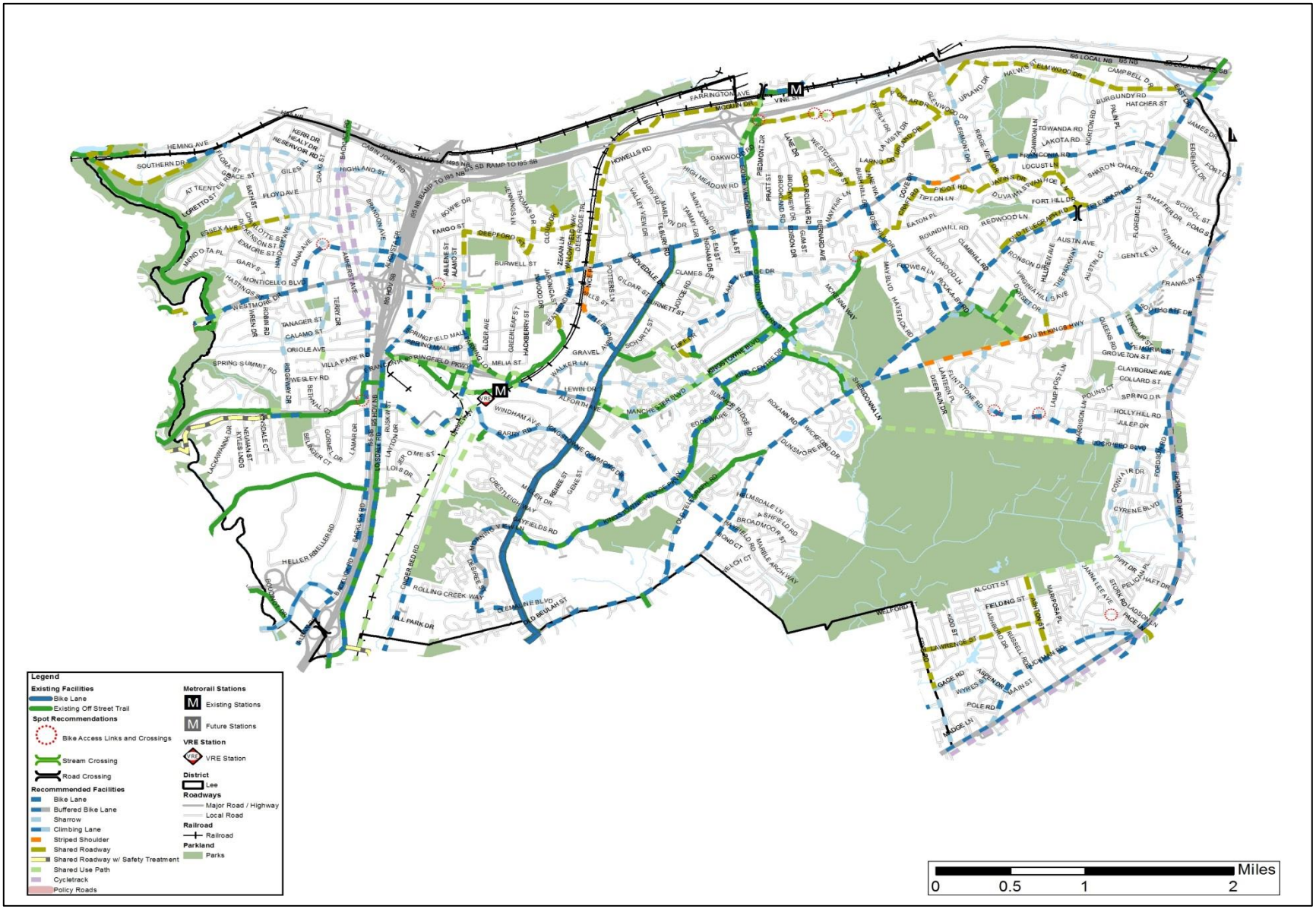


Figure 23: Recommended Bikeway Network Map – Mason District

Figure 24: Recommended Bikeway Network Map – Mount Vernon District

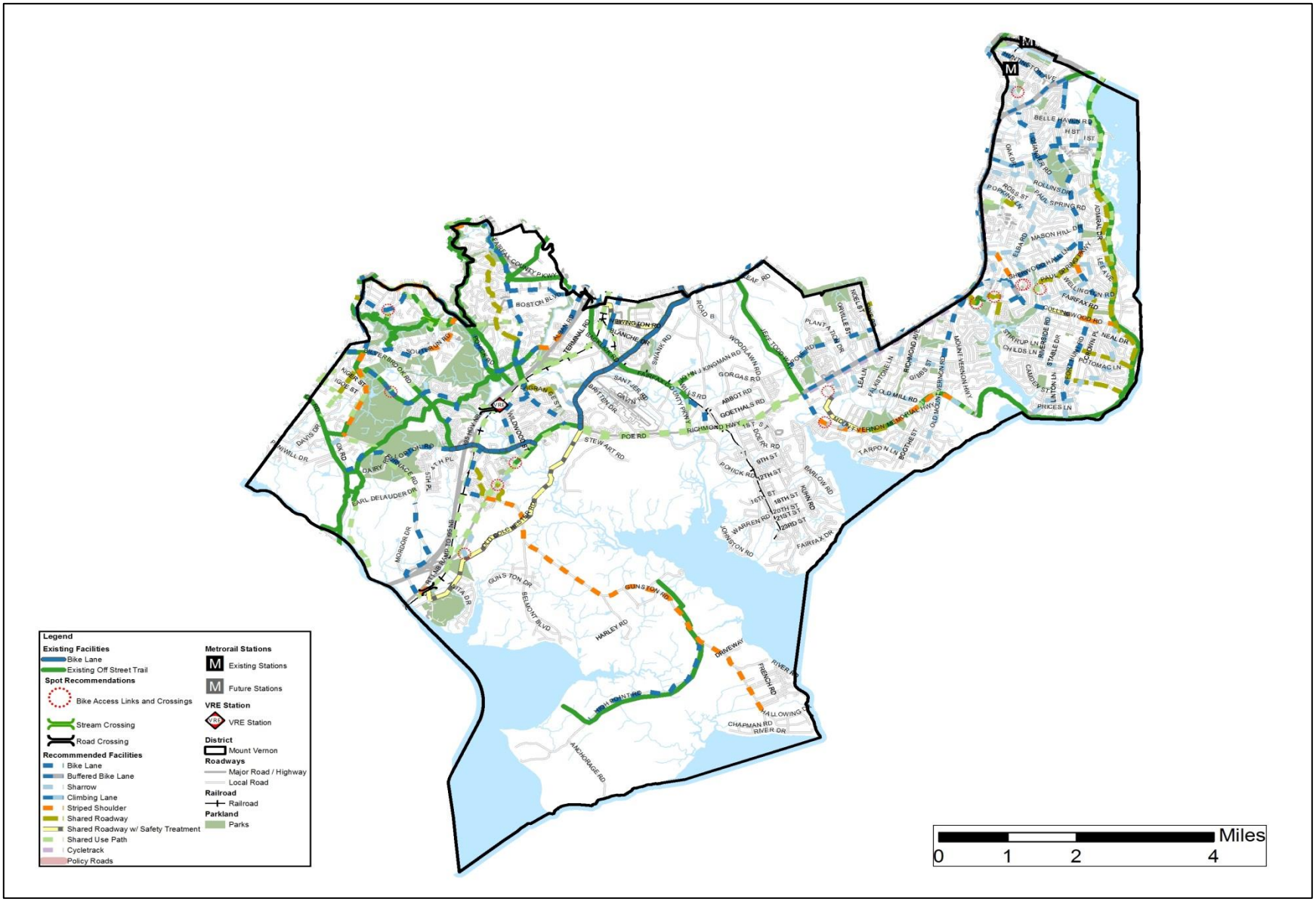


Figure 25: Recommended Bikeway Network Map – Providence District

Figure 26: Recommended Bikeway Network Map – Springfield District

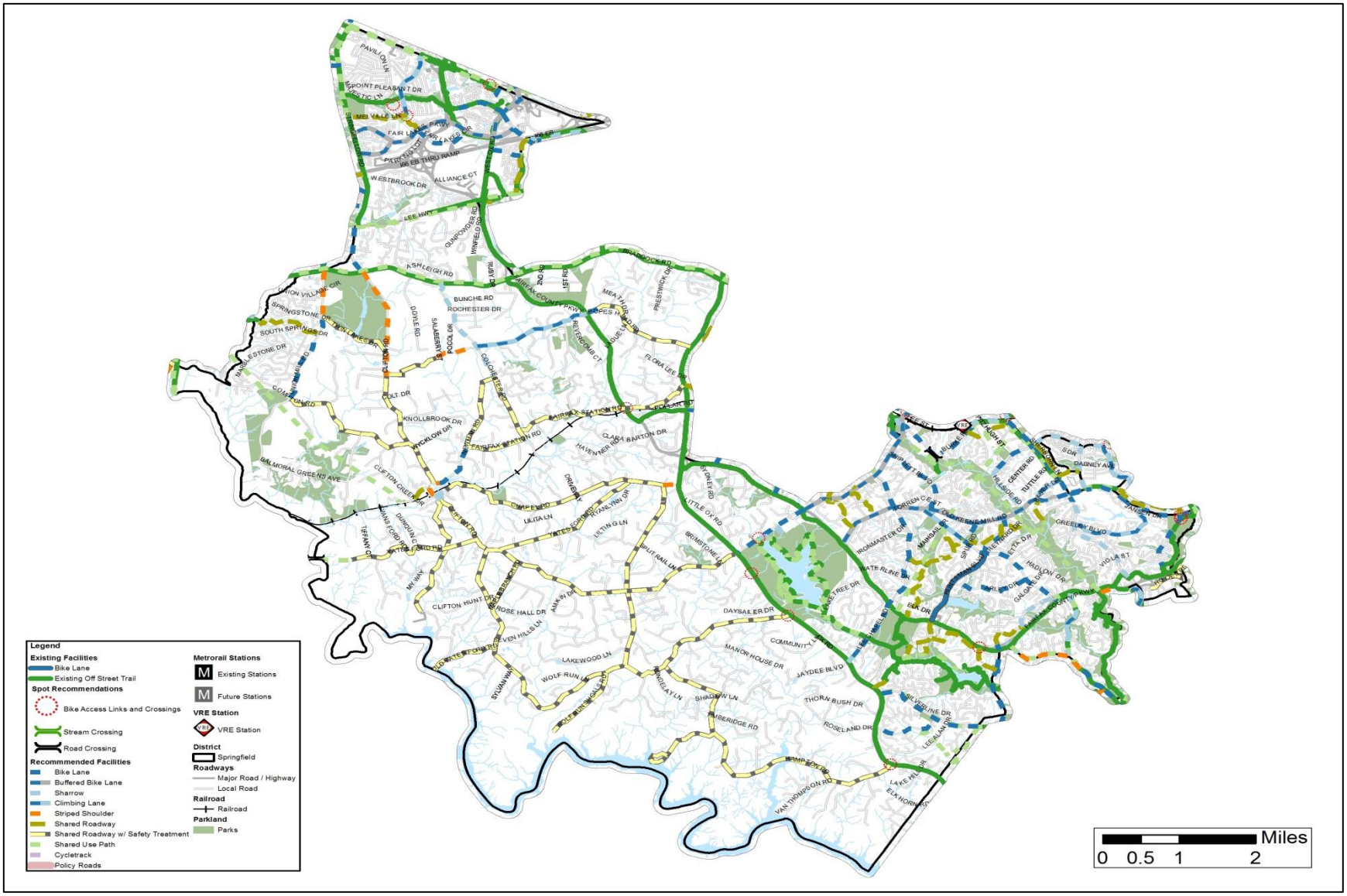


Figure 27: Recommended Bikeway Network Map – Sully District

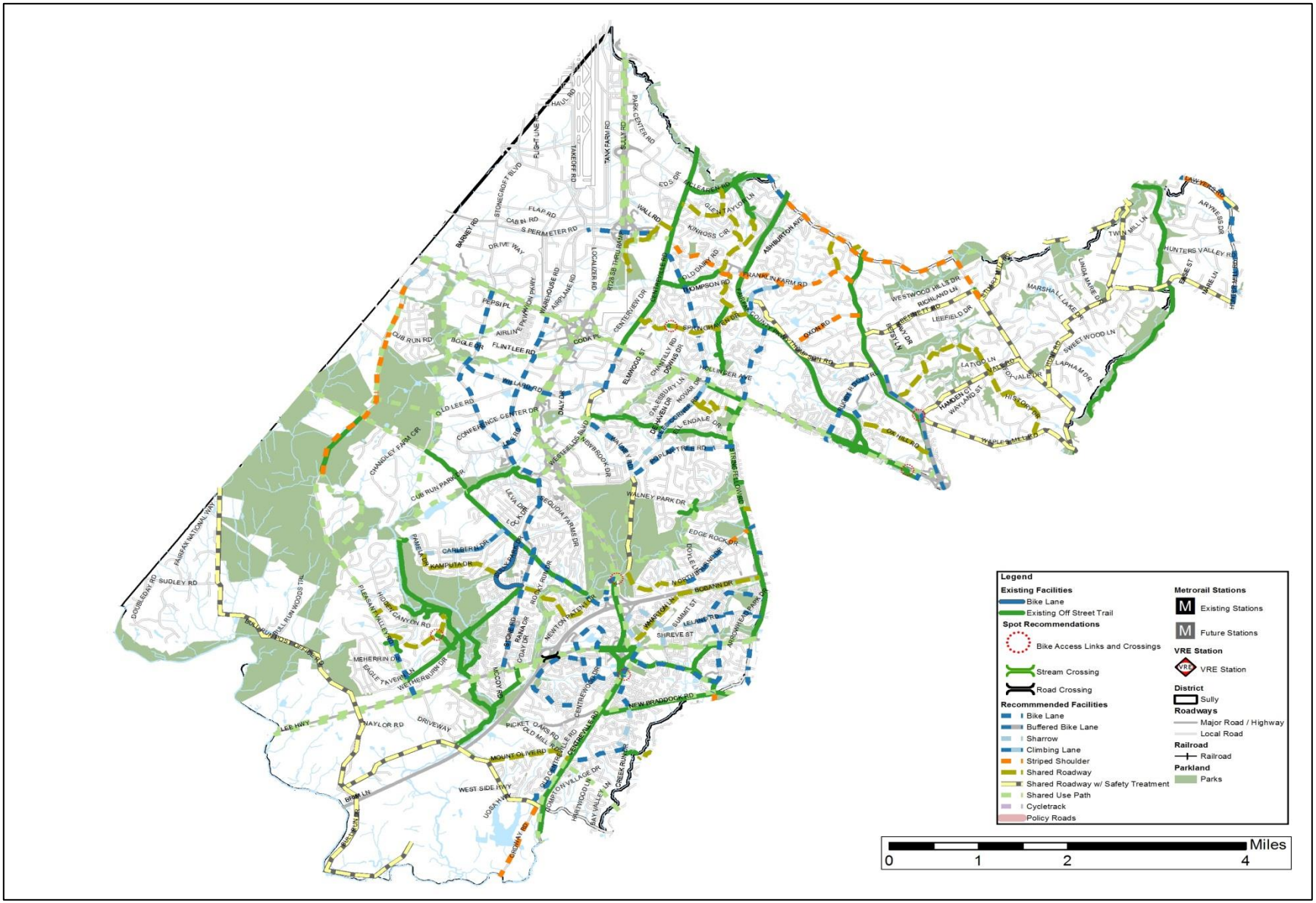
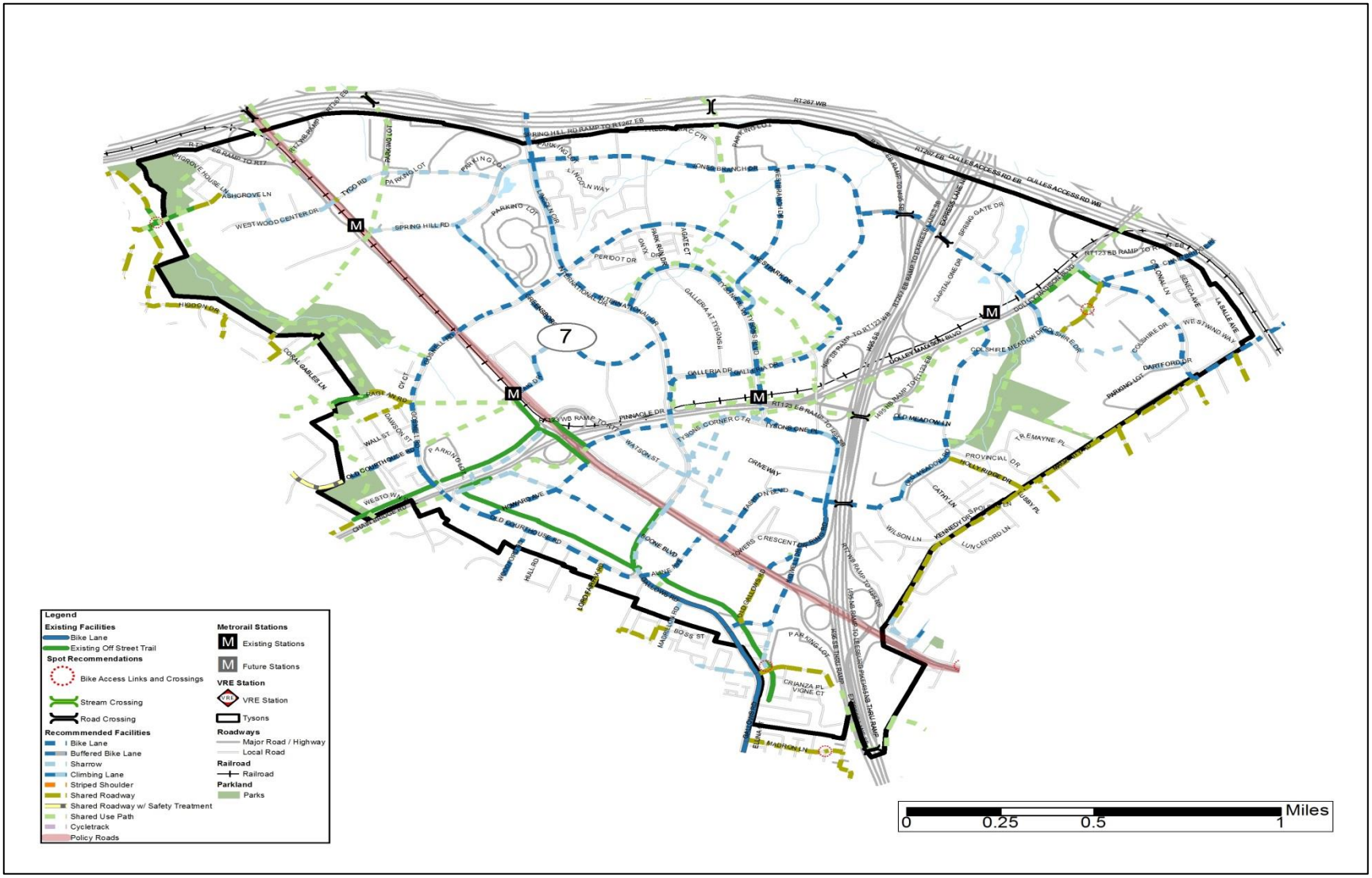


Figure 28: Recommended Bikeway Network Map – Tysons



3.5 Bicycle Facility Summary Table

All of the existing bicycle facilities (as of 2013) and bicycle facilities recommended as part of the Bikeway Network, are totaled countywide and by Supervisor District in the table below.

Table 3.2 Bicycle Facility Summary Table

	Supervisor Districts									
	Braddock	Dranesville	Hunter Mill	Lee	Mason	Mt. Vernon	Providence	Springfield	Sully	Countywide Total
Existing Facilities (as of 2013)	Units in Miles									
Bicycle Lanes	1.78	5.39	4.44	5.14	0.00	7.29	3.68	2.57	0.90	31.19
Shared-Use Paths	32.32	33.38	58.72	24.12	7.08	47.11	21.17	56.63	41.09	321.62
Major Bike/Pedestrian Bridges	0.00	0.00	1.00	0.00	0.00	0.00	2.00	0.00	0.00	3.00
Major Underpasses/Tunnels	1.00	0.00	2.00	0.00	1.00	1.00	0.00	0.00	0.00	5.00
Subtotal:	**34.10**	**38.77**	**63.16**	**29.26**	**7.08**	**54.40**	**24.85**	**59.20**	**41.99**	**352.81**
Recommended Bikeway Improvements	Units in Miles									
On-Road Facility Types										
Bicycle Lanes	26.08	23.46	43.40	26.65	20.17	33.48	29.98	23.24	29.80	256.26
Buffered Bicycle Lanes	6.07	0.54	0.07	1.37	0.00	0.30	1.88	8.41	1.28	19.92
Climbing Lanes	5.92	3.61	2.86	2.30	6.61	1.47	3.58	6.00	2.14	34.49
Paved and Striped Shoulders	0.93	7.08	11.59	1.68	0.00	13.41	0.30	5.02	9.45	49.46
Shared-Lane Markings	9.69	18.17	8.66	17.58	7.21	23.88	18.93	7.48	4.18	115.78
Shared Roadway with Safety Treatments	2.02	28.46	9.49	0.68	4.04	6.57	9.75	45.16	23.34	129.51
Shared Roadway	23.17	28.78	31.15	13.78	29.06	10.64	23.20	10.90	16.28	186.96
Subtotal:	**73.88**	**110.10**	**107.22**	**64.04**	**67.09**	**89.75**	**87.62**	**106.21**	**86.47**	**792.38**
Off-Road Facility Types										
Shared-Use Paths, New	17.75	16.64	6.13	7.39	4.36	12.53	17.04	11.16	24.72	117.72
Shared-Use Paths, Upgrade Existing	8.23	9.37	20.77	5.89	4.90	11.20	6.51	16.01	6.47	89.36
Cycle Tracks	0.00	1.93	0.46	2.50	7.79	7.07	2.01	0.00	0.00	21.76
Subtotal:	**26.05**	**27.94**	**27.36**	**15.78**	**17.05**	**30.80**	**25.56**	**27.17**	**31.19**	**228.84**
Policy Roads **Subtotal:**	**0.00**	**0.00**	**0.00**	**0.00**	**12.60**	**0.00**	**12.46**	**0.00**	**0.00**	**25.06**

Table 3.2 Bicycle Facility Summary Table (continued)

	Supervisor Districts									
	Braddock	Dranesville	Hunter Mill	Lee	Mason	Mt. Vernon	Providence	Springfield	Sully	Countywide Total
Recommended Spot Improvements	Units in Number of Locations									
Bridges, Underpasses, and Tunnels										
New Grade Separations (Major)	0	5	3	0	7	0	8	2	1	26
New Trails Bridges over Streams (Minor)	1	2	0	1	1	1	0	0	0	6
Upgrade Existing Bicycle/Pedestrian Bridges	0	0	1	0	0	0	2	0	0	3
Upgrade Existing Underpasses and Tunnels	1	0	2	0	1	1	0	0	0	5
Subtotal:	**2**	**7**	**6**	**1**	**9**	**2**	**10**	**2**	**1**	**40**
Access Improvements										
Small Bicycle Links	3	5	2	7	5	9	15		2	48
Trail Access Improvements	3	7	5	3		4	5	11	3	41
Transit Station and Park-and-Ride Improvements	3	2	6	5	1	5	6	2	7	37
Subtotal:	**9**	**14**	**13**	**15**	**6**	**18**	**26**	**13**	**12**	**126**
Intersection Improvements										
On-Road Intersection Improvements (Intersection Improvement; On-Road Crossing; and Policy Improvements, including Standard, Signal, and Complex)	25	49	37	48	70	31	75	50	51	436
Trail Crossing Improvements (Midblock, Trail Sidepath Crossing)	6	5	14	10	3	6	1	10	5	60
Interchange Crossing Improvements	1	6	4	1	3			2	3	20
Subtotal:	**32**	**60**	**55**	**59**	**76**	**37**	**76**	**62**	**59**	**516**

4 Bicycle Policy Recommendations

4.0 Bicycle Policy Recommendations

The field of bicycle transportation is evolving at a rapid pace. Many facility types introduced within the last decade have been adopted as best practices and are included in professional manuals and guides. This chapter includes the five sections developed to address topics and issues related to bicycle facility selection, implementation, and maintenance that incorporate best practices and professional standards.

4.1 PRINCIPLES

General principles governing development of the planned Bikeway Network.

This is Fairfax County's first comprehensive and detailed bicycle transportation plan. Nationwide, bikeway facility types and practices for designing bicycle accommodations into road and street infrastructure are undergoing rapid change. American cities are developing and adopting their own guidelines and standards for facility design through the National Association of City Transportation Officials. The American Association of State Transportation Officials (AASHTO) regularly revises and expands its bikeway planning and design guidelines to respond to evolving practices. Updates to the Manual on Uniform Traffic Control Devices (MUTCD) have adopted new bikeway signing and pavement marking options for use by state and local agencies. Moreover, U.S. communities are now implementing long-successful bikeway designs from Europe such as the cycle track, bicycle box, and bicycle-exclusive signals.

Fairfax County, while largely characterized as a suburban community is increasingly becoming urbanized. There is increasing demand to bicycle within many parts of the County where residential, retail, recreational, and employment land uses are in close proximity. However, large arterial roadways that provide direct access to and through these areas are not typically bicycle friendly. Many changes are needed on these facilities, but they cannot happen all at once. Additionally, there are many competing interests to balance in the process of allocating space for bicycle travel. While it cannot predict every need, or the best approach for balancing competing interests in every location, this plan sets a course for the change that needs to happen to make Fairfax County a bicycle-friendly community.

In this context, the following principles provide a solid foundation upon which a successful Bikeway Network can be developed:

1. The bicycle facility recommendations shown on the Recommended Bikeway Network Maps represent the facility type that should be installed. It is expected that the Bicycle Network will be updated on a five-year schedule and recommendations will be revised based upon existing conditions and the state of the practice at the time.

2. Fairfax County will build upon and take full advantage of VDOT's Bicycle Policy Plan.
3. To provide overall guidance regarding Bicycle Network development, Fairfax County will utilize the most current editions of the following guidance documents:
   - AASHTO Guide to the Planning and Design of Bicycle Facilities;
   - Manual on Uniform Traffic Control Devices (MUTCD);
   - VDOT's 2011 MUTCD Supplement;
   - VDOT's Road Design Manual – Volume I, Appendix A, Section A-5; and
   - The National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide
4. Given county law that permits bicycling on all sidewalks and paths, it is understood that whether or not a sidewalk or path is considered part of the Bicycle Network, it likely will be used by children/youth cyclists to get to and from school, and/or by other cyclists as a link to the Network. As such, it is recommended that the owning agency or entity be attentive to basic maintenance and its general condition.
5. Evaluate every roadway development project and land development proffer for its contribution toward achieving the goal of creating a connected network that is safe and functional for bicyclists from ages 8 to 80+.
6. Routinely consider and use new bicycle facility designs and treatments where appropriate; where prudent, formal experimentation should be undertaken when implementing new designs.
7. While flexibility is needed in bikeway design, flexibility should not be used for the purposes of providing "lowest-cost" facilities at the expense of cyclist safety and comfort and/or network continuity and connectivity.

In total, these principles help govern the decision-making process with regard to implementing bicycle network improvements and help ensure that each incremental project is viewed as a contributor to the overall goal of improving bicycling conditions for bicycle travel in Fairfax County.

4.2 ON-ROAD FACILITY SELECTION AND DESIGN

General principles governing on-road facility selection and design.

For on-road bikeways, facility selection and design are key decisions that will determine the overall character of the Fairfax County Bicycle Network. In most cases, this master plan has made specific facility recommendations. These recommendations are based on a planning-level assessment of what facility is generally feasible, and what facility is optimal based upon road and traffic conditions and likely levels of bicycle usage. Other factors such as maintaining continuity of a single facility type through connecting road segments, whether or not the road segment is part of a longer route, and the types of destinations served also factored into the recommendation.

Each facility recommendation is accompanied by an action or set of actions that are necessary to achieve the facility. These actions include the following: lane diet, road diet; widening the road; modifying on-street parking, and implementing traffic calming treatments in addition to the bikeway.

Extensive study of newer VDOT roadways revealed that there are many collector and minor arterial roads that are median divided 4-lane roads with curb and gutter. The cartway (curb-to-curb road space) for each direction of travel is normally 27-feet wide. Currently, these roads are striped with two 12-foot travel lanes; this includes a 1-foot inside lane offset (shy area) from the median, and a 2-foot gutter pan.

With a lane diet, these roads could be restriped to provide bike lanes, which would clearly indicate that cyclists are accommodated on the road and may be an important action to attract more cyclists. National research has shown that most bicyclists feel more comfortable in the road with a white line demarcating space that they can use. However, some cyclists also report that cars pass them more closely when there is a bike lane stripe than when they are sharing a wide outside lane. It also is true, that due to a lack of regular sweeping by VDOT, existing bike lanes in Fairfax tend to gather debris while shared lanes tend to be kept clear by motor vehicle use.

In the Master Plan, most of the roadways with this cross-section are recommended for bicycle lanes. However, due to the issues discussed above, Recommendation 4 below suggests that some experimentation with different cross-sections be undertaken. The results can be used to inform the development of criteria to guide utilization of a single solution, or variable solutions depending on road context and other factors.

In addition to the situation described above, reevaluation and reconsideration of the facility recommendations in this plan may be necessary due to any number of factors that could not be taken into consideration during the master plan process. This is to be expected. If facility selections need to be modified, the following recommendations should guide any changes made to the initial facility recommendations shown on the maps:

Recommendations

1. In general, bicycle accommodation with some type of striping or markings (i.e., bike lanes, striped/paved shoulders, or shared-lane markings in wide outside lanes) are preferred over unmarked wide outside lanes.
2. At a minimum, buffered bike lanes or wide (6- to 10-foot) shoulders should be provided on Bikeway Network roads with heavy volumes and/or speed limits at or above 40 miles per hour).
3. Removing on-street parking can be an appropriate action to provide an on-road bicycle facility, especially on streets which have greater vehicular parking capacity than demand.
   - Facilities that require modification to on-street parking in residential areas should be vetted with the affected property owners; in almost all cases the bikeway recommendation requires only a reduction in capacity, not elimination

of all on-street parking; alternating the side with parking block-by-block can both calm traffic and mitigate inconveniences.

4. VDOT and FCDOT should experiment with alternative typical sections: at least two bicycle facility design options for four-lane divided roadways with 26- to 27-foot cartways:
   - A 10- to 11-foot inside lane and 13- to 14-foot outside lane with a shared-lane marking; or
   - A 10-foot inside lane, 10-foot outside lane and a 5- to 6-foot bike lane with 3- to 4-foot of asphalt, exclusive of the gutter pan.
5. When sections of primary arterial roads are resurfaced or reconstructed in revitalization areas, and other areas seeking a traditional main street or urban downtown setting, they should be retrofitted as follows:
   - Posted speed limit of 25 miles per hour – Standard bike lanes or shared-lane markings;
   - Posted speed limit of 30 or 35 miles per hour – standard bike lanes;
   - Posted speed limit > 35 miles per hour – cycle tracks or buffered bike lanes; or
   - Continuous service roads with standard bike lanes or shared-lane markings.

   New, resurfaced, and reconstructed streets (collector and local) in revitalization or urban centers should have a speed limit of 25 to 30 miles per hour and accommodate bicycles using unmarked shared roadways, shared-lane markings, or standard bicycle lanes as is appropriate given their overall function in the Bicycle Network and roadway system.

   In all situations, if short-term (i.e., high turnover) parking is provided, due to the potential problem of cyclists being hit by a driver's side door being opened into the roadway, consideration should be given as to whether shared-lane markings or bike lanes may be the safest and best facility option.
6. The County will continue to develop a system of signed bicycle routes. As conditions on roads and trails along the route are determined to be consistent enough to support a signed route, future routes can be established.

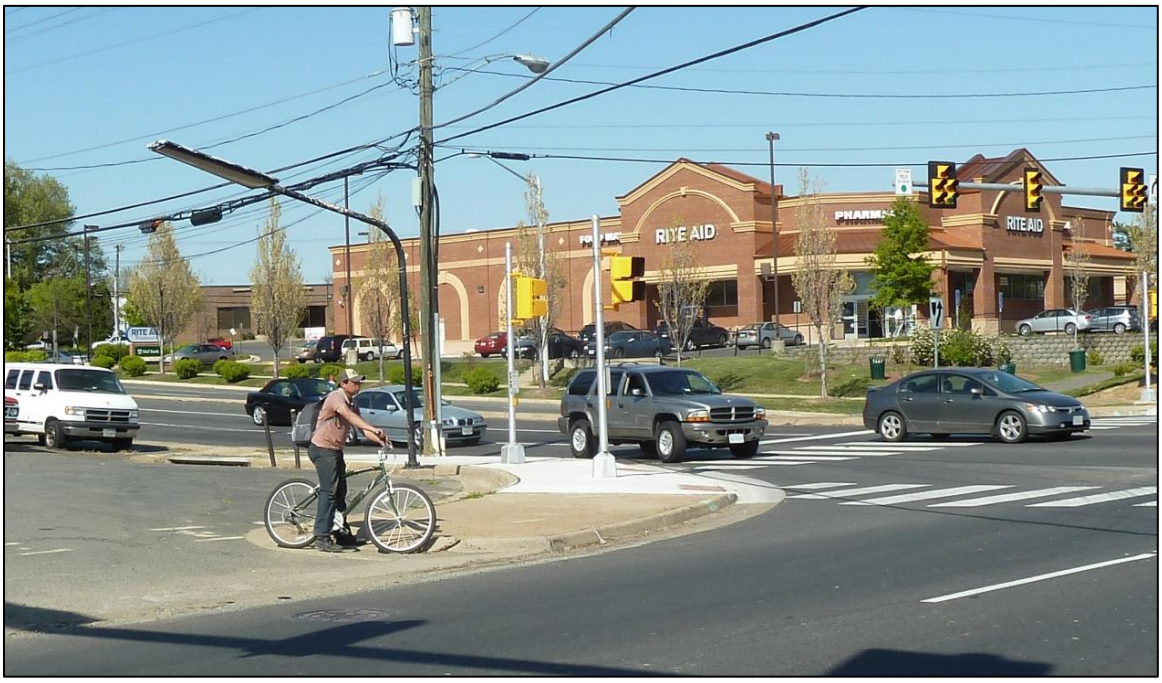
4.3 INTERSECTION AND INTERCHANGE POLICY RECOMMENDATIONS

Policy recommendations for accommodating bicycles at intersections and interchanges on VDOT roads in Fairfax County.

Public feedback gathered during the master plan public outreach process continually emphasized that intersections of arterial roadways in Fairfax County are often difficult for bicyclists to navigate. The Bicycle Advisory Committee (BAC) for the project emphasized this issue as well, and field work confirmed that very few intersections of multilane roads have any type of bicycle accommodations.

Interchanges, where arterial roadways cross limited-access highways, present an even greater challenge for cyclists. It is extremely difficult for cyclists using the arterial roadway to cross entrance and exit ramps. Cyclists using the sidewalks also have difficulty crossing the ramps at pedestrian crossings due to high vehicle speeds and long waiting periods for a safe gap.

Many intersections and interchanges in Fairfax have become barriers to today's bicyclist, as well as those who might choose to bicycle in the future. Improving bicyclists' safety and providing accommodations at intersections and interchanges is critical for the county to reach its goals for increased levels of bicycling.



Bicyclist attempts to cross at an intersection

Source: Toole Design Group.

Intersection and interchange accommodations also are important to improve safety for bicyclists and motorists. It is well understood that most bicycle crashes involving motor vehicles occur at intersections, interchanges, or commercial driveways. These are the primary locations where vehicles and bicycles cross paths, and a wide variety of factors contribute to high numbers of crashes and the severity of crashes at these locations. A focus on improving intersections may be the single most important action to take in the effort to achieve the goal of reducing bicycle crash rates and the severity of injuries resulting from crashes.

Deficiencies that are typical at large intersections include the following:

- Right turn-only slip lanes that allow motorists to make right-turn movements at high speeds. It is difficult for motorists to yield to pedestrian and cyclists attempting to cross a ramp when they are traveling high speeds.
- Lack of transition striping and pocket bike lanes (or shoulders) for bicycles to move from the right edge of the road to the left side of a right-turn lane.

- Widened intersections (two-lane roads widen to three to five lanes at intersections) thus requiring left turning cyclists to merge left across one to three lanes of traffic.
- Lack of bicycle detection at actuated intersections with minor roads where signals provide a green light only when a motor vehicle is present and waiting on the minor road, to cross or enter the major road.
- Lack of crosswalks and pedestrian signals at all legs of an intersection.
- A lack of curb ramps or the presence of substandard curb ramps at intersection corners which impact safe bicycle travel.

Extensive dialogue with VDOT traffic engineers took place during the plan development process. It was noted that the MUTCD and AASHTO reference guides include treatments and facilities for bicycle travel and safety that are not yet common practice in Northern Virginia. While there is general agreement among the traffic engineering community, the Master Plan's BAC, current bicyclists and potential bicyclists that intersection improvements are key, it is also understood that it will take time and resources to retrofit the many intersections and interchanges in the county. The following recommendations for addressing the significant bicycle safety issues associated with crossing intersections and interchanges were developed as an outcome of the dialogue with VDOT and the Master Plan's BAC.

1. It is recommended that VDOT implement bicycle detection (or bicyclist accessible actuation) at all signalized intersections in the designated Bikeway Network, unless they provide green time for each leg on a routine cycle.
2. VDOT should upgrade pedestrian signals and crosswalks to include all legs of the intersections on Bikeway Network routes designated by the Master Plan.
3. Bicycle facilities and regulatory/warning signs to improve bicyclist safety through intersections should be provided as a part of all intersection improvement projects at Bikeway Network intersections or as a part of linear roadway improvement projects, including or approaching a Bikeway Network intersection.
4. VDOT should coordinate with the Northern Virginia Regional Park Authority (NVRPA) and Fairfax County Park Authority to ensure clear, consistent and effective safety treatments at signalized and unsignalized mid-block trail/roadway crossings along the W&OD and other major trails under their respective jurisdictions.
5. As a minimum standard, VDOT should provide appropriate at-grade crossing accommodations for all Transportation Trails that cross free-flow highway entrance and exit ramps. For additional recommendations related to trails and crossings, see Transportation Trails section of this chapter.
6. VDOT should experiment with colored bike lanes to address safety and accommodation at locations creating vehicular conflict; where on-road cyclists must cross free-flow exit and entrance ramps and develop criteria for ongoing application of this treatment.

4.4 NEW FACILITIES AND ACCOMMODATIONS

New Facilities and Accommodations – Shared Roadway with Safety Treatment and Cycle tracks

The network of bicycle facilities recommended in this Plan is composed primarily of standard accommodations and treatments, found in National and state standards and guidelines, including the AASHTO Guide to the Planning and Design of Bicycle Facilities, and the latest Manual on Uniform Traffic Control Devices (MUTCD), VDOT's 2011 MUTCD Supplement, and VDOT's Road Design Manual, the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, Volume I Appendix A, Section A-5.

Some of these treatments, such as the Shared-Lane Marking and colored bike lanes (green), have been added to the national "toolbox" over the past 10 years. While they have been utilized and studied in communities across the country and adopted into national transportation design guidance documents, they are new to Fairfax County.

There are two treatments recommended by the plan for a variety of locations throughout the County that have not yet become standard options in the national "toolbox." These include Shared Roadways with Safety Treatment and Cycle Tracks.

Shared Roadways with Safety Treatment

During the planning process, a new facility category was created called "shared roadways with safety treatment" to address safety needs for cyclists along two-lane roads ways that lack curb and gutter, relatively narrow travel lanes, and little to no shoulder. A roadway where this treatment is recommended typically has a combination of the following design elements:

- Two 10- to 12-foot paved travel lanes;
- No or minimal shoulder, unpaved;
- Double yellow centerline stripe;
- Posted speed limit of 35 miles per hour or greater; advisory speed limits of 30 miles per hour or less on sharp curves;
- Traversing hilly terrain and crossing numerous streams;
- Drainage ditches and mature trees on the edge of the roadway;
- Horizontal and vertical curves contributing to poor sight distances;
- Low-density residential land use; and
- Forested and/or rural residential landscape.

During the planning process, both regular and infrequent cyclists identified roads with these characteristics as uncomfortable and potentially dangerous for cyclists. Moreover, many motorists would concur that they seem dangerous for bicycling. Due to the hills, which slow cyclists down and the periodic curves and poor sight distances, it is easy for a motorist to come upon a cyclist from behind with little or no warning. The lack of a

paved shoulder requires cyclists to use the travel lane, and thus motorists must decelerate quickly and determine when it may be safe to pass.

Study of the County's entire road system revealed that there are many roads like this that people would like to use for bicycling, but rarely or never do, due to these safety issues. Due to a lack of overall street connectivity, many of these roads do not have an alternative or parallel route. There are many other roads in this category in very low-density residential areas that are very attractive for recreational cycling, especially during weekday mornings or weekends when traffic volumes are relatively low.

Because these roads are legally open to bicycling and the need for safe bicycle access will only increase, this Plan recommends that new approaches be developed to increase both safety and mutual respect for cyclists and motorists who must share these public thoroughfares. The County recognizes that while some of its roads are rural in character, it has become a fully suburban/urban community where safe multimodal access to all streets and roads is an essential element and that for a variety of important reasons many of these roads will not, or cannot be widened over their entire length. Nonetheless, during this planning process a number of important treatments were identified that can enable all road users to safely and more effectively share these roads.

Recommendations

VDOT should consider developing a new approach for roads indicated in the adopted plan as Shared Roadways with Safety Treatments, including any or all of the following:

- Utilize existing signs, such as the BIKES MAY USE FULL LANE sign, and available flexibility in the MUTCD to develop a proactive approach to bicycle safety on two-lane "rural" roads;
- Ensure that sign messages are unambiguous and have separate messages directed to motorists and cyclists, explaining why and how all users must share the road;
- On hills, in the uphill direction, add passing lanes, i.e., short segments of shoulder where a cyclist can pull to the side and let a line of cars following them to safely pass; and/or
- Implement other strategies to educate the motoring and bicycling public how to drive safely and respect all road users along road segments with "safety treatment" signage.

Cycle Tracks

While Fairfax County is identified as a suburban jurisdiction, it is becoming urbanized in strategic locations, and has consciously chosen to create more traditional urban centers such as Tysons, Merrifield, Reston and others. Because cities across the United States are reorganizing their downtown streets and other urban arteries to more effectively provide space for bicycling, it makes sense for Fairfax County to look to U.S. cities for direction. Fairfax County has a unique opportunity, prior to the full build out of its new urban centers, to plan in advance for the most effective urban style bikeways, which are known as cycle tracks.

Cycle tracks are dedicated bicycle facilities that physically separate bicyclists from motor vehicle traffic and pedestrian traffic. By design, they provide for the efficient movement of large volumes of people regardless of which mode they choose, including bus or rail transit. By providing faster-moving bicyclists their own dedicated space, conflicts with pedestrians on sidewalks are reduced, and by separating bicyclists from motor vehicles, a wider range of cyclists are attracted to this mode of travel. Special designs are used to address potential conflicts with transit vehicles and transit patrons waiting at stops, as well as locations where the modes must cross paths, such as at intersections.

While cycle tracks are still in the experimental stages in the United States, they are well proven in many European cities, and have contributed to creating urban mode splits for bicycle transportation in the 20-40 percent range in Dutch, Danish, German, and other European cities.

In U.S. cities, as in Europe, cycle tracks are being implemented as retrofit projects. Roadway space, formally allocated to moving motor vehicle traffic or parking must be shifted to bicycle space, while at the same time maximizing space for pedestrians and light-rail or bus transit. Fairfax County has a unique opportunity to include these facilities in the initial transformation process from suburban to urban land forms, and not have to retrofit them at a later date, when it will be much more difficult to do so.

Recommendations

The plan has identified a number of large arterial roadway segments in areas where existing or future zoning and other land use and transportation factors suggest that cycle tracks will be the safest, most attractive and most efficient bikeway accommodation possible.

- Cycle tracks will be included in the toolbox of facilities that are provided in Fairfax County.
- Cycle tracks will be the most desirable bicycle facility type for use on roadways such as International Drive in Tysons. They also will be the most desirable facility along arterials in other urbanized and revitalization areas such as U.S. 1 in Mount Vernon, in Annandale, Bailey's Crossroads, Seven Corners, Merrifield, and potentially others.
- Cycle tracks can be configured and designed in a variety of ways. Due to the need to address transit access, driveways, intersections, street trees, adjacent land uses, and right of way impacts, care should be exercised in the design and construction of all cycle tracks.

4.5 TRANSPORTATION TRAILS

General principles governing designation, development and design of the Transportation Trail component of the Bicycle Network.

The Master Plan identifies a select set of trails, both existing and proposed, for inclusion in the Bicycle Network as Transportation Trails. These include major trails along roadways, many stream valley trails, trails within utility corridors or along railroad

rights of way, and many short connecting paths for their potential contribution to a connected Bicycle Network. This designation will enable the county to begin prioritizing existing trails for maintenance and capital improvements, and investments in new trails that will serve both transportation and recreation needs.

Fairfax County has over a thousand miles of shared use paths, park trails, and sidewalks. They are used by bicyclists, pedestrians, people with disabilities, joggers, in-line skaters, equestrians and others for both recreation and transportation. Trails are owned, managed and maintained by any number of agencies within the county including the Department of Public Works and Environmental Services, the Fairfax County Public Schools, VDOT, Northern Virginia Regional Park Authority (NVRPA), Fairfax County Park Authority, homeowner associations, and private property owners. This plan did not complete a comprehensive assessment of all of the trails in the county, nor did it accomplish a formal update of the 2002 approved Countywide Trails Plan. It did however evaluate major trails along roadways, many stream valley trail systems, and many short connecting paths for their potential contribution to a connected Bicycle Network.

Character of the Transportation Trail Network: The Transportation Trail network in the Master Plan includes primarily four types of shared-use paths:

- Sidepaths along roads; these tend to vary considerably in design, age, character, and condition;
- Select park trails within stream valleys and parks managed by the Fairfax County Park Authority or the Northern Virginia Regional Park Authority (NVRPA);
- Short segments of path that may be owned by Homeowner Associations (HOA), municipalities, commercial or residential property owners, or other institutions, but clearly allow public access;
- Select sidewalks that have been identified as key for maintaining continuity in the overall Bicycle Network; and
- Included among these path types are both major and minor bridge and underpass structures providing connectivity to major barriers (for example, I-495, Dulles International Airport Access Road (DIAAR) and Dulles Toll Road, and stream channels).

Field work for this plan, consultations with Fairfax County Park Authority staff, review of GIS data and hundreds of comments from the public identified a number of deficiencies in the trail network. These included the following:

- Unsafe and difficult street crossings;
- Deteriorating trail surfaces;
- Discontinuity of paths and sidewalks and/or neighborhood streets;
- Lack of all-weather surface and all-weather stream crossings;
- Lack of wayfinding signage;
- Lack of buffering from high-speed travel lanes;

- Lack of width to safely accommodate user volumes and mix of users;
- Lack of maintenance of vegetation; and
- Lack of lighting.

Policy, Facility Design, and Program Recommendations

The following policies provide a framework for creation and management of the Transportation Trail network.

- Shared Use Paths (Sidepaths and Park Trails) identified in the Plan are designated Transportation Trails.
- Transportation Trails are eligible for Federal, State and local transportation funding.
- Where sidepaths (a shared use path adjacent to a roadway) are provided along roads where *there are no on-street facilities*, they should be provided on both sides of the street. Where it is infeasible to provide sidepaths on both sides of the road, a single sidepath should be provided consistently on the same side of the road and not alternate in contiguous roadway segments.
- Shared Use Paths in the Transportation Trail network should be designed and constructed to meet VDOT and VDRPT standards. On high volume divided roadways, parallel shared use paths should be evaluated.
- All curb ramps at crossings will be designed and constructed providing the full width of the trail.
- All Transportation Trail crossings at signalized intersections will have countdown pedestrian signal heads or bicycle signals.
- Wayfinding guidance should be included along all Transportation Trails.
- In conjunction with Northern Virginia Regional Park Authority and the Fairfax County Park Authority, VDOT and FCDOT should develop and implement trail/roadway intersection design standards and guidelines that facilitate safe use of intersections, encourage road and trail user compliance with the law, are clear and equitable for trail users and motorists, and enforceable by Fairfax County Police.
- More than 70 trail access and bicycle link improvements are identified in the plan, most of which are low cost improvements. They will address safety and connectivity needs.
- As funding is made available, Transportation Trails should be considered a priority for upgrades, treatments, and management policies that will increase their safety and functionality for transportation use.
- Implementation of specific upgrades to transportation trails will require consideration on a case by case basis.
- Within the framework of Transportation Trails described above, Fairfax County should develop a plan for managing a smaller, very select set of trails for high priority transportation use; which would mean a higher level of maintenance and

permission of nighttime use. Development of this plan should involve representatives of all necessary agencies, departments, and jurisdictions including but not limited to; the Fairfax County Department of Transportation, the Fairfax County Park Authority, the Northern Virginia Regional Park Authority, the Towns of Vienna and Herndon, the Virginia Department of Rail and Public Transportation, VDOT, and others as required.

- The Tysons area could be used as a test case where a select set of transportation trails and pathways can be identified for application of maintenance and management practices that will offer a higher level of service for cyclists and other trail users. This test case would be coordinated with The Tysons Partnership, the Department of Planning and Zoning, and the Office of Commercial Revitalization.
- A higher level of service could include the following:
  - » Providing lighting to enable trails to be open and safely used before dawn and after dusk, especially in Fall, Winter and Spring months.
  - » Providing snow removal to enable trails to be safe and passable within a few days after a winter storm.
  - » Providing reflective edge striping and supplemental signage ensuring that all potential obstructions and fixed objects (such as bollards) are delineated.

5 Bicycle Program Recommendations

5.0 Bicycle Program Recommendations

To achieve the vision of the Master Plan, bicycle facility and infrastructure improvements will need to be complemented with programs and initiatives that encourage bicycling, educate users on safe behavior, and enforce traffic safety laws. Five sections were created to provide guidance and recommendations for a robust and comprehensive bicycle program in Fairfax County and they are included in this chapter.

5.1 DEVELOP AN ENCOURAGEMENT PROGRAM – "BIKE FAIRFAX"

"Bike Fairfax" program development, objectives, and organization.

Throughout the planning process, the public and the Bicycle Advisory Committee (BAC) voiced support for a bicycling encouragement and education program. BikeArlington provides a good model for Fairfax County in coordinating and carrying out encouragement tasks. Fairfax County Department of Transportation (FCDOT) Bike Program staff reviewed the BikeArlington program and it was included as one among 18 options for Early Initiatives that were subject to an informal vote by those who attended the two countywide public meetings in June 2012 and the June 2012 BAC meeting. Bike Fairfax was the top initiative favored by the public and one of the top initiatives favored by the BAC.

As BikeArlington became more fully understood, it was recognized that the program would be effective at both encouraging more bicycling as well as conducting bicycle safety education, especially for cyclists. A Bike Fairfax program should be structured to address the goals of the Bicycle Master Plan.

Bike helmet fitting event
Source: FCDOT.

Currently, FCDOT Bike Program staff addresses all aspects of a bicycle program: planning; engineering; education; encouragement; and evaluation and are a liaison to the police for enforcement issues. A program such as Bike Fairfax would provide a more effective approach for education and encouragement programs which require different skill sets than those needed for planning and engineering the physical bicycle network.

A Bike Fairfax program would undertake the following list of program tasks:

1. Provide bicycle commuting support and information to employers and employees and coordinate those efforts with FCDOT transportation demand management (TDM) staff.
2. Promote bicycling for non-commute trips.
3. Coordinate and host countywide bicycle encouragement events, such as those during Bike-to-Work Month, regional Bike-to-Work Day, etc.
4. Organize local bike promotion events with shopping centers, large employers, health care institutions and agencies, special events, festivals, the Fairfax County Park Authority.
5. Promote the bicycle parking installation program.
6. Coordinate with the Towns and Cities within Fairfax County, as well as other institutions such as the Department of Defense, National Park Service, and Fairfax County government agencies to promote biking as a safe and reliable transportation choice in the County.
7. Organize and offer classes that teach hands-on bicycling skills and rules of the road to a wide variety of constituencies within the County.
8. Serve as a clearinghouse for skills and safety education training opportunities offered by other programs in the County.
9. Provide a web site and serve as a source of bicycle-related news and events. The Bike Fairfax web site could provide public access to the following:
   a) Maps, routes and rides and a Bicycle Facilities Toolbox;
   b) Fairfax Bicycle Forum (Q&A);
   c) Fairfax County Bicycle-Friendly Business Program (which could be established);
   d) Information about commuting by bicycle and recreational riding;
   e) Safe Routes to School;
   f) Event Calendar;
   g) General educational and safety information; and
   h) Information on Bikeshare (when Bikeshare comes to Fairfax).

Potential Structure of Bike Fairfax

BikeArlington functions as a program of Arlington County Commuter Services, within the Department of Environmental Services. Like BikeArlington, Bike Fairfax should have a dedicated staff, separate from the FCDOT Bike Program staff. The program could be housed in the FCDOT or another appropriate county agency. It would require its own funding to support program administration, marketing materials and events. Bike Fairfax Staff would be part of a BAC if one is established.

Bike Fairfax would be coordinated with existing County TDM programs such as Fairfax County Commuter Services, the Employer Services Program and related agencies/ organizations to integrate biking as a realistic commuter transportation option.

A sustainable funding source is needed to support the Bike Fairfax Program. Possible sources include: County transportation funds, TDM contributions from developers and major employers, and Federal Congestion Mitigation Air Quality funding (Federal dollars dedicated to transportation expenditures that reduce congestion and contribute to improved air quality).

5.2 BICYCLE SAFETY EDUCATION

Recommended program strategies for enhancing bicycle safety education.

At many of the public meetings conducted for this plan participants commented on the general lack of understanding of the rules of the road and safe bicycling practices. Some cited their own lack of understanding and others commented upon the apparent lack of knowledge among cyclists and motorists they observe using the roads. In a number of the focus group meetings conducted as a part of the planning process, a similar lack of understanding was cited by educators, cycling advocates, and law enforcement officers.

Specifically, cyclists frequently report that the lack of respect shown to them from motorists is one of the most intimidating factors related to bicycling in the County. Motorists often express concern about the apparent disregard they see cyclists exhibit for traffic laws and "rules of the road." To improve conditions and promote multimodal harmony on streets and roads, there is a clear need for increased understanding of safe cycling behaviors and the "rules of the road."

Fortunately, in recent years, reported bicycle/motor vehicle crashes have been relatively low, and cyclist deaths are not common. Bicycle crashes involving motor vehicles tend to be the only crashes reported to police, however as is the case for local jurisdictions across the country, a many bicycle crashes go unreported because they do not involve motor vehicles. It also is suspected that there are many bicycle/motor vehicle conflicts that do not result in a crash (a "near miss") but none-the-less are indicative of real and present safety problems. Moreover, they likely contribute to tensions that may exist between motorists and cyclists in the County.

The Fairfax County Police track reported bike crashes and make some of the information available on their web site.[9] Examples of this data are presented in Table 5.1.

Table 5.1 Fairfax County – Bicycle Crash Data Example

	2010	2011	2012
Total reportable crashes involving a bicycle	86	85	106
Reported bicycle fatalities	4	0	1
Hit-and-run crashes involving a bicyclist; motorist fled	5	6	2
Bicyclist held at fault (percentage)	52%	52%	35%

[9] http://www.fairfaxcounty.gov/police/traffic/bike_crashes_2011.htm.

- While reportable bicycle crashes increased in 2012, the percentage at which the bicyclist was held at fault fell significantly in 2012 from 52 percent in 2010 and 2011 to 35 percent.
- Recorded bicyclist fatalities have been decreasing since 2010.
- Reported incidents of hit-and-run crashes also have been decreasing since 2010.
- Failing to yield the right-of-way is cited most often as the leading cause of most crashes, whether fault is attributed to the cyclist or motorist.

The programmatic action steps needed to address the bicycle safety and educational needs of a variety of constituencies in Fairfax County, including the following:

- Youth bicyclists (K-12);
- Adult bicyclists (college students, immigrant populations, new commuters, seniors, etc.);
- General motorists; and
- Professional drivers (of trucks, fleet vehicles, buses, and driver's education instructors).

Recommendations

Increasing numbers of people are bicycling throughout the Washington metropolitan region. Intensifying efforts in the area of bicycle safety education may be one of the best ways to prevent increased numbers of crashes as overall exposure increases. With better bicycle safety education, Fairfax County can keep crashes, injuries, and deaths low as people begin to choose bicycling for transportation more frequently.

After reviewing a wide range of approaches recommended by the public and various participants in the focus groups, the Bicycle Advisory Committee for the project identified two key strategies for effective bicycle safety education: a) maximizing use of the public school system because over time, the vast majority of the County population will be reached; and b) using public awareness and enforcement campaigns that focus on road sharing and crossing issues related to motorists and bicyclists.

- Support implementing Fairfax County Public Schools' health education bike safety lessons in all elementary schools and work with Fairfax County Public Schools to provide bicycle safety education at all levels.
- Work with the Department of Motor Vehicles to update the Virginia Driver Education curriculum to include types of road facilities and roadway markings for cyclists and include instructions on how to safely maneuver around them such as Bike Lane; Buffered Bike Lanes; Shared-Lane Markings; Climbing Lane; Shared Roadway; Shared Roadways with Safety Treatment; Side Path; and Cycle Track.
- Focus public education campaigns on the issues surrounding motorists and bicyclists sharing of the road and participate fully in the regional Street Smarts Campaign, which coordinates education and enforcement efforts relative to bicycle, pedestrian, and motorist safety.

- In conjunction with the Northern Virginia Regional Park Authority (NVRPA) and Fairfax County Park Authority conduct a trail user and motorist education campaign related to safety at trail/roadway crossings, and other trail safety issues.

Additional Education Initiatives to Consider

- Consider working with private providers for defensive driving and other private vendor driving schools to include bicycling in their curriculum. Drivers education should teach the relationships of everyone on the roadway (and paths), such as who is entitled to what space, right-of-way, and general guidelines for interactions.
- Programs are needed to specifically address immigrant drivers at all income levels to ensure that when they bicycle they understand Virginia's bicycle rules of the road, and when they are a motorist they understand how to share the road safely and respectfully with bicyclists.
- Consider including bicycle safety education as part of English-as-a-Second-Language (ESL) classes for both youth and adults.
- Include parents in educating children about safety issues. Parents can be helpful as volunteers and as support to visiting police staff, and advocates for the importance of bicycle safety.
- Reach out to parents via schools – Safety Night and Back to School Night are two great opportunities to talk to parents about safe bicycling as a family.
- Create and disseminate public service announcements using a variety of media outlets.
- Reach out to community anchors such as churches and non-English language newspapers to promote safe bicycling practices in areas with large ethnic populations.
- Schools promote health at home with different monthly themes – Explore opportunity to include biking as a possible theme.
- Partner with community organizations, health educators, events and fairs, churches, sporting and activity groups, and non-profit organizations to schedule classes, bike rodeos, and demonstrations.

5.3 SCHOOL TRANSPORTATION

Bicycle Network and program recommendations to improve bicycle access to schools and through school grounds.

In Fairfax County schools serve as community centers that generate short neighborhood-based trips. These trips include students, faculty, and staff traveling to and from schools, and also trips associated with after school activities, night meetings, and special events. Fairfax County has one of the largest school districts in the nation. As of the 2012-2013 school year, Fairfax County Public Schools (FCPS):

- Have 196 school/center facilities. Is projected to serve approximately 181,510 students.
- Encompasses a service area covering approximately 395 square miles.
- Employs 22,779 full-time employees.
- Is responsible for 1,520 buses which transport 110,000 students daily along 6,500 routes; and
- Generates approximately 200,000 total daily trips to and from schools.

The size of the school system and the geographic area that it covers make the transportation challenges and resulting impacts significant. A broad cross-section of stakeholders is engaged in school transportation issues, including parents, administrators, staff, and students. People with no direct connection to schools also are impacted because school area and neighborhood congestion, parking impacts, and traffic safety affect the entire community. Additionally, the American public is becoming aware of the widespread problems of childhood obesity, caused in part by decreased levels of physical activity among young people.

Current activities and initiatives reflect a growing desire to find sustainable and safe solutions to these transportation challenges. For example, a Safe Routes to School Working Group has been meeting throughout the 2011-2012 school year and includes a diverse range of participants. An important outcome of the group's efforts was a change in school policy to make the decision to walk or bike to school one that parents are responsible for, as opposed to one made by school administrators.

At the same time, VDOT is continuing to develop its statewide Safe Routes to School program, which will provide support and assistance for infrastructure and programs to support walking and biking to school. The National Center for Safe Routes to School recently hosted a training workshop in Fairfax County in which more than 40 people participated. Importantly, the desire to provide more transportation options to and from school also is coming from the "bottom up." For example, parents, advocates and school staff recently spearheaded the first annual Bike-to-School Day event in which 20 Fairfax County schools participated. As of 2014, over 35 schools participated.

Transportation Challenges

Current school-related transportation challenges are large and varied. Shifting trips to the bicycle mode will not solve all of the problems; however it can contribute to improving conditions. Student trips shifted from parent drop-off or bus trips will reduce congestion around schools, improve the health and lifestyle of students, and help reduce the need for costly bus transportation. Teacher and administrator trips will help in the same way, as well as providing a positive lifestyle model for students. Moreover, parents, students, and other members of the public attending events at schools should be able to get to schools by bicycle and find secure bike parking there. However, embracing the bicycle as a means to travel to and from school may be as important symbolically, as it is practically, because it will demonstrate that the adult community is committed to encouraging sustainable transportation choices to future generations.

Following is a detailed list of how bicycling to and from schools can contribute to solving school transportation issues and help the County at large meet its goals to increase bicycling for transportation.

- As the largest single employer in the county, and as one of the largest school districts in the nation, the schools account for a significant share of daily trips, especially in the morning peak period. Nationally, school trips are estimated to be 10-15% of all morning peak period trips.
- Bicycle trips that replace parent auto drop-off and pick-up at schools will reduce hidden costs to the county and its residents, including: drop-off area maintenance costs and staffing by crossing guards, school staff, police and/or volunteer parents to ensure order and safety.
- Parent drop-off and pick-up, as well as other trips to schools often create traffic congestion because the motor vehicle traffic movements overwhelm the capacity of the roadway system. This increases the risks of crashes that may involve students, especially those on foot or bike. Students that already choose to walk or bike to school have a right to a safe and comfortable environment.
- Due to the proximity of many schools within residential neighborhoods, parent drop-off and pick-up trips generate high volumes of motor vehicle traffic (and sometimes high speed traffic) on small residential streets spreading safety risks throughout the neighborhood.
- Increases in bike trips to schools will also help reduce parking demand at schools, which can overflow onto neighborhood streets surrounding schools, causing inconvenience for local residents. In some cases, this happens on a daily basis, in other cases, it is related to the number of motor vehicle trips generated by sporting events or other periodic school or community events taking place at school facilities.
- Throughout the planning process for the Master Plan many school locations were identified where traversing school grounds by bicycle is key to overall bicycle transportation needs. People living in residential communities bordering school grounds typically must circle the school on their bike to get to the school itself or to travel to other destinations. Cyclists often desire to pass through school grounds to achieve a convenient and time efficient bicycle trip. It will be imperative that schools maintain campus security during school days. As such, schools may be required to block applicable through campus access points during school days. It should be noted that these are only the access points on/through school property and do not include street right-of-way sidewalks/trails.

The task of increasing bicycle trips to schools is not without its own challenges.

- FCPS staff have reported that addressing school transportation issues is difficult because VDOT owns and controls the roads around the schools; coordination between FCPS, FCDOT, and VDOT is critical.
- Bicycling to/from school can be a challenge for teachers, administrators, and staff because of the expectations placed upon them to be presentable and dressed in a professional manner; thus access to convenient showers and changing facilities and

the time to make this transition would be needed to facilitate bicycle use for many adults working at schools.

- It is important to note that the size and type of school (Elementary, Middle, High, or Special Education) has a significant relationship with the numbers and types of trips it generates; and thus the potential to convert motor vehicle trips to bicycle trips.
- FCPS surveys about school traffic have shown that convenience is most often cited by parents as the reason they choose to drive their kids to school in the morning.

Recommendations

In order for bicycling to be a viable and safe transportation choice, coordinated infrastructure improvements will be needed. FCDOT, FCPS, and VDOT will need to make improvements that are linked together to provide linear "door-to-door" networks of facilities, including bicycle parking at the school. Bike-related infrastructure improvements will lead to improved safety for all modes, including pedestrian, school bus, and motor vehicles. Improvements to infrastructure must be supported by a range of education and encouragement activities. As schools are increasingly seen as a hub for bicycle activity, the desire to travel to and through school grounds as a part of neighborhood-oriented trips will increase. It will be imperative that schools maintain campus security during school days. As such, schools may be required to block applicable through campus access points during school days. It should be noted that these are only the access points on/through school property and do not include street right-of-way sidewalks/trails.

- Recommend bicycle parking (preferably covered) at all school facilities. The quantity and quality of bike parking to be provided at schools should be determined based upon the Fairfax County *Bike Parking Guidelines* referenced above.
- Recommend spot improvements (including new and upgraded pathway segments) on school properties to improve bike access to and through school grounds as appropriate; prioritize other bicycle infrastructure improvements near middle and high schools as those schools develop interest in promoting biking to the school.
- Recommend the continued expansion and institutionalization of the bicycling component of Safe Routes to School (SRTS) activities for all schools in the system, K-12; recommend that these activities address all key components of SRTS programs, including bike safety education, encouragement, enforcement, engineering, and program evaluation.

Additional School Transportation Recommendations for Consideration

- Develop leadership and advocates at the local school level.
  - Continue to develop, encourage, and promote the success of small pilot projects that encourage student biking to school; such as "bike trains" and "walking school buses."
  - Provide resources for parents, teachers and school administrators that will raise their knowledge base in two areas—a) bicycle safety education and

encouragement for children, and b) identification of "age/skill-appropriate" bike routes to a particular school.

  - Advertise and promote biking to school with parents; use routine school parent communication methods (back to school nights, flyers in back packs, etc.).
  - Increase publicity about small groups of parents and students that are biking to school.
  - Because adults (teachers, administrators, staff) working in the FCPS system are role models for the students, there is potential for modeling of green transportation choices such as bicycling to the school.

- Develop a contest – a multimodal time challenge for making a trip to school.
- Identify local SRTS program leadership.
- Establish the current walking and biking mode share systemwide and at the school level.
- Identify current bus routes that might be able to be eliminated with specific walking and biking-related improvements.
- Restore funding for school sidewalk/trails projects.

5.4 LAW ENFORCEMENT

Recommendations for clarifying laws, public understanding of these laws, and enforcement of the law with regard to bicycling.

Law enforcement is a cornerstone of an effective local bicycle program. There is a broad range of bicycle transportation topics related to law enforcement. To identify the critical law enforcement issues for bicycling in Fairfax County local cyclists and representatives from the law enforcement community were engaged. Issues were identified in public forums as well as in a focus group that involved officers from a number of law enforcement agencies operating within the county.[10]

Table 5.2 presents a list of the law enforcement issues that arose during this planning process, their status in Fairfax County, and their level of importance, based on the findings of the planning process (topics are listed in general order of importance).

[10] Law enforcement agencies operating in the County include the Fairfax County Police, the Sheriff's office, local police for the incorporated towns and cities, WMATA's metro police, state police, military police at Ft. Belvoir, National Park Police, and campus police for the universities.

Table 5.2 Law Enforcement Issues Summary

Topic	Status	Level of Importance
Understanding of existing law pertaining to bicyclists and motor vehicle traffic.	Among police officers, cyclists, and motorists: levels of understanding vary widely.	All parties agree that more clarity is needed about some laws, especially related to right-of-way at trail crossings and sharing the road.
Enforcement of motor vehicle traffic law infractions.	This is done in response to particular complaints at particular locations, or during periods of special enforcement programs.	Cyclist enforcement needs to be increased in order to improve cycling safety.
General level of attention and priority law enforcement agencies give to bicycle safety issues.	Level of priority varies from agency/department. Resource allocation makes sustained enforcement difficult. Is important for GMU campus police.	Increasing the level of priority given to these issues would help create a more comfortable bicycling environment.
Participation in bicycle safety oriented operations geared to support public education.	Participation in the Regional Street Smarts Program is determined by each police district commander.	This is way to highlight bike safety and enforcement issues.
Training of officers regarding traffic laws pertaining to bicyclists.	Training in the academy for bicycle-related traffic laws is minimal. In-service training opportunities do not focus on bicycle law enforcement.	Baseline knowledge among some officers needs to be raised to ensure equitable treatment of all.
Determination of fault regarding crashes involving bicyclists and motorists.	Anecdotal evidence reported by cyclists and cycling advocacy groups suggests that problems occur in this area periodically. Most officers have greater expertise in evaluating vehicle crashes than bicycle crashes.	There is room for improvement in this area.
Officer participation in bike safety education, especially with children and youth.	Was much higher in previous years when SRO and SEO officers were more prevalent and available to conduct courses and participate in events at schools.	As the County strives to become more bicycle friendly and promote bicycling as an alternate transportation, the County should intensify its efforts in the area of bicycle safety education.
Crash data analysis and dissemination.	For the most part participants felt that there were so few reported crashes that analysis and dissemination of the data would not reveal anything strategically relevant to reducing crashes.	It was agreed that that there were no major issues in this area. However, if the data is to be used as a performance measure for implementation of the Bike Plan, cyclists need to report all crashes involving vehicles.

Recommendations

- Fairfax County Department of Transportation should work with County law enforcement officials, state and county elected officials, and advocacy groups to enact changes in law (or policy) at the state and county levels that will clarify code language relating to right-of-way on public roads and trails.
- To ensure a common understanding of laws related to bicycling and right-of-way on public facilities, and the consistent and fair enforcement of these laws, prepare clarifying communications for the law enforcement community, VDOT and FCDOT traffic engineers, cyclists, motorists, and judges.
- Increase training of Fairfax County law enforcement officers with regard to traffic law enforcement involving cyclists and crash reporting involving cyclists.
- Coordinate on-road and trail design and enforcement practices to ensure consistency in the application of bicycle and trail safety treatments and infrastructure design.
- Always include education with enforcement to achieve the greatest impact with the intended audience.

Background Information

Clarifying the Law (pertains to Recommendations #1 and #2 above)

The Commonwealth of Virginia laws relating to bicycle right-of-way are unclear, and therefore difficult to enforce and can be open to interpretation. Enforcement depends on each situation. Fairfax County should continue to work with state legislators to support passing new bicyclist right-of-way provisions.

A VDOT report which looked at W&OD trail crossing issues concluded:

> *"A review of the Code of Virginia should be undertaken with respect to those sections dealing with trail users on multiuse pathways and their obligation to comply with nonsignalized traffic control devices. The purpose of the review should be to determine if legislative changes could help alleviate the confusion about right-of-way, and if so, to suggest appropriate legislative change proposals. Such a review could be initiated, or led, by VDOT's Traffic Engineering Division with assistance from staff at Virginia Transportation Research Council. A cursory review of the Code language in this study suggested that trail users on multiuse pathways may not be obligated to comply with nonsignalized traffic control devices where the trail intersects a roadway. In addition, the research found there is confusion among motorists and trail users about right-of-way laws regarding the W&OD Trail where a STOP sign is directed toward the trail users. This confusion could compromise safety at these and other similar multiuse trail/roadway intersections."*

Laws, especially those that apply to bicyclists, are often worded ambiguously and many find them to be confusing. The ambiguity in the language requires police officers to make a determination which will likely be unpopular with some individuals. Some Officers need more detailed training on the related laws and the impacts on cyclists.

Laws have been passed in the Commonwealth that affect bicyclists; however most cyclists and motorists are unaware of them. The "Pocket Guide to Virginia Laws," published by the Northern Virginia Regional Commission, the Department of Motor Vehicles, and the Virginia Department of transportation currently is being updated to both incorporate the new laws and expand on the educational content. This resource, when completed, could be distributed to bike shops and be required to be issued with the sale of every new bike. This guide also should be made available on-line.

Detailed Recommendations for Training of Law Enforcement Officers (pertains to Recommendation #3 above)

Law enforcement officers of Fairfax County and other agencies regularly receive in-service training~~s~~ on various subjects. Although bicycle safety and bicycle traffic laws are not currently covered in depth, there are opportunities for officers to receive training, education and professional development throughout their career. Metropolitan Police Department (MPD) has recently partnered with the Washington Area Bicyclists Association (WABA) to help train their officers on bicycle traffic laws, especially those that have been commonly misinterpreted or enforced incorrectly.

- Provide refresher training specific to bicycle and pedestrians for all officers who conduct enforcement.
- Discuss common problems in bicycle and pedestrian enforcement during roll call and other appropriate venues.
- Expand outreach and education opportunities, including but not limited to attending Fairfax County Bicycle Advisory Committee meetings.
- Consider requesting training from other departments/agencies in the metropolitan area that have experienced growth in bicycle usage (e.g., District of Columbia, Arlington County, City of Alexandria, and Montgomery County, Maryland).

The Transportation System (pertains to Recommendation #4 above)

Inconsistent and confusing traffic engineering design can be another factor contributing to poor bicyclist or motorist behavior on the roads and trails.

More on-road bike lanes are being added each year and new bicycle facility types will be implemented in Fairfax County for the first time. On-road treatments such as buffered bike lanes, contraflow bike lanes, and cycle tracks will be new to the officers enforcing their proper use.

- Law enforcement officers and engineers agreed that in similar contexts it is important to implement consistent design to reduce confusion and frustration.

- Traffic engineers and law enforcement officers need to communicate with each other about how these facilities are intended to be used and what laws uphold those intentions.

Enforcement Activities (pertains to Recommendation #5 above)

- Continue to participate in programs in the spring and fall that incorporate ticketing to help educate lawbreakers in a way that is constructive.

5.5 MAINTENANCE OF FACILITIES

Recommendations for maintaining the existing and planned Bikeway Network.

Throughout the planning process, and especially at the public workshops held in eight subareas throughout the County, better maintenance of shared-use paths and on-road bicycle facilities was raised as a critical need. Poor path surface was often cited as a reason for not using existing trails. Most participants also were concerned that if the County created an extensive system of bike lanes they would not be swept by VDOT, and thus could become unappealing or even hazardous.

Fairfax County has close to a thousand miles of shared-use paths and park trails that are used for bicycling and an expanding system of bike lanes that are more frequently being included in general roadway improvement projects. However, historically, minimal funding has been allocated for trail maintenance and no funding is allocated for routine sweeping of bike lanes or striped shoulders. At the time of this Plan's development the status of bicycle-oriented maintenance practices is as follows:

- VDOT does not provide dedicated funding for the maintenance of trails and sidepaths along roadways. Fairfax County does dedicate funding to trail maintenance, however the amount of funds in insufficient to maintain the current infrastructure.
- VDOT responds to user generated calls alerting them of spot hazards on the roadway and trail network for which they are responsible.
- The FCDOT bicycle program responds to user generated calls about spot hazards and forwards these reports to the appropriate agency responsible for maintenance, including other Fairfax County agencies, VDOT, homeowner associations, Federal

Source: Toole Design Group.

agencies, or commercial property owners.

- VDOT does not routinely sweep bicycle lanes or other bikeways for which it is responsible (once or twice annually). Typically, VDOT does not sweep streets or roads in suburban jurisdictions.
- When responding to a vehicular crash, police and tow-truck operators will sometimes remove wreckage from the travel lanes; however, this often results in the debris being moved to the side of the road or shoulder where the cyclists is most likely to encounter it as a hazard.
- The Fairfax Park Authority and Northern Virginia Regional Park Authority annually allocate funding for maintenance of park trails for which they are responsible.

Trails and on-road bicycle facilities represent a tremendous investment of resources over the years; however, most of the trails built to accommodate bicycle travel along roadways have not been well maintained. Many and have fallen into a state of disrepair that makes them unusable. The investment that VDOT, developers and the County has made is not producing the results originally intended.

Recommendations

1. The GIS database of all trails in the county should be updated annually to include the trail owner and the agency responsible for maintenance for all trail segments. This database should include information about privately-owned trails that are open for public access, and the trail surface type, surface width, the presence and implications of interagency maintenance agreements and other information relevant to effective maintenance and management of a trail system.
2. Using GIS and interactive internet mapping capabilities, it is recommended that the county establish a method of effective coordination between key agencies that own, manage and maintain components of the Transportation Trail Network. This will include the VDOT, FCDOT, Northern Virginia Regional Park Authority, Fairfax County Park Authority, the National Park Service, the Fairfax County Department of Public Works and Environmental Services, the Fairfax County Public Schools, private property owners, home owner associations, and potentially others.
3. Fairfax County, VDOT and other key agencies/entities that own and manage Transportation Trails should establish dedicated funding for annual maintenance of Transportation Trails in the Bikeway Network; VDOT and FCDOT should establish dedicated funding for maintenance of on-road bicycle facilities.
4. It is recommended that periodic bicycle lane and shoulder sweeping become a routine VDOT maintenance activity.
5. It is recommended that VDOT increase the frequency at which is sweeps roads that are identified as part of the Bikeway Network.
6. Clean-up activities after car crashes must leave the road safe for cyclists.

6 Implementation Strategies

6.0 Implementation

Transitioning from planning to action requires the coordination of many stakeholders and processes. For instance, while the Master Plan was developed by Fairfax County Department of Transportation (FCDOT), multiple agencies will be involved as bike lanes are designed and encouragement programs are launched. This chapter includes recommendations that will help guide FCDOT and others involved with implementing the facility, policy and program recommendations of the Master Plan.

6.1 STRENGTHEN THE FCDOT BICYCLE PROGRAM

Overall program improvements to help FCDOT manage and implement the Bicycle Master Plan.

Since the early 2000s, the FCDOT has increased its emphasis on bicycling, walking and access to transit by providing staff to address infrastructure and other needs in these areas. In the mid-2000s, the Bicycle Program was established with 1.5 full-time staff.

With existing staff and budget, the Bicycle Program has accomplished a great deal. It has managed a countywide bicycle master plan process, developed and published three editions of the Countywide Bicycle Map, developed bicycle parking standards, increased the active inventory of bicycle racks and lockers at public facilities and park-and-ride lots, reviewed countless sets of plans for road and development projects to ensure inclusion of bicycle facilities, installed bicycle route signs, and coordinated a host of encouragement and bike safety education activities.

Shared use path adjacent to a neighborhood collector.
Source: Toole Design Group.

In a County of 1.1 million people and 391 square miles, it is difficult for one full-time and one part-time staff people to maintain a multifaceted bicycle program. It is instructive to compare Fairfax County to other jurisdictions in the metropolitan area. Arlington and Alexandria, Virginia and Washington, D.C. are the three jurisdictions with the strongest bicycle transportation programs.

- Arlington County employs the equivalent of 2.5 full-time staff in their transportation planning office working on bicycle and trail issues. Bike Arlington employs 3 full-time staff focused on encouragement and education programs, and uses consultants as well to produce its marketing materials. The traffic division and capital projects division have staff that routinely manages striping, signing, and trail construction projects. Arlington has had a bicycle advisory committee supporting its program for many years.

- The City of Alexandria employs the equivalent of 1.5 full-time staff in their transportation planning and capital projects office that work solely on bicycle and pedestrian transportation. Alexandria has LocalMotion, a multimodal encouragement program similar to Bike/WalkArlington.
- Washington, D.C. has the equivalent of 4.5 full-time staff dedicated to the bicycle and trail transportation programs and planning, 1 full-time addressing safe routes to school, and 1 dedicated to pedestrian transportation. Additional staff are involved in Bike Sharing and Car Sharing programs. Washington's bicycle advisory committee was created by law in the 1980s and remains active today. The District of Columbia Department of Transportation runs GoDCGo, a multimodal encouragement program similar to Bike/WalkArlington.

Recommendations

To strengthen the FCDOT bicycle program, four key issues should be addressed. These issues relate to the following interrelated aspects of the program: staffing; funding; public participation; and division of labor. It is anticipated that if the following five actions are carried out, over a period of five years, absent any other major initiatives, the plan goals for improving bicycling conditions and increasing levels of bicycle use can be accomplished:

- Continue to expand the number of full-time employees staffing the Bicycle Program in order to accomplish the goals and objectives outlined in the Plan.
- Allocate an annual budget dedicated to bicycle planning and programmatic initiatives and small-scale capital projects such as: installation of bicycle parking racks and lockers; signs for signed bicycle routes; curb ramps; and small bicycle and trail access projects.
- Establish a permanent Countywide BAC that reports to the Board of Supervisors through the Transportation Advisory Commission (TAC). Reform the Trails and Sidewalks Committee as a Pedestrian Advisory Committee under the TAC. If needed, create a Recreational Trails Committee under the Fairfax County Park Authority to address issues and needs related to equestrian trails, mountain biking, hiking, and other issues pertaining to recreational trails.
- Charge the Bicycle Program with bicycle transportation tasks related to the following: on-road and off-road bicycle facility engineering and design, bicycle parking, bicycle-related coordination with VDOT, bikeway capital project management, interagency and intergovernmental coordination, development review, bicycle counts, data management and program evaluation, and staff liaison with Bike Fairfax. Delegate primary leadership for encouragement and education programs to a new Bike Fairfax program (further detail on this program is included in Chapter 5: Bicycle Program Recommendations of this Master Plan).
- Establish a bike parking installation program. Bike Parking Guidelines recently developed by the Fairfax County Bike Program should be adopted as the standard by which to determine and evaluate the quantity and quality of bike parking to be provided. It should be noted that existing zoning regulations will ensure that future

developments will provide bike parking; however, there is and will remain a need to retrofit existing buildings to provide outdoor publicly accessible bike parking. The County should pass legislation to allow for cost sharing with (or property tax credit for) private property owners to encourage the provision of more outdoor, publicly accessible bike parking at existing commercial, retail, office, and multifamily residential buildings, especially given the unambiguous public need for and benefit from bike parking at these types of locations.

6.2 BICYCLE FACILITY IMPLEMENTATION POLICY

Implementation policy recommendations for accommodating bicycles on VDOT roadways in Fairfax County.

The VDOT State Bicycle Policy Plan (adopted 2011) addresses a wide range of bicycle transportation and roadway design issues. A number of provisions in the policy plan are especially important to the Master Plan, including the following:

- Action 1.1a – Development of additional design guidance to address bicycle issues in the highly variable suburban environments and in response to the rapidly evolving changes in bicycle treatments and design options related to the MUTCD and AASHTO Bike Guide.
- Action 1.2 – Clarification of how the bicycle facility selection decision process relative to exemptions, is supposed to function.
- Action 1.3 – Providing encouragement and guidance regarding implementation of lane and road diets. Both lane diets and road diets have been successfully implemented in Fairfax County.
- Action 1.4 – Value Engineering – Clarifying that planned bicycle accommodations cannot be significantly reduced in quality or eliminated based on value engineering decisions applied to roadway improvement projects.
- Action 1.8 – Effective use of resurfacing funds for paving shoulders for improved bicycling accommodations.
- Action 1.10a – Updating its various roadway design manuals to address new policies and practices in roadway design that provides bicycle facilities.

During the planning process the consultant team conducted a series of meetings with VDOT staff to better understand existing policies and practices used in the Northern Virginia office of VDOT. Areas discussed included how the resurfacing program is administered, intersection design, use of safety funding, and capital programming. Throughout the process VDOT staff attended every BAC meeting and every public workshop. Through the course of this interaction a thorough understanding of VDOT policies and practices related to bicycling was integrated into the master planning process.

As a result, the consultant team, FCDOT staff and BAC developed a set of recommendations for modifications to current VDOT policy and practice. Each of these modifications is consistent with the recommendations made in the new State Bicycle

Policy Plan. Therefore, Fairfax County requests that VDOT implement the following policy within Fairfax County:

1. As a part of every resurfacing project, VDOT and Fairfax County should consult the Bikeway Network Plan for potential upgrades to bicycling conditions.
2. In Fairfax County, resurfacing funds being accounted toward the two percent requirement for bikes and pedestrians, should result in a shoulder of at least three feet in width, and preferably four feet or greater.
3. Fairfax County will identify and prioritize stand-alone shoulder paving projects to be undertaken primarily for bikeway improvements; VDOT should consider paving such shoulders independent of repaving the entire street.
4. For roadways with speed limits of 35 miles per hour or less, in order to provide bicycle lanes (or a bicycle climbing lane) lane diets using 10-foot travel lanes should be considered.
5. At select locations identified in the plan, to enable use of the Shared-Lane Marking, VDOT will conduct studies necessary to consider speed limit reductions to 30 or 35 miles per hour.
6. All bridge replacements and reconstructions should provide the same level of bicycle accommodation called for on each approach, *or a more comfortable level* of accommodation as may be needed because of the speed and volume of motor vehicle traffic to be accommodated on the new bridge.
7. It is not acceptable for roadway design and construction decisions based upon the application of "value engineering" to degrade or remove bicycle facilities called for in the adopted plan, from a roadway improvement project.

6.3 INTERAGENCY AND INTERJURISDICTIONAL COORDINATION

Coordination is needed regarding bicycle facility and network development as well as on encouragement, education, and enforcement programs.

While VDOT is almost the singular owner and manager of public roads and streets in Fairfax County, for development of the Bikeway Network and implementation of the Master Plan's policy and program recommendations there are a tremendous number of agencies, neighboring governments, and other entities with which coordination is essential. For example, development of on-road facilities requires coordination between one set of entities, including the planning, capital programming, traffic, safety, and infrastructure management divisions of VDOT, the FCDOT, and potentially developers; while development of off-road facilities creates the need to work with a number of other agencies, including the Fairfax Park Authority, Northern Virginia Regional Park Authority, Home Owner Associations, utility companies, and others.

For the bicycling public, most will not know when they have crossed a boundary between Fairfax City and Fairfax County, or Fairfax County and Arlington County; however, the continuity of roads, bicycle facilities, and signed routes is completely

dependent upon intergovernmental coordination between agencies that are governed by completely separate bodies of elected officials.

Coordination activities can be the least exciting work in the development of a bikeway transportation network; however, effectiveness in this area may be the lynchpin that determines success or not. For this reason specific performance measures for coordination are recommended as a means to ensure that these essential activities take place and that the public has access to the decisions that result from the process.

Recommendations

- Within and between FCDOT and VDOT, improved coordination is needed between capital project managers, right-of-way staff, road designers, traffic engineers, pedestrian and bicycle facility planners, resurfacing program managers, and roadway maintenance staff to ensure that the safety and travel needs of bicyclists are met in all aspects of the project development and implementation process, as well as the ongoing maintenance of public transportation infrastructure.
- The formation of a VDOT Northern Virginia District Bicycle Advisory Committee is recommended to improve communication and coordination with VDOT on major projects that impact bicyclists. This committee would assist the agency with staff training related to bicycle design, support facility experimentation projects and track progress on road, trail, and transit improvement projects, and maintenance activities that impact bicyclists.
- To effectively maintain and manage the Bikeway Network and implement various program and policy initiatives recommended in this Plan the following Fairfax County agencies should share relevant information and coordinate activities on a regular basis:
  - Fairfax County Department of Transportation;
  - Fairfax County Public Works and Environmental Services;
  - Fairfax County Department of Planning and Zoning;
  - Fairfax County Park Authority;
  - Fairfax County Department of Neighborhood and Community Services;
  - Fairfax County Department of Public Health;
  - Fairfax County Public Schools; and
  - Fairfax County Office of Commercial Revitalization.
- To ensure network continuity, FCDOT should coordinate bicycle facilities, street design, signed bike routes, and other bicycle transportation-related activities with the other political jurisdictions within and surrounding Fairfax County. These include the following:
  - The Towns of Herndon, Vienna, and Clifton;
  - The Cities of Falls Church and Fairfax City; and

  - The adjacent jurisdictions of Arlington County, Prince William County, Loudoun County, and City of Alexandria.
- Regarding a variety of Bicycle Network development issues, as well as funding and program implementation activities, FCDOT should coordinate with the following regional transportation agencies:
  - The Washington Metropolitan Area Transit Authority;
  - The Northern Virginia Transportation Commission (Virginia Railway Express, VRE);
  - The Metropolitan Washington Airports Authority;
  - The Northern Virginia Regional Commission;
  - The Northern Virginia Transportation Authority; and
  - Northern Virginia Regional Park Authority (NVRPA).
- Periodically, FCDOT, VDOT, and others need to coordinate transportation issues and projects with Federal agencies such as Eastern Federal Lands Division of Federal Highway Administration, the National Park Service and the Department of Defense. Areas where coordination is essential to ensure continuous, compatible and safe bicycle facilities include the following:
  - Roadway improvement projects managed by Eastern Federal Lands for other Federal agencies;
  - The Mount Vernon Trail, crossings of the George Washington Parkway, and bike access to/from Wolf Trap; and
  - Access to/from Fort Belvoir.

6.4 FUNDING

Recommendations regarding funding for development of the Bikeway Network and key program initiatives.

In recent years, Fairfax County has used a variety of funding sources to support bikeway capital improvement projects. Examples of projects that have been implemented through a variety of funding sources include the following:

- **From Transportation Bonds:** Gallows Road bike lanes (Tysons to Route 50);
- **From Park Bonds:** Paving various sections of the CCT south of Lake Accotink;
- **From Commercial and Industrial Tax:** the trail bridge connecting Wolf Trap Road near Joyce Kilmer Middle School and the Bobann Drive Bikeway;
- **From the Federal Transportation Enhancements Program:** Sully Historic District bike the historic sites bike map and signs;
- **From the Federal CMAQ program:** racks lockers and amenities installed at 23 locations;

- **From the VDOT Resurfacing Program:** Soapstone Drive, Lawyers Road, and River Birch Road Bike Lanes; and
- **From a developer proffer:** Bike Lanes on Tower Crescent Drive.

Absent recommendations from this Master Plan, future funding strategies will include making the most opportune use of the following funding sources and programs:

State Transportation Bill – In April 2013 The Virginia General Assembly passed the Governor's Transportation Plan (HB2313) which allocates transportation dollars to the counties. The six-year plan makes available 1.2 billion in state funding over a six year period. In early 2014, the County Board of Supervisors approved the priority project list which appropriated over $202 million dollars to bicycle and pedestrian projects to be spent through the year 2020. Many projects in this Master Plan were included in the priority project list.

County Transportation Bonds – Every five to seven years the County typically approves a transportation bond issue to raise money for capital improvement projects that are needed above and beyond what is provided in VDOT's Six-Year Program and routine resurfacing, intersection improvement, and road maintenance expenditures. In the past, bond funding has been used for bikeway projects. In the future, this source could be used more extensively. During the planning process for this Master Plan, FCDOT, in consultation with each Supervisor, began development of a multimodal "wish list" as a start to developing a set of capital projects that could be funded in future Transportation Bonds. To be included in a bond issue bikeway projects generally need Supervisor support, and they compete with other transportation needs such as pedestrian, transit and traditional roadway improvement projects.

County Park Bonds – Also, every few years the voters are asked to approve a bond issue for capital funds that are used for park development. New trail development and major trail rehabilitation and trail bridge upgrades are funded in this manner. Typically, Park Bonds include a list of specific projects as well as some funds that are undesignated. Some of the trails built with these funds in the past are now contributing to the Transportation Trail Network designated in this plan. This could be a source of trail funding in the future, however typically, only a few trail projects are included among many other park improvements such as land acquisition, swimming pools, recreation center development, etc.

Allocation of Special Tax Revenue, such as the Commercial and Industrial Tax – This tax has been collected since 2008 for the specific purposes of supporting transportation infrastructure improvements in the County that reduce congestion. It has funded a variety of small and medium sized bicycle and pedestrian improvement projects. The County also uses it to make roadway intersection improvements, support its transit services, and supplement various other transportation projects. It can be used for local match in order to leverage various federal transportation program dollars.

Federal Transportation Funds – In July 2012, the U.S. Congress passed a two-year Transportation Reauthorization Bill (MAP-21) which made significant changes in the structure of and funding levels for Federal programs that are focused on funding bicycle and pedestrian facilities and programs. Specifically, the Transportation Enhancements,

Recreational Trails and Safe Routes to School programs were replaced with a new program funded at a significantly lower level than the previous Transportation Bill. If this approach is continued with the succeeding Federal transportation bills, there may be less Federal funding opportunities for bicycle and pedestrian facility and program projects in the future.

Federal Congestion Mitigation and Air Quality (CMAQ) program funds are likely to be a good source of Federal transportation funding that the County should seek in the future. Related to these funds are Federal Surface Transportation Program (STP) funds and RSTP funds (for nonattainment areas in Virginia).

While less central, the County will benefit from strategic use of Federal Safety and Safe Routes to School funds. These funds are administered by VDOT and the County and NOVA office of VDOT should review program and funding requirements (including project eligibility) for these programs and strategize which projects in the Plan may be the most cost effective to target for these funding sources.

VDOT State Transportation Funds – There are a variety of funding programs supported by state transportation dollars, including a *"State 100% program,"* the *Maintenance/Resurfacing* program, and the regular *VDOT Six-Year Plan*. The *VDOT Six-Year Plan* will have primarily major road widening projects, road rehabilitation projects, and bridge rehab and replacement projects. VDOT should consult the Master Plan regularly to ensure that the bicycle facilities identified in the plan are routinely incorporated into the VDOT Six-Year Plan projects at the initial project scoping level.

Developer Proffers – Developer contributions will continue to be an important method for Bikeway Network facilities to be built. A challenge related to this method of implementation is that proximity between the development and the planned facility typically limits the physical scope of the bikeway contribution that a developer makes. Ways to set aside meaningful levels of contributions from developers until such time that a useful segment of a planned facility can be built must be developed.

Recommendations

- The County should establish dedicated funding for Bikeway Network development and program implementation.
- Funding and programming for development of bicycle facilities should be simplified and made transparent in order for performance measures for spending and program utilization to be established and monitored through public oversight.
- Funding for encouragement and safety education should be derived from employer contributions to TDM programs, partner organizations, and CMAQ funds.
- Fairfax County should continue to consider funding standalone projects to address bicycle safety and facility discontinuity resulting from intermittent redevelopment of roadside property.

6.5 PERFORMANCE MEASURES

Data collection and performance measurement to track plan implementation and benefits.

The primary goal of the Bicycle Master Plan is to develop a connected physical network of existing and proposed on-road and off-road (shared-use paths and trails) bicycling facilities that will serve all cyclist and trip types. Developing the facility network and enhancing policies and programs to support bicycling is anticipated to increase bicycle use for transportation, especially for non-commute trips which are about 75 percent of all trips. Developing the network will reduce gaps and eliminate barriers, two of the main problems that prohibit people from cycling more often. Creation of a recognizable network of facilities using designs that are appropriate for their specific location and conditions also will increase bicycling safety.

McLean's bicycle wayfinding signs.
Source: FCDOT.

As part of the Master Plan, Fairfax County has set aggressive yet achievable targets for Plan implementation and overall performance for the 10-year period 2015-2024. These targets include:

- By 2024, triple the number of bicycle trips over baseline levels (assumed 2012 or 2013);
- By 2024, increase by five-fold the number of center line miles of on-road bicycle facilities, and minimize gaps in the bicycle network;[11] and
- By 2024, reduce bicycle crash and fatality rates by increasing the numbers of people bicycling and maintaining or reducing the total number of crashes and fatalities involving bicyclists.

To track the rate of Master Plan implementation, keep the public informed on plan progress, and report the benefits of the overall plan to Fairfax County, an annual Bicycle Master Plan performance tracking program is needed.

There are many existing datasets that will assist the County in identifying baseline performance. Some existing sources and the primary data available from them include the following (data for other jurisdictions provided for comparison purposes only):

- **U.S. Census – American Community Survey 2012** (one-year estimate).

  Means of Transportation to Work (Bicycle):

  - Fairfax County – 0.3 percent
  - Arlington County – 1.2 percent

[11] Facilities to be counted include: Bike lanes of all types, climbing lanes, paved shoulders four feet or greater, and cycle tracks.

- **Transportation Planning Board (TPB) 2007/2008 Household Travel Survey** (11,500 regional households with 132,000 trips – 15,360 trips from Fairfax County households).

  Bike commuting trip share - 2008 (1994):

  - Fairfax – 0.5 percent (0.2 percent)
  - Arlington – 1.4 percent (1.1 percent)
  - Montgomery – 1.4 percent (1.1 percent)
  - District of Columbia – 3.3 percent (2.2 percent)

  Daily bike trip share - 2008 (all trips):

  - Fairfax – 0.3 percent
  - Arlington – 0.8 percent
  - Montgomery – 0.6 percent
  - District of Columbia – 1.5 percent

  Weekday bike trips per 1,000 residents - 2008:

  - Fairfax – 13
  - Arlington – 37
  - Montgomery – 27
  - District of Columbia – 58

- **TPB State of the Commute Survey (Commuter Connections).**

  Triennial survey of randomly selected residents (575 in each jurisdiction for the 2013 State of the Commute Survey), only 200+ regional bikers/walkers included.

- **TPB 2009 Central Employment Core Cordon Counts (2002, 2006, 2009).**

  Bicycle traffic is counted at locations within the Central Employment Core, as well as all points at which designated bike trails cross the cordon line outside the core, including bike and multiuse trails such as the Capital Crescent Trail, the C&O Canal Towpath, and the Custis and Mount Vernon Trails in Virginia.

  - 841 inbound bike trips recorded (AM peak period) in 2009

- **WMATA Bicycle Parking Census, 2011.**

  - 344 total rack spaces at Vienna, Dunn Loring, West Falls Church, and East Falls Church; and
  - 293 parked bikes counted (261 on racks, 32 elsewhere)

    Note: WMATA has an updated census with 2012 and 2013 data however it was not possible to access and analyze the data for this report.

While these sources represent the range of existing regional bicycle data sources, all sources are based on a limited sample size and likely underestimate the actual volume of

total bicycle travel, and none of these sources include detail on facility-specific trips in Fairfax County.

The Bicycle Master Plan recommends the following count program to both establish a baseline assessment of bicycle activity in Fairfax County, and to track on an annual basis the implementation and performance of the Master Plan.

- FCDOT shall establish an annual bicycle count program using a methodology focused on select locations throughout the County where significant bicycle trip activity already is present.
- FCDOT should expand the bicycle count program annually to additional locations as the physical network is expanded; FCDOT should and use automatic counters in high-volume locations.
- Utilize WMATA's bicycles at rail station census and bicycle and pedestrian access needs assessment database to count bicycle activity and ensure adequate bicycle parking capacity and quality of service at Metrorail stations in Fairfax County, including the new Silver Line stations as they open.
- FCDOT and VDOT should continue to coordinate track of total miles of the on- and off-road Bikeway Network and provide routine updates to the Board of Supervisors and general public. The report should include the following:
  - Growth of miles of each facility type;
  - Growth in bicycle parking capacity;
  - Growth in use of new or experimental facility types;
  - Change in levels of bicycling as measured by the bicycle count program; and
  - Change in levels of reported bicycle crashes and resulting deaths and injuries.
- Coordinate with the Transportation Planning Board to enhance future regional travel surveys to better account for bicycle travel.

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CAMBRIDGE SYSTEMATICS