Huntington Metrorail Station

Active Transportation Study

May 2022

COUNTY OF FAIRFAX 1742 VIRGINIA

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Table of Contents

Appendices

List of Figures

List of Tables

Introduction

Purpose and Need

The Huntington Metrorail Station site is located in the Mount Vernon Planning District, Huntington Community Planning Sector of Fairfax County, and the Huntington Transit Station Area (TSA). The site is bounded to the south by North Kings Highway, to the north by Huntington Avenue, to the east by Biscayne Drive, and to the west by Kathryn Street. The site is landlocked by established residential communities to the east and west. The Huntington Metrorail Station was built as a mid-line station which, as defined by WMATA, "are typically located in areas with low to medium density, and are usually accessed by Park & Ride, Kiss & Ride, bus, bicycling, and walking modes." Most Metro users access the mid-line stations by foot (51% for the average of all mid-line stations) followed by bus and auto. The study area includes the Huntington TSA, not just the metrorail site, and overlaps with the Lee District.

The Huntington TSA has been transitioning from low density to mid density for decades and will continue to become denser. The current Comprehensive Plan plans for a mix of uses, including office, residential, retail, and/or hotel/mixed-use in the Huntington Metrorail Station area and much of these land uses have already been built out or have gone through the initial phases of approval. The Comprehensive Plan Amendment proposes to increase residential dwelling units as well as commercial square footage. The following development projects contribute to the need for improved bicycle and pedestrian facilities in the study area:

- Huntington Metro Site Redevelopment
- Huntington Club
- Aventon Huntington Metro
- The Grande at Huntington
- South Alex
- Belhaven Apartments
- Lennar at Huntington Crossing
- The Arden
- Riverside Apartments
- Midtown Alexandria Station
- The Parker at Huntington Metro

This will increase opportunities for active modes to be the dominant mode of access for metro riders. The ActiveFairfax website defines active transportation as self-propelled, mostly human-powered travel including walking, biking, rolling (scooter, wheelchair, stroller), hiking, running, and riding for transportation and recreational purposes. Substantial growth in active mode share will be predicated on improving the user experience of walking and cycling.

The Richmond Highway Bus Rapid Transit (BRT) project plans to build a BRT system along Richmond Highway and North Kings Highway. The system will include dedicated lanes for buses, new BRT stations, and new information technology systems such as off-board fare collection. This system will originate at the Huntington Metrorail Station Bus Loop on the southern portion along North Kings Highway and end at the intersection of Richmond Highway and Belvoir Road in Fort Belvoir. It will operate in mixed traffic along North Kings Highway and on dedicated bus lanes in the median along Richmond Highway. The project is anticipated to open by 2030 and contributes to expectations that future transit ridership will increase creating a greater need for high quality pedestrian access to the transit stations.

This study evaluated the existing and future walking and biking experience based on a series of metrics and used results to develop recommendations for capital improvements within the project study area shown in **Figure 1**.

Methodology

The year 2045 was selected as the horizon year analysis to align with the Huntington Metrorail Transportation Impact Study TIS.
Existing and Future (2045) conditions were evaluated based on the following metrics:

Pedestrian Network Connectivity

The pedestrian network was defined based on the presence of sidewalks on public streets and the trails network. Planned and approved projects were assumed as part of the Future (2045) Conditions network. A gap assessment identified opportunities to prioritize adding new sidewalks for improved connectivity.

Distance Between Crossing Locations

Marked crossing locations and control type were catalogued within the study area to identify locations where the distances between crossings exceeded 400 feet. These represent opportunities for additional crossings depending on other contributing factors such as land use context, line of sight, and control type.

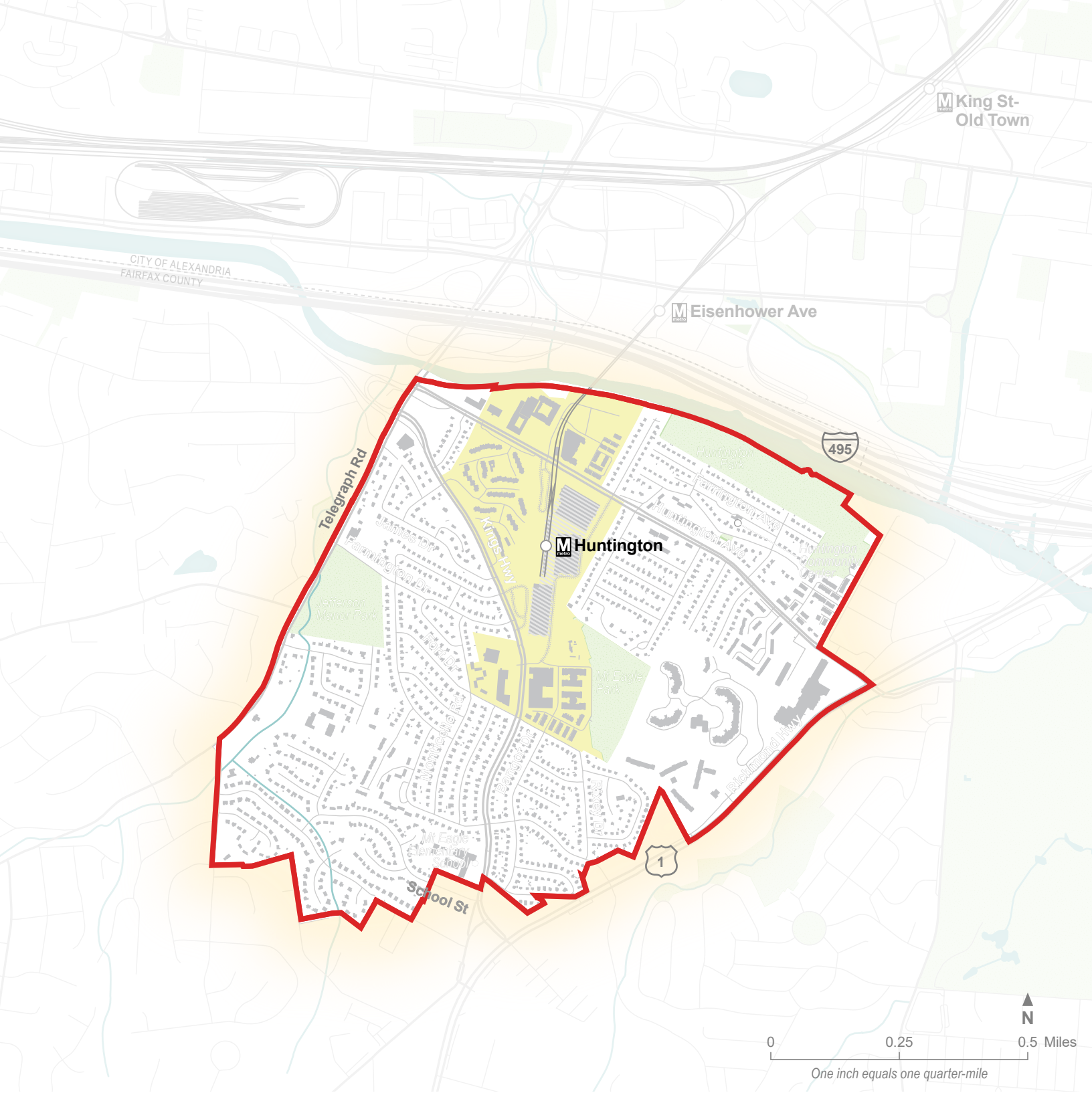


Figure 1
Study Area

Uncontrolled Crosswalks Assessment

Uncontrolled crosswalks were evaluated according to the Federal Highway Administration (FHWA) *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*. FHWA provides clear guidance on how to enhance uncontrolled crosswalks based on roadway characteristics that drive pedestrian safety. The evaluation uses average annual daily traffic (AADT), posted speed limit and number of lanes to determine whether existing treatments adequately meet best practices. Recommended crossing treatments include:

- Crosswalk visibility enhancements
- In-street pedestrian crossing sign
- Advance stop bar
- Curb extension
- Raised crosswalk
- Pedestrian refuge island
- Pedestrian hybrid beacon
- Rectangular rapid flashing beacon

Results identify opportunities to improve the adequacy of uncontrolled crosswalks with design treatments.

Bicycle Level of Traffic Stress

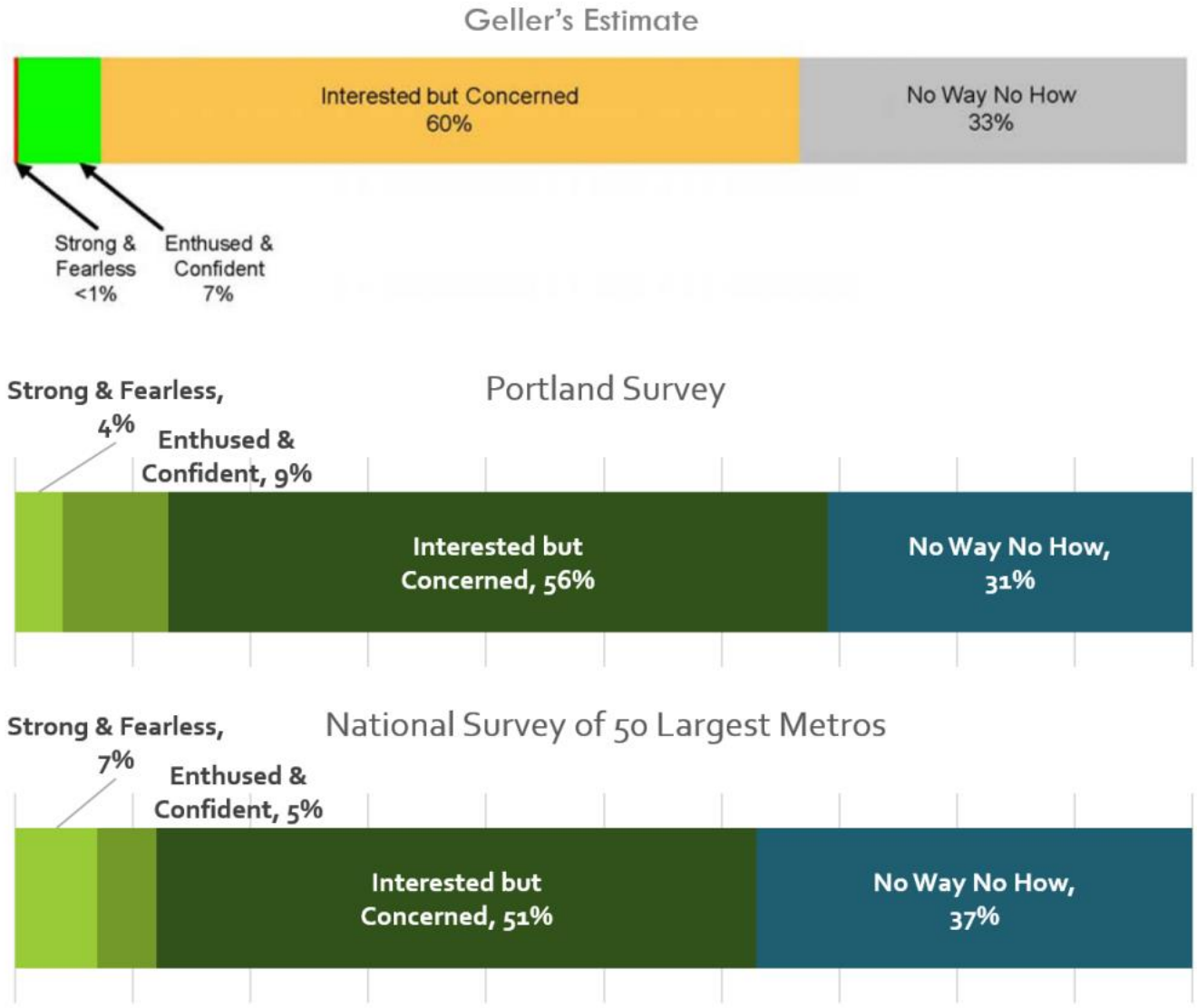
The bicycle Level of Traffic Stress (LTS) methodology was developed by Mekuria, Furth, and Nixon (2012) in *Low Stress Bicycling and Network Connectivity*. These analyses derive from a typology invented by then-bicycle coordinator for the City of Portland, Roger Gellar, that characterizes people as one of four types of bicyclists – strong and fearless, enthused and confident, interested but concerned, and no way, no how. Gellar hypothesized, and Jennifer Dill later demonstrated, that the 'interested but concerned' typology represented the bulk of travelers and that building facilities to suit this group would increase bicycle mode share.

The analysis assigns one of four ratings to bicycle segments and crossings based on four types defined in **Figure 2**:

- **LTS 1:** The lowest level of traffic stress and the design goal for a network that truly accommodates people of all ages and abilities. This level of traffic stress would allow children trained in traffic safety to bicycle to school by themselves as well as people "interested but concerned" about bicycling.[1]
- **LTS 2**: The highest level of acceptable traffic stress for the "interested but concerned" segment of the population. This is the threshold for a "low traffic stress" bicycle network that truly accommodates people of all ages and abilities.
- **LTS 3**: This level of traffic stress accommodates a much smaller segment of population—Geller's "enthused and confident" segment—who are excited and more familiar with biking and will therefore accept a higher level of traffic stress.
- **LTS 4**: This is a very high level of traffic stress that is beyond the comfort level of approximately 99% of the population according to Geller's classification scheme. Only the "strong and fearless" cohort will feel comfortable riding on these facilities, and most bicyclists will choose not to bike or make the trip on these corridors.

[1] Geller. "Four Types of Cyclists." Undated. https://www.portlandoregon.gov/transportation/article/237507

Figure 2: Four Types of Cyclists



Source: jenniferdill.net/types-of-cyclists/

The LTS scoring is analyzed based on the bicycle facility type and roadway attributes, such as ADT, number of lanes, posted speeds, and prevailing speeds. The following bicycle facility types were analyzed as part of this study:

- Bicycles in mixed traffic (no bicycle facility type)
- Shared use path
- One-way bike lanes without a buffer
- One-way bike lanes with a buffer

Table 1 below summarizes the methodology for bicycles in mixed traffic, and **Table 2** summarizes the methodology for a shared use path.

Table 1 Bicycles in Mixed Traffic LTS Methodology

Number of lanes	Effective ADT*	Prevailing Speed						
		≤ 20mph	25mph	30mph	35mph	40mph	45mph	50+mph
Un-laned 2-way street (no centerline)	0-750	LTS 1	LTS 1	LTS 2	LTS 2	LTS 3	LTS 3	LTS 3
	751-1500	LTS 1	LTS 1	LTS 2	LTS 3	LTS 3	LTS 3	LTS 4
	1501-3000	LTS 2	LTS 2	LTS 2	LTS 3	LTS 4	LTS 4	LTS 4
	3000+	LTS 2	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
1 thru lane per direction (1-way, 1-lane street or 2-way street with centerline)	0-750	LTS 1	LTS 1	LTS 2	LTS 2	LTS 3	LTS 3	LTS 3
	751-1500	LTS 2	LTS 2	LTS 2	LTS 3	LTS 3	LTS 3	LTS 4
	1501-3000	LTS 2	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
	3000+	LTS 3	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
2 thru lanes per direction	0-8000	LTS 3	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
	8001+	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4
3+ thru lanes per direction	Any ADT	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4

**Effective ADT = ADT for two-way roads; Effective ADT = 1.5*ADT for one-way roads*

Table 2 Shared Use Path LTS Methodology					
Criteria[2]		**LTS 1**	**LTS 2**	**LTS 3**	**LTS 4**
Buffer Width[3]		>= 6-ft OR continuous barrier[4]	3-ft to 6-ft[5]	(no effect)	< 3-ft
Barrier Type[6]	**<= 25mph**	Painted Buffer with/without Flexible Posts > 3-ft in width or any more substantial buffer including parked cars	(no effect)	(no effect)	(no effect)
	26-30mph	Parking protected[7], raised median, flexible delineator posts, parking stops, planter boxes, concrete barriers, rigid bollards	Paint only (e.g. only parked cars)	(no effect)	(no effect)
	31-35mph	Parking protected, raised median, planter boxes, concrete barriers	Flexible delineator posts, parking stops, rigid bollards	Paint only with parked cars	(no effect)
	>=36mph	Parking protected, raised median, concrete barriers	Planter boxes	Flexible delineator posts, parking stops, rigid bollards	Paint only with parked cars
Usable bicycle lane width[8]	**Low volume**	>= 10-ft	8 to <10-ft	(no effect)	< 8-ft
	Medium volume	>= 11-ft	10-ft to <11-ft	(no effect)	< 10-ft
	High volume	>= 14-ft	11-ft to <14-ft	(no effect)	< 11-ft
Curbside management		Vehicle loading (trucks, passenger, transit) is planned for through design	(no effect)	Vehicle loading (trucks, passenger, transit) is not accommodated through design and blockages are expected	(no effect)

[1]It is assumed that all bike lanes have a vertical clearance of at least 100 inches

[1]Street buffer can consist of parked cars, vertical objects, raised medians, landscaped medians, and a veraitey of other elements.

[1]Can be a continuous raised curb/median, continuous landscape planters, parking stops, or similar continuous physical barrier.

[1]Ok to use 2-ft as the minimum threshold if applying outside of California.

[1]It is assumed that all bike lanes will provide the appropriate paint to supplement vertical buffer treatments.

[1]The parking provided as part of the bike lane parking protection should be provided as a 24-hour parking zone that does not transition into a travel lane during peak periods.

[1]Low volume is <150 bicyclists per hour, medium volume is 150-750 bicyclists per hour, and high volume is >750 bicyclists per hour

Table 3 below summarizes the methodology for one-way, unprotected bike lanes, and **Table 4** summarizes the methodology for one-way, protected bike lanes.

Table 3 One-Way Unprotected Bike Lanes LTS Methodology

Number of lanes	Bike lane width	Prevailing Speed					
		<=25mph	30mph	35mph	40mph	45mph	50+mph
1 thru lane per direction, or unlaned	6+ ft	LTS 1	LTS 2	LTS 2	LTS 3	LTS 3	LTS 3
	4-ft or 5-ft	LTS 2	LTS 2	LTS 2	LTS 3	LTS 3	LTS 4
2 thru lanes per direction	6+ ft	LTS 2	LTS 2	LTS 2	LTS 3	LTS 3	LTS 3
	4-ft or 5-ft	LTS 2	LTS 2	LTS 2	LTS 3	LTS 3	LTS 4
3+ lanes per direction	Any width	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4

Table 4 One Way Protected Bike Lane LTS Methodology					
Criteria[9]		**LTS 1**	**LTS 2**	**LTS 3**	**LTS 4**
Street Buffer Width[10]		>= 6-ft OR continuous barrier[11]	3-ft to 6-ft[12]	(no effect)	< 3-ft
Barrier Type[13]	**< 25mph**	Painted Buffer with/without Flexible Posts > 3-ft in width or any more substantial buffer including parked cars	(no effect)	(no effect)	(no effect)
	25-30mph	Parking protected[14], raised median, flexible delineator posts, parking stops, planter boxes, concrete barriers, rigid bollards	Paint only (e.g. only parked cars)	(no effect)	(no effect)
	31-35mph	Parking protected, raised median, planter boxes, concrete barriers	Flexible delineator posts, parking stops, rigid bollards	Paint only	(no effect)
	>=36mph	Parking protected, raised median, concrete barriers	Landscape planters, paint AND plastic posts or similar	Flexible delineator posts, parking stops, rigid bollards	Paint only
Usable bicycle lane width[15]	**Low volume**	>= 6.5-ft	5 to <6.5-ft	(no effect)	< 5-ft or > 5-ft with obstruction
	Medium volume	>= 8-ft	6.5-ft to <8-ft	(no effect)	< 6.5-ft or > 6.5-ft with obstruction
	High volume	>= 10-ft	8-ft to <10-ft	(no effect)	< 8-ft or > 8-ft with obstruction

Curbside management	Vehicle loading (trucks, passenger, transit) is planned for through design	(no effect)	Vehicle loading (trucks, passenger, transit) is not accommodated through design and blockages are expected	(no effect)

[1]It is assumed that all bike lanes have a vertical clearance of at least 100 inches

[1]Street buffer can consist of parked cars, vertical objects, raised medians, landscaped medians, and a variety of other elements.

[1]Can be a continuous raised curb/median, continuous landscape planters, parking stops, or similar continuous physical barrier.

[1]Ok to use 2-ft as the minimum threshold if applying outside of California.

[1]It is assumed that all bike lanes will provide the appropriate paint to supplement vertical buffer treatments.

[1]The parking provided as part of the bike lane parking protection should be provided as a 24-hour parking zone that does not transition into a travel lane during peak periods.

[1]Low volume is <150 bicyclists per hour, medium volume is 150-750 bicyclists per hour, and high volume is >750 bicyclists per hour

Pedestrian Level of Comfort

Pedestrian Level of Comfort (PLOC) is based on elements of the built environment such as speed and volume of vehicles and amount of separation from traffic. It is a relatively new adaptation of LTS that is part of an evolving best practice. Pedestrian Level of Comfort (LOC) is measured based on the National Association of City Transportation Officials (NACTO) Urban Streets Design Guide and engineering judgement. The NACTO guide provides critical, recommended and optional parameters for a pedestrian environment consistent with best practices and documents supporting guidance and literature. Additional considerations of comfort are informed by practitioners and best practice experience.

The NACTO guide specifically address the following topic areas: usable sidewalk space, driveways, pedestrian-scale lighting, street trees and landscaping and roadway design speed. Other criteria that influence comfort and are included in this methodology include: sidewalk quality, number of travel lanes, heavy vehicle volumes and crosswalk frequency. Level of Comfort analysis assigns one of four ratings to pedestrian segments and crossings:

1. **LOC 1:** Highly comfortable, pedestrian-friendly, and easily navigable for pedestrians of all ages and abilities, including seniors or school-aged children walking unaccompanied to school. These streets provide an ideal "pedestrian-friendly" environment.
2. **LOC 2:** Generally comfortable for many pedestrians, but parents may not feel comfortable with children walking alone. Seniors may have concerns about the walking environment and take more caution. These streets may be part of a "pedestrian-friendly" environment where it intersects with a more auto-oriented roadway or other environmental constraints.

3. **LOC 3:** Walking is uncomfortable. Minimum sidewalk and crossing facilities may be present, but barriers are present that make the walking experience uninviting and uncomfortable.
4. **LOC 4:** Walking is a barrier and is very uncomfortable. Streets have limited or no accommodation for pedestrians and are inhospitable and possibly unsafe environment for pedestrians.

The LOC analysis distinguishes between detached (buffered) and attached (curb abutted) facilities. Buffered segments are analyzed based on usable sidewalk width, sidewalk quality, buffer width, and buffer quality. Curbed pedestrian facilities were assessed based on usable sidewalk width, sidewalk quality and number of travel lanes. Residential streets analysis does not incorporate posted speed, number of lanes, or sidewalk width into evaluation. The following types of pedestrian facilities were analyzed as part of this study:

- No Facility
- Curbed Sidewalk
- Buffered Sidewalk

Shared use paths or trails were analyzed as buffered sidewalks. **Table 5** below summarizes the methodology for no pedestrian facilities, **Table 6** summarizes the methodology for curbed sidewalks, and **Table 7** summarizes the methodology for buffered sidewalks.

Table 5 No Pedestrian Facility LOC Methodology

Criteria	LOC 1	LOC 2	LOC 3	LOC 4
Travel lanes	No centerlines OR single lane one-way	(no effect)	(no effect)	2 or more lanes in any direction
Prevailing speed	<10mph	11-15mph	16-20mph	21-25mph
Vehicular speeds turning into driveways	<10mph	10-15mph	15-20mph	>=20mph
Heavy vehicle	<=5%	6-7%	(no effect)	>8%

Table 6 Curbed Sidewalk LOC Methodology

Criteria	LOC 1	LOC 2	LOC 3	LOC 4
Posted speed limit	<=20mph	21-25mph	26-30mph	31-35mph
Usable sidewalk width	>=10-ft	9-ft to 8-ft	6-ft to 8-ft	<6-ft
# of travel lanes	2-3	(no effect)	4 to 5 lanes	6+ lanes

Sidewalk quality	Even, smooth surface	(no effect)	Some cracks and upheavals, but usable sidewalk width is maintained	Cracks, failing pavement, such that usable sidewalk width is not maintained

Table 7 Buffered Sidewalk LOC Methodology					
Criteria		**LOC 1**	**LOC 2**	**LOC 3**	**LOC 4**
# of Travel Lanes	**Buffer width >=14-ft**	2-3 lanes	4-5 lanes	6+ lanes	(no effect)
	Buffer width <14-ft	2-3 lanes	(no effect)	4-5 lanes	6+ lanes
Usable Sidewalk Width		>=10-ft	9-ft to 8-ft	6-ft to 7-ft	<6-ft
Sidewalk Quality		Even, smooth surface	(no effect)	Some cracks and upheavals, but usable sidewalk width is maintained	Cracks, failing pavement, such that usable sidewalk width is not maintained
Posted Speed Limit	**Buffer width >=14-ft**	<=30mph	31-35mph	36-40mph	>=40mph
	Buffer width <14-ft	<=25mph	26-30mph	31-35mph	>=36mph
Landscape buffer and street trees		Yes, continuous	Yes, discontinuous[16]	No landscaping	(no effect)
Buffer quality		High quality buffer such as lush landscaping or parklet	Physical barrier such as modest landscaping, parked cars, or bicycle parking	Width buffer such as painted bike lane or bus lane	(no effect)
[1] Discontinuous is defined as not having a consistent effect on street life. Regularly spaced street trees may still feel like a "continuous" buffer and should receive a score of 1.					

Both Bicycle LTS and Pedestrian LOC use a "weakest link" approach such that the lowest score for all variables considered in the index determines the overall segment score. An example of the weakest link analysis is demonstrated in **Figure 3**.

LTS methodology was born from the idea that building less stressful bikeways and walkways would enable greater levels of biking and walking and that the shift from LTS 3 or 4 to 2 is often considered the point at which dramatic active mode shift can be accomplished. But there are other lenses that could be applied to the LTS and LOC methods including one that considers how inclusive facilities are for all users, for which a score of 1 would be an appropriate target. For the purposes of this study, bicycle LTS 1 and pedestrian LOC 1 were considered the ideal targets.

Figure 3 Weakest Link Analysis

	Posted Speed	ADT	Lane Count	Buffer Type	Buffer Width	Bike Volumes	Sidewalk Width	Sidewalk Quality	Lighting	Overall Score
Existing Conditions	30 MPH	> 15,000	4	None, cyclists mix with traffic	< 14 ft	Low	< 6 ft	Some cracks, but usable width maintained	Roadway lighting	
Bicycle	3	4	3							4
Pedestrian	2		3	2	3		4	3	2	4

Huntington Ave from Metroview Pkwy to Telegraph Rd West of Metroview Pkwy, looking West

Existing Conditions

Existing Conditions analysis was based on a detailed data collection effort from the project team. Data collection included a walking tour with County staff, summarizing 2019 VDOT ADT volumes in the study area, and extensive field visits to collect geometric dimension data to inform the level of traffic stress and level of comfort analyses. **Figure 4** displays the existing land uses within the study area which is predominantly a mix of low, medium and high residential density, pockets of recreational open space, and small strip retail centers.

Pedestrian Network Connectivity

Figure 5 displays the existing sidewalk network where most streets provide sidewalks with the exception of some low residential density areas. Despite an extensive network there are still opportunities for greater east-west connectivity between Telegraph Road and North Kings Highway which would also support connections to the Huntington Metrorail Station. There are also some missing links to recreational amenities such as Mount Eagle Park and the Huntington Community Center which could enhance connectivity. Other pedestrian challenges in the area include poor sidewalk quality, narrow sidewalk widths, and a significant grade differential between the Northwest corner of the study area and the southeast corner which results in steep inclines along North Kings Highway.

Pedestrian Crossings

Figure 6 shares an inventory of the marked crosswalks within the study area, including controlled and uncontrolled. Fairfax County has begun to prioritize marked crosswalks on all four legs of a signalized intersection, and there are ten locations that are missing marked crosswalks. There are also stretches on Huntington Avenue and North Kings Highway where the distance between crossings exceeds 400 feet:

- Huntington Avenue, between Biscayne Drive and Foley Street (~2,000 feet)
- North Kings Highway, between Telegraph Road and Jefferson Drive (~2,100 feet)
- North Kings Highway, between Fort Drive and Fairhaven Avenue (~1,100 feet)

There are six uncontrolled crosswalks in the study area, three on Huntington Avenue and three on North Kings Highway. An evaluation of each of these crossing locations for adequacy indicates only 40% of industry recommended treatments are in place and implemented.

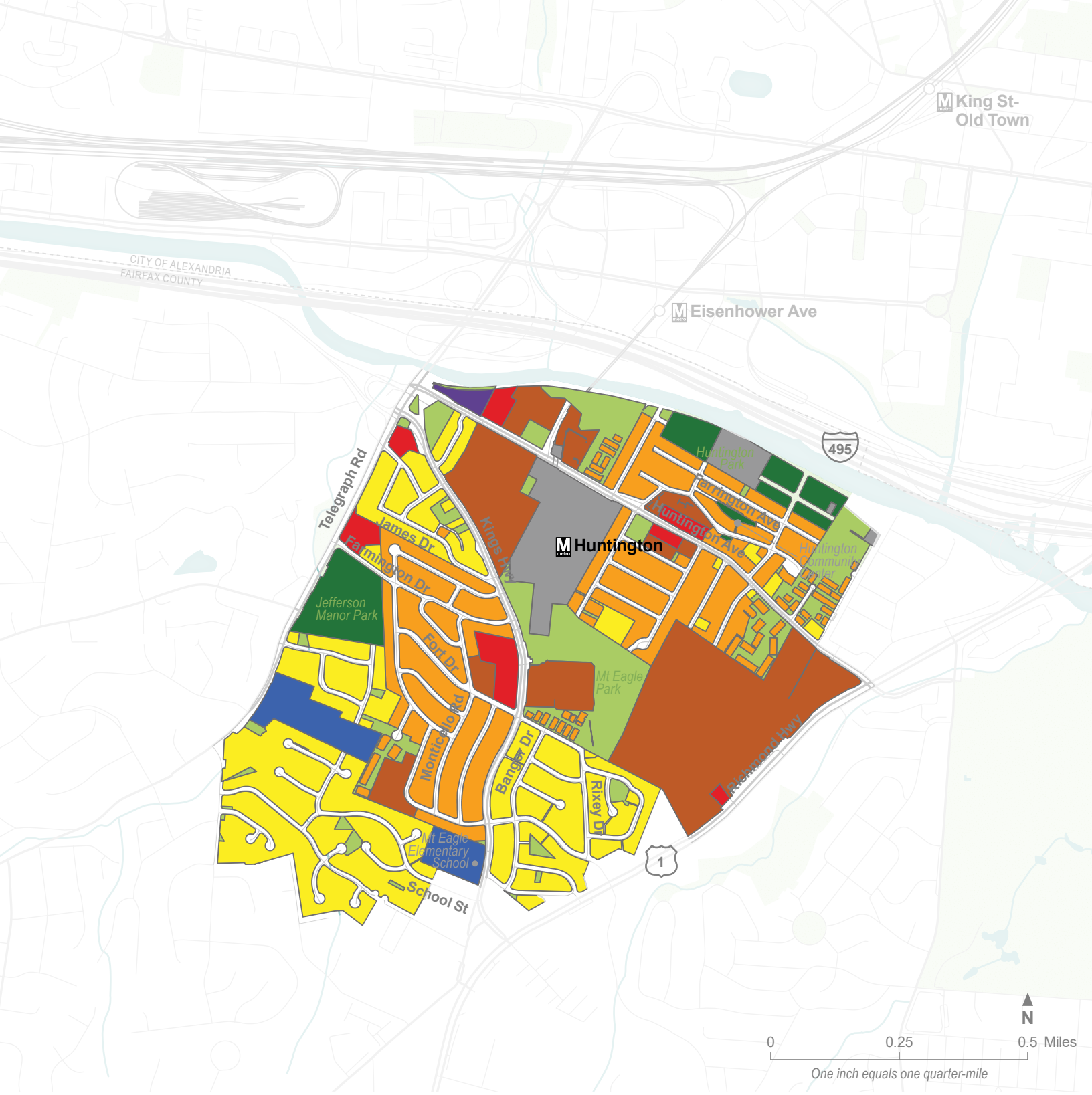


Figure 4

Land Uses Existing

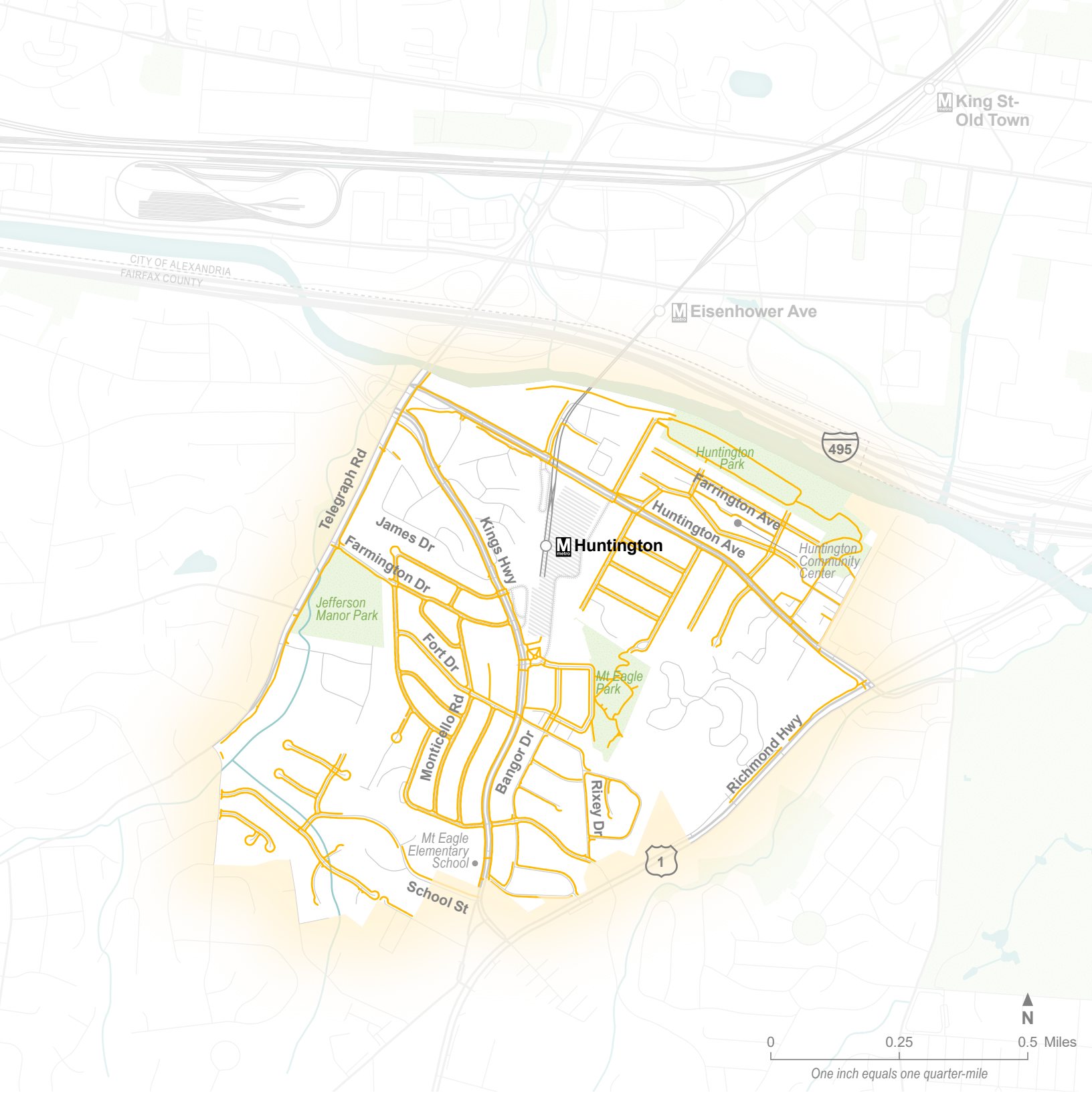


Figure 5

Sidewalk Network Existing

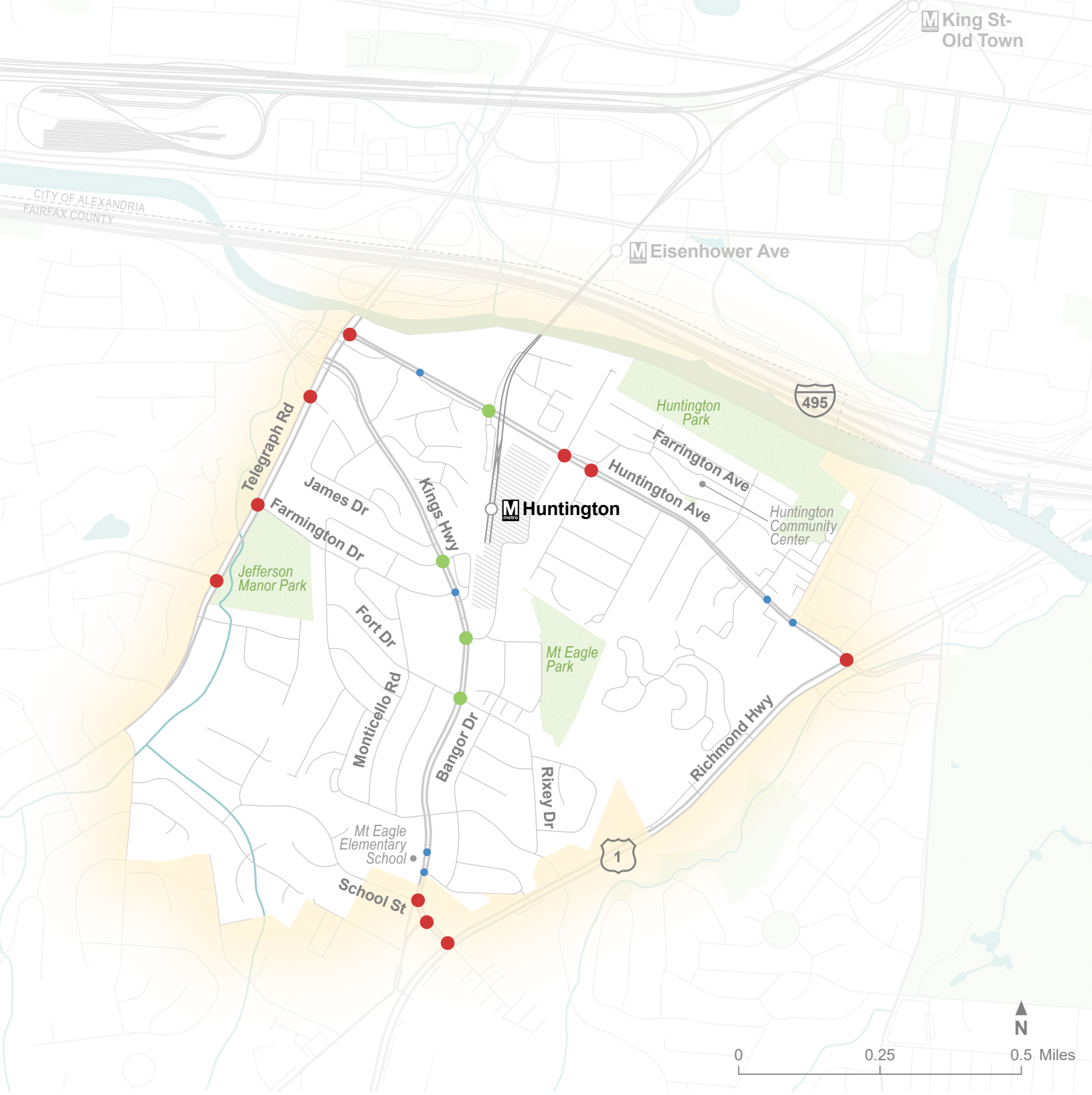


Figure 6

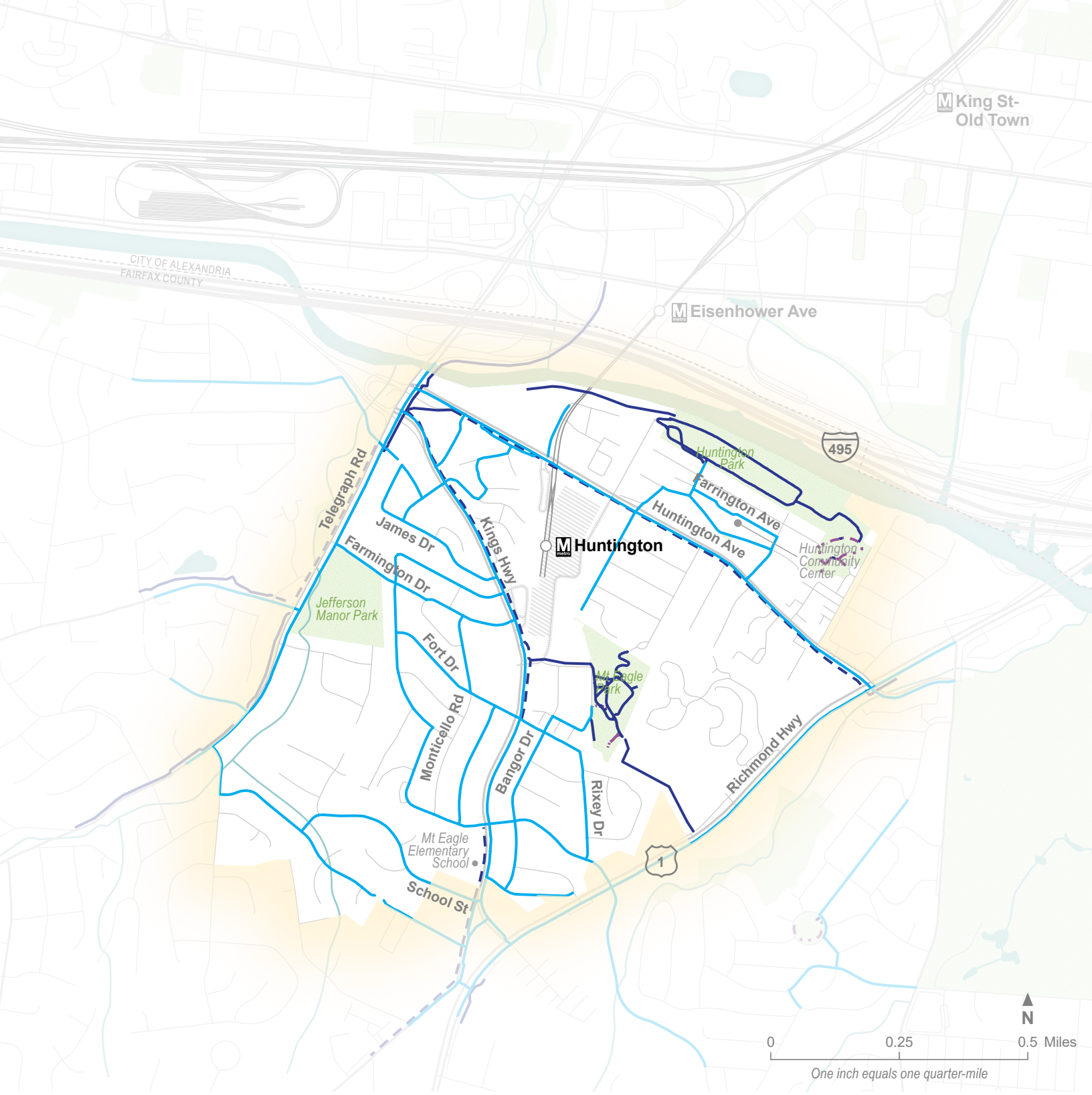
Existing Pedestrian Crossings

Bicycle Level of Traffic Stress

Figure 7 displays the existing bicycle facilities in the study area. While there are some identified bicycle routes in the study area, there are no bike lanes. The project team analyzed bicycle LTS for a subset of streets within the study area determined to be priority streets and results are displayed in **Figure 8**. While there are some LTS 1 facilities, the majority of analyzed roads are LTS 3 or 4. Huntington Avenue, North Kings Highway, and Telegraph Road are all LTS 4 due to not having a separated bicycle facility available. Other contributing factors include large crossing distances and high speeds. **Appendix A** includes the detailed inputs and results, by segment, for the bicycle level of stress.

Pedestrian Level of Comfort

The project team analyzed pedestrian LOC for a subset of streets within the study area determined to be priority streets and results are displayed in **Figure 9**. Almost all of the analyzed roads were deemed highly uncomfortable for pedestrians and scored either a 3 or a 4. Huntington Avenue, North Kings Highway, and Telegraph Road all scored a LOC 4 due to narrow sidewalks, large crossing distances, and high speeds. It is also worth noting that areas around community resources such as Mt. Eagle Elementary School and the Huntington Community Center are also highly uncomfortable due to sidewalk quality and a lack of pedestrian scaled lighting. **Appendix A** includes the detailed inputs and results, by segment, for the pedestrian level of comfort.



Bicycle Network

Bicycle routes	Trails
Bikeable sidewalks	Unpaved / natural surfaces
Station access roads	Station footprint

Figure 7

Bicycle Network Existing

Figure 8

Bicycle Level of Traffic Stress Existing

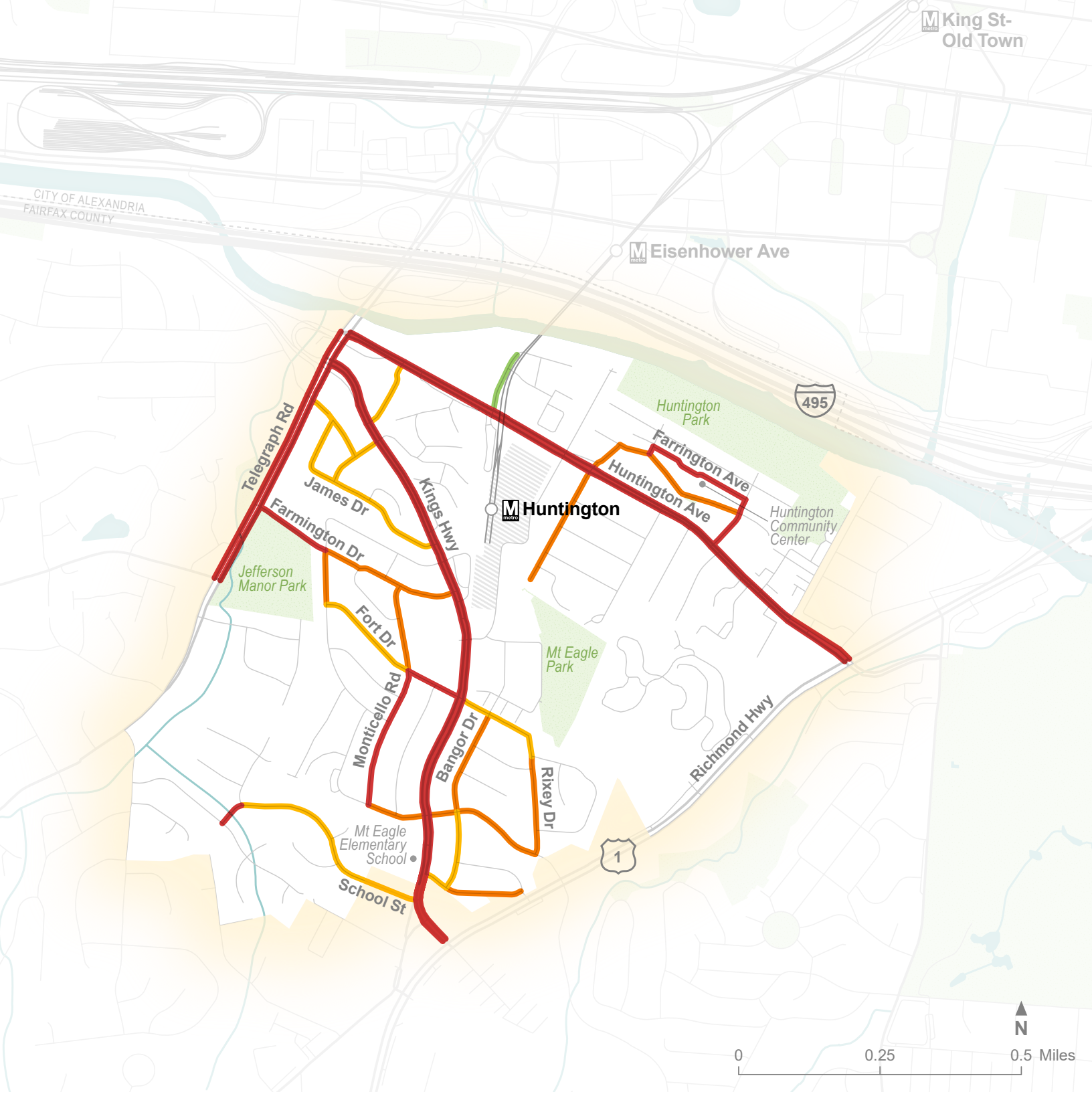


Figure 9

Pedestrian Level of Comfort Existing

Future (2045) Conditions

Future (2045) Conditions analysis assumed planned and approved active transportation projects as part of the pedestrian and bicyclist networks in order to assess pedestrian connectivity, bicycle level of traffic stress, pedestrian level of comfort, and pedestrian crossings. **Appendix B** summarizes a review of relevant planning documents and related projects. Future traffic volumes for 2045 were developed based on 2019 ADT volumes with a nominal one percent annual growth rate that provides a simple potential volume forecast. Future (2045) Conditions also assumed future land uses consistent with the Fairfax County Comprehensive Plan as shown in **Figure 10** below. The study area will continue to be mostly residential in nature, with slightly higher densities. There are also plans for a mixed-use center along North Kings Highway, just south of the Huntington Metrorail Station.

Pedestrian Connectivity

A review of existing planning documents identified planned and approved infrastructure improvements to include in the Future (2045) Conditions analysis in this study, and these are identified in **Table 3** below.

Figure 11 below illustrates the future pedestrian network with planned development projects and anticipated pedestrian connections within the study area.

Table 8: 2045 Baseline Planned Infrastructure Improvements

2045 Baseline Assumptions		
Planned Improvement	**Analysis Assumptions**	**Plan/Study Reference**
Install a path along N Kings Hwy, between Telegraph Rd and Jefferson Dr	10 ft "hard surface trail". Assumed 5 ft continuous, raised landscape buffer between path and road.	Countywide Trails Plan / ActiveFairfax
Install a path along Huntington Ave, between Telegraph Rd and Richmond Highway	10 ft "hard surface trail". Assumed 5 ft continuous, raised landscape buffer between path and road.	Countywide Trails Plan / ActiveFairfax
Install a minor paved trail along Farmington Dr	6 ft sidewalk	Countywide Trails Plan
Allocate excess space from narrowing the travel lanes down to 10.5 ft to the sidewalk area on N Kings Hwy	6 to 8 ft sidewalks	Proposed North Kings Highway Resolution
Install light barrier types between the curb travel lane and the sidewalk	Assumed continuous 2 to 3 ft landscape buffer	Proposed North Kings Highway Resolution
Install pedestrian-focused lighting	Update lighting to pedestrian-scale	Proposed North Kings Highway Resolution
Install a HAWK beacon signal at the crosswalk directly in front of the Mount Eagle Elementary School	Assumed HAWK under crosswalk analysis	Proposed North Kings Highway Resolution
Construct new / improve existing sidewalks throughout the Transit Station Area	6 to 8 ft sidewalks	Fairfax County Comprehensive Plan

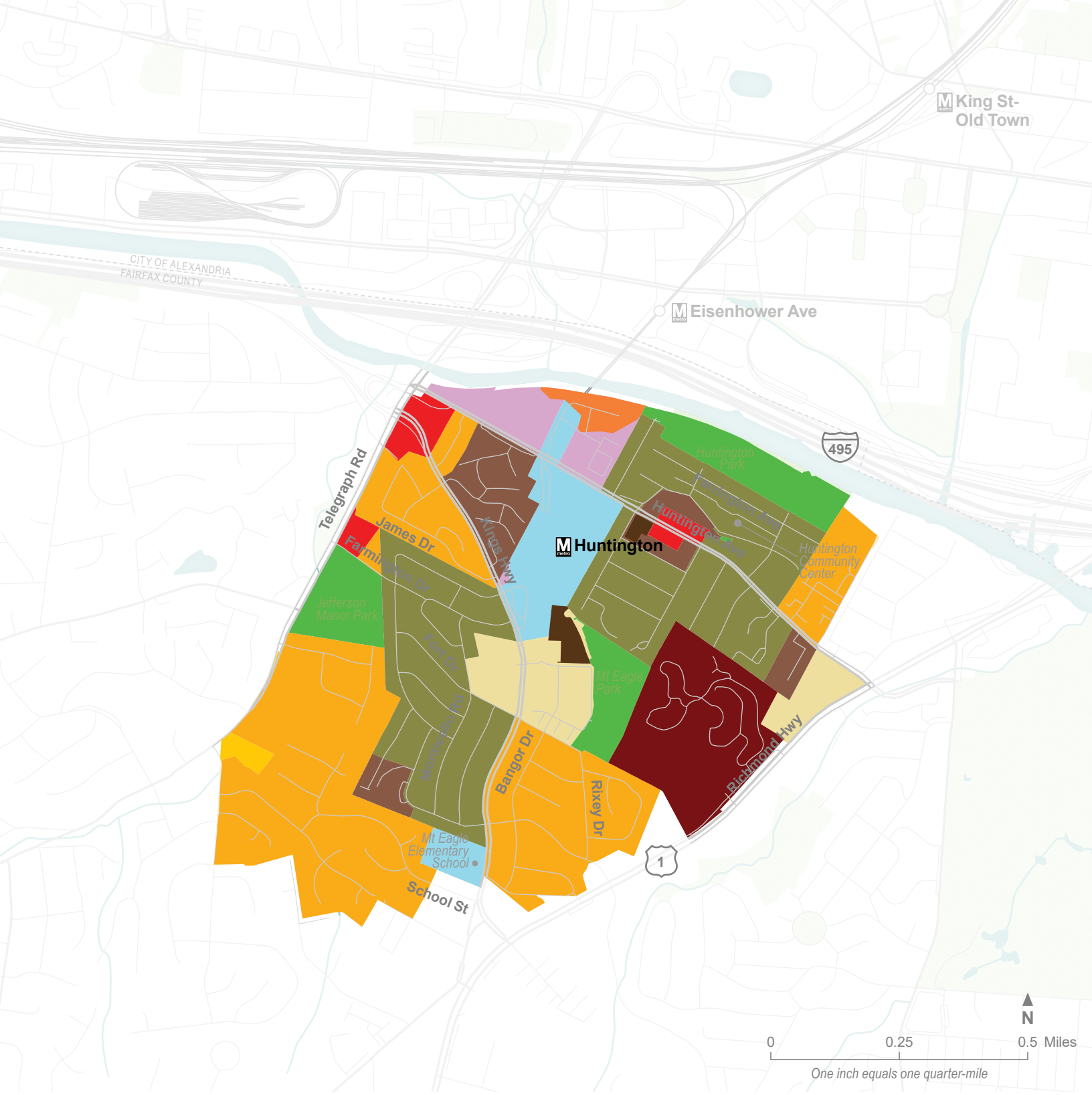


Figure 10

Land Use Plan

Figure 11

Future Pedestrian Network 2045

Bicycle Level of Traffic Stress

As shown in **Table 8** above, a 10-foot shared use path was assumed for both Huntington Avenue and North Kings Highway which was analyzed as an off-street bicycle facility. **Figure 12** displays the bicycle level of traffic stress results. Where a shared use path is planned on Huntington Avenue, North Kings Highway, and Telegraph Road the LTS score improves from LTS 4 to LTS 1. The benefits are limited due to the short extents of these planned improvements. The Richmond Highway BRT project will terminate at Huntington Metrorail Station and buses will travel from Richmond Highway, north along North Kings Highway in mixed flow traffic to access the Metro station. As a result, there is no extra space within the right-of-way of North Kings Highway between Jefferson Drive and Richmond Highway to allocate space for a continued shared use path. There could be an opportunity on Huntington Avenue, east of Metroview Parkway, to re-allocate space to a shared use path allowing for a continuous facility between Telegraph Road and Richmond Highway. **Appendix C** includes the detailed inputs and results, by segment, for the bicycle level of traffic stress.

Volume to capacity ratios can serve as a measure of congestion on a given roadway and ultimately inform opportunities to reduce travel lanes. Volume to capacity for Future (2045) Conditions was evaluated on North Kings Highway and Huntington Ave using VDOT historical ADT count data, applying a one percent annual growth rate, and assuming a capacity of 1,150 veh/hr/ln. **Figure 13** below summarizes the volume to capacity ratio results which indicate there is available capacity on Huntington Avenue and a road diet could be feasible and there is an opportunity for the County to explore this further with more detailed analysis. A road diet is also referred to as a lane reduction where the effective width of the road is reduced to address improvements to multi-modal safety. Results indicate that the Future (2045) congestion on North Kings Highway is too high to make a road diet feasible.

Pedestrian Level of Comfort

As shown in Table 8 above, a ten-foot shared use path is planned for both Huntington Avenue and North Kings Highway which was analyzed as a buffered pedestrian facility. Future (2045) Conditions analysis also included all of the identified pedestrian improvements in **Table 8** and **Figure 14** displays the pedestrian level of comfort results. While some segments of Huntington Avenue and North Kings Highway improve from LOC 4 to LOC 3, the majority of the study area continues to have a low level of pedestrian comfort under Future (2045) Conditions. Ongoing challenges in the study area include poor sidewalk quality and missing pedestrian scaled lighting. Along Huntington Ave, North Kings Highway, and Telegraph Road despite the shared use path acting as an off-street facility, the number of lanes contributes to long crossing distances and combined with high speeds these facilities have a very low level of comfort for pedestrians. **Appendix C** includes the detailed inputs and results, by segment, for the pedestrian level of comfort.

Figure 12

Bicycle Level of Traffic Stress Baseline 2045

Pedestrian Crossings

Future (2045) Conditions evaluation did not assume any new pedestrian crossings and assumed the existing adequacy of pedestrian crossings remained the same as shown in **Figure 5** above.

Figure 13

Vehicular Volume-to-Capacity Ratio Baseline 2045

Figure 14

Pedestrian Level of Comfort
Baseline 2045

Recommendations

Recommendations for improved infrastructure were developed based on analysis results and collaboration with County staff.

Figure 15 below identifies three proposed mid-block crossing locations to improve the distance between marked pedestrian crossings on Huntington Avenue and North Kings Highway with consideration for optimizing connectivity to local trails. The following crossing treatments are recommended to ensure adequacy at crossing locations in line with industry best practices:

- High visibility crosswalks and adequate nighttime lighting
- Crossing warning signs for all uncontrolled crosswalks
- Pedestrian refuge islands for all uncontrolled crosswalks

There are also opportunities for an improved walking and biking experience on collector and residential streets, particularly where these streets offer connectivity to the County's trail network. Slow Streets is a term used to refer to instances where authorities limit vehicular through traffic on a given stretch of roadway and create a shared space for vehicles with pedestrians and bicyclists. The ideal context for this treatment is on streets with low vehicle volume and low to moderate speeds, where vehicle volumes have dropped, or serve a redundant through-traffic role. Characteristics of Slow Streets include:

- Prevailing speeds of 15 MPH or less
- Partially closed intersections
- Partial barriers at entry points with signage
- Allow local access to residents but not through traffic (vehicles or trucks), to deliveries, and to emergency vehicles

Implementation involves identifying a network of streets that can be closed at key entry points, where interior intersections remain unobstructed. Temporary traffic barriers and "Local Traffic Only", Slow/Shared, or branded signs are installed at main vehicle entry points. Light separation is used to partially block streets and indicate restricted use and lower speeds.

Figure 16 identifies locations where the County could implement bicycle and pedestrian improvements, including Slow Streets and enhanced connections to the trail network. Opportunities for enhanced trail connections could include a subset of Slow Street features such as filtered access to vehicles and reducing prevailing speeds.

Figure 14

Pedestrian Level of Comfort
Baseline 2045

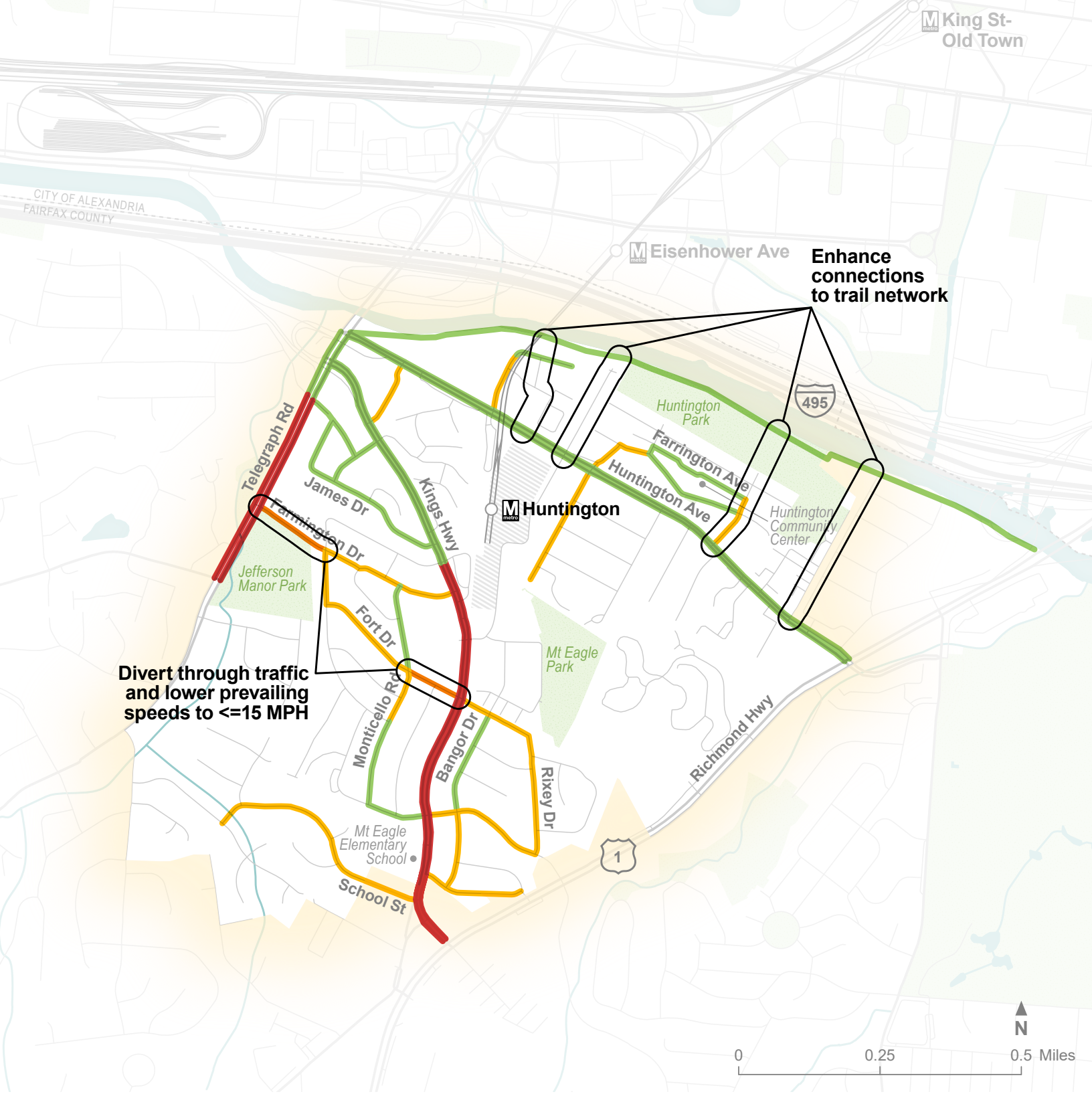


Figure 16

Bicycle and Pedestrian Improvements

Initial evaluations of volume to capacity ratios indicate that North Kings Highway and Telegraph Road have high vehicular volumes that limit the feasibility of a road diet. An initial evaluation indicates Huntington Avenue does have capacity in the peak period and a more detailed analysis of the roadway is recommended to determine the feasibility of repurposing travel lanes. **Table 9** below summarizes these recommendations by street and identifies high level cost. Recommendations to improve sidewalk quality are deemed a lower cost recommendation, while new or widening sidewalks is a medium cost. High costs are assumed for road diets and new bicycle and pedestrian facilities.

Table 9: Summary of Recommendations by Street

Recommendations	Cost
Bangor Dr	
Improve sidewalk quality to smooth surface	Low
Install pedestrian-scale lighting between Fort Dr and Fairhaven Ave	Low
Widen sidewalk from less than 6 ft to 6 to 8 ft	Medium
Fort Dr	
Slow streets opportunity; reduce through traffic and prevailing speeds to 15 MPH or less between Monticello Rd and N Kings Hwy	Low
Increase sidewalk width to 6 ft between Monticello Rd and N Kings Hwy	Medium
Farmington Dr	
Slow streets opportunity; reduce through traffic and prevailing speeds to 15 MPH or less between Telegraph Rd and N Kings Hwy	Low
Improve sidewalk quality to smooth surface between Monticello Rd and N Kings Hwy	Low
School St	
Install pedestrian-scale lighting between Dewey Dr and Shaffer Dr	Low
Monticello Rd	
Improve sidewalk quality from cracked and failing to smooth surface between Fort Dr and Fairhaven Ave	Low
Widen sidewalk from less than 6 ft to 6 to 8 ft and install pedestrian-scale lighting between Farmington Dr and Fairhaven Ave	Medium
Community Center Access Rd	
Install pedestrian-scale lighting between Liberty Dr and Mt Vernon Dr	Low
Mt Vernon Dr	
Install pedestrian-scale lighting between Huntington Park and Huntington Ave	Low
Enhance connection to trails from Huntington Ave	Medium

Huntington Ave	
Add marked crosswalks at Fenwick Dr, Biscayne Dr and Richmond Hwy intersections, 5 legs total	Low
Add advance "Yield Here to (Stop Here For) Pedestrian" sign and yield lines to all unsignalized crossings	Low
Enhanced slow street connections to Cameron Run Trail at Fenwick Dr, Mt Vernon Dr and Huntington Creek Rd	Low
Add pedestrian refuge island and RRFB at mid-block crossings between 1) Kathryn St and Metroview Pkwy, 2) Foley St and Hunting Creek Rd	Medium
New crossing locations between 1) Metroview Pkwy and Fenwick Dr, and 2) Blaine Dr and Fifer Dr, with pedestrian refuge islands and RRFBs	Medium
Reduce posted (and prevailing) speed to 25 MPH	Low
Remove one through-lane in each direction between Telegraph Rd to Richmond Hwy and provide two-way protected bike lane and 8 ft sidewalk,	High
North Kings Hwy	
Add advance "Yield Here to (Stop Here For) Pedestrian" sign and yield lines to all unsignalized crossings	Low
Reduce posted (and prevailing) speeds to 30 MPH	Low
Restrict truck access	Low
New crossing location at Fairhaven Ave with pedestrian refuge island, yield lines and RRFB	Medium
Remove one through-lane in each direction north of Jefferson Dr	High
Extend shared use path south to Richmond Hwy	Medium
Telegraph Rd	
Add marked crosswalks at Lenore Ln, Farmington Dr and Franconia Rd intersections, 3 legs total	Medium
Increase sidewalk width from less than 6 ft to 8 ft between Lenore Ln and Franconia Rd	Medium
Reduce posted (and prevailing) speed to 30 MPH	Low
Remove one through-lane in each direction between Lenore Ln and Franconia Rd and provide 6 ft bike lanes on both sides	High

With these recommendations implemented, all streets improve to a bicycle level of traffic stress score and pedestrian level of comfort score of 1 or 2. **Figure 17** displays the bicycle level of traffic stress results with these recommendations in place and **Figure 18** displays the pedestrian level of comfort results. **Appendix D** includes the analysis inputs for both bicycle level of traffic stress and pedestrian level of comfort.

Figure 17

Bicycle Level of Traffic Stress 2045 with Recommendations

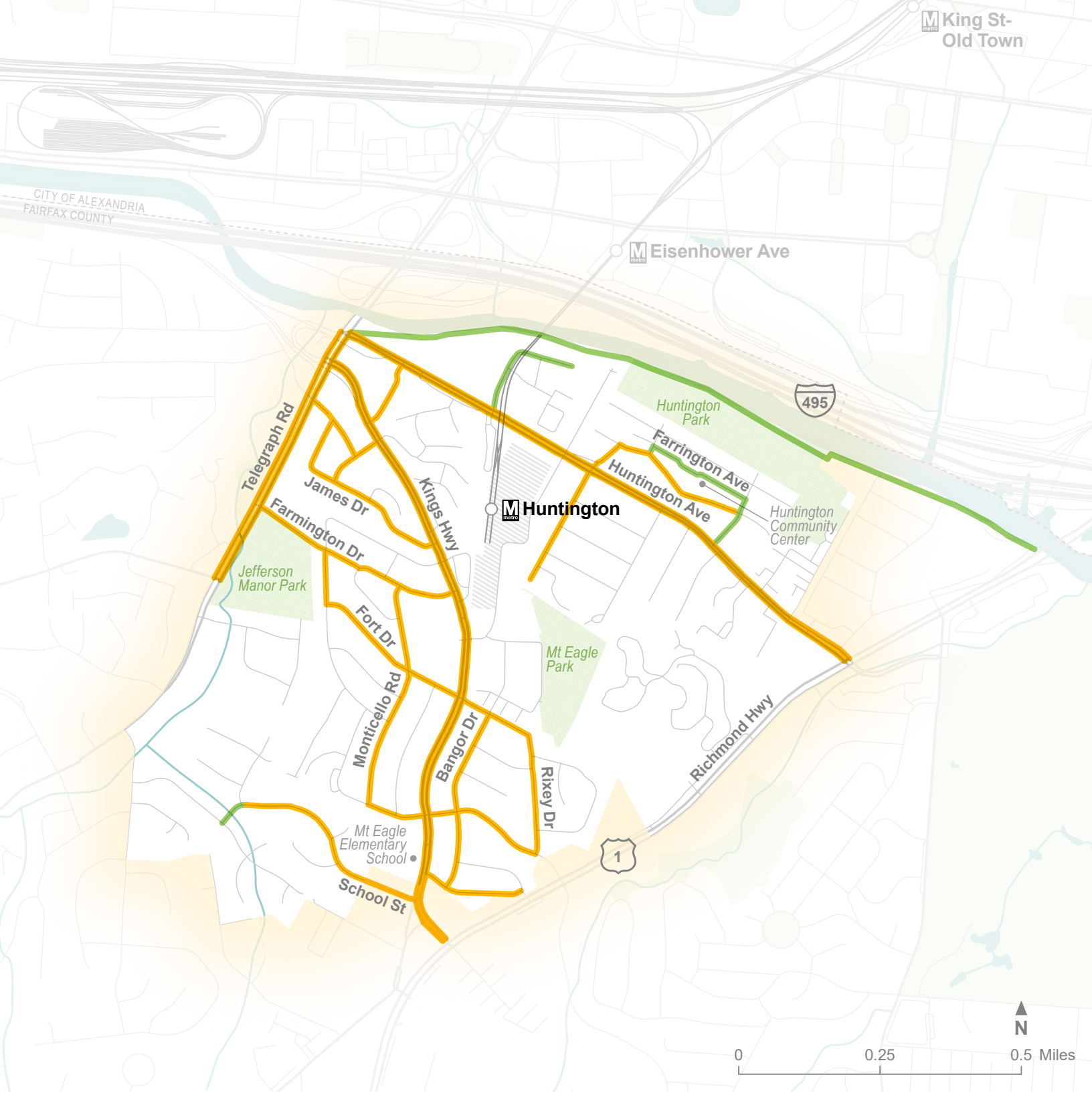
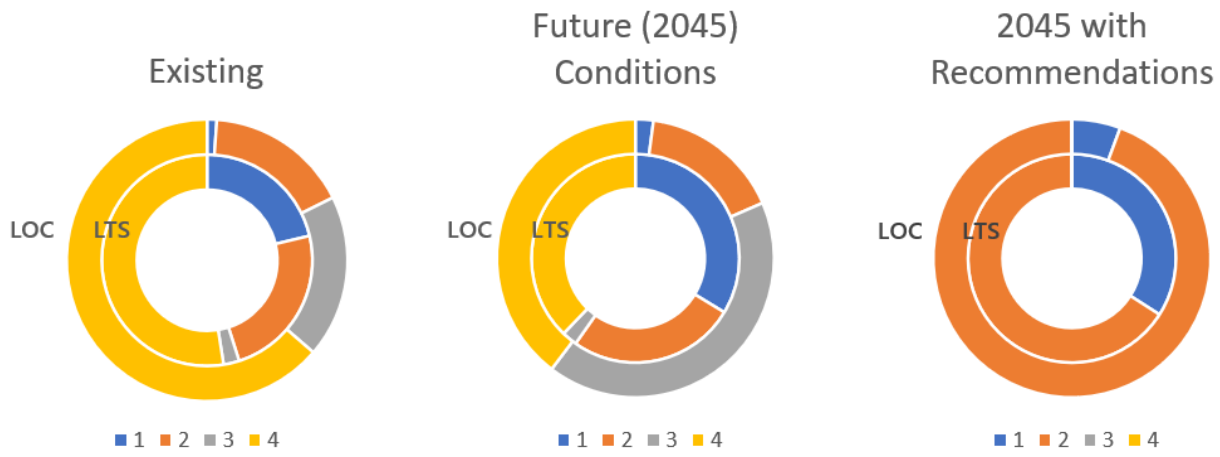


Figure 18

Pedestrian Level of Comfort 2045 with Recommendations

Compared to 2045 Baseline, deficient (LTS 3 and 4) bicycle and pedestrian travel decrease from 4.1 and 8.2 miles of facilities to 0 miles with recommendations. Facilities that are suitable to all users (LTS 1 and LOC 1) increase from 3.3 and 0.2 miles to 3.4 and 0.6 miles. **Figure 19** illustrates the bicycle LTS and pedestrian LOC scoring for the entire study area.

Figure 19 Bicycle LTS and Pedestrian LOC by Scenario



While the above recommendations result in zero deficient facilities for bicyclists and pedestrians (Score of 1 or 2), Huntington Avenue, North Kings Highway, and Telegraph Road all face similar obstacles to a score of 1 (suitable for all users). The following additional improvements would allow for a bicycle LTS 1 and pedestrian LOC 1 score:

- Continue a 10-ft shared use path the entire length of the corridor
- Crosswalks every 400-ft
- Either ensure pedestrians have a 14-ft buffer (on-street parking, landscaping, etc.) or reduce the speed limit further to 25 MPH

Appendix A

ID	Roadway Name	Roadway Extents	VDOT ADT (Existing)	ADT (Existing)	VDOT ADT Year	Functional Class	One-way?	Lane Count	Prevailing (or Posted) Speed	Bike Facility Type	Usable Facility Width
1	Bangor Dr	Fort Dr to Fairhaven Ave	430	0-750	2008		Two-way	2	15	None (cyclists mix with traffic)	N/A
2	Bangor Dr	Fairhaven Ave to Jamaica Dr	870	751-1500	2008		Two-way	2	15	None (cyclists mix with traffic)	N/A
3	Biscayne Dr	Entire segment	740	0-750	2008		Two-way	2	15	None (cyclists mix with traffic)	N/A
4	Edgehill Dr	Entire segment	3100	3001-8000	2016		Two-way	2	15	None (cyclists mix with traffic)	N/A
5	Fairhaven Ave	East of N Kings Hwy to Rixey Dr	2700	1501-3000	2019	Minor Collector	Two-way	2	15	None (cyclists mix with traffic)	N/A
6	Fairhaven Ave	Fairhaven to Fort - south segment	440	0-750	2019		One-way	1	15	None (cyclists mix with traffic)	N/A
7	Fairhaven Ave	West of N Kings Hwy to Monticello Rd	260	0-750	2008		One-way	1	15	None (cyclists mix with traffic)	N/A
8	Farmington Dr	N Kings Hwy to Monticello Rd	4000	3001-8000	2019	Minor Collector	Two-way	1	15	None (cyclists mix with traffic)	N/A
9	Farmington Dr	Edgehill Dr to Telegraph Rd	4000	3001-8000	2019	Minor Collector	Two-way	2	25	None (cyclists mix with traffic)	N/A
10	Farmington Dr	Monticello Rd to Edgehill Dr	4000	3001-8000	2019	Minor Collector	Two-way	1	15	None (cyclists mix with traffic)	N/A
11	Farrington Ave	Farrington Ave - west segment	1100	751-1500	2016		Two-way	2	15	None (cyclists mix with traffic)	N/A
12	Farrington Ave	Farrington Ave - east segment	240	0-750	2008		Two-way	2	15	None (cyclists mix with traffic)	N/A
13	Fort Dr	Rixey Dr to N Kings Hwy	3100	3001-8000	2016		Two-way	2	15	None (cyclists mix with traffic)	N/A
14	Fort Dr	N Kings Hwy to Monticello Rd	3300	3001-8000	2016		Two-way	2	25	None (cyclists mix with traffic)	N/A
15	Fort Dr	Monticello Rd to Edgehill Dr	3400	3001-8000	2019		Two-way	2	15	None (cyclists mix with traffic)	N/A
16	Huntington Ave	Mt Vernon Dr to Foley St	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
17	Huntington Ave	Farrington Ave to Blaine Dr	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
18	Huntington Ave	Fifer Dr to Mt. Vernon Dr	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
19	Huntington Ave	Hunting Creek Rd to Richmond Hwy	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
20	Huntington Ave	Robinson Way to Metroveiw Pkwy	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
21	Huntington Ave	Foley St to Hunting Creek Rd	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
22	Huntington Ave	Kathryn St to Robinson Wy	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
23	Huntington Ave	Telegraph Rd to Kathryn St	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
24	Huntington Ave	Blaine Dr to Fifer Dr	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
25	Huntington Ave	Fenwick Dr to Biscayne Dr/Farrington Ave	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
26	Huntington Ave	Metroview Pkwy to Fenwick Dr/Huntington Metro Access Rd	16000	15001+	2019	Minor Arterial	Two-way	4	30	None (cyclists mix with traffic)	N/A
27	Jamaica Dr	Bangor Dr to Belleview Ave	650	0-750	2016		Two-way	2	15	None (cyclists mix with traffic)	N/A
28	Jamaica Dr	N Kings Hwy to Bangor Dr	1200	751-1500	2016		Two-way	2	25	None (cyclists mix with traffic)	N/A
29	James Dr	Entire street	230	0-750	2011		Two-way	2	15	None (cyclists mix with traffic)	N/A
30	James Dr	Entire street	230	0-750	2011		Two-way	2	15	None (cyclists mix with traffic)	N/A
31	James Dr	Entire street	70	0-750	2016		Two-way	2	15	None (cyclists mix with traffic)	N/A
32	Kathryn St	Entire street	990	751-1500	2016		Two-way	2	15	None (cyclists mix with traffic)	N/A
33	Lenore Ln	Entire street	160	0-750	2011		Two-way	2	15	None (cyclists mix with traffic)	N/A
34	Liberty Dr	Liberty Dr - Entire segment	0	0-750	2019		One-way	1	15	None (cyclists mix with traffic)	N/A
35	Liberty Dr	Liberty Dr - Entire segment	420	0-750	2016		One-way	1	15	None (cyclists mix with traffic)	N/A
36	Metroview Pkwy	Metroview Pkwy NS segment	1200	751-1500	2016		Two-way	2	15	None (cyclists mix with traffic)	N/A
37	Monticello Rd	Fairhaven Ave to Fort Dr - north segment	1200	751-1500	2016		One-way	1	15	None (cyclists mix with traffic)	N/A
38	Monticello Rd	Jamaica Dr to School St	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
39	Monticello Rd	Farmington Dr to Fort Dr	130	0-750	2016		One-way	1	15	None (cyclists mix with traffic)	N/A
40	Monticello Rd	School St to N Kings Hwy	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
41	Mount Vernon Dr	Entire segment	720	0-750	2016		Two-way	2	15	None (cyclists mix with traffic)	N/A
42	N Kings Hwy	Jefferson Dr/Shady Oak to Farmington Dr	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
43	N Kings Hwy	James Dr to Jefferson Dr	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
44	N Kings Hwy	Timothy Pl/Fort Farnsworth Rd to Wagon Dr/James Dr	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
45	N Kings Hwy	Huntington Park Dr to Fort Dr	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
46	N Kings Hwy	Fort Dr to Fairhaven Ave	24000	15001+	2019	Minor Arterial	Two-way	5	35	None (cyclists mix with traffic)	N/A
47	N Kings Hwy	Kathryn St to Timothy Pl/Fort Farnsworth Rd	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
48	N Kings Hwy	Farmington Dr to Huntington Park Dr	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
49	N Kings Hwy	Telegraph Rd to Kathryn St	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
50	N Kings Hwy	Fairhaven Ave to Jamaica Dr	24000	15001+	2019	Minor Arterial	Two-way	4	35	None (cyclists mix with traffic)	N/A
51	Rixey Dr	Entire segment	2800	1501-3000	2016		Two-way	2	15	None (cyclists mix with traffic)	N/A
52	School St	N Kings Hwy to Pine Grove Cir	2000	1501-3000	2008		Two-way	2	15	None (cyclists mix with traffic)	N/A
53	School St	Pine Grove Cir to Dewey Dr	1800	1501-3000	2019		Two-way	2	15	None (cyclists mix with traffic)	N/A
54	School St	Dewey Dr to Schaffer Dr	1900	1501-3000	2008		Two-way	2	25	None (cyclists mix with traffic)	N/A
55	Stella Pl	Metroview Pkwy EW Segment/Stella Pl	0	0-750	2019		Two-way	2	N/A	None (cyclists mix with traffic)	N/A
56	Telegraph Rd	Lenore Ln/East Dr to Farmington Dr	37000	15001+	2019	Minor Arterial	Two-way	6	35	None (cyclists mix with traffic)	N/A
57	Telegraph Rd	Farmington Dr to Franconia Rd	37000	15001+	2019	Minor Arterial	Two-way	5	35	None (cyclists mix with traffic)	N/A
58	Telegraph Rd	N Kings Hwy to Lenore Ln/East Dr	37000	15001+	2019	Minor Arterial	Two-way	8	35	Protected bike lanes (any buffer type present)	6.5 to <8 feet
59	Telegraph Rd	Huntington Ave to N Kings Hwy	37000	15001+	2019	Minor Arterial	Two-way	8	35	Protected bike lanes (any buffer type present)	6.5 to <8 feet
60	Timothy Pl	Entire street	230	0-750	2014		Two-way	2	15	None (cyclists mix with traffic)	N/A

ID	Roadway Name	Buffer Type	Buffer Type (Other)	Buffer Width	Buffer Continuity	Height	Pedestrian Facility Type	Through Zone Width	Buffer Zone Width	Furniture Type
1	Bangor Dr	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
2	Bangor Dr	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
3	Biscayne Dr	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
4	Edgehill Dr	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
5	Fairhaven Ave	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
6	Fairhaven Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
7	Fairhaven Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
8	Farmington Dr	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
9	Farmington Dr	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
10	Farmington Dr	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
11	Farrington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
12	Farrington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
13	Fort Dr	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
14	Fort Dr	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
15	Fort Dr	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
16	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
17	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
18	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
19	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
20	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
21	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
22	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
23	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
24	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
25	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
26	Huntington Ave	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
27	Jamaica Dr	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
28	Jamaica Dr	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
29	James Dr	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
30	James Dr	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
31	James Dr	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
32	Kathryn St	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
33	Lenore Ln	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
34	Liberty Dr	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
35	Liberty Dr	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
36	Metroview Pkwy	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
37	Monticello Rd	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
38	Monticello Rd	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
39	Monticello Rd	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
40	Monticello Rd	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
41	Mount Vernon Dr	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
42	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
43	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
44	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
45	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
46	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
47	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
48	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
49	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
50	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
51	Rixey Dr	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
52	School St	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
53	School St	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
54	School St	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
55	Stella Pl	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
56	Telegraph Rd	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
57	Telegraph Rd	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
58	Telegraph Rd	N/A	Landscape panel	<3 feet	Continuous (no gaps)	Sidewalk height	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer
59	Telegraph Rd	N/A	Landscape panel	<3 feet	Continuous (no gaps)	Sidewalk height	Detached (buffer between sidewalk and travel lanes)	8 to <9 feet	<14 feet	Landscape buffer
60	Timothy Pl	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A

ID	Roadway Name	Sidewalk Quality	Lighting	Crosswalk Frequency	Existing Bike Score	Existing Pedestrian Score
1	Bangor Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	1	3
2	Bangor Dr	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	2	2
3	Biscayne Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	2	3
4	Edgehill Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	2	3
5	Fairhaven Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	2	3
6	Fairhaven Ave	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced 400 feet or less	1	4
7	Fairhaven Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	1	3
8	Farmington Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	2	3
9	Farmington Dr	Even, smooth surface	Roadway lighting	Spaced > 400 feet	3	4
10	Farmington Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	2	3
11	Farrington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	2	3
12	Farrington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	1	3
13	Fort Dr	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	2	2
14	Fort Dr	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	3	4
15	Fort Dr	Even, smooth surface	Roadway lighting	Spaced > 400 feet	2	2
16	Huntington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
17	Huntington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
18	Huntington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
19	Huntington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
20	Huntington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
21	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	4	4
22	Huntington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
23	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	4	4
24	Huntington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
25	Huntington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	4	4
26	Huntington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
27	Jamaica Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	2	3
28	Jamaica Dr	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	1	2
29	James Dr	N/A	Roadway lighting	Spaced > 400 feet	1	2
30	James Dr	N/A	Roadway lighting	Spaced > 400 feet	1	2
31	James Dr	N/A	Roadway lighting	Spaced > 400 feet	1	2
32	Kathryn St	N/A	Roadway lighting	Spaced > 400 feet	2	2
33	Lenore Ln	N/A	Roadway lighting	Spaced > 400 feet	1	2
34	Liberty Dr	Some cracks, but usable width maintained	No lighting	Spaced > 400 feet	1	4
35	Liberty Dr	Some cracks, but usable width maintained	No lighting	Spaced > 400 feet	1	4
36	Metroview Pkwy	Even, smooth surface	Pedestrian-scale	Spaced > 400 feet	1	1
37	Monticello Rd	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced 400 feet or less	1	4
38	Monticello Rd	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	4	4
39	Monticello Rd	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	1	3
40	Monticello Rd	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced 400 feet or less	4	4
41	Mount Vernon Dr	Some cracks, but usable width maintained	No lighting	Spaced > 400 feet	2	4
42	N Kings Hwy	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	4	4
43	N Kings Hwy	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
44	N Kings Hwy	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced > 400 feet	4	4
45	N Kings Hwy	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	4	4
46	N Kings Hwy	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced > 400 feet	4	4
47	N Kings Hwy	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
48	N Kings Hwy	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	4	4
49	N Kings Hwy	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
50	N Kings Hwy	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	4	4
51	Rixey Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	2	3
52	School St	Even, smooth surface	Roadway lighting	Spaced > 400 feet	2	2
53	School St	Even, smooth surface	Roadway lighting	Spaced > 400 feet	2	2
54	School St	Even, smooth surface	No lighting	Spaced 400 feet or less	2	4
55	Stella Pl	N/A	N/A	N/A	N/A	N/A
56	Telegraph Rd	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced > 400 feet	4	4
57	Telegraph Rd	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4
58	Telegraph Rd	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	4
59	Telegraph Rd	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	4
60	Timothy Pl	N/A	Roadway lighting	Spaced > 400 feet	1	2

Appendix B

Huntington Metrorail Area Active Transportation Plan

Existing Plans + Relevant Recommendations

February 21, 2022

Fehr & Peers + Rhodeside Harwell

NOTE: Not for External Review

CONTENTS

Study Area Existing Plans + Relevant Recommendations

Document	Recommendations
Proposed North Kings Highway Resolution	A) Travel lanes should be narrowed to 10.5 feet and the excess space should be allocated to the sidewalk area; a speed reduction from 35 mph to 30 mph with flexi-posts or other light barrier types placed between the curb travel lane and the sidewalk. B) Pedestrian-focused street lighting to improve walking safety and support travel to neighborhood nighttime activities; a HAWK beacon signal at the crosswalk directly in front of Mount Eagle Elementary School to facilitate safe and efficient crossings. C) The resulting design must be attractive, traffic calming, place making, and safe without the acquisition of additional property from the adjacent residences.
Huntington Metro Redevelopment - Proposed Bus Terminal Overlay	Refer to the “Supplemental Information | Proposed Huntington Metro Redevelopment” section starting on page 16.
Huntington Metro Site - Presentation by Dover, Kohl & Partners	Refer to the “Supplemental Information | Proposed Huntington Metro Redevelopment” section starting on page 16.
Fairfax County Comprehensive Plan	Refer to the “Supplemental Information | Fairfax County Comprehensive Plan” section starting on page 20.
Fairfax County Countywide Trails Plan	Refer to the “Supplemental Information | Fairfax County Comprehensive Plan” section starting on page 20.
2017 Mount Vernon-Huntington Community Planning Sector	Refer to the “Supplemental Information | Fairfax County Comprehensive Plan” section starting on page 20.
Fairfax County Bicycle Master Plan	Refer to the “Supplemental Information | Fairfax County Bicycle Master Plan” section starting on page 25.

STUDY AREA

KEY

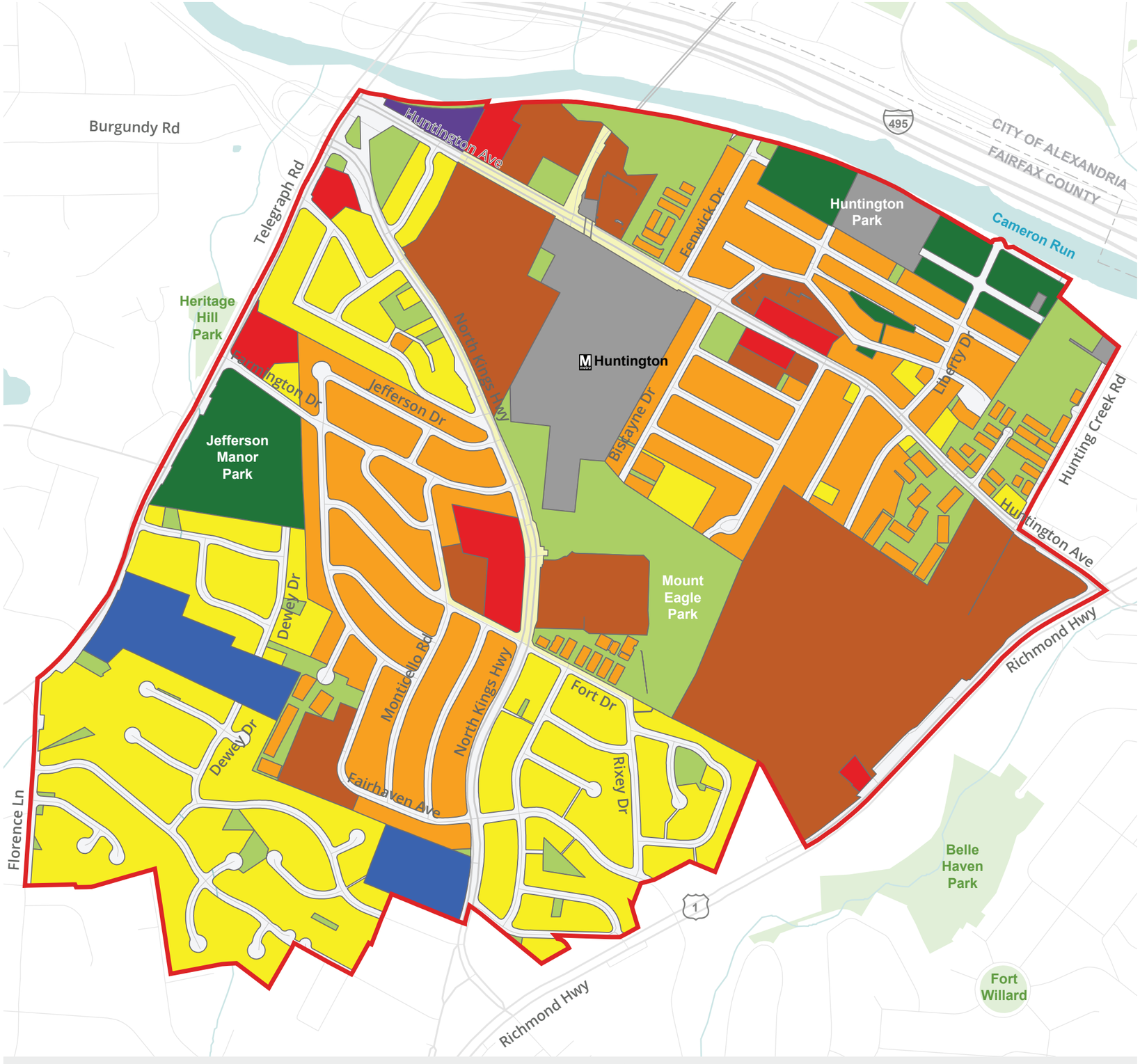
- Transit Station Area (Study Area)
- Transit Development Area
- Buildings
- Streams, Creeks, Water Resources
- Parks

Data Sources: Fairfax County GIS, ESRI
Creation Date: January 2022

N

0 0.25 0.5 Miles

EXISTING LAND USES



KEY

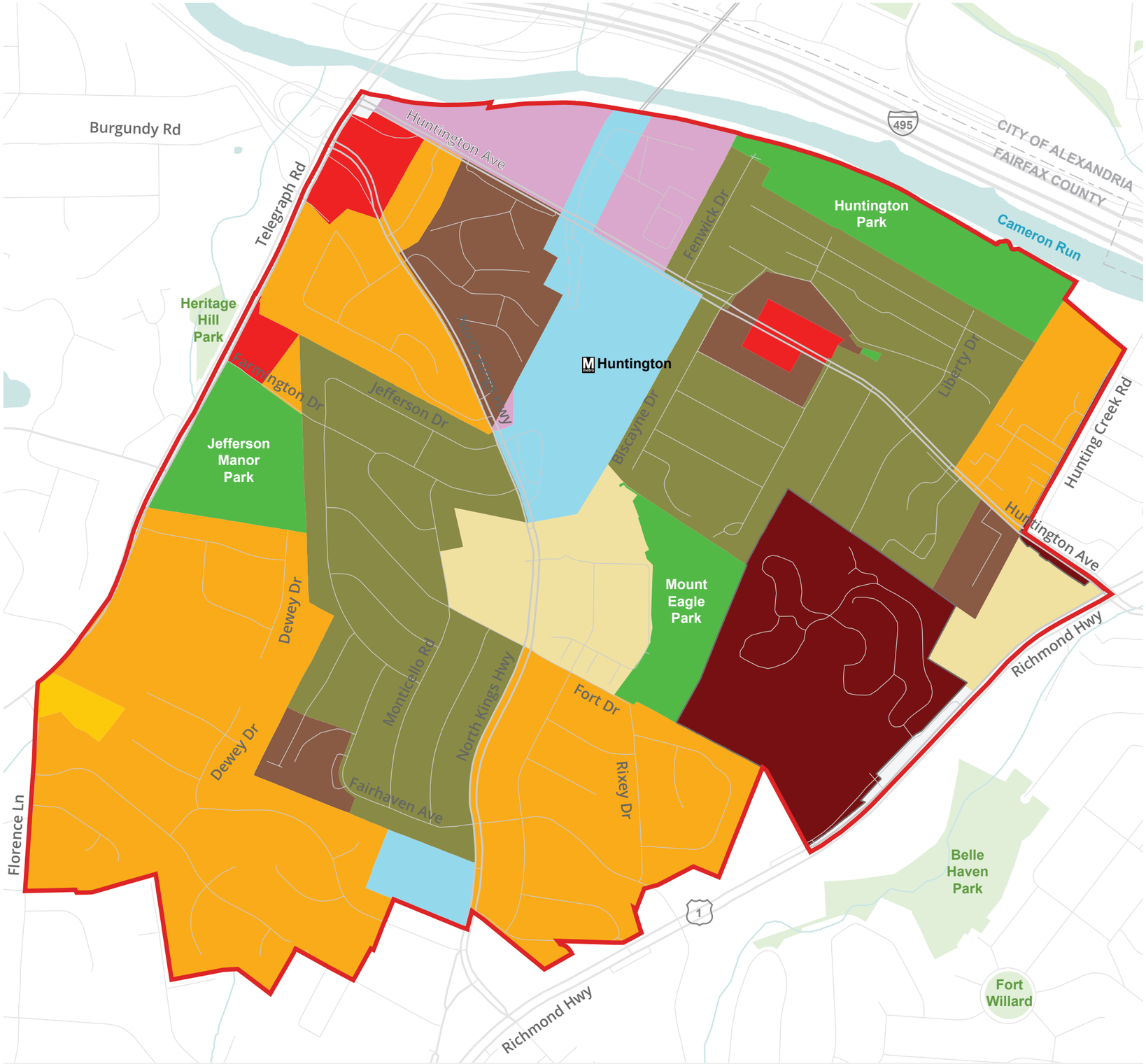
- Residential - Low
- Residential - Medium
- Residential - High
- Commercial
- Institutional
- Industrial - Light and Heavy
- Recreation
- Open Land - Not Forested or Developed
- Public Facilities

Data Sources: Fairfax County, ESRI
Creation Date: January 2022

N

0 0.25 0.5 Miles

LAND USE PLAN
(Based on the Comprehensive Plan)

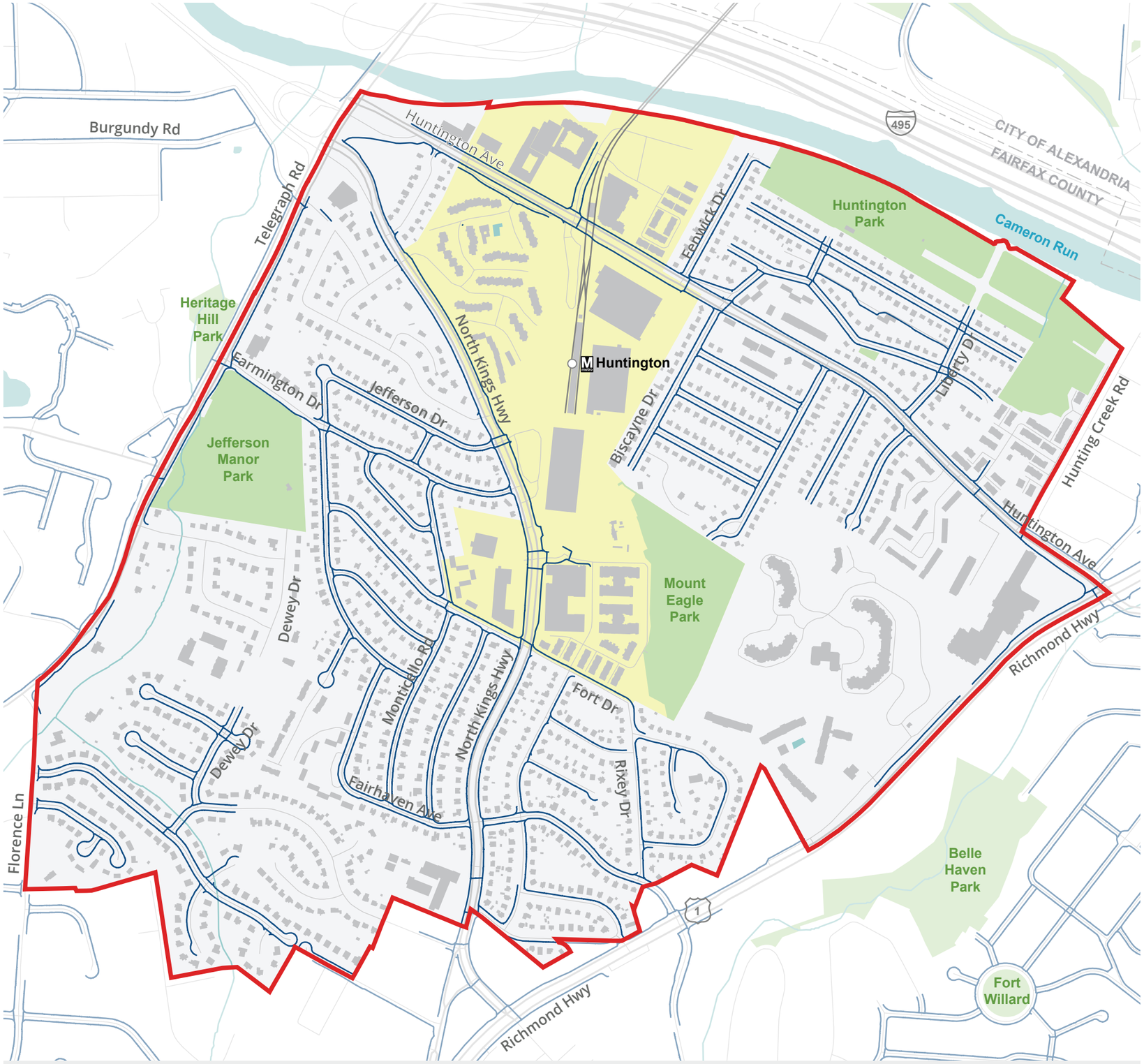


KEY

- Residential - 20+ Dwelling Units Per Acre (DU/AC)
- Residential - 16-20 DU/AC
- Residential - 8-12 DU/AC
- Residential - 3-4 DU/AC
- Residential - 2-3 DU/AC
- Mixed Uses
- Office
- Public Facilities
- Public Parks
- Retail and Other
- Transit Station Area (Study Area)
- Streams, Creeks, Water Resources

Note: The map represents baseline plan recommendations and does not show the Mixed-Use/Redevelopment options.

EXISTING SIDEWALK NETWORK



KEY

- Existing Sidewalks
- Transit Station Area (Study Area)
- Transit Development Area
- Buildings
- Streams, Creeks, Water Resources
- Parks

Data Sources: Fairfax County GIS, ESRI
Creation Date: January 2022

N

0 0.25 0.5 Miles

EXISTING BUS ROUTES + STOPS

Data Sources: Fairfax County Master Transportation, Plan, Fairfax County GIS, ESRI
Creation Date: January 2022

N

0 0.25 0.5 Miles

KEY

- Northern Bus Depot
- Southern Bus Depot
- Bus Stops
- ## Bus Route Number

Burgundy Road

- Route 310

Telegraph Road

- Routes 109, 301

Huntington Avenue

- Routes 101, 109, 171, 301, 310, REX

Kings Highway

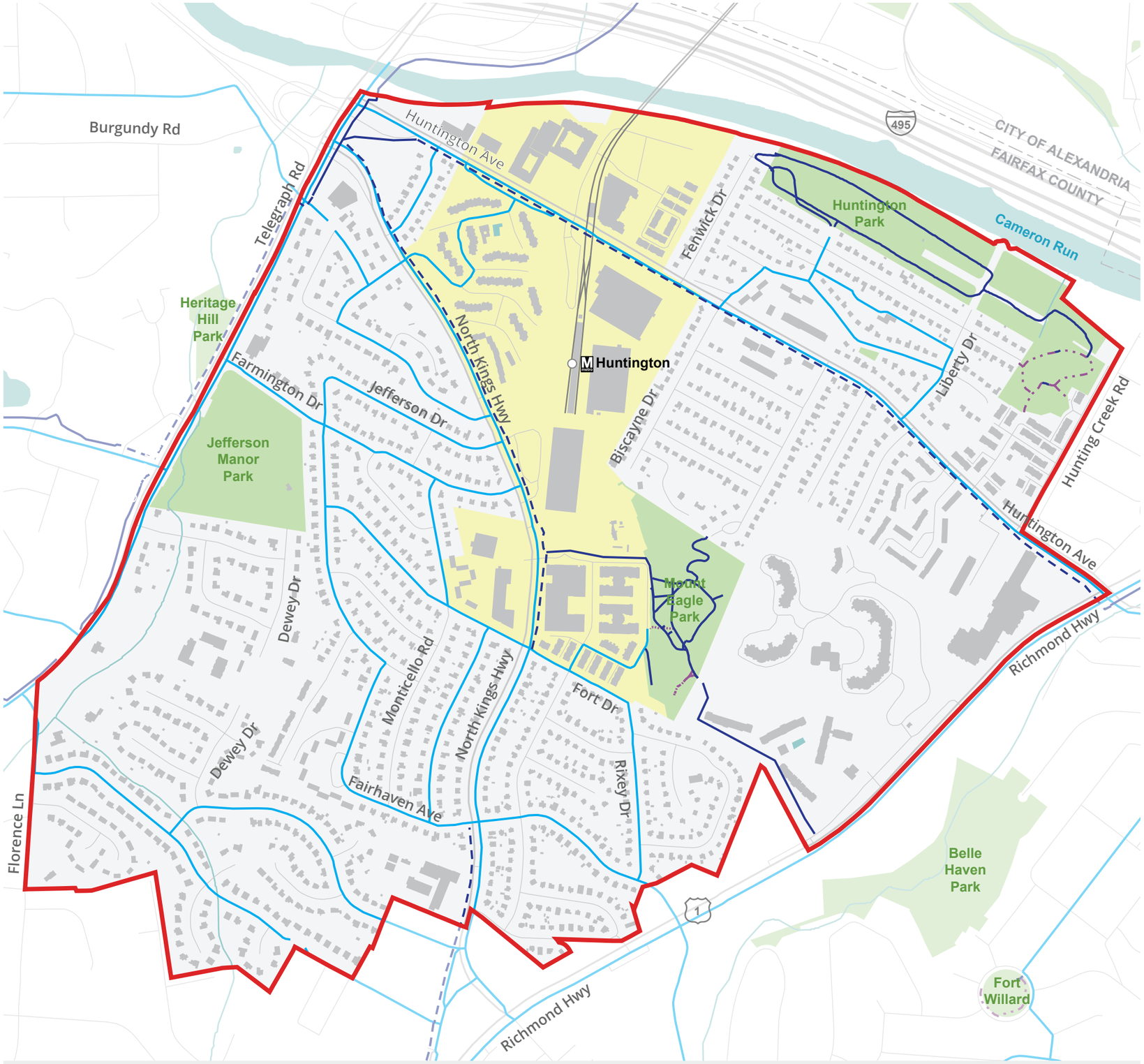
- Routes 151, 152, 159, 161, 162

Richmond Highway

- Routes 151, 159, 161, 162, REX

- Transit Station Area (Study Area)
- Transit Development Area
- Buildings
- Streams, Creeks, Water Resources
- Parks

EXISTING BICYCLE NETWORK



KEY

Bicycle Routes

- Bicycle Routes

Trails (Shared Use Paths)

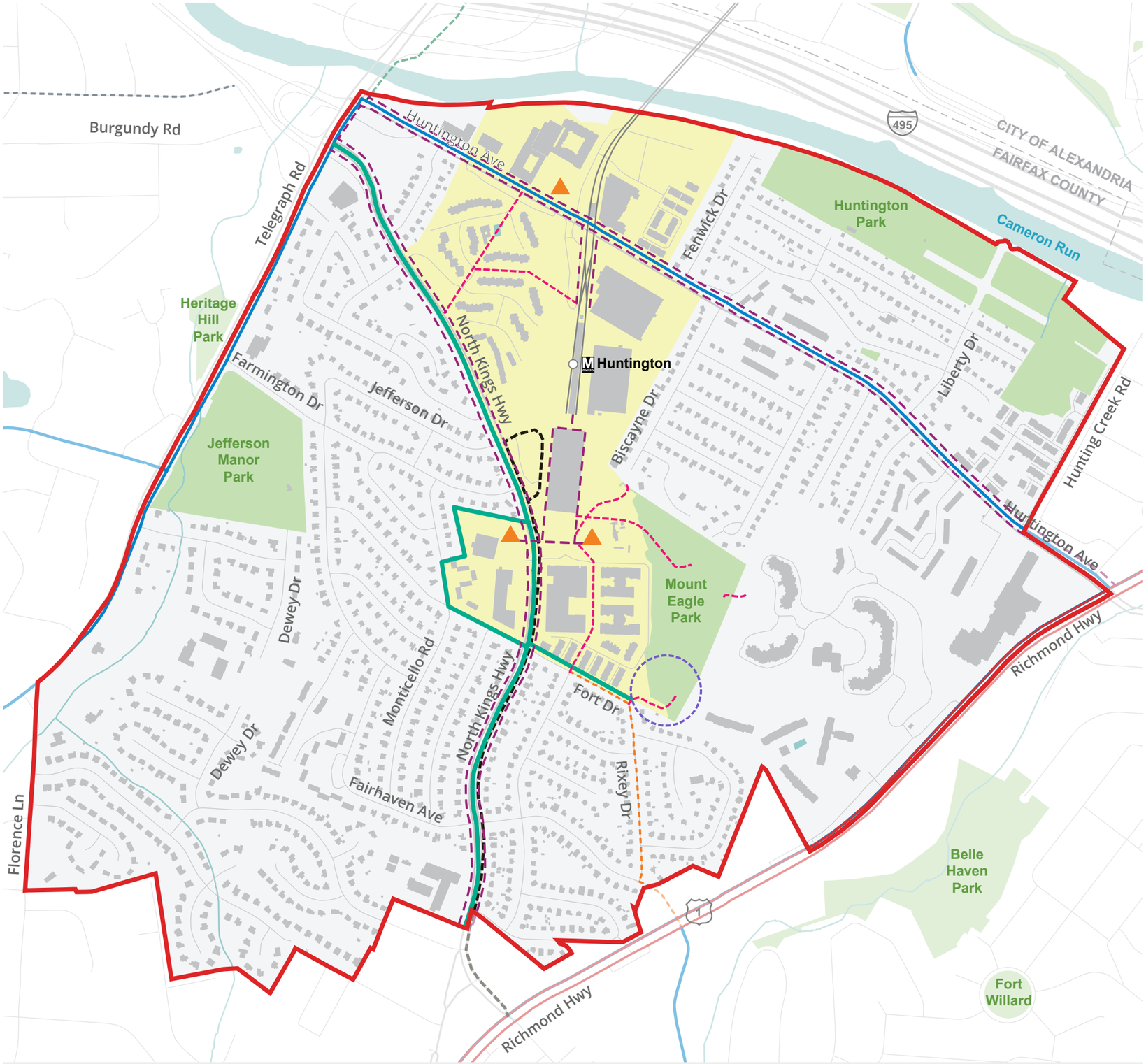
- Trails
- Bikeable Sidewalks
- Unpaved / Natural Surfaces
- Transit Station Area (Study Area)
- Transit Development Area
- Buildings
- Streams, Creeks, Water Resources
- Parks

Data Sources: Fairfax County Bicycle Master Plan, Fairfax County GIS, ESRI
Creation Date: January 2022

N

0 0.25 0.5 Miles

STUDY AREA PLANNED RECOMMENDATIONS



Data Sources: Fairfax County Comprehensive Plan, Bicycle Master Plan, ESRI
Creation Date: January 2022

N

0 0.25 0.5 Miles

KEY

Pedestrian Recommendations

- Trails[1]
- Major Walkways[1]
- Streetscaping[1]
- Plaza or Other Public Space[1]

Bicycle Recommendations

- Policy Road[2]
- Shared Use Paths[2]
- Sharrows[2]
- Bicycle Lanes[2]
- Bicycle Access Link[2]

Transit Recommendations

- BRT Connections[1]

- Exisiting Trails
- Transit Station Area (Study Area)
- Transit Development Area
- Buildings
- Streams, Creeks, Water Resources
- Parks

Plan Reference

1. Fairfax County Comprehensive Plan (2017 Edition)
2. Fairfax County Bicycle Master Plan

PLANNED + ENTITLED PROJECTS
(Based on County Info Dated 01.10.2022)

KEY

Pending Comprehensive Plan Amendments (Within the Study Area)

① Huntington Metro Station

Pending Comprehensive Plan Amendments (Adjacent to Study Area)

② Brookside Motel

③ Richmond Highway Corridor - Suburban Neighborhood Areas Study

Pending Zoning Applications

④ Alexandria Crossing

- Transit Station Area (Study Area)
- Transit Development Area
- Buildings
- Streams, Creeks, Water Resources
- Parks

Data Sources: Fairfax County GIS, ESRI
Creation Date: January 2022

N

0 0.25 0.5 Miles

SITE EXPLORATION AREAS

KEY

- Intersections Reviewed
- Roadway Segments
- Transit Station Area (Study Area)
- Transit Development Area
- Streams, Creeks, Water Resources
- Parks

Data Sources: Fairfax County, ESRI, Rhodeside Harwell
Creation Date: January 2022

N

0 0.25 0.5 Miles

SUMMARY OF PLANNED RECOMMENDATIONS

#	RECOMMENDATIONS	PLAN / STUDY REFERENCE
Pedestrian		
1	Install a Minor Paved Trail along North Kings Highway	Countywide Trails Plan
2	Install a Minor Paved Trail along Huntington Avenue	Countywide Trails Plan
3	Install a Minor Paved Trail along Farmington Drive	Countywide Trails Plan
4	Install a Major Paved Trail along Telegraph Road (south of Franconia Road only)	Countywide Trails Plan
5	Install a Major Paved Trail along Richmond Highway / US-1	Countywide Trails Plan
6	Install a Major Paved Trail along the southern portion of Cameron Run	Countywide Trails Plan
7	Allocate the excess space from narrowing the travel lanes down to 10.5 feet to the sidewalk area	Proposed North Kings Highway Resolution
8	Install light barrier types between the curb travel lane and the sidewalk	Proposed North Kings Highway Resolution
9	Install pedestrian-focused street lighting	Proposed North Kings Highway Resolution
10	Install a HAWK beacon signal at the crosswalk directly in front of the Mount Eagle Elementary School	Proposed North Kings Highway Resolution
11	Construct new / improve existing sidewalks throughout the Transit Station Area	Fairfax County Comprehensive Plan
12	Develop and implement a streetscape program for the street defining the boundary of the Transit Development Area west of North Kings Highway.	Fairfax County Comprehensive Plan
13	Develop and implement a streetscape program for the segments of Huntington Avenue and North Kings Highway that lie within the Transit Station Area.	Fairfax County Comprehensive Plan
14	Incorporate public plazas, or other public spaces such as courtyards or atriums, on the WMATA property and at the Huntington Station Shopping Center.	Fairfax County Comprehensive Plan
15	Implement safe, attractive, and logical pedestrian connections to adjacent residential streets and the Metro station	Fairfax County Comprehensive Plan
16	Install a civic plaza oriented to the Metro station, and which connects to a landscaped east-west linear park or pedestrian corridor to provide access between the Metro station and Monticello Road.	Fairfax County Comprehensive Plan

SUMMARY OF PLANNED RECOMMENDATIONS

#	RECOMMENDATIONS	PLAN / STUDY REFERENCE
Bicycle		
1	Install a bicycle lane along North Kings Highway	Fairfax County Bicycle Master Plan
2	Install a bicycle lane along Huntington Avenue	Fairfax County Bicycle Master Plan
3	Install a sharrow lane along Grand Pavillion Way / Rixey Drive	Fairfax County Bicycle Master Plan
4	Install a bicycle access link at Fort Drive / Rixey Drive	Fairfax County Bicycle Master Plan
5	Implement safe, attractive, and logical bicycle connections to adjacent residential streets and the Metro station	Fairfax County Comprehensive Plan
6	Install a civic plaza oriented to the Metro station, and which connects to a landscaped east-west linear park or bicycle corridor to provide access between the Metro station and Monticello Road.	Fairfax County Comprehensive Plan
Bus		
1	Proposed BRT connection from the Huntington Metro Station to Richmond Highway / Route 1	Fairfax County Comprehensive Plan
Automobile		
1	Consolidate vehicle access points within the Transit Development Area	Fairfax County Comprehensive Plan
2	Separate vehicle access to private development from vehicle access to the Metro station	Fairfax County Comprehensive Plan

Supplemental Information

Proposed Huntington Metro Redevelopment

PROPOSED
BUS TERMINAL OVERLAY

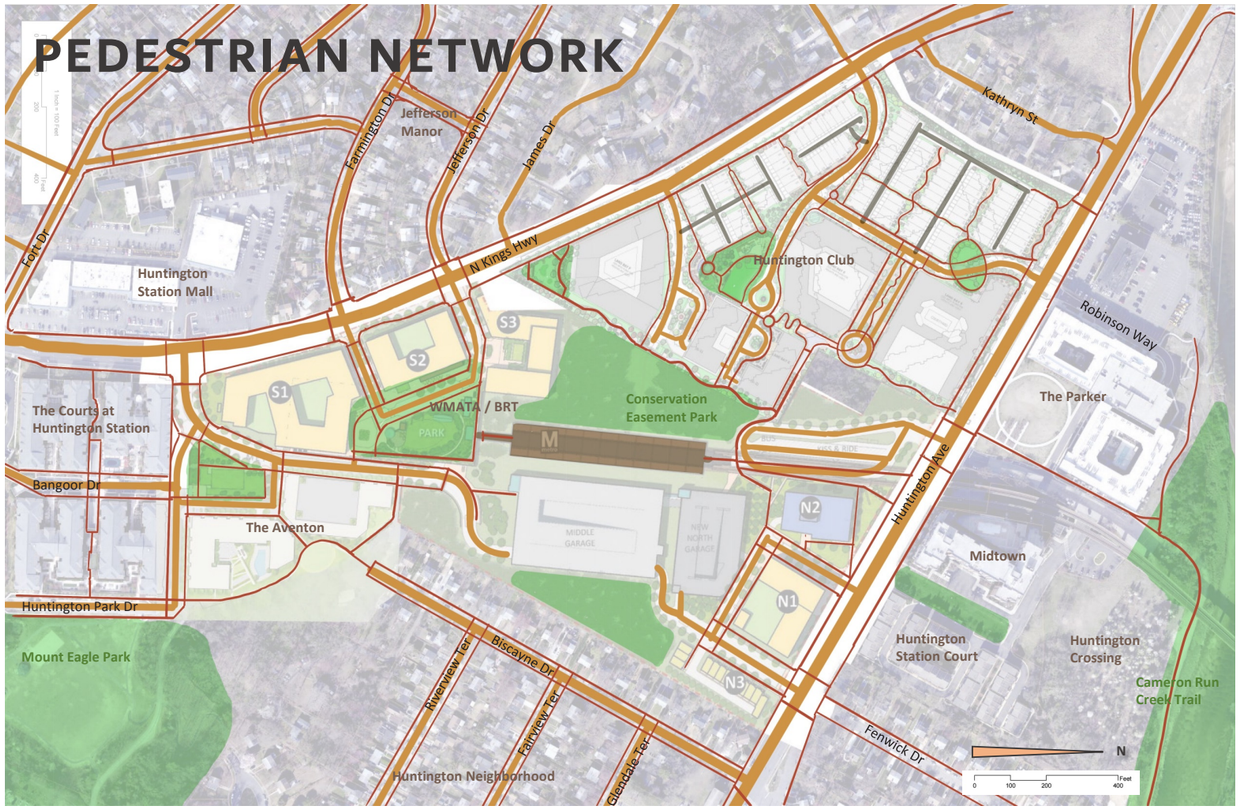
HUNTINGTON METRO REDEVELOPMENT
FAIRFAX COUNTY, VA

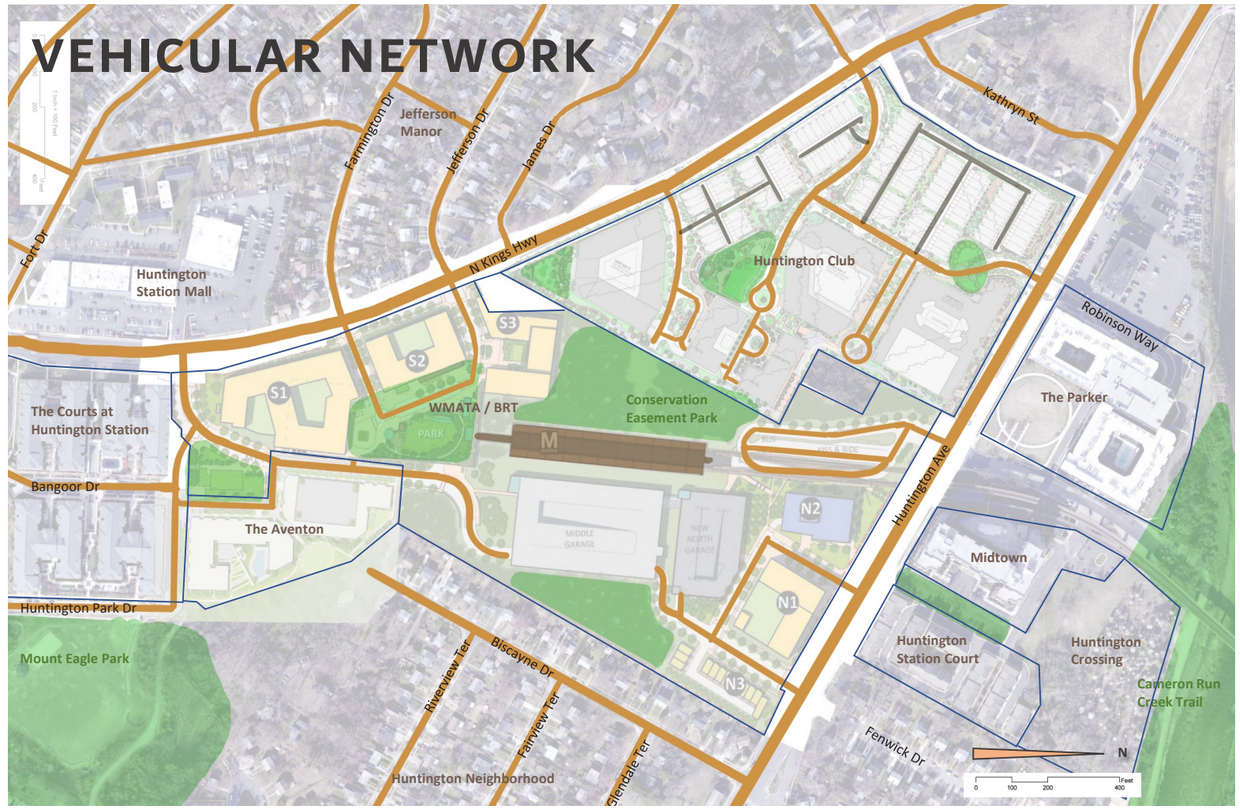
DRAFT

NTS

hord | coplan | macht
09.27.21

PROPOSED CIRCULATION NETWORK





PROPOSED HUNTINGTON METRO SITE REDEVELOPMENT

Supplemental Information

Fairfax County Comprehensive Plan

LAND UNITS

KEY

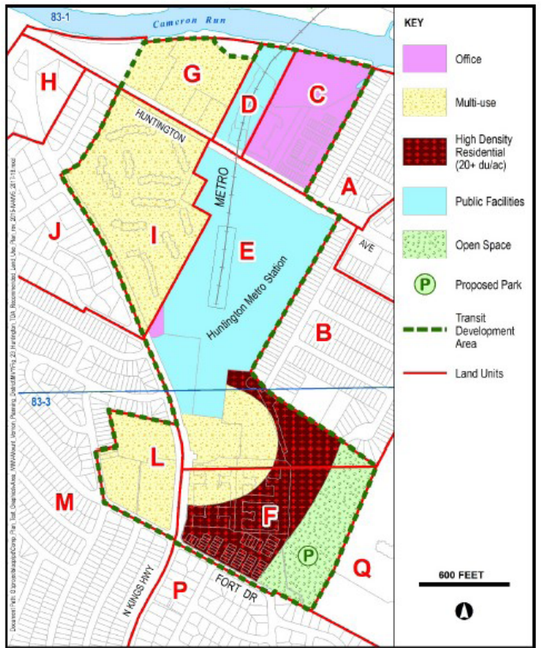
- Land Unit Boundaries
- Transit Station Area (Study Area)
- Transit Development Area
- Streams, Creeks, Water Resources
- Parks

Data Sources: Fairfax County Comprehensive Plan, Fairfax County GIS, ESRI
Creation Date: January 2022

N

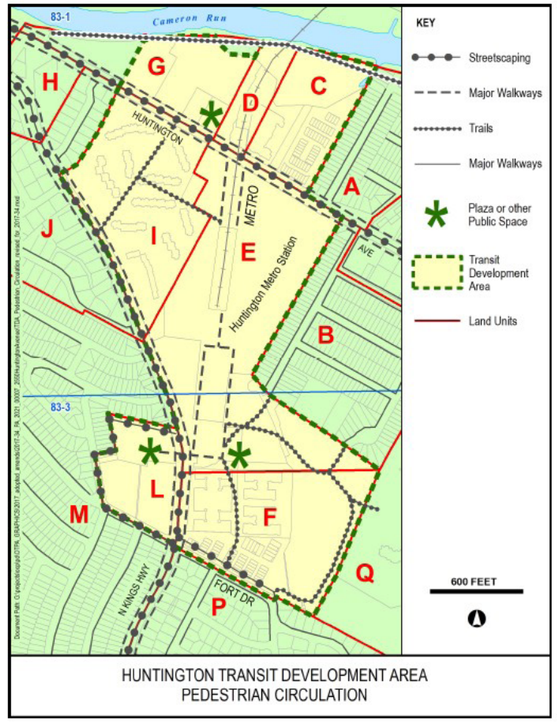
0 0.25 0.5 Miles

COMPREHENSIVE PLAN FIGURES



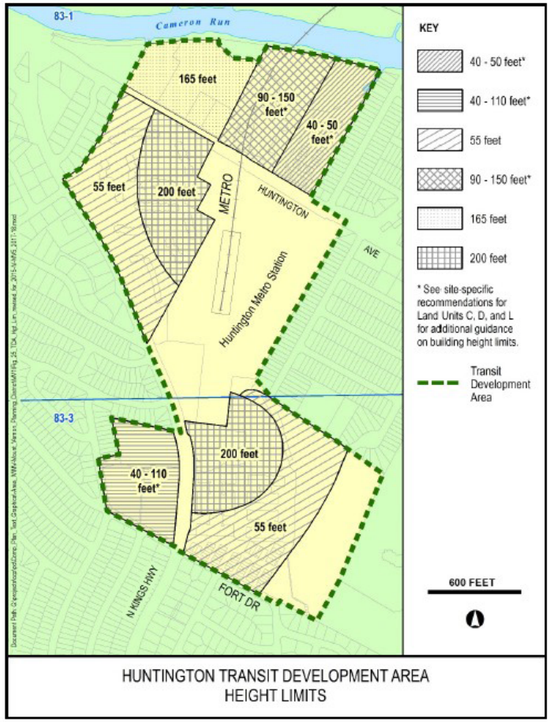
HUNTINGTON TRANSIT DEVELOPMENT AREA
RECOMMENDED LAND USE PLAN

HUNTINGTON TRANSIT DEVELOPMENT AREA **FIGURE 10**
RECOMMENDED LAND USE PLAN



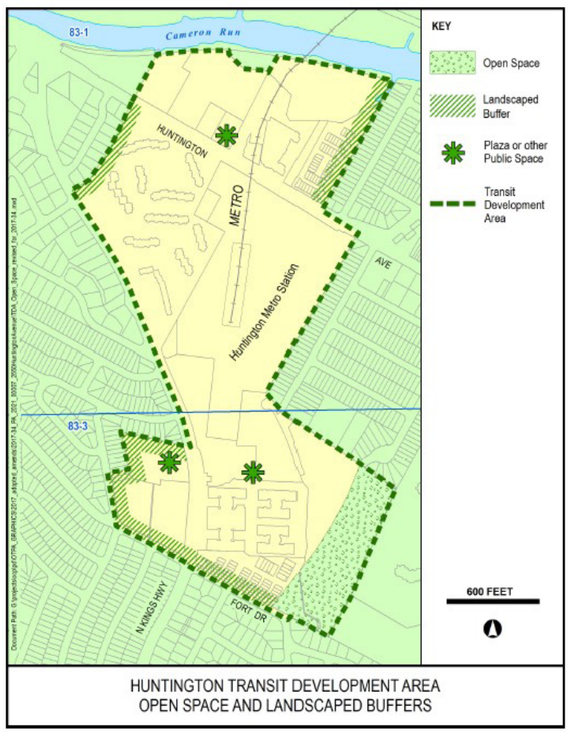
HUNTINGTON TRANSIT DEVELOPMENT AREA
PEDESTRIAN CIRCULATION

HUNTINGTON TRANSIT DEVELOPMENT AREA **FIGURE 11**
PEDESTRIAN CIRCULATION



HUNTINGTON TRANSIT DEVELOPMENT AREA
HEIGHT LIMITS

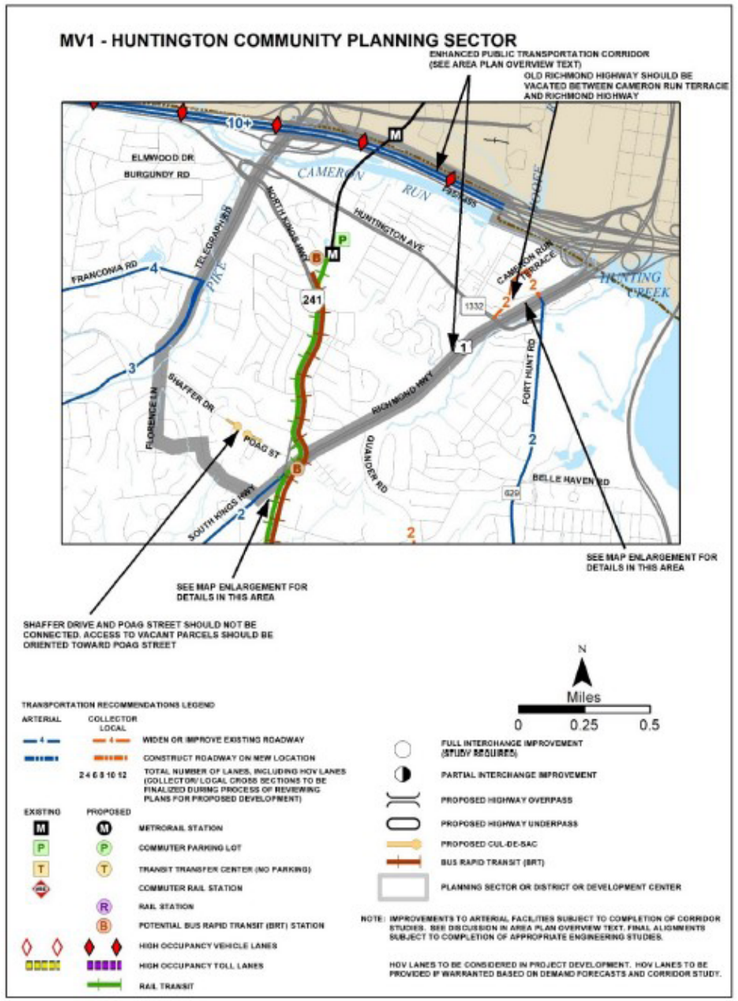
HUNTINGTON TRANSIT DEVELOPMENT AREA **FIGURE 12**
HEIGHT LIMITS



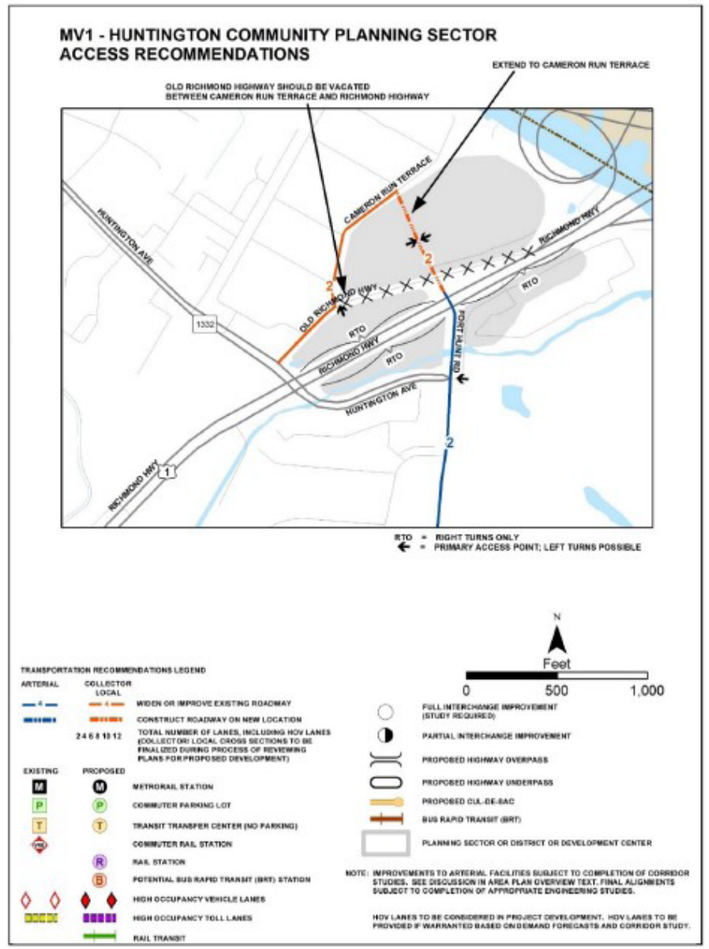
HUNTINGTON TRANSIT DEVELOPMENT AREA
OPEN SPACE AND LANDSCAPED BUFFERS

HUNTINGTON TRANSIT DEVELOPMENT AREA **FIGURE 13**
OPEN SPACE AND LANDSCAPED BUFFERS

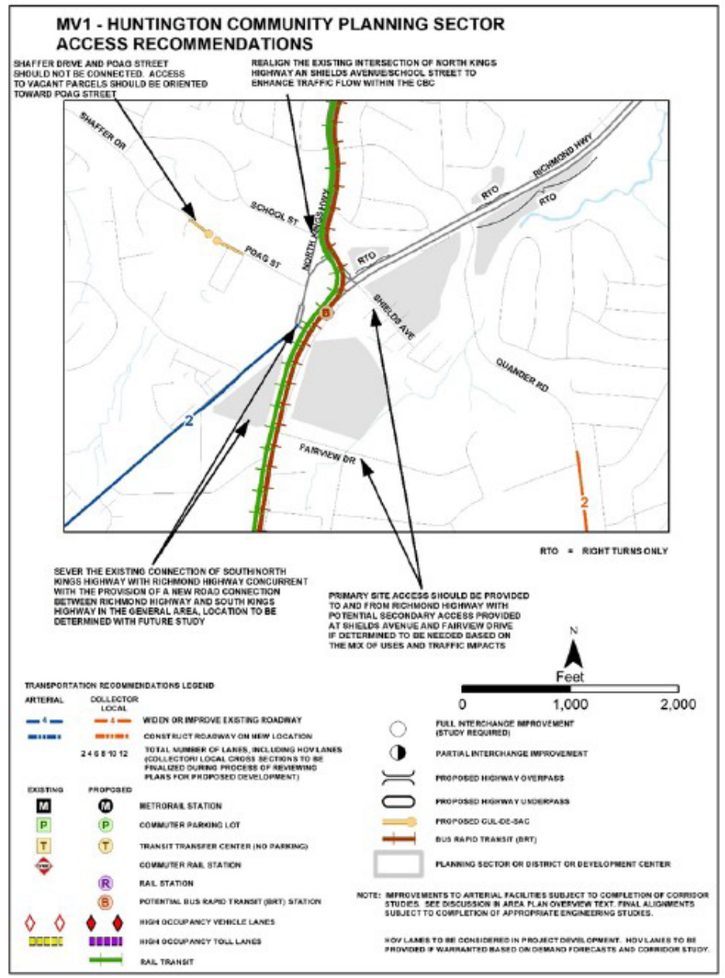
COMPREHENSIVE PLAN FIGURES



TRANSPORTATION RECOMMENDATIONS **FIGURE 16**



ACCESS RECOMMENDATIONS **FIGURE 17**
MV1 HUNTINGTON COMMUNITY PLANNING SECTOR



ACCESS RECOMMENDATIONS **FIGURE 18**
MV1 HUNTINGTON COMMUNITY PLANNING SECTOR

GLOSSARY OF RELEVANT KEY TERMS

BUS RAPID TRANSIT (BRT)

A flexible, rubber-tired, rapid-transit mode that mostly operates in a dedicated right-of-way with at-grade intersections. Limited sections are in mixed traffic. BRT is an integrated system of facilities, services, and amenities that collectively improves the speed, reliability, and identity of bus transit. Distinguishing features may include:

- Distinctive and clearly designated stops/stations with unique passenger amenities at regularly spaced stations;
- Standard or extended sized buses with distinct appearance, high quality passenger comfort, low floor or high platform, and multiple doors for easy and fast boarding/alighting at stops/stations;
- Frequent service headways throughout the day;
- Off-board fare collection;
- Well organized movement of buses along the line, including optimized signal timing and intersection treatments, dispatching at stops; and
- Passenger information controlled by various Intelligent Transportation Systems (ITS) measures to provide reliability.

COLLECTOR STREET

A street that provides direct service to and from local areas, routing traffic to the arterial street system. A Collector Street provides the primary means of circulation between adjacent neighborhoods and can serve as a local bus route. The Street provides for the dual purpose of land access and local traffic movement. Generally, these roadways are not used for through trips.

CONSERVATION

The restoration, stabilization, management, and wise use of natural and heritage resources for compatible educational, recreational, aesthetic, agricultural and scientific purposes, or environmental protection.

CONSERVATION EASEMENT

A legal mechanism whereby a landowner retains ownership of his/her land, but grants some right(s) to the land to a "holder" that is defined as a charitable organization declared exempt from taxation pursuant to 26 U.S.C.A. §501 (c) (3). The Code of Virginia, Virginia Conservation Easements Act, § 10.1-1900, authorizes these private, non-profit entities, such as land trusts, to hold easements when the entity has a primary purpose to retain or protect natural or open space, agricultural, forestal, recreational, or open space use; protect natural resources; maintain or enhance air or water quality; preserve historic, architectural or archaeological resources. [The Virginia Conservation Easement Act, Va. Code Ann. §§ 10.1-1009 through -1016 (Michie 1998)]

LOCAL STREET

A street which is primarily intended to provide direct access to properties abutting the roadway and within the immediate vicinity. A Local Street offers the lowest level of mobility and usually does not serve a bus route. Overall operating speeds are low in order to permit frequent stops or turning movements to be made with maximum safety. Service to through traffic movement is deliberately discouraged.

MODE

A means of travel. Transportation modes include automobile, rail, bus or walking. In some cases, subsections of the above might also be considered modes, as for example, single-occupant automobiles, autos with two passengers, and autos with three or more passengers.

PARATRANSIT

The family of transportation services which falls between the single-occupant automobile and fixed-route transit. Examples of paratransit include taxis, carpools, vanpools, minibuses, jitneys, demand-responsive bus services, and specialized bus services for the mobility-impaired or transportation disadvantaged.

PRINCIPAL ARTERIAL

A highway that serves main travel corridors. Significant intra-area travel and important intra-urban and intercity bus services are served by this class of street. Some access is provided to abutting land, but the primary function of a Principal Arterial roadway is to carry through traffic.

RIDESHARING

Programs designed to increase the occupancy of automobiles, or other vehicles, and thereby reduce demand on the roadway system. Examples include carpooling, vanpooling, buspooling, and promotion of the use of High Occupancy Vehicle (HOV) facilities.

TRAILS

A pathway constructed of various materials such as asphalt, stone dust, or natural surface that is used for recreation, or as an alternative mode of non-motorized transportation, or both.

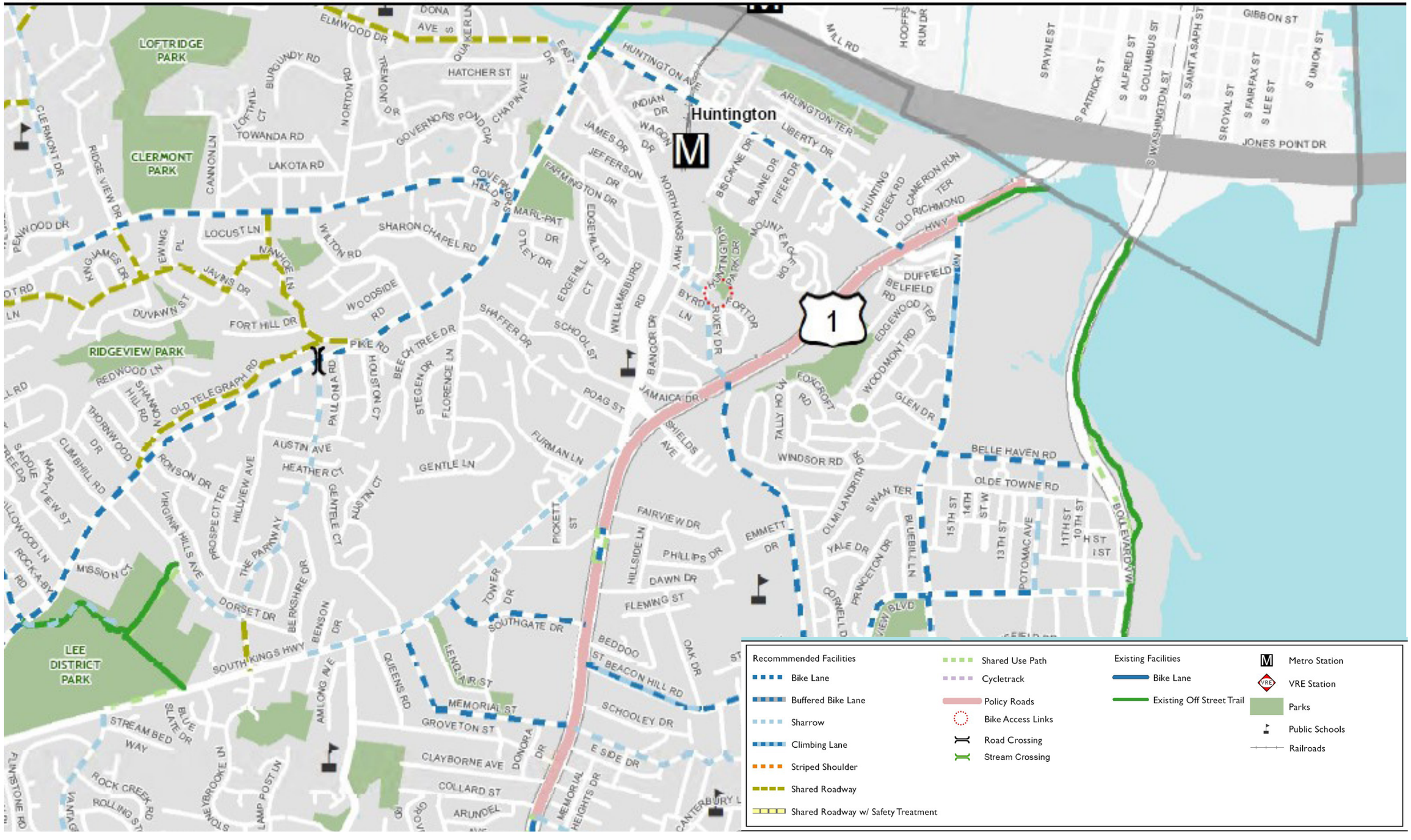
TRANSIT STATION AREAS (TSAs)

These areas encompass Metrorail Stations (where applicable, a TSA might also be adjacent to a Metrorail station in a neighboring locality) and are directly influenced by the presence of access points to the Metrorail system. Transit station areas promote a land use pattern that supports Metrorail by encouraging a mix of uses in a compact, pedestrian-friendly urban form within walking distance of the rail station. The transit-oriented development (TOD) area may be generally defined as a ¼ mile radius from the station platform with a density and intensity tapering to within a ½ mile radius from the station platform or a 5-10 minute walk. Within the region, Metrorail provides a vital public transportation choice that enhances accessibility and reduces the reliance upon single occupancy vehicle use. Transit Station Area boundaries are strongly influenced by the area's access characteristics and the relationship of the station to surrounding stable neighborhoods.

Supplemental Information

Fairfax County Bicycle Master Plan

RECOMMENDED BICYCLE NETWORK



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:

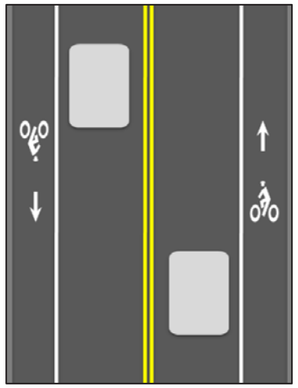


Figure 1: Bicycle lane concept
Source: Toole Design Group.

- 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.

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.

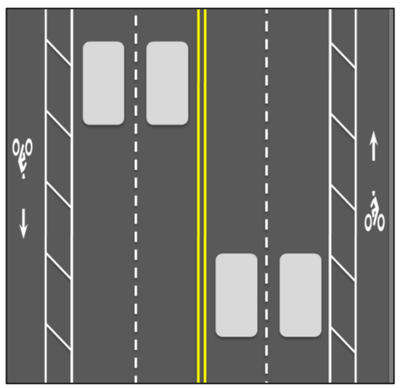


Figure 2: Buffered bike lane concept
Source: Toole Design Group.

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.

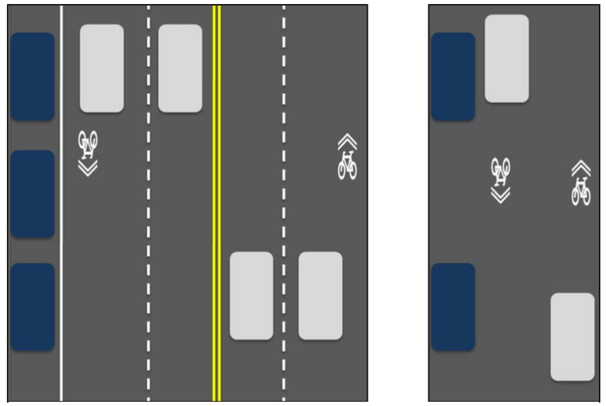


Figure 3: Shared lane marking concepts
Source: Toole Design Group.

Contribution to the Bikeway Network: While shared lane markings are recommended in some locations, especially on collector roadways with more than 3,000 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.

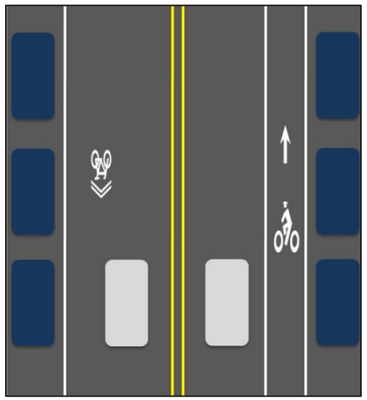


Figure 4: Climbing lane concept
Source: Toole Design Group.

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.

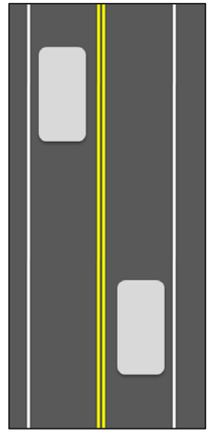


Figure 5: Striped paved shoulders concept
Source: Toole Design Group.

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.

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.

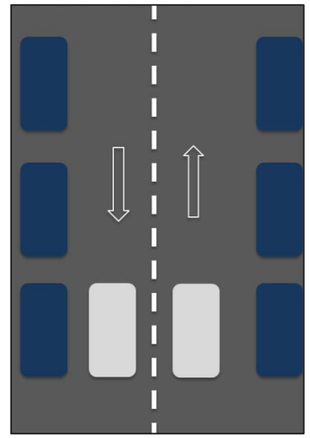


Figure 6: Shared roadways concept
Source: Toole Design Group.

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.

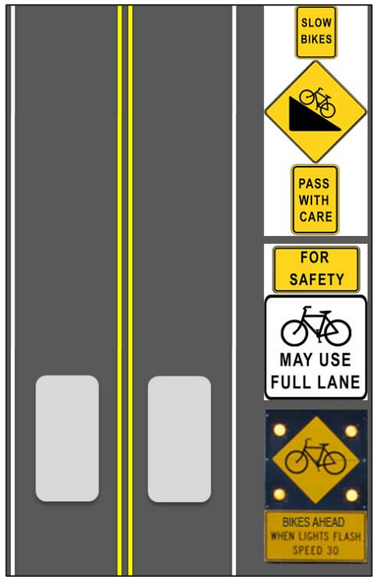


Figure 7: Shared roadways with safety treatment concepts

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

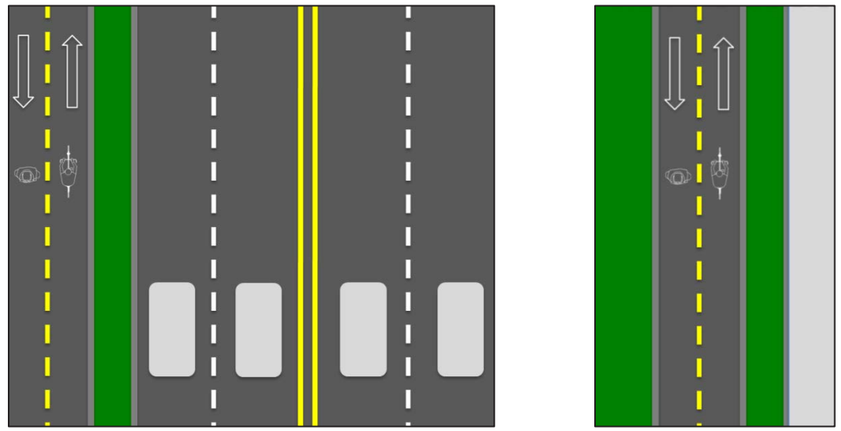
with better cycling conditions may not exist or may add considerable distance to one's trip. In some locations the shared roadway with safety treatment may only be needed along a single segment of road that links other road segments that have adequate or easily improvable bicycling conditions. Examples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



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 (Separated Bike Lanes)

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.

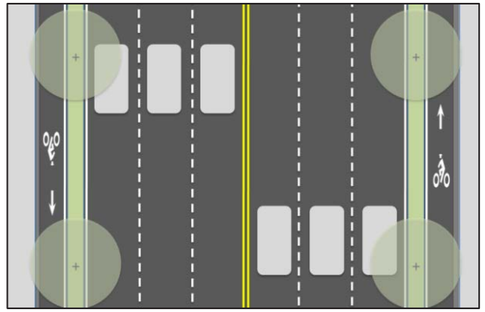


Figure 9: Cycle track concept
Source: Toole Design Group.

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.

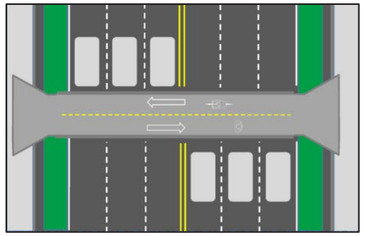
In Fairfax County, cycle tracks are facilities that are most appropriate for certain Policy Roads especially in mixed-use areas and along road segments that serve high-density development. In these areas, such as along VA 7 and VA 123 in Tysons, along U.S. 1 in Mount Vernon, and along Policy Roads through 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.



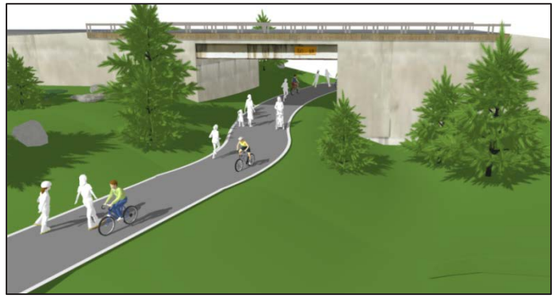


Figure 10: Grade separation concept
Source: Toole Design Group.

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.

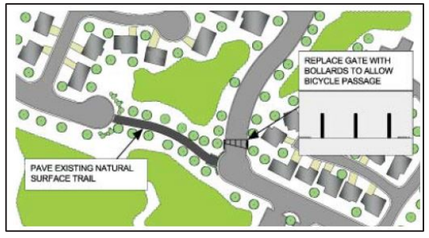


Figure 12: Bicycle link concept
Source: Toole Design Group.

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.

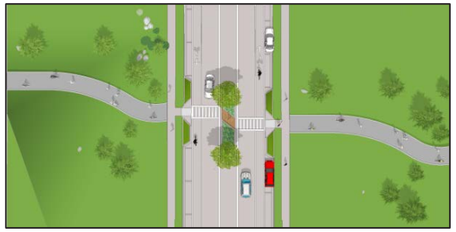


Figure 14: Trail crossing concept
Source: Toole Design Group.

Contribution to the Bikeway Network: Recommendations for trail access improvements are found throughout the County.

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.

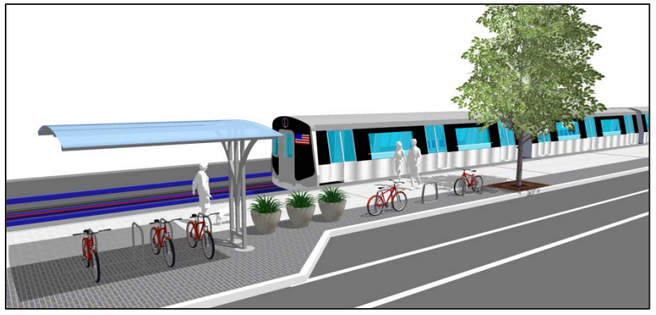


Figure 15: Rendering of covered bicycle parking at a transit station
Source: Toole Design Group.

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;
- 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.

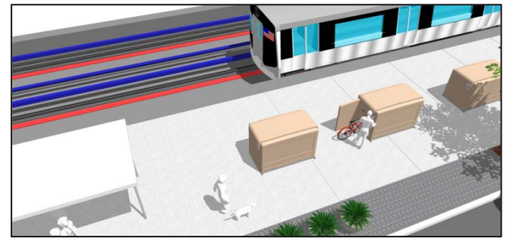
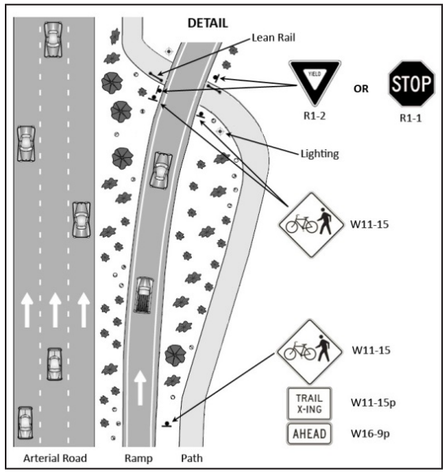


Figure 16: Rendering of bicycle lockers at a transit station
Source: Toole Design Group.

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.



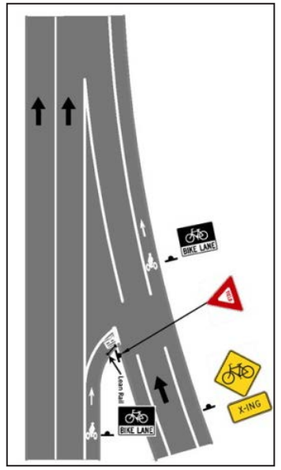


Figure 17: Concept drawings for bicycle facility improvements at interchanges
Source: Toole Design Group.

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.

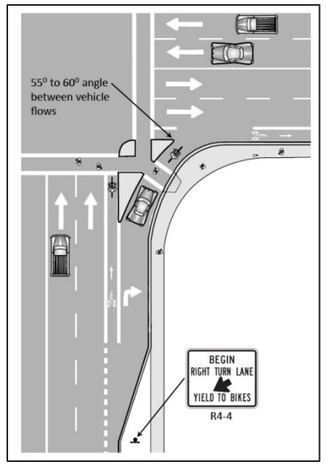


Figure 18: Concept of intersection improvement
Source: Toole Design Group.

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 not 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 (Roads Requiring Further Study)

This plan identifies a set of primary arterial roadways that are considered part of the Bicycle Network as "Policy Roads." On the Fairfax County 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 (e.g. Area Plan updates and amendments, Transportation Corridor/Multi-Modal Studies).

In general, these roads are multilane highways and/or have relatively high posted speed limits (greater than 40 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, lengthy merge lanes, large numbers of commercial entrances, 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.

Supplemental Information

VDOT Bicycle + Pedestrian Treatments

High-Visibility Crosswalk

DESCRIPTION

- Distinctive from standard transverse (parallel) lines in that high-visibility crosswalks consist of wide longitudinal lines, a bar-pair pattern, ladder, or zebra markings.
- High-visibility crosswalks can help pedestrians decide where to cross.
- High-visibility crosswalks are often installed in conjunction with improved lighting and pedestrian signage.

CONTEXT

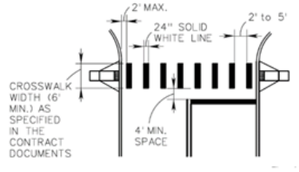
- High-visibility crosswalks help make crosswalks and/or pedestrians more visible to motorists, increasing driver recognition distance by twice that of standard parallel lines, which equates to 8 seconds of additional driving time at 30 mph.
- High-visibility crosswalks can help the driver better detect the presence of the crosswalk and potential for pedestrian crossings, particularly where a standard crosswalk might not get noticed due to roadway geometry or visual clutter.
- High-visibility crosswalks are often installed at:
  - High-volume pedestrian crossings,
  - Crossings ¼ mile between busy residential areas and schools or recreational areas,
  - Within ¼ mile of major transit transfer locations, and
  - Crossings in downtown Central Business Districts and at shared use path crossings.

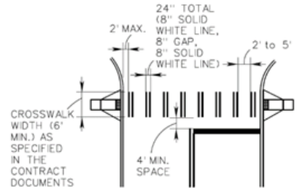
BENEFITS

- ✓ **Improved safety**
- ✓ **Improved comfort**
- ✓ **Traffic compliance**
- ✓ **Cost effective**
- ✓ **Aesthetics**

POLICY AND DESIGN GUIDANCE

- Either longitudinal lines (“continental”), bar pair, zebra, or ladder patterns may be used; however, on VDOT-maintained roads VDOT policy is to only use continental or bar pair patterns as there is not enough evidence that zebra or ladder patterns provide any additional benefit.
- VDOT policy requires high-visibility markings:
  - At multilane roundabout crossings. They should be considered at single-lane roundabout approaches and exits.
  - At uncontrolled crossings of four or more lanes with speed limits greater than 35 mph.
  - At uncontrolled crossings of three or fewer lanes where the traffic volumes exceed 15,000 vehicles per day or where the speed limit is 45 mph or greater.
  - At crossings of shared use paths crossing an uncontrolled road with a speed limit greater than 25 mph.
  - At Pedestrian Hybrid Beacon (PHB) crossings.
- High-visibility crosswalks should also be considered at uncontrolled crossings with speed limits greater than 35 mph and where speed limits are less than 35 mph but have traffic volumes exceeding 15,000 vehicles per day.
- High-visibility crosswalks typically cost five times more than transverse parallel lines or about $8 per linear foot. The bar pairs pattern can reduce costs since they use less material while performing similarly to longitudinal line in driver recognition.
- High-visibility crosswalks should be installed at an angle with adequate spacing to increase the longevity of the crossing.





VDOT TE-384 Pedestrian Crossing Accommodations at Unsignalized Locations

RESOURCES

Treatment applications and general design guidance:

- MUTCD
- VDOT IIM 384.0
- Virginia Supplement to the MUTCD

General guidance:

- FHWA
- VDOT State Pedestrian Policy Plan
- Pedestrian and Bicycle Information Center

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

For more information on **High-Visibility Crosswalks** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

Pedestrian Hybrid Beacon

DESCRIPTION

- PHBs warn and control traffic at unsignalized locations and assist pedestrians in crossing the street at a marked crosswalk.
- The PHB rests in the dark until a pedestrian activates it then a sequence of flashing and solid lights indicate the pedestrian walk interval and when drivers can proceed.

CONTEXT

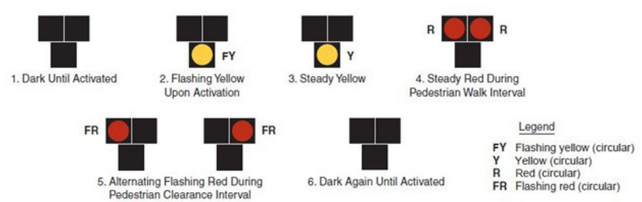
- PHBs are typically installed at school crossings, parks, senior centers, and other pedestrian crossings on multilane streets.
- PHBs are installed at the side of the road or on mast arms over midblock pedestrian crossings.

BENEFITS

- ✓ **Improved safety**
- ✓ **Traffic compliance**
- ✓ **Cost effective**

POLICY AND DESIGN GUIDANCE

- A PHB head is two red lenses above a single yellow lens.
- PHBs are installed on roads with three or more lanes with an annual average daily traffic (AADT) above 9,000.
- PHBs are considered for all midblock and intersection crossings where the roadway speed limits are equal to 40 miles per hour or greater.
- PHBs should only be installed with marked crosswalks and pedestrian countdown signals.
- PHBs, on average, cost $230,000 to $265,000.



RESOURCES

Design guidance for Virginia:

MUTCD

VDOT

Virginia State Preferred CMF List

Treatment applications and general design guidance:

FHWA

NCHRP

For more information on **PHBs** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

Raised Crosswalk

DESCRIPTION

- Raised crosswalks are ramped speed tables that span across the width of the roadway and typically 3 to 6 inches above road grade.
- Raised crosswalks are marked as a pedestrian crossing.
- Raised crosswalks make the pedestrian more visible in a driver's field of vision and allows the pedestrian to cross at the same level as the sidewalk.
- Raised crosswalks reduce vehicle speeds and enhance pedestrian's crossing experience.

CONTEXT

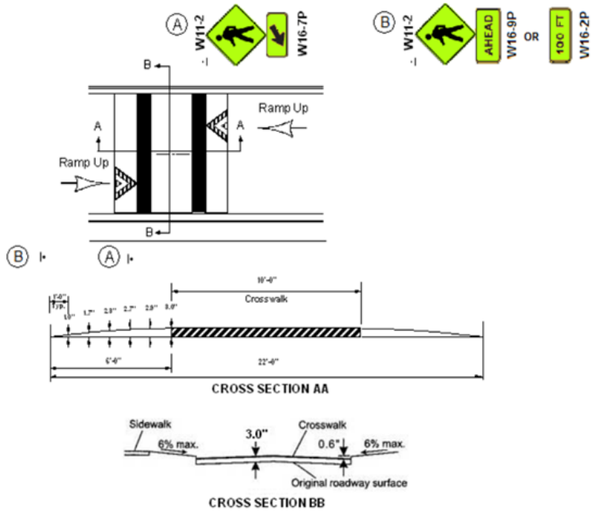
- Raised crosswalks are often installed in campus settings, shopping centers, and pick-up/ drop-off zones like airports, schools, and transit centers.
- Raised crosswalks are often used with other crosswalk visibility enhancements.
- Raised crosswalks are often used as a traffic calming device and often with curb extensions.
- Raised crosswalks may be used for midblock crossings to bring attention to the crossing, but are also often used at entrances to commercial and private drives.
- Typically, raised crosswalks add less than 5 seconds to an emergency vehicle's response time. The safety impacts of this minor delay must be weighed against the safety benefits of this treatment to reduce risk of serious pedestrian injury or fatality.

BENEFITS

- ✓ **Improved pedestrian safety**
- ✓ **Improved comfort**
- ✓ **Traffic calming**
- ✓ **Safer speeds**

POLICY AND DESIGN GUIDANCE

- Raised crosswalks are on average 10-feet wide but conform to the desired width.
- Raised crosswalks are 3 to 6 inches above road grade.
- Raised crosswalk may be constructed flush with adjacent curb or with pedestrian ramps on both the curb and raised crosswalk.
- Crossings must be fully accessible for those with visual or physical disabilities. Curb ramps and truncated domes that are in compliance with the American with Disabilities Act are added to crossings to make them accessible.
- Raised crosswalks may be installed on two- or three-lane roads with a speed limit of 30 miles per hour (mph) or less and an annual average daily traffic (AADT) below 9,000.
- When designing for raised crosswalks, it is important to consider the impacts on drainage and snowplowing.
- Raised crosswalks, on average, cost $5,000 to $8,000.



Traffic-Calming-Guide-For-Neighborhood-Streets

RESOURCES

Treatment applications and general design guidance:

- MUTCD
- FHWA
- VDOT Road Design Manual
- Virginia Supplement to the MUTCD

General guidance:

- Traffic Calming Guide for Neighborhood Streets

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

For more information on **Raised Crosswalks** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

Rectangular Rapid Flashing Beacon (RRFB)

DESCRIPTION

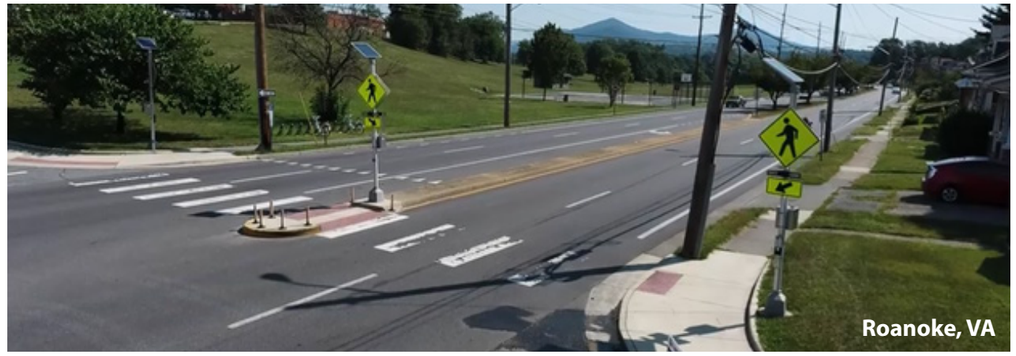
- A Rectangular Rapid Flashing Beacon (RRFB) is a pedestrian-activated device that emits rapidly flashing yellow LED lights.
- The LED lights flash long enough to allow pedestrians to cross the street in the crosswalk.
- RRFBs supplement warning signs at mid-block crossings and are a lower-cost alternative to traffic signals and pedestrian hybrid beacons.
- Flashing beacons can also be installed overhead or in advance of an intersection. RRFBs are a unique type of beacon because of the distinct flashing pattern and signage installed under the signal.

CONTEXT

- The RRFB is installed in combination with pedestrian, school, or trail crossing warning signs. They cannot be installed in conjunction with other signs.
- RRFBs are installed at both ends of a crosswalk or overhead. If a crosswalk contains a pedestrian refuge island, an RRFB should be placed to the right of the crosswalk and on the median.
- RRFBs may draw power from solar panel units or be wired to a traditional power source.
- RRFBs may be installed at midblock locations or at intersections for crossings of the uncontrolled traffic movements.

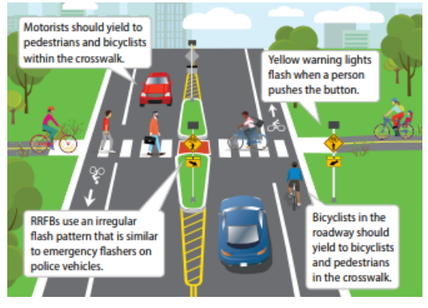
BENEFITS

- ✓ **Improved safety**
- ✓ **Traffic compliance**
- ✓ **Cost effective**



POLICY AND DESIGN GUIDANCE

- The RRFB should meet the application guidelines provided in the VDOT Traffic Engineering Division Memorandum IIM-TE-384 Attachment A, "Unsignalized Marked Crosswalk Standards."
  - RRFBs are a candidate treatment for roads with two or more lanes that generally have annual average daily traffic (AADT) above 1,500.
  - RRFBs may be considered as an additional crossing treatment to supplement marked crosswalks on roadways where the speed limits are less than or equal to 45 miles per hour.
  - RRFBs are not currently included in the 2009 MUTCD and may be installed in Virginia per FHWA's Interim Approval. Localities may install RRFBs without seeking separate Interim Approval, however each road agency is responsible for ensuring they comply with FHWA's Interim Approval requirements.
- RRFB costs range from $4,500 to $52,000 depending on power service and/or other geometric improvements (e.g., median refuge island, ramps, etc.). On average, RRFBs cost $22,250.



Source: AlertTodayFlorida.com funded by Florida DOT

RESOURCES

Design guidance for Virginia:

VDOT IIM-TE-384

FHWA

Treatment applications and general design guidance:

VA Center for Transportation Innovation and Research

VDOT Pedestrian Safety Action Plan

Fairfax County

City of Roanoke

PEDSAFE

NCHRP 841

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

For more information on **RRFBs** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

Left-Turn Hardening

DESCRIPTION

- Left-turn hardening refers to the use of modular curbs, vertical delineators, and striping at intersections to reduce left-turning speeds and to prevent "corner cutting."
- Common left-turn hardening strategies include:
  - Centerline hardening, which refers to the placement of modular curbs where the centerline meets the intersection, and
  - Slow turn wedges, which use striping and delineators at intersection corners to slow left-turning vehicles at intersections between two one-way streets.
- Left-turn hardening emphasizes the separation between travel directions, guides vehicles into the receiving lane, and reduces turning speeds, reducing the conflict zone between turning vehicles and people biking and walking.

CONTEXT

- Left-turn hardening is often installed at intersections where a minor street intersects with a major street, with the elements addressing left-turns from the minor street onto the major street.
- Slow turn wedges are often installed at intersections of two one-way streets.
- Left-turn hardening is especially useful at intersections with high volumes of pedestrians and where speeds of left-turning vehicles are an issue.

BENEFITS

- ✓ **Improved safety**
- ✓ **Safer speeds**

POLICY AND DESIGN GUIDANCE

- Hardened centerlines are installed in line with the centerline approaching an intersection and typically include modular curbs and vertical delineators. These elements may extend to the stop bar, to the crosswalk, or farther into the intersection.
- Slow turn wedges are installed at the corners of intersections in line with on-street parking and on the far side of crosswalks. They typically include pavement markings and vertical delineators.
- Left-turn hardening elements may be installed without vertical elements or with adjusted vertical elements to accommodate larger vehicles and/or sight lines.

RESOURCES

Treatment applications and general design guidance:

NACTO

Geometric design guidance for Virginia:

VDOT Road Design Manual

Pavement markings, signage, and spacing:

VDOT 2016 Road and Bridge Standards

Examples from other states and districts:

NYC DOT

DDOT

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

For more information on **Left-Turn Hardening** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

Pedestrian Signal Control Treatments

Two-Stage Directional Crossing

DESCRIPTION

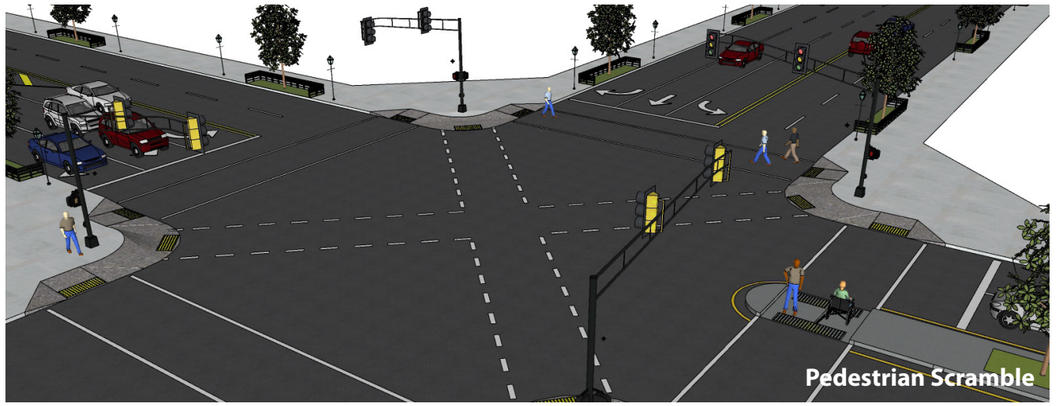
- A protected pedestrian signal phase is when all conflicting turning vehicular movements are protected-only and do not occur during the pedestrian signal phase. Parallel vehicular movements may occur concurrently with the pedestrian crossing.
- A two-stage signal-controlled directional crossing is designed to force pedestrians to cross the roadway in two separate movements. The z-configuration orients the pedestrian to bring their attention to the two separate crossings and to view oncoming vehicles while in the median refuge area walking from one crossing to the next.
- A pedestrian scramble is an exclusive pedestrian phase that stops all traffic at an intersection and allows pedestrians to cross in any direction (including diagonal).
- An LPI gives pedestrians three to seven seconds to begin entering the crosswalk before conflicting vehicles are given the green light. Turning vehicles must yield to the pedestrians in the crosswalk and may proceed once the crosswalk is clear.

CONTEXT

- A protected pedestrian signal phase allows pedestrians to cross while conflicting vehicles are stopped. Pedestrians can look to the pedestrian signal heads for indication of when it is safe to cross.
- A two-stage signal-controlled directional crossing is best implemented in mid-block areas with multiple lanes of oncoming traffic, but may be used at signal-controlled intersections or across a multilane roundabout leg.
- A pedestrian scramble is most commonly used in areas with extremely high surges of pedestrian traffic such as downtowns, university campuses, and sports arenas.
- LPIs are typically installed in areas with numerous pedestrian crashes, high pedestrian volumes, high volumes of children or older adults, or where turning vehicles make it difficult for pedestrians to begin a crossing.

BENEFITS

- ✓ **Improved safety**
- ✓ **Improved comfort**



Pedestrian Scramble

POLICY AND DESIGN GUIDANCE

- Pedestrian refuge islands should meet the application guidelines provided in the VDOT Traffic Engineering Division Memorandum IIM-TE-384 Attachment A, "Unsignalized Marked Crosswalk Standards."
  - The pedestrian walkway through a refuge island shall be at least 5-feet wide and at least 6-feet long.
- Two-stage directional crossings can be installed at any signal-controlled intersection approach. Additionally, they might be installed on unsignalized approaches or in midblock locations on roadway cross-sections with four or more lanes, a speed limit of at least 35 miles per hour (mph), or an annual average daily traffic (AADT) over 9,000.
- An LPI should last at least three seconds to ensure that pedestrians are able to cross at least one travel lane.
- LPIs should be accompanied by Accessible Pedestrian Signals (APS), which help visually impaired pedestrians navigate intersections using audible tones, speech messages, and vibrotactile feedback.
- The two-stage directional crossing requires passive pedestrian detection or pushbuttons in the refuge island.
- Installing pedestrian signal phasing when the crossings are currently unsignalized can range from $65,000 to $250,000. An LPI can range from $500 for controller setting changes only to several thousand dollars if an engineering study or crosswalk markings are also required. A two-stage directional crossing can range from $2,000 with no new pedestrian signal infrastructure to over $40,000 with new pedestrian signal infrastructure.

RESOURCES

Treatment applications and general design guidance:

- VDOT IIM 384.0
- VDOT Traffic Engineering Design Manual
- Virginia Supplement to the MUTCD

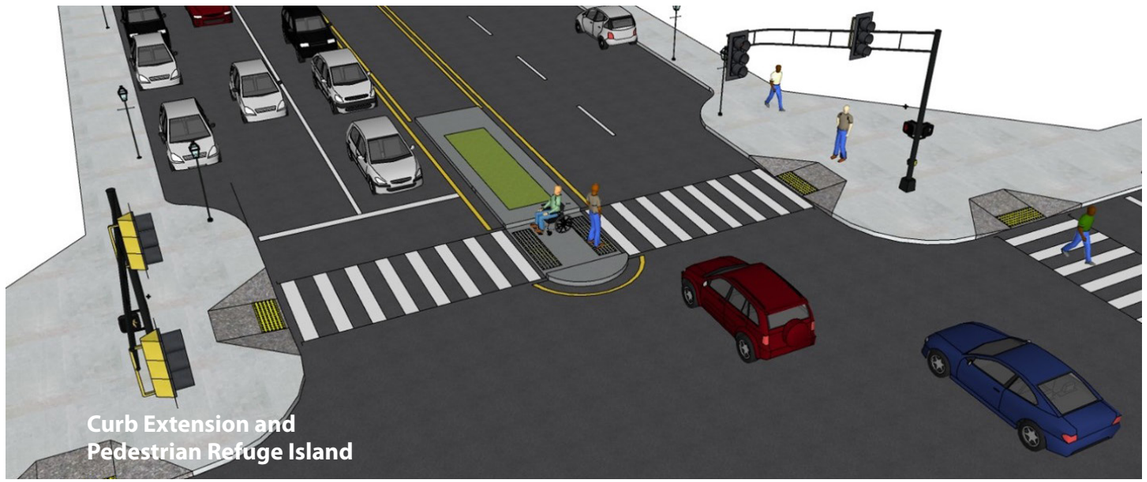
General guidance:

- FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations
- FHWA STEP Resources
- FHWA Pedestrian Facilities Users Guide
- VDOT Pedestrian Safety Action Plan
- NACTO
- FHWA Tech Brief

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

For more information on **Pedestrian Signal Control Treatments** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

Speed Management via Signal Timing Strategies



Curb Extension and Pedestrian Refuge Island

DESCRIPTION

- Speed management via signal timing strategies can include implementing traffic controller strategies to alter a driver's behavior and therefore improve conditions for pedestrians and bicyclists. Three such treatments include dwelling on red, pedestrian recall, and signal coordination based on safe speeds.
  - Dwell-on-Red is a treatment that involves signals reverting to an all-red phase when there is no vehicular traffic demand, thereby reducing nighttime speeding when volumes are typically low.
  - Pedestrian Recall is a treatment that involves a pedestrian phase activating every signal cycle regardless of pedestrian presence. This treatment can increase driver expectation of the pedestrian signal phase.
  - Signal coordination is typically based on observed 85th percentile vehicle speeds, which may be higher than appropriate safe speeds. Instead, the corridor progression can be designed for a safe speed (i.e., the posted speed limit) and that speed can be communicated to drivers.
- These signal timing strategies work in concert with physical speed management countermeasures like pedestrian refuge islands, raised crossings, curb extensions, or other pavement markings to influence lower vehicle speeds and improve the conditions for pedestrians and bicyclists. All these strategies work together to reduce pedestrian exposure to vehicles or prompt a psychological response in motorists to choose lower speeds.

CONTEXT

- Signal timing strategies that can improve speed management are often implemented at intersections with higher volumes of vehicle, pedestrian, and bicyclist traffic.
- Dwell-on-red is often used during late night periods when impairment crashes are more prevalent and there would be a minimal impact on traffic congestion.

BENEFITS

- ✓ **Safer speeds**
- ✓ **Cost effective**

POLICY AND DESIGN GUIDANCE

- Signal timing should meet the guidelines provided in the Virginia Supplement to the Manual on Uniform Traffic Control Devices.
- For additional strategies related to traffic calming and speed management, refer to:
  - VDOT's Neighborhood Traffic Programs
  - $200 Speeding Fine Program
  - Cut Through Traffic and Watch for Children Sign Program
  - VDOT's Policy for Speed Display Signs

RESOURCES

General guidance:

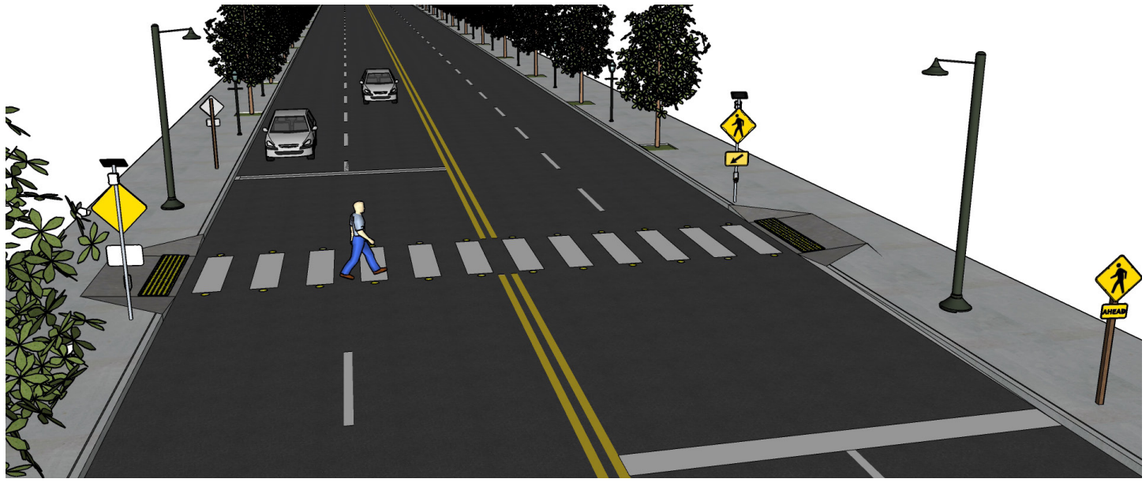
NCHRP 812

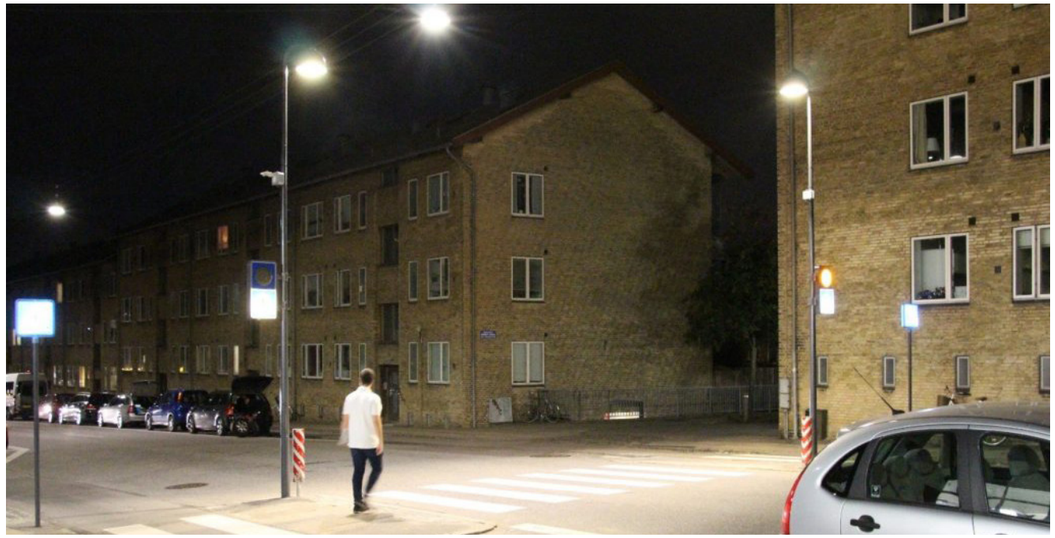
NCHRP 284

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

For more information on **Speed Management via Signal Timing Strategies** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

Smart Lighting





DESCRIPTION

- Smart lighting, or adaptive lighting, is a type of pedestrian device that once activated, increases a pedestrian's or bicyclist's visibility to drivers through illumination.
- Smart lighting can be more cost-efficient than static lighting by having the lights be dimmed or off except when a pedestrian is detected.
- Smart lighting provides an alternative to static lighting in locations with light pollution concerns, especially in urban residential environments, by limiting illumination only to occasions when pedestrians are present.

CONTEXT

- Smart lighting is often considered for installation in combination with crosswalk visibility improvements and signing improvements.
- Smart lighting is suitable for installation at all crosswalks.

BENEFITS

- ✓ **Improved safety**
- ✓ **Improved comfort**
- ✓ **Traffic compliance**
- ✓ **Cost effective**

POLICY AND DESIGN GUIDANCE

- Design guidance varies depending on type, detection, and electrical service source.
- Smart lighting is typically hardwire-powered, but as solar technology continues to improve, solar-powered smart lighting may be feasible.
- Passive detection is recommended over pushbutton application, as drivers may grow conditioned to only expect pedestrians in the crosswalk at night when the lights are on, increasing risk for a pedestrian who does not push the button. This also ensures that the lights do not activate during daytime when they provide little benefit.
- The cost of smart lighting can vary considerably depending on type, scale, detection type, and electrical service, among other factors. Cost may range from $15,000 to $150,000.

For more information on **Smart Lighting** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

RESOURCES

Design guidance for Virginia:

VDOT IIM-TE-390

FHWA Research and Technology

Treatment applications and general design guidance:

SFMTA

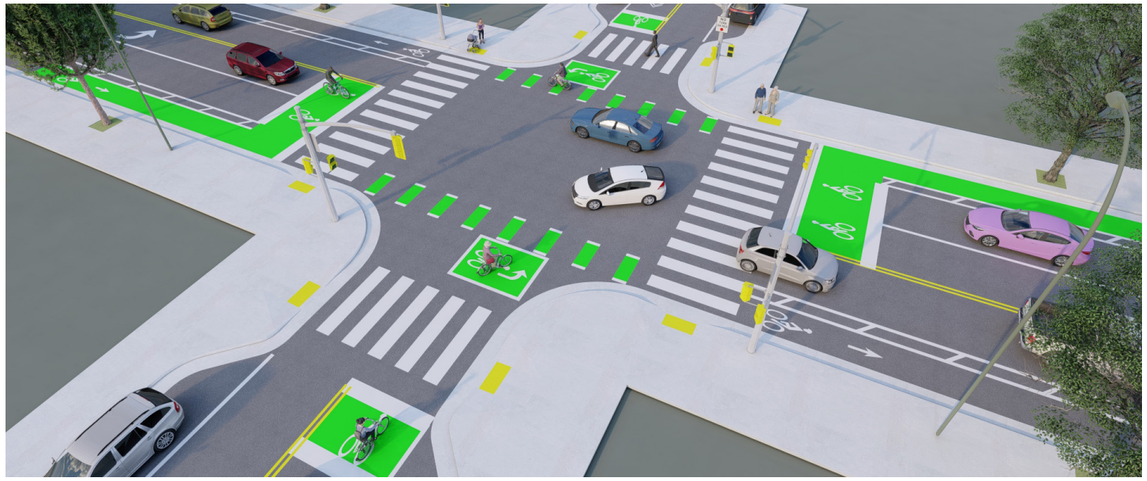
Transportation Research Record

FHWA Safety

FHWA Public Roads

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

Bike Boxes & Two-Stage Left-Turn Boxes



DESCRIPTION

- A bike box is a designated area placed ahead of a travel lane at a signalized intersection in which bicyclists can safely get ahead of stopped traffic during a red light.
- Bike boxes help to prevent conflicts between bicyclists and right-turning vehicles and increase the visibility of bicyclists at intersections by facilitating better left-turn positioning and giving bicyclists a head start when the signal changes.
- A two-stage left-turn box is a marked area in an intersection in which bicyclists can safely wait and prepare to make a two-stage left-turn.
- Two-stage left-turn boxes can also help facilitate transitions from cycle tracks or shared use paths and prevent the need for cyclists to merge into traffic or across several travel lanes to make a left-turn.

CONTEXT

- Bike boxes are typically installed at signalized intersections with frequent bicyclist left-turns, motorist right-turns, or where a bicycle lane transitions to the left-side of the street.
- Two-stage left-turn boxes are typically installed at signalized intersections where at least one intersecting road has more than one lane.

BENEFITS

- ✓ **Improved safety**
- ✓ **Increased efficiency**
- ✓ **Improved comfort**

Charlottesville, VA

POLICY AND DESIGN GUIDANCE

- Bike boxes are formed by two transverse lines, often the crosswalk line on one side and an advanced stop line on the other, indicating the point behind which motorists are required to stop.
- Bike boxes may extend across multiple travel lanes or just the right-most lane.
- An ingress lane should be used to define the bicycle space ahead of the bike box and an egress lane may be used to clearly define the bicycle space through the intersection.
- Two-stage left-turn boxes shall be placed in a protected area, buffered by either a cycle track, parking lane, or crosswalk setback. At midblock locations, a "jughandle" configuration can be used to integrate the queue box into the sidewalk space.
- Right-turns on red shall be prohibited to prevent motorists from entering the bike boxes.
- Green pavement markings are often used as a background color to increase visibility and compliance.
- Pavement marking materials range from $2 - $20 per square foot, depending on material and expected performance. Bicycle lanes may range from $85,000 - $320,000 per mile (high end assumes continuous application of green pavement markings in conflict areas.)

For more information on **Bike Boxes, Two-Stage Left-Turn Boxes** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

RESOURCES

Treatment applications and general design guidance:

NACTO
AASHTO
VTRC

Geometric design guidance for Virginia:

VDOT Road Design Manual

Pavement markings, signage, and spacing:

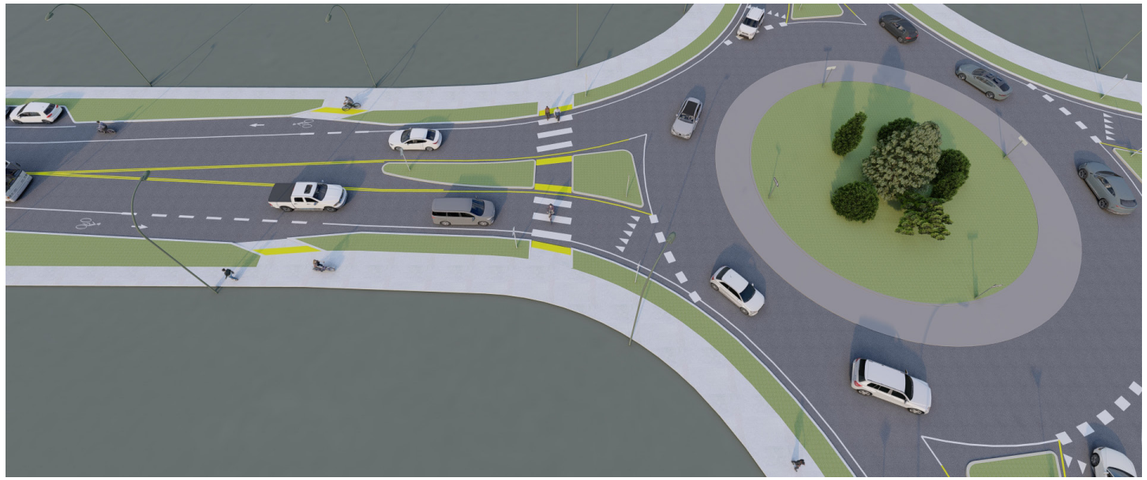
MUTCD
MUTCD Interim Approval IA-18
MUTCD Interim Approval IA-20
VDOT 2016 Road and Bridge Standards
Virginia Supplement to the MUTCD

Material Guidance:

Oklahoma DOT

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

Bikes at Roundabouts



DESCRIPTION

- When designed appropriately, roundabouts can be an important part of a comfortable and connected bicycle network.
- Depending on the location, roundabouts can be designed to direct bicyclists to travel through the intersection with vehicle traffic in the center of the travel lane, on the sidewalk, or on a separated facility or shared use path. Bicycle lanes without vertical separation are not to be provided on the circular roadway of a roundabout.
- When planning bicycle facilities at roundabouts, it is important to provide appropriate space, minimize conflict points and stop-start maneuvers, and maximize visibility of all users.

CONTEXT

- At most urban, single-lane roundabouts, on-street bicycle lanes should be terminated in advance of the intersection, directing bicyclists either to merge into traffic or onto a separated bicycle lane or shared use path.
- At multilane roundabouts, directing bicyclists to merge into traffic is not preferred. Bicycle ramps should be provided to allow bicyclists to exit the roadway onto a separated bicycle lane or shared use path parallel to the sidewalk.

BENEFITS

- ✓ **Improved safety**
- ✓ **Shorter wait times**
- ✓ **Safer speeds**

POLICY AND DESIGN GUIDANCE

- It is possible to install different bicycle treatments at different intersection legs depending on the bicycle facilities present on each approach.
- When terminating a bicycle lane approaching a roundabout, an appropriate taper should be provided to narrow the lane widths and encourage bicyclists to merge.
- At roundabouts where bicycle ramps are provided, a widened sidewalk or shared use path should be considered, depending on expected bicycle volumes.
- Bicycle ramps must be designed to ensure usability by bicyclists and to avoid the potential for confusion of pedestrians, especially those with visual impairments.
- Roundabouts vary widely in cost depending on the roadway context, size, and right-of-way acquisitions. For example, a temporary mini-roundabout costs approximately $50,000 and a standalone multilane roundabout can cost up to $4M.

For more information on **Bikes at Roundabouts** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

RESOURCES

Legal definitions and regulations:

Code of Virginia

Bikes at roundabouts design guidance:

NCHRP

AASHTO

MassDOT

General roundabout design guidance:

FHWA

PEDSAFE

Geometric design guidance for Virginia:

VDOT Roundabout Design Guidance

VDOT Road Design Manual

Pavement markings, placement, and spacing:

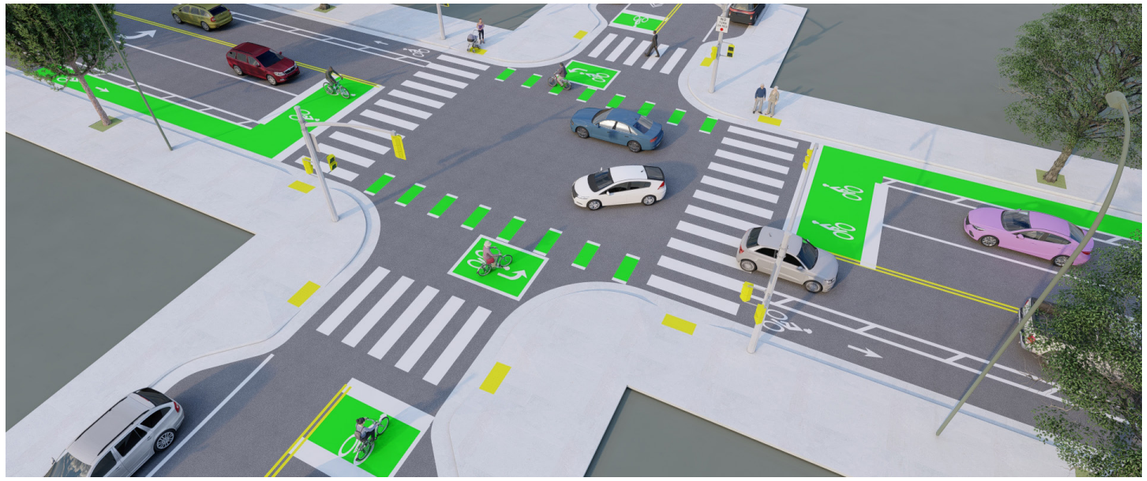
MUTCD

VDOT 2016 Road and Bridge Standards

Virginia Supplement to the MUTCD

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

Green Pavement Markings



DESCRIPTION

- The use of green colored pavement markings within bicycle lanes and bicycle queuing areas can help increase the visibility of bike facilities and remind motorists to watch for bicyclists.
- Green pavement markings increase comfort levels for bicyclists and can be used in conjunction with any type of bicycle lane (traditional, buffered, separated, or contraflow).
- Green pavement markings are provided chiefly to increase the visibility of bicycle facilities. They do not change the operations or restrictions of bicycle lanes.

CONTEXT

- Green pavement markings can be applied along the entirety of a bicycle facility or used as a spot treatment.
- Typically, green pavement markings are used to highlight bicycle lanes as they traverse intersections or driveways, in bike boxes and two-stage left turning boxes, or in other conflict areas.

BENEFITS

- ✓ **Improved safety**
- ✓ **Improved comfort**
- ✓ **Traffic compliance**

POLICY AND DESIGN GUIDANCE

- Green pavement markings should be installed in a consistent manner along a corridor to provide clear guidance for all roadway users.
- Green pavement markings supplement, but do not replace the white pavement markings that legally establish the bicycle facility.
- Green pavement markings may be installed as an overlay or they may be embedded as colored asphalt. Overlay materials are recommended for pilot installations or spot treatments, while embedded treatments are better for corridor treatments.
- The maintenance of green pavement markings is important to ensure the effectiveness of the application.
- Pavement marking materials range from $2 - $20 per square foot, depending on material and expected performance. Bicycle lanes may range from $85,000 - $320,000 per mile (high end assumes continuous application of green pavement markings in conflict areas.)
  - Periodic maintenance of pavement markings will require an additional cost.

For more information on **Green Pavement Markings** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

RESOURCES

Treatment applications and general design guidance:

NACTO

AASHTO

FHWA

Material Guidance

Oklahoma DOT

Geometric design guidance for Virginia:

VDOT Road Design Manual

Pavement markings, placement, and spacing:

MUTCD

VDOT 2016 Road and Bridge Standards

Virginia Supplement to the MUTCD

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Protected Intersection

DESCRIPTION

- Protected intersections, also known as offset or setback intersections, refer to a collection of intersection treatments that are designed to maintain the separation provided by bicycle lanes through the intersection. In this way, they can improve bicyclists' visibility to turning motorists and minimize the potential for conflict between modes.
- The main features of protected intersections include setbacks, corner islands, queuing areas, pedestrian islands and waiting zones.
- Elements of protected intersections may be installed individually, but they are most effective when installed together.

CONTEXT

- Protected intersections are commonly installed on streets where enhanced bicycle infrastructure is desirable or there are high volumes of bicyclists.
- Typically, candidate locations already have buffered or separated bicycle lanes on at least one street.

BENEFITS

- ✓ **Improved safety**
- ✓ **Improved comfort**
- ✓ **Traffic compliance**
- ✓ **Increased efficiency**

POLICY AND DESIGN GUIDANCE

- The main features of a protected intersection include:
  1. No Stopping/No Standing zone
  2. Pedestrian islands, where pedestrians can request the pedestrian signal and wait safely between the bicycle lane and the vehicle travel lane
  3. Bike queue area, where bicyclists can wait for the green signal ahead of the crosswalk
  4. Bikeway setback, which increases visibility and reaction time for bicyclists
  5. Corner islands, which protect the bike queue areas, slow turning traffic, and provide physical separation between bicyclists and turning vehicles
  6. Motorist waiting zone, where drivers can safely wait and yield to through-moving bicyclists before turning
  7. Intersection crossing markings
  8. Bike yield line (optional)
- The cost of a protected intersection depends on the intersection context and which design elements already exist.

RESOURCES

Treatment applications and general design guidance:

NACTO

PEDSAFE

Protected Intersections for Bicyclists

FHWA

Geometric design guidance for Virginia:

VDOT Road Design Manual

Pavement markings, signage, and spacing:

MUTCD

VDOT 2016 Road and Bridge Standards

Virginia Supplement to the MUTCD

Guidelines are provided for informational purposes only. For detailed design guidance, please refer directly to design manuals and standards.

For more information on **Protected Intersections** and other bicycle and pedestrian treatments, visit **virginiadot.org/programs/bikeped/bicycle_and_pedestrian_treatments.asp**

Appendix C

ID	Roadway Name	Roadway Extents	VDOT ADT (Existing)	ADT (Existing)	VDOT ADT (2045)	ADT (2045)	One-way?	Lane Count	Prevailing (or Posted) Speed	Bike Facility Type
1	Bangor Dr	Fort Dr to Fairhaven Ave	430	0-750	589	0-750	Two-way	2	15	None (cyclists mix with traffic)
2	Bangor Dr	Fairhaven Ave to Jamaica Dr	870	751-1500	1192	751-1500	Two-way	2	15	None (cyclists mix with traffic)
3	Biscayne Dr	Entire segment	740	0-750	1014	751-1500	Two-way	2	15	None (cyclists mix with traffic)
4	Edgehill Dr	Entire segment	3100	3001-8000	3999	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
5	Fairhaven Ave	East of N Kings Hwy to Rixey Dr	2700	1501-3000	3402	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
6	Fairhaven Ave	Fairhaven to Fort - south segment	440	0-750	554	0-750	One-way	1	15	None (cyclists mix with traffic)
7	Fairhaven Ave	West of N Kings Hwy to Monticello Rd	260	0-750	356	0-750	One-way	1	15	None (cyclists mix with traffic)
8	Farmington Dr	N Kings Hwy to Monticello Rd	4000	3001-8000	5040	3001-8000	Two-way	1	15	None (cyclists mix with traffic)
9	Farmington Dr	Edgehill Dr to Telegraph Rd	4000	3001-8000	5040	3001-8000	Two-way	2	25	None (cyclists mix with traffic)
10	Farmington Dr	Monticello Rd to Edgehill Dr	4000	3001-8000	5040	3001-8000	Two-way	1	15	None (cyclists mix with traffic)
11	Farrington Ave	Farrington Ave - west segment	1100	751-1500	1419	751-1500	Two-way	2	15	None (cyclists mix with traffic)
12	Farrington Ave	Farrington Ave - east segment	240	0-750	329	0-750	Two-way	2	15	None (cyclists mix with traffic)
13	Fort Dr	Rixey Dr to N Kings Hwy	3100	3001-8000	3999	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
14	Fort Dr	N Kings Hwy to Monticello Rd	3300	3001-8000	4257	3001-8000	Two-way	2	25	None (cyclists mix with traffic)
15	Fort Dr	Monticello Rd to Edgehill Dr	3400	3001-8000	4284	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
16	Huntington Ave	Mt Vernon Dr to Foley St	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
17	Huntington Ave	Farrington Ave to Blaine Dr	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
18	Huntington Ave	Fifer Dr to Mt. Vernon Dr	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
19	Huntington Ave	Hunting Creek Rd to Richmond Hwy	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
20	Huntington Ave	Robinson Way to Metroveiw Pkwy	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
21	Huntington Ave	Foley St to Hunting Creek Rd	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
22	Huntington Ave	Kathryn St to Robinson Wy	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
23	Huntington Ave	Telegraph Rd to Kathryn St	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
24	Huntington Ave	Blaine Dr to Fifer Dr	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
25	Huntington Ave	Fenwick Dr to Biscayne Dr/Farrington Ave	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
26	Huntington Ave	Metroview Pkwy to Fenwick Dr/Huntington Metro Access Rd	16000	15001+	20160	15001+	Two-way	4	30	Off-street trail
27	Jamaica Dr	Bangor Dr to Belleview Ave	650	0-750	838	751-1500	Two-way	2	15	None (cyclists mix with traffic)
28	Jamaica Dr	N Kings Hwy to Bangor Dr	1200	751-1500	1548	1501-3000	Two-way	2	25	None (cyclists mix with traffic)
29	James Dr	Entire street	230	0-750	308	0-750	Two-way	2	15	None (cyclists mix with traffic)
30	James Dr	Entire street	230	0-750	308	0-750	Two-way	2	15	None (cyclists mix with traffic)
31	James Dr	Entire street	70	0-750	90	0-750	Two-way	2	15	None (cyclists mix with traffic)
32	Kathryn St	Entire street	990	751-1500	1277	751-1500	Two-way	2	15	None (cyclists mix with traffic)
33	Lenore Ln	Entire street	160	0-750	214	0-750	Two-way	2	15	None (cyclists mix with traffic)
34	Liberty Dr	Liberty Dr - Entire segment	0	0-750	0	0-750	One-way	1	15	None (cyclists mix with traffic)
35	Liberty Dr	Liberty Dr - Entire segment	420	0-750	542	0-750	One-way	1	15	None (cyclists mix with traffic)
36	Metroview Pkwy	Metroview Pkwy NS segment	1200	751-1500	1548	1501-3000	Two-way	2	15	None (cyclists mix with traffic)
37	Monticello Rd	Fairhaven Ave to Fort Dr - north segment	1200	751-1500	1548	1501-3000	One-way	1	15	None (cyclists mix with traffic)
38	Monticello Rd	Jamaica Dr to School St	24000	15001+	30240	15001+	Two-way	4	35	None (cyclists mix with traffic)
39	Monticello Rd	Farmington Dr to Fort Dr	130	0-750	168	0-750	One-way	1	15	None (cyclists mix with traffic)
40	Monticello Rd	School St to N Kings Hwy	24000	15001+	30240	15001+	Two-way	4	35	None (cyclists mix with traffic)
41	Mount Vernon Dr	Entire segment	720	0-750	929	751-1500	Two-way	2	15	None (cyclists mix with traffic)
42	N Kings Hwy	Jefferson Dr/Shady Oak to Farmington Dr	24000	15001+	30240	15001+	Two-way	4	35	None (cyclists mix with traffic)
43	N Kings Hwy	James Dr to Jefferson Dr	24000	15001+	30240	15001+	Two-way	4	35	Off-street trail
44	N Kings Hwy	Timothy Pl/Fort Farnsworth Rd to Wagon Dr/James Dr	24000	15001+	30240	15001+	Two-way	4	35	Off-street trail
45	N Kings Hwy	Huntington Park Dr to Fort Dr	24000	15001+	30240	15001+	Two-way	4	35	None (cyclists mix with traffic)
46	N Kings Hwy	Fort Dr to Fairhaven Ave	24000	15001+	30240	15001+	Two-way	5	35	None (cyclists mix with traffic)
47	N Kings Hwy	Kathryn St to Timothy Pl/Fort Farnsworth Rd	24000	15001+	30240	15001+	Two-way	4	35	Off-street trail
48	N Kings Hwy	Farmington Dr to Huntington Park Dr	24000	15001+	30240	15001+	Two-way	4	35	None (cyclists mix with traffic)
49	N Kings Hwy	Telegraph Rd to Kathryn St	24000	15001+	30240	15001+	Two-way	4	35	Off-street trail
50	N Kings Hwy	Fairhaven Ave to Jamaica Dr	24000	15001+	30240	15001+	Two-way	4	35	None (cyclists mix with traffic)
51	Rixey Dr	Entire segment	2800	1501-3000	3612	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
52	School St	N Kings Hwy to Pine Grove Cir	2000	1501-3000	2740	1501-3000	Two-way	2	15	None (cyclists mix with traffic)
53	School St	Pine Grove Cir to Dewey Dr	1800	1501-3000	2268	1501-3000	Two-way	2	15	None (cyclists mix with traffic)
54	School St	Dewey Dr to Schaffer Dr	1900	1501-3000	2603	1501-3000	Two-way	2	25	None (cyclists mix with traffic)
55	Stella Pl	Metroview Pkwy EW Segment/Stella Pl	0	0-750	0	0-750	Two-way	2	0	None (cyclists mix with traffic)
56	Telegraph Rd	Lenore Ln/East Dr to Farmington Dr	37000	15001+	46620	15001+	Two-way	6	35	None (cyclists mix with traffic)
57	Telegraph Rd	Farmington Dr to Franconia Rd	37000	15001+	46620	15001+	Two-way	5	35	None (cyclists mix with traffic)
58	Telegraph Rd	N Kings Hwy to Lenore Ln/East Dr	37000	15001+	46620	15001+	Two-way	8	35	Protected bike lanes (any buffer type present)
59	Telegraph Rd	Huntington Ave to N Kings Hwy	37000	15001+	46620	15001+	Two-way	8	35	Protected bike lanes (any buffer type present)
60	Timothy Pl	Entire street	230	0-750	301	0-750	Two-way	2	15	None (cyclists mix with traffic)

ID	Roadway Name	Usable Facility Width	Buffer Type	Buffer Type (Other)	Buffer Width	Buffer Continuity	Height	Pedestrian Facility Type	Through Zone Width	Buffer Zone Width	Furniture Type
1	Bangor Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
2	Bangor Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
3	Biscayne Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
4	Edgehill Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
5	Fairhaven Ave	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
6	Fairhaven Ave	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
7	Fairhaven Ave	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
8	Farmington Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
9	Farmington Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Parked cars
10	Farmington Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Parked cars
11	Farrington Ave	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
12	Farrington Ave	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
13	Fort Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
14	Fort Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
15	Fort Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
16	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
17	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
18	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
19	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
20	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
21	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
22	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
23	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
24	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
25	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
26	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
27	Jamaica Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
28	Jamaica Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
29	James Dr	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
30	James Dr	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
31	James Dr	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
32	Kathryn St	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
33	Lenore Ln	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
34	Liberty Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	7 to <8 feet	N/A	N/A
35	Liberty Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
36	Metroview Pkwy	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
37	Monticello Rd	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
38	Monticello Rd	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer
39	Monticello Rd	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars
40	Monticello Rd	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer
41	Mount Vernon Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
42	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	7 to <8 feet	N/A	N/A
43	N Kings Hwy	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
44	N Kings Hwy	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
45	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer
46	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer
47	N Kings Hwy	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
48	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer
49	N Kings Hwy	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer
50	N Kings Hwy	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer
51	Rixey Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A
52	School St	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
53	School St	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
54	School St	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
55	Stella Pl	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A
56	Telegraph Rd	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
57	Telegraph Rd	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer
58	Telegraph Rd	6.5 to <8 feet	N/A	Landscape panel	<3 feet	Continuous (no gaps)	Sidewalk height	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer
59	Telegraph Rd	6.5 to <8 feet	N/A	Landscape panel	<3 feet	Continuous (no gaps)	Sidewalk height	Detached (buffer between sidewalk and travel lanes)	8 to <9 feet	<14 feet	Landscape buffer
60	Timothy Pl	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A

ID	Roadway Name	Sidewalk Quality	Lighting	Crosswalk Frequency	2045 Baseline Bike Score	2045 Baseline Pedestrian Score	2045 Baseline Pedestrian Score (No CW Frequency)
1	Bangor Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	1	3	3
2	Bangor Dr	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	2	2	2
3	Biscayne Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	2	3	3
4	Edgehill Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	2	3	3
5	Fairhaven Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	2	3	3
6	Fairhaven Ave	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced 400 feet or less	1	4	4
7	Fairhaven Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	1	3	3
8	Farmington Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	2	3	3
9	Farmington Dr	Even, smooth surface	Roadway lighting	Spaced > 400 feet	3	3	3
10	Farmington Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	2	3	3
11	Farrington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	2	3	3
12	Farrington Ave	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	1	3	3
13	Fort Dr	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	2	2	2
14	Fort Dr	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	3	4	4
15	Fort Dr	Even, smooth surface	Roadway lighting	Spaced > 400 feet	2	2	2
16	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	3	3
17	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	3	3
18	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	3	3
19	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	3	3
20	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	3	3
21	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	1	3	3
22	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	3	3
23	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	3	3
24	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	3	3
25	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	1	3	3
26	Huntington Ave	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	3	3
27	Jamaica Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	2	3	3
28	Jamaica Dr	Even, smooth surface	Roadway lighting	Spaced 400 feet or less	2	2	2
29	James Dr	N/A	Roadway lighting	Spaced > 400 feet	1	2	2
30	James Dr	N/A	Roadway lighting	Spaced > 400 feet	1	2	2
31	James Dr	N/A	Roadway lighting	Spaced > 400 feet	1	2	2
32	Kathryn St	N/A	Roadway lighting	Spaced > 400 feet	2	2	2
33	Lenore Ln	N/A	Roadway lighting	Spaced > 400 feet	1	2	2
34	Liberty Dr	Some cracks, but usable width maintained	No lighting	Spaced > 400 feet	1	4	4
35	Liberty Dr	Some cracks, but usable width maintained	No lighting	Spaced > 400 feet	1	4	4
36	Metroview Pkwy	Even, smooth surface	Pedestrian-scale	Spaced > 400 feet	2	1	4
37	Monticello Rd	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced 400 feet or less	2	4	4
38	Monticello Rd	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	4	3	3
39	Monticello Rd	Some cracks, but usable width maintained	Roadway lighting	Spaced 400 feet or less	1	3	3
40	Monticello Rd	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced 400 feet or less	4	4	4
41	Mount Vernon Dr	Some cracks, but usable width maintained	No lighting	Spaced > 400 feet	2	4	4
42	N Kings Hwy	Some cracks, but usable width maintained	Pedestrian-scale	Spaced 400 feet or less	4	4	4
43	N Kings Hwy	Even, smooth surface	Pedestrian-scale	Spaced > 400 feet	1	3	3
44	N Kings Hwy	Even, smooth surface	Pedestrian-scale	Spaced > 400 feet	1	3	3
45	N Kings Hwy	Even, smooth surface	Pedestrian-scale	Spaced 400 feet or less	4	3	3
46	N Kings Hwy	Cracks, failing pavement, usable width not maintained	Pedestrian-scale	Spaced > 400 feet	4	4	4
47	N Kings Hwy	Even, smooth surface	Pedestrian-scale	Spaced > 400 feet	1	3	3
48	N Kings Hwy	Some cracks, but usable width maintained	Pedestrian-scale	Spaced 400 feet or less	4	3	3
49	N Kings Hwy	Even, smooth surface	Pedestrian-scale	Spaced > 400 feet	1	3	3
50	N Kings Hwy	Some cracks, but usable width maintained	Pedestrian-scale	Spaced 400 feet or less	4	3	3
51	Rixey Dr	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	2	3	3
52	School St	Even, smooth surface	Roadway lighting	Spaced > 400 feet	2	2	2
53	School St	Even, smooth surface	Roadway lighting	Spaced > 400 feet	2	2	2
54	School St	Even, smooth surface	No lighting	Spaced 400 feet or less	2	4	4
55	Stella Pl	N/A	N/A	N/A	1	1	4
56	Telegraph Rd	Cracks, failing pavement, usable width not maintained	Roadway lighting	Spaced > 400 feet	4	4	4
57	Telegraph Rd	Some cracks, but usable width maintained	Roadway lighting	Spaced > 400 feet	4	4	4
58	Telegraph Rd	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	4	4
59	Telegraph Rd	Even, smooth surface	Roadway lighting	Spaced > 400 feet	1	4	4
60	Timothy Pl	N/A	Roadway lighting	Spaced > 400 feet	1	2	2

Appendix D

ID	Roadway Name	Roadway Extents	VDOT ADT (Existing)	ADT (Existing)	VDOT ADT (2045)	ADT (2045)	One-way?	Lane Count	Prevailing (or Posted) Speed	Bike Facility Type
1	Bangor Dr	Fort Dr to Fairhaven Ave	430	0-750	589	0-750	Two-way	2	15	None (cyclists mix with traffic)
2	Bangor Dr	Fairhaven Ave to Jamaica Dr	870	751-1500	1192	751-1500	Two-way	2	15	None (cyclists mix with traffic)
3	Biscayne Dr	Entire segment	740	0-750	1014	751-1500	Two-way	2	15	None (cyclists mix with traffic)
4	Edgehill Dr	Entire segment	3100	3001-8000	3999	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
5	Fairhaven Ave	East of N Kings Hwy to Rixey Dr	2700	1501-3000	3402	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
6	Fairhaven Ave	Fairhaven to Fort - south segment	440	0-750	554	0-750	One-way	1	15	None (cyclists mix with traffic)
7	Fairhaven Ave	West of N Kings Hwy to Monticello Rd	260	0-750	356	0-750	One-way	1	15	None (cyclists mix with traffic)
8	Farmington Dr	N Kings Hwy to Monticello Rd	4000	3001-8000	5040	3001-8000	Two-way	1	15	None (cyclists mix with traffic)
9	Farmington Dr	Edgehill Dr to Telegraph Rd	4000	3001-8000	5040	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
10	Farmington Dr	Monticello Rd to Edgehill Dr	4000	3001-8000	5040	3001-8000	Two-way	1	15	None (cyclists mix with traffic)
11	Farrington Ave	Farrington Ave - west segment	1100	751-1500	1419	751-1500	Two-way	2	15	None (cyclists mix with traffic)
12	Farrington Ave	Farrington Ave - east segment	240	0-750	329	0-750	Two-way	2	15	None (cyclists mix with traffic)
13	Fort Dr	Rixey Dr to N Kings Hwy	3100	3001-8000	3999	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
14	Fort Dr	N Kings Hwy to Monticello Rd	3300	3001-8000	4257	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
15	Fort Dr	Monticello Rd to Edgehill Dr	3400	3001-8000	4284	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
16	Huntington Ave	Mt Vernon Dr to Foley St	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
17	Huntington Ave	Farrington Ave to Blaine Dr	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
18	Huntington Ave	Fifer Dr to Mt. Vernon Dr	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
19	Huntington Ave	Hunting Creek Rd to Richmond Hwy	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
20	Huntington Ave	Robinson Way to Metroveiw Pkwy	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
21	Huntington Ave	Foley St to Hunting Creek Rd	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
22	Huntington Ave	Kathryn St to Robinson Wy	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
23	Huntington Ave	Telegraph Rd to Kathryn St	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
24	Huntington Ave	Blaine Dr to Fifer Dr	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
25	Huntington Ave	Fenwick Dr to Biscayne Dr/Farrington Ave	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
26	Huntington Ave	Metroview Pkwy to Fenwick Dr/Huntington Metro Access Rd	16000	15001+	20160	15001+	Two-way	3	30	Off-street trail
27	Jamaica Dr	Bangor Dr to Belleview Ave	650	0-750	838	751-1500	Two-way	2	15	None (cyclists mix with traffic)
28	Jamaica Dr	N Kings Hwy to Bangor Dr	1200	751-1500	1548	1501-3000	Two-way	2	25	None (cyclists mix with traffic)
29	James Dr	Entire street	230	0-750	308	0-750	Two-way	2	15	None (cyclists mix with traffic)
30	James Dr	Entire street	230	0-750	308	0-750	Two-way	2	15	None (cyclists mix with traffic)
31	James Dr	Entire street	70	0-750	90	0-750	Two-way	2	15	None (cyclists mix with traffic)
32	Kathryn St	Entire street	990	751-1500	1277	751-1500	Two-way	2	15	None (cyclists mix with traffic)
33	Lenore Ln	Entire street	160	0-750	214	0-750	Two-way	2	15	None (cyclists mix with traffic)
34	Liberty Dr	Liberty Dr - Entire segment	0	0-750	0	0-750	One-way	1	15	None (cyclists mix with traffic)
35	Liberty Dr	Liberty Dr - Entire segment	420	0-750	542	0-750	One-way	1	15	None (cyclists mix with traffic)
36	Metroview Pkwy	Metroview Pkwy NS segment	1200	751-1500	1548	1501-3000	Two-way	2	15	None (cyclists mix with traffic)
37	Monticello Rd	Fairhaven Ave to Fort Dr - north segment	1200	751-1500	1548	1501-3000	One-way	1	15	None (cyclists mix with traffic)
38	Monticello Rd	Jamaica Dr to School St	24000	15001+	30240	15001+	Two-way	3	30	Bike lanes
39	Monticello Rd	Farmington Dr to Fort Dr	130	0-750	168	0-750	One-way	1	15	None (cyclists mix with traffic)
40	Monticello Rd	School St to N Kings Hwy	24000	15001+	30240	15001+	Two-way	3	35	Bike lanes
41	Mount Vernon Dr	Entire segment	720	0-750	929	751-1500	Two-way	2	15	None (cyclists mix with traffic)
42	N Kings Hwy	Jefferson Dr/Shady Oak to Farmington Dr	24000	15001+	30240	15001+	Two-way	3	30	Bike lanes
43	N Kings Hwy	James Dr to Jefferson Dr	24000	15001+	30240	15001+	Two-way	3	30	Off-street trail
44	N Kings Hwy	Timothy Pl/Fort Farnsworth Rd to Wagon Dr/James Dr	24000	15001+	30240	15001+	Two-way	3	35	Off-street trail
45	N Kings Hwy	Huntington Park Dr to Fort Dr	24000	15001+	30240	15001+	Two-way	3	30	Bike lanes
46	N Kings Hwy	Fort Dr to Fairhaven Ave	24000	15001+	30240	15001+	Two-way	3	30	Bike lanes
47	N Kings Hwy	Kathryn St to Timothy Pl/Fort Farnsworth Rd	24000	15001+	30240	15001+	Two-way	3	35	Off-street trail
48	N Kings Hwy	Farmington Dr to Huntington Park Dr	24000	15001+	30240	15001+	Two-way	3	30	Bike lanes
49	N Kings Hwy	Telegraph Rd to Kathryn St	24000	15001+	30240	15001+	Two-way	3	35	Off-street trail
50	N Kings Hwy	Fairhaven Ave to Jamaica Dr	24000	15001+	30240	15001+	Two-way	3	30	Bike lanes
51	Rixey Dr	Entire segment	2800	1501-3000	3612	3001-8000	Two-way	2	15	None (cyclists mix with traffic)
52	School St	N Kings Hwy to Pine Grove Cir	2000	1501-3000	2740	1501-3000	Two-way	2	15	None (cyclists mix with traffic)
53	School St	Pine Grove Cir to Dewey Dr	1800	1501-3000	2268	1501-3000	Two-way	2	15	None (cyclists mix with traffic)
54	School St	Dewey Dr to Schaffer Dr	1900	1501-3000	2603	1501-3000	Two-way	2	25	None (cyclists mix with traffic)
55	Stella Pl	Metroview Pkwy EW Segment/Stella Pl	0	0-750	0	0-750	Two-way	2	0	None (cyclists mix with traffic)
56	Telegraph Rd	Lenore Ln/East Dr to Farmington Dr	37000	15001+	46620	15001+	Two-way	3	30	Bike lanes
57	Telegraph Rd	Farmington Dr to Franconia Rd	37000	15001+	46620	15001+	Two-way	3	30	Bike lanes
58	Telegraph Rd	N Kings Hwy to Lenore Ln/East Dr	37000	15001+	46620	15001+	Two-way	3	30	Protected bike lanes (any buffer type present)
59	Telegraph Rd	Huntington Ave to N Kings Hwy	37000	15001+	46620	15001+	Two-way	3	30	Protected bike lanes (any buffer type present)
60	Timothy Pl	Entire street	230	0-750	301	0-750	Two-way	2	15	None (cyclists mix with traffic)

ID	Roadway Name	Usable Facility Width	Buffer Type	Buffer Type (Other)	Buffer Width	Buffer Continuity	Height	Pedestrian Facility Type	Through Zone Width	Buffer Zone Width	Furniture Type	Sidewalk Quality
1	Bangor Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A	Even, smooth surface
2	Bangor Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
3	Biscayne Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
4	Edgehill Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars	Even, smooth surface
5	Fairhaven Ave	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A	Even, smooth surface
6	Fairhaven Ave	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars	Even, smooth surface
7	Fairhaven Ave	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars	Even, smooth surface
8	Farmington Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars	Even, smooth surface
9	Farmington Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Parked cars	Even, smooth surface
10	Farmington Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Parked cars	Even, smooth surface
11	Farrington Ave	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
12	Farrington Ave	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
13	Fort Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A	Even, smooth surface
14	Fort Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	6 to 8 feet	N/A	N/A	Even, smooth surface
15	Fort Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A	Even, smooth surface
16	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
17	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
18	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
19	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
20	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
21	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
22	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
23	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
24	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
25	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
26	Huntington Ave	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
27	Jamaica Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A	Even, smooth surface
28	Jamaica Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
29	James Dr	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A	N/A
30	James Dr	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A	N/A
31	James Dr	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A	N/A
32	Kathryn St	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A	N/A
33	Lenore Ln	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A	N/A
34	Liberty Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	7 to <8 feet	N/A	N/A	Even, smooth surface
35	Liberty Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A	Even, smooth surface
36	Metroview Pkwy	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
37	Monticello Rd	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars	Even, smooth surface
38	Monticello Rd	5 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer	Even, smooth surface
39	Monticello Rd	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Parked cars	Even, smooth surface
40	Monticello Rd	5 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer	Even, smooth surface
41	Mount Vernon Dr	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
42	N Kings Hwy	5 feet	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer	Even, smooth surface
43	N Kings Hwy	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
44	N Kings Hwy	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
45	N Kings Hwy	5 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer	Even, smooth surface
46	N Kings Hwy	5 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer	Even, smooth surface
47	N Kings Hwy	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
48	N Kings Hwy	5 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer	Even, smooth surface
49	N Kings Hwy	>=10 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	>=10 feet	<14 feet	Landscape buffer	Even, smooth surface
50	N Kings Hwy	5 feet	Landscape	N/A	3 to <6 feet	Continuous	N/A	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer	Even, smooth surface
51	Rixey Dr	N/A	N/A	N/A	N/A	N/A	N/A	Attached (no buffer)	<6 feet	N/A	N/A	Even, smooth surface
52	School St	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
53	School St	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
54	School St	N/A	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	<6 feet	<14 feet	Landscape buffer	Even, smooth surface
55	Stella Pl	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A	N/A
56	Telegraph Rd	5 feet	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	8 to 9 feet	<14 feet	Landscape buffer	Even, smooth surface
57	Telegraph Rd	5 feet	N/A	N/A	N/A	N/A	N/A	Detached (buffer between sidewalk and travel lanes)	8 to 9 feet	<14 feet	Landscape buffer	Even, smooth surface
58	Telegraph Rd	6.5 to <8 feet	N/A	Landscape panel	<3 feet	Continuous (no gaps)	Sidewalk height	Detached (buffer between sidewalk and travel lanes)	7 to <8 feet	<14 feet	Landscape buffer	Even, smooth surface
59	Telegraph Rd	6.5 to <8 feet	N/A	Landscape panel	<3 feet	Continuous (no gaps)	Sidewalk height	Detached (buffer between sidewalk and travel lanes)	8 to <9 feet	<14 feet	Landscape buffer	Even, smooth surface
60	Timothy Pl	N/A	N/A	N/A	N/A	N/A	N/A	No sidewalk	N/A	N/A	N/A	N/A

ID	Roadway Name	Lighting	Crosswalk Frequency	2045 Long-term Recommendations Bike Score	2045 Long-term Recommendations Pedestrian Score
1	Bangor Dr	Roadway lighting	Spaced 400 feet or less	1	2
2	Bangor Dr	Roadway lighting	Spaced 400 feet or less	2	2
3	Biscayne Dr	Roadway lighting	Spaced > 400 feet	2	2
4	Edgehill Dr	Roadway lighting	Spaced 400 feet or less	2	2
5	Fairhaven Ave	Roadway lighting	Spaced 400 feet or less	2	2
6	Fairhaven Ave	Roadway lighting	Spaced 400 feet or less	1	2
7	Fairhaven Ave	Roadway lighting	Spaced 400 feet or less	1	2
8	Farmington Dr	Roadway lighting	Spaced 400 feet or less	2	2
9	Farmington Dr	Roadway lighting	Spaced 400 feet or less	2	2
10	Farmington Dr	Roadway lighting	Spaced 400 feet or less	2	2
11	Farrington Ave	Roadway lighting	Spaced > 400 feet	2	2
12	Farrington Ave	Roadway lighting	Spaced > 400 feet	1	2
13	Fort Dr	Roadway lighting	Spaced 400 feet or less	2	2
14	Fort Dr	Roadway lighting	Spaced 400 feet or less	2	2
15	Fort Dr	Roadway lighting	Spaced > 400 feet	2	2
16	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
17	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
18	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
19	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
20	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
21	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
22	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
23	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
24	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
25	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
26	Huntington Ave	Roadway lighting	Spaced 400 feet or less	1	2
27	Jamaica Dr	Roadway lighting	Spaced > 400 feet	2	2
28	Jamaica Dr	Roadway lighting	Spaced 400 feet or less	1	2
29	James Dr	Roadway lighting	Spaced > 400 feet	1	2
30	James Dr	Roadway lighting	Spaced > 400 feet	1	2
31	James Dr	Roadway lighting	Spaced > 400 feet	1	2
32	Kathryn St	Roadway lighting	Spaced > 400 feet	2	2
33	Lenore Ln	Roadway lighting	Spaced > 400 feet	1	2
34	Liberty Dr	Pedestrian-scale	Spaced > 400 feet	1	1
35	Liberty Dr	Pedestrian-scale	Spaced > 400 feet	1	1
36	Metroview Pkwy	Pedestrian-scale	Spaced > 400 feet	2	1
37	Monticello Rd	Roadway lighting	Spaced 400 feet or less	2	2
38	Monticello Rd	Roadway lighting	Spaced 400 feet or less	2	2
39	Monticello Rd	Roadway lighting	Spaced 400 feet or less	1	2
40	Monticello Rd	Roadway lighting	Spaced 400 feet or less	2	2
41	Mount Vernon Dr	Pedestrian-scale	Spaced > 400 feet	2	1
42	N Kings Hwy	Pedestrian-scale	Spaced 400 feet or less	2	2
43	N Kings Hwy	Pedestrian-scale	Spaced 400 feet or less	1	2
44	N Kings Hwy	Pedestrian-scale	Spaced 400 feet or less	1	2
45	N Kings Hwy	Pedestrian-scale	Spaced 400 feet or less	2	2
46	N Kings Hwy	Pedestrian-scale	Spaced 400 feet or less	2	2
47	N Kings Hwy	Pedestrian-scale	Spaced 400 feet or less	1	2
48	N Kings Hwy	Pedestrian-scale	Spaced 400 feet or less	2	2
49	N Kings Hwy	Pedestrian-scale	Spaced 400 feet or less	1	2
50	N Kings Hwy	Pedestrian-scale	Spaced 400 feet or less	2	2
51	Rixey Dr	Roadway lighting	Spaced > 400 feet	2	2
52	School St	Roadway lighting	Spaced > 400 feet	2	2
53	School St	Roadway lighting	Spaced > 400 feet	2	2
54	School St	Pedestrian-Scale	Spaced 400 feet or less	2	1
55	Stella Pl	N/A	N/A	1	1
56	Telegraph Rd	Roadway lighting	Spaced 400 feet or less	2	2
57	Telegraph Rd	Roadway lighting	Spaced 400 feet or less	2	2
58	Telegraph Rd	Roadway lighting	Spaced 400 feet or less	1	2
59	Telegraph Rd	Roadway lighting	Spaced 400 feet or less	1	2
60	Timothy Pl	Roadway lighting	Spaced > 400 feet	1	2