CHELTENHAM DRIVE - WISONSIN AVENUE TO PEARL STREET BIKEWAY FEASIBILITY STUDY

BETHESDA, MONTGOMERY COUNTY; MD

FINAL REPORT

JANUARY 2022

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MCDOT
Montgomery County Department of Transportation

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Cheltenham Drive – Wisconsin Avenue (MD 355) to Pearl Street Bikeway Feasibility Study

Bethesda, Montgomery County; MD

Final Report

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Montgomery County Department of Transportation (MCDOT)

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Table of Contents

List of Figures

List of Tables

1. INTRODUCTION

Montgomery County Department of Transportation (MCDOT), in partnership with the Maryland-National Capital Park and Planning Commission (M-NCPPC), has been planning and implementing bicycle facility projects in Bethesda over the last several years. MCDOT is advancing bikeway projects to implement the bicycle network recommended in the 2018 county-wide Bicycle Master Plan and the 2017 Bethesda Downtown Sector Plan.

This project conducted a planning and concept design feasibility study to recommend bikeway routes and recommended bikeway facility types, west of Wisconsin Avenue (MD 355) as part of the Bethesda Loop. The Bethesda Loop is a planned network of low-stress bicycle facilities in and near Downtown Bethesda. This planned network will create a low-stress bikeway loop, running along Woodmont Avenue, Montgomery Lane/Montgomery Avenue, Pearl Street, and Cheltenham Drive. **Figure 1** shows the study area in the context of the existing and planned transportation projects. Some of the major planned projects near the study area include the Purple Line, Georgetown Branch Trail/Capital Crescent Trail, and the Bethesda Bike Loop. Apart from the Bethesda Loop, several other bikeway projects have been planned in and around the study area per the 2018 Montgomery County Bicycle Master Plan.

This feasibility study was focused on the following topics:

- Addressed discrepancies between bikeway route alignments proposed in the 2017 Bethesda Downtown Sector Plan and the 2018 Montgomery County Bicycle Master Plan.
- Identified route alignment alternatives and bike facility type alternatives to complete the Bethesda Loop, west of Wisconsin Avenue.
- Developed a planning-level qualitative assessment for route and bike facility type alternatives.
- Engaged major stakeholders and the community members to identify issues, opportunities and solicit feedback on alternatives.

Project Background

Several projects that form the Bethesda Loop, including the two-way separated bicycle lanes on Woodmont Avenue and Montgomery Lane/Montgomery Avenue, are in various stages of engineering design and implementation. However, exact route and bicycle facility types had not yet been finalized for part of the loop along Pearl Street and Cheltenham Drive, west of Wisconsin Avenue. This project builds on the previous planning studies and advances bikeway projects to complete the Bethesda Loop. **Figure 2** displays the study segments within the scope of this project.

Although Pearl Street and Cheltenham Drive were identified as proposed routes in the 2017 Bethesda Downtown Sector Plan, several feasibility factors needed to be addressed to advance these projects to engineering design. Cheltenham Drive, east of Tilbury Street, is a one-way west-bound residential street with on-street parking that may not accommodate two-way bicycle traffic. Other parallel routes had to be explored to create a connected bicycle network. Finally, public outreach and stakeholder engagement was necessary to gain input on routes and bike facility types.

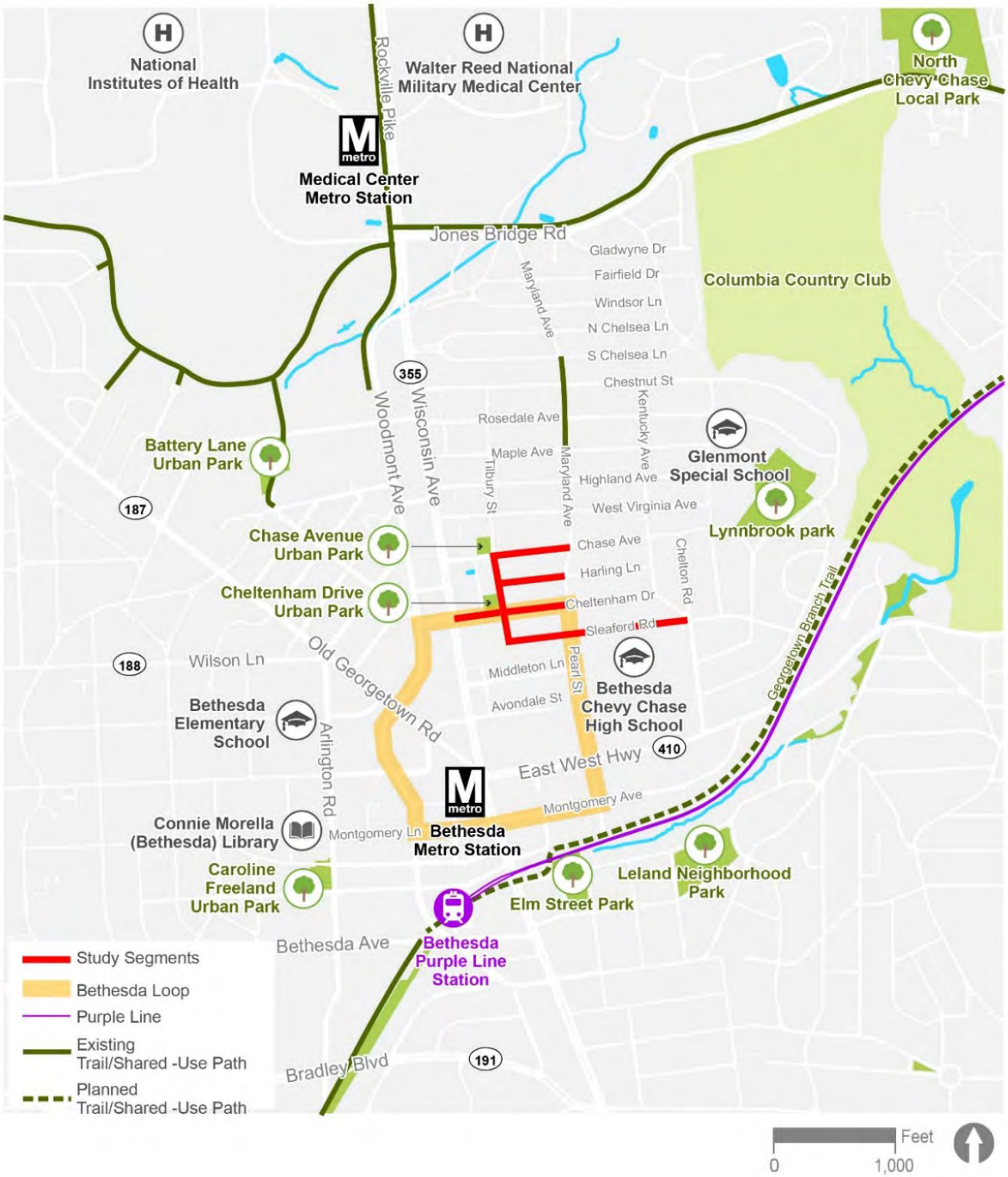


Figure 1: Study Area Context Map

Figure 2: Study Area and Study Segments

Planning Process

The project team developed a streamlined planning process to guide the project through various tasks. The project began with a kick-off meeting held on November 19th, 2020. Several bike network and facility type alternatives were developed and evaluated. Finally, concept plans were developed for a preferred alternative. The preferred network and bike facility type alternative were selected based on planning-level qualitative assessment, inter-agency feedback, as well as public and stakeholder feedback. The overall planning process is shown in **Figure 3**.

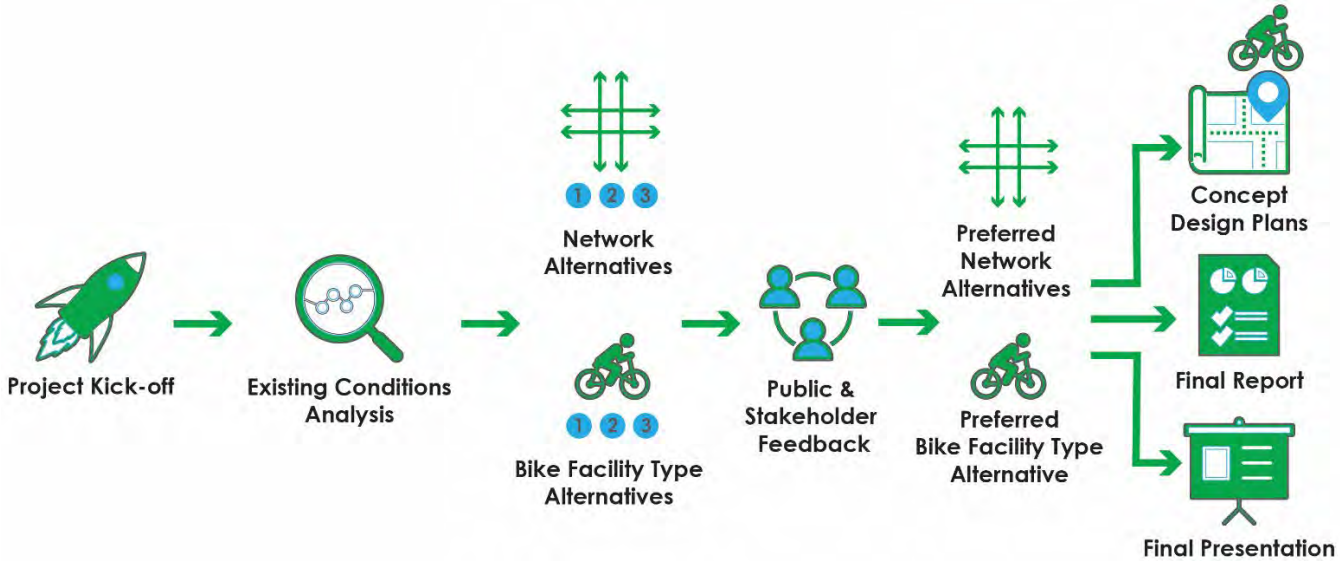


Figure 3: Planning Process Diagram

Cheltenham Drive – Looking North from Tilbury Street intersection

2. PROJECT GOALS & EVALUATION MEASURES

The following goals were identified to help guide this project:

- **Evaluate cross-section alternatives to identify a preferred low-stress bikeway facility for Cheltenham Drive.**
- **Evaluate network alternatives to identify a preferred bike network between Tilbury Street and Pearl Street.**
- **Engage major stakeholders and community members to gather feedback as part of identifying the preferred alternative.**
- **Develop conceptual design plans for the preferred bikeway facility for the study area.**

This report documents the overall planning process and is organized to describe the study area's existing conditions, present alternatives analysis, summarize public and stakeholder feedback, and showcase the preferred alternative.

Chapter 3 summarizes findings for the following existing conditions topic areas:

- Land use
- Existing and proposed pedestrian facilities
- Existing and proposed bicycle facilities
- Crash history
- Roadway characteristics

For the existing conditions analysis, the project team collected data from open-source databases and other agency sources such as:

- Montgomery County Department of Transportation (MCDOT)
- GIS Open Data portal for Montgomery County
- Maryland- National Capital Parks and Planning Commission (M-NCPPC)
- Maryland Department of Transportation (MDOT) – State Highway Administration (SHA)

Qualitative Evaluation Measures

A preferred alternative was selected for each study segment. The preferred design alternative was selected based on public input and qualitative assessment based on the following measures:

- **Bicycle Safety & Comfort**
- **Cost**
- **Right-of-Way Impacts**
- **Parking Impacts**
- **Drainage & Utility Impacts**

3. EXISTING CONDITIONS ANALYSIS

The existing conditions analysis is the first step in evaluating and understanding the study area's challenges and opportunities. This analysis involved mapping and analyzing land use and multi-modal transportation infrastructure as well as roadway characteristics and crash history. The data collected and analyzed was also utilized in the next project phase to develop and assess conceptual alternatives. The findings from the existing conditions analysis are summarized below.

Existing Land Use

The study area consists of a mix of commercial, office, and residential land uses, as shown in **Figure 4**. Wisconsin Avenue, and the area west of Wisconsin Avenue are characterized by commercial, retail, and office land uses as well as medium to high-density multi-family residential development. Wisconsin Avenue is a major roadway with many everyday destinations such as restaurants, convenience stores, gas stations, banks, car rental facilities, and hotels. East of Wisconsin Avenue, the study area, has smaller, slower, and narrower streets that service mostly residential uses. There are some multi-family housing units mixed in with the office, and commercial land uses east of Wisconsin Avenue.

The study area contains mostly detached single-family residential land uses east of Tilbury Street. There are two small neighborhood urban parks located within the study area. Cheltenham Drive Urban Park is located at the intersection of Cheltenham Drive and Tilbury Street. Chase Avenue Urban Park is located at the intersection of Chase Avenue and Tilbury Street. The Bethesda Chevy Chase High School, Our Lady of Lourdes Church, and MedStar Georgetown University Hospital are some of the major institutional land uses located along Pearl Street, just south of the study area.

Commercial land uses fronting Cheltenham Drive between Wisconsin Avenue and Tilbury Street.

Single-family detached residential land uses fronting Cheltenham Drive, east of Tilbury Street.

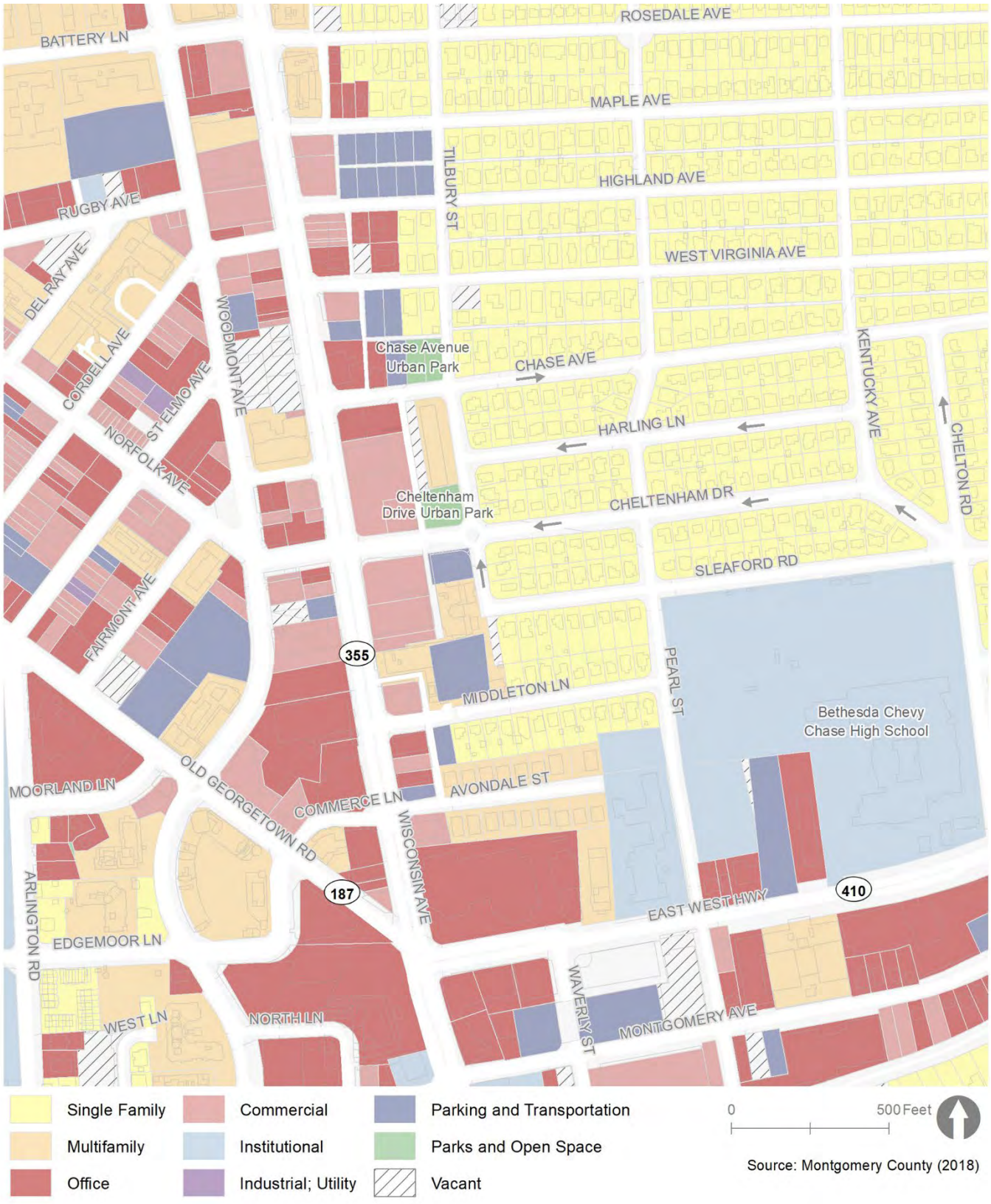


Figure 4: Existing Land Use Map

Pedestrian Facilities

Existing and planned pedestrian facilities were mapped to understand the current and proposed infrastructure and gaps in the system. In many areas where there are no dedicated bicycle facilities, pedestrian facilities like sidewalks function as bicycle facilities. Depending on the width, pedestrian volumes, and the surrounding land use context, a 10'wide or wider pedestrian facility can effectively function as a shared-use path that is used by both, pedestrians and bicyclists.

Most study segments, except Cheltenham Drive between Wisconsin Avenue and Tilbury Street, have narrow 4' to 5' wide sidewalks on one side of the street. Wide sidewalks with street furniture (street trees, landscaping, planters, benches) are provided along Wisconsin Avenue and Cheltenham, Drive between Wisconsin Avenue and Tilbury Street. Many curb cuts and driveway entrances to the CVS, Cheltenham Parking garage, and Midas auto repair shop create conflict points for people using the sidewalk along Cheltenham Drive near Wisconsin Avenue.

Additionally, opportunities for pedestrians to cross Cheltenham Drive exist at the signalized crosswalk at Wisconsin Avenue and at the unmarked crosswalk at the mini traffic circle at Tilbury Street. The unmarked pedestrian crosswalk on the westbound leg of the approach lacks an ADA ramp to accommodate people crossing Cheltenham Drive. **Figure 5** maps the existing pedestrian facilities.

Most residential study segments have a narrow 4' wide sidewalk on one side of the street.

Sidewalks on Cheltenham Drive between Wisconsin Avenue and Tilbury Street are 10' wide with an additional 5' of; tree-lined landscape buffer but are frequently interrupted by driveways.

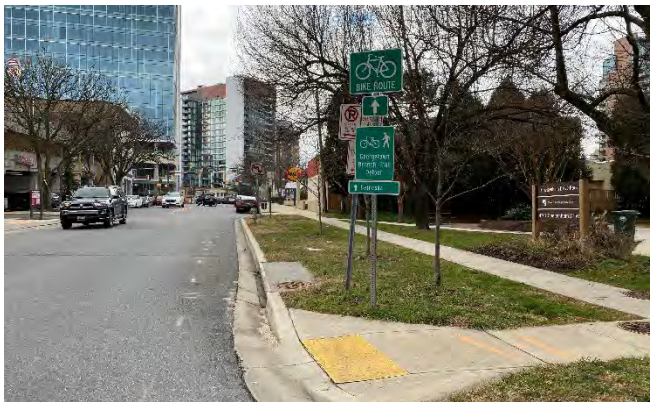
Bicycle Facilities

Limited bicycle facilities exist in and around the study area. Cheltenham Drive, from Wisconsin Avenue to Tilbury Street; Tilbury Street, south of Cheltenham Drive; and Sleaford Road are marked Bike Routes with way-finding signs. Pearl Street is also an assigned Bike Route with signs and sharrow markings, as shown in **Figure 5**. These on-street bicycle facilities connect people to the Georgetown Branch Trail, located just south and east of the study area.

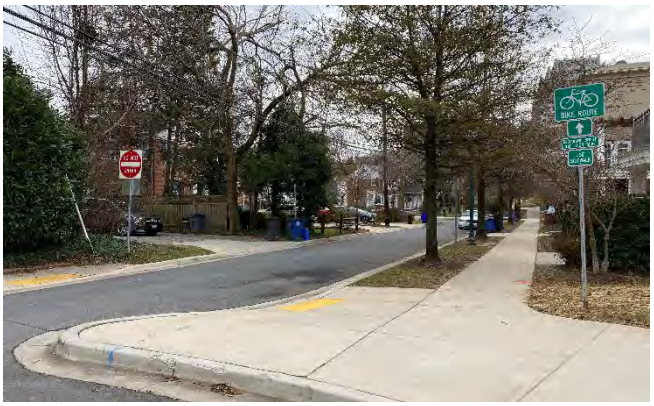
Existing Bicycle Level of Traffic Stress (LTS) is calculated based on a variety of street characteristics, such as width, speed, traffic volumes, and type of bicycle facility. Bicycle LTS provides an indication of which streets feel comfortable (lowest stress – LTS 1) and which streets feel uncomfortable or unsafe for people biking (highest stress – LTS 4).

Figure 6 depicts the existing LTS of each street surrounding the study area from low stress (LTS 1) to high stress (LTS 4). As shown, Wisconsin Avenue is uncomfortable for most cyclists. Alternatively, the local neighborhood streets, east of Tilbury Street, such as Cheltenham Drive, Chase Avenue, Pearl Street, and Sleaford Road, are more comfortable for most people biking. This is likely due to the lower speeds and lower vehicle volumes traveling on these local streets.

Figure 7 displays the proposed bicycle facility improvements recommended in the 2018 Montgomery County Bicycle Master Plan. The Master Plan provides a range of bicycle facility recommendations throughout the study area. Separated bike lanes are recommended for Cheltenham Drive between Wisconsin Avenue and Tilbury Street. Neighborhood greenways (Marked shared roadways with traffic calming and way-finding signs) are recommended for Tilbury Street, Chase Avenue, Sleaford Road. Two-way separated bicycle facilities are currently being constructed on Woodmont Avenue and Montgomery Avenue/Montgomery Lane.



Bike Route sign on Cheltenham Drive.



Bike Route sign on Tilbury Street.

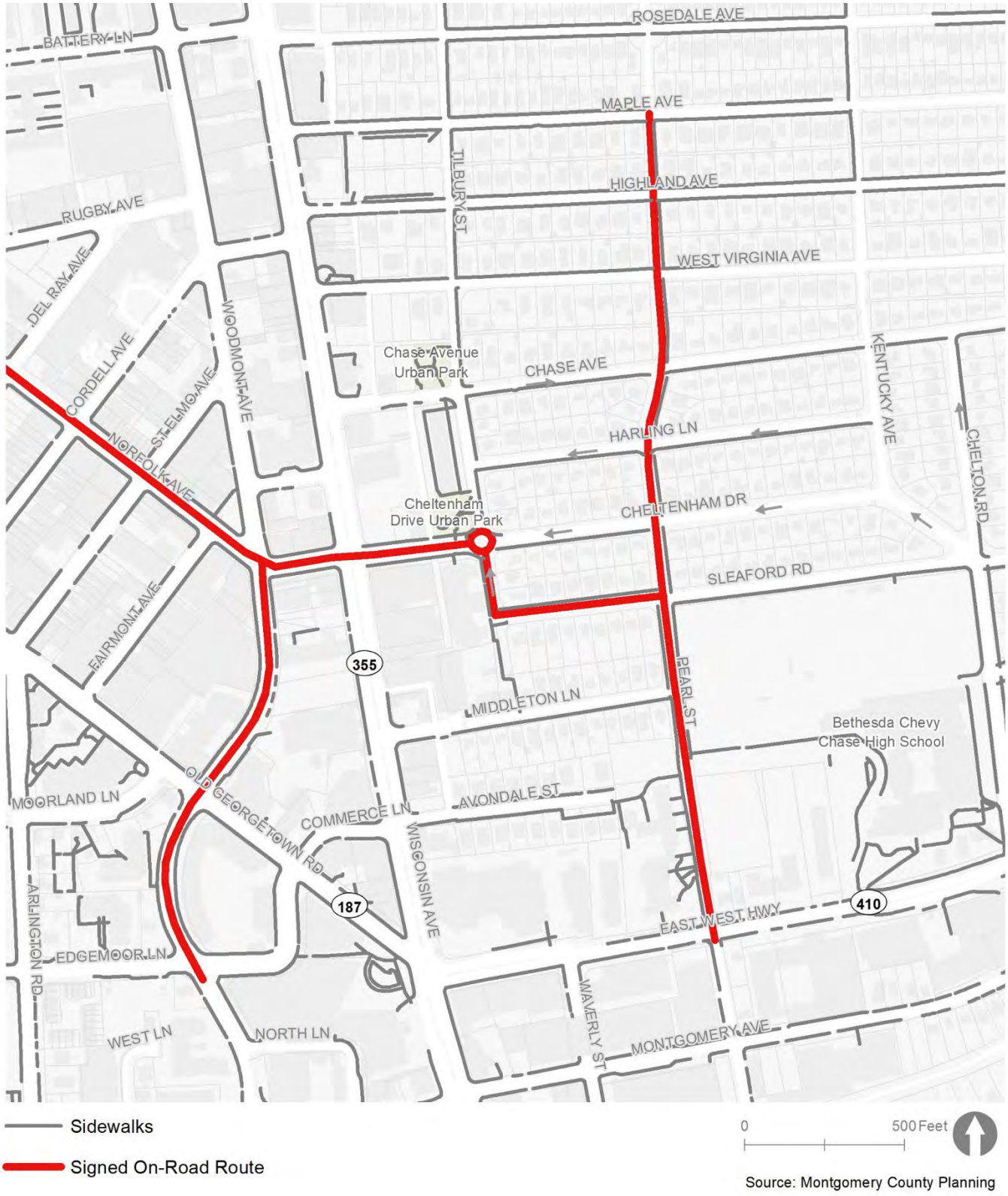


Figure 5: Existing Pedestrian and Bicycle Facilities

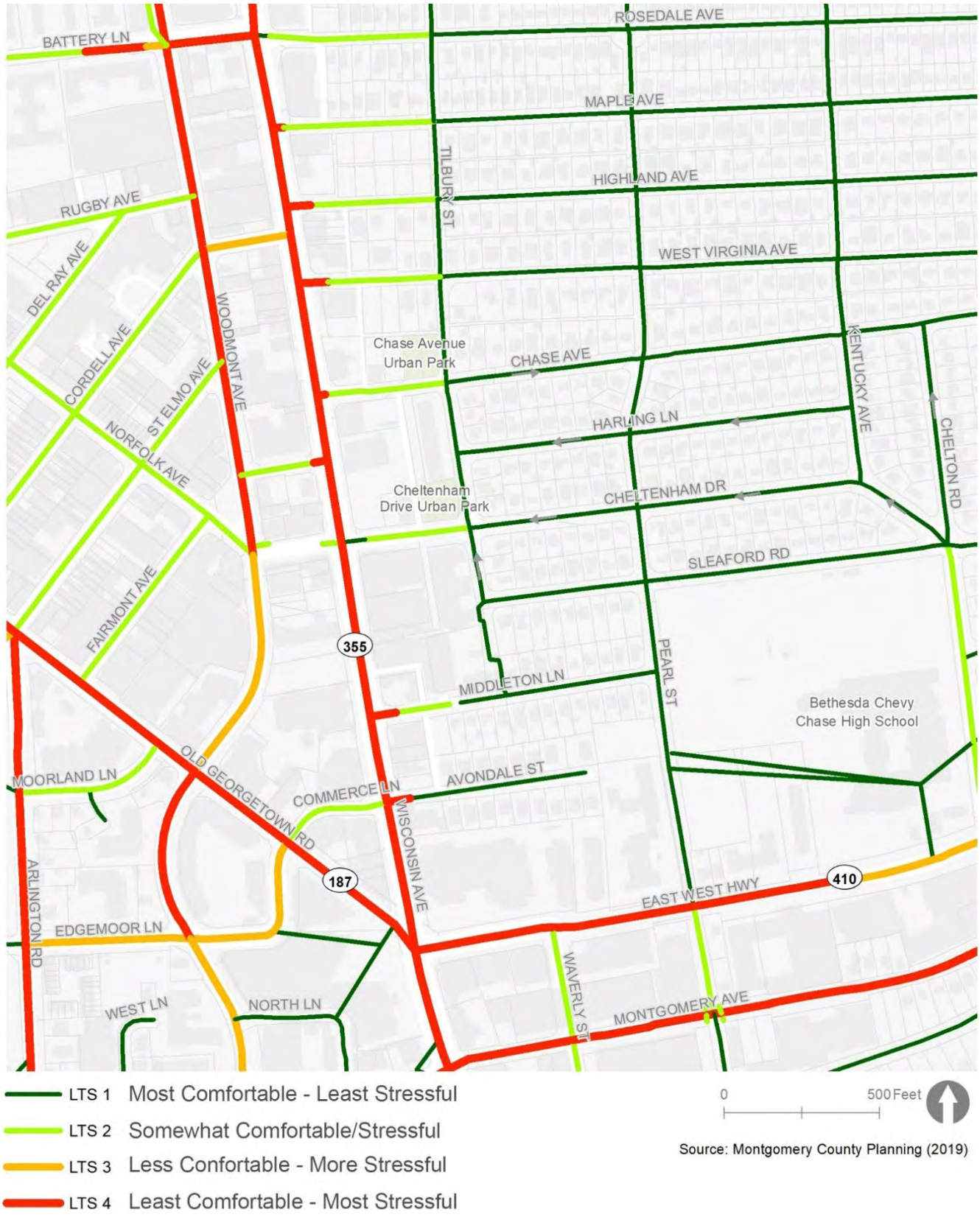


Figure 6: Existing Bicycle Level of Traffic Stress

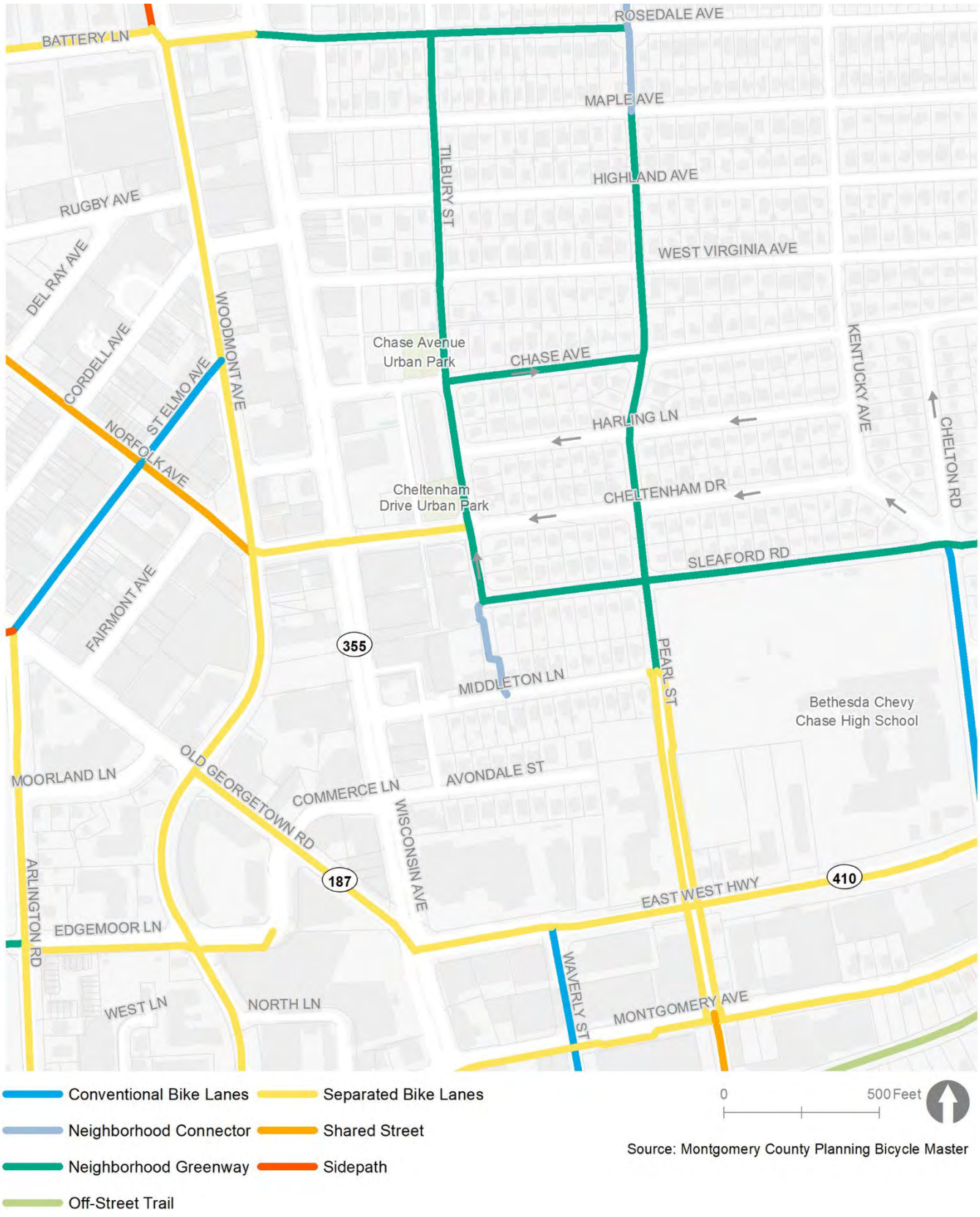


Figure 7: Proposed Bicycle Facilities


BIKE ROUTE

Transit Facilities

Almost all transit trips start and end as a pedestrian and/or bicycle trip. This phenomenon is often referred to as the concept of first and last-mile connectivity. Transit stops that are well connected to the surrounding areas by comfortable and safe bicycle and pedestrian facilities not only address the needs of the existing transit users but may induce more residents to ride transit.

Bethesda Metro Station on WMATA Metro Rail's Red Line is located a little over quarter mile south of the study area.

Source: McEnearney Associates

Medical Center Metro Station on WMATA Metro Rail's Red Line is located a little under one mile north of the study area.

Source: NIH

Figure 8 displays the study area's existing transit facilities. Both WMATA and Ride On bus services provide transit service to and from the study area. WMATA bus J2 runs north and south along Wisconsin Avenue, connecting Silver Spring and Bethesda. Additionally, the Bethesda Red Line Metro Rail station and the planned Purple Line are located just south of the study area. Medical Center Metro Rail Station is located a little under one mile north of the study area. MCDOT's bus-based transit service - Ride On, services the study area along Old Georgetown Road. Ride On routes 29, 30, 32, 34, 47, and 70 provide transit services along Old Georgetown Road. There is no transit service running along any of the study segments.

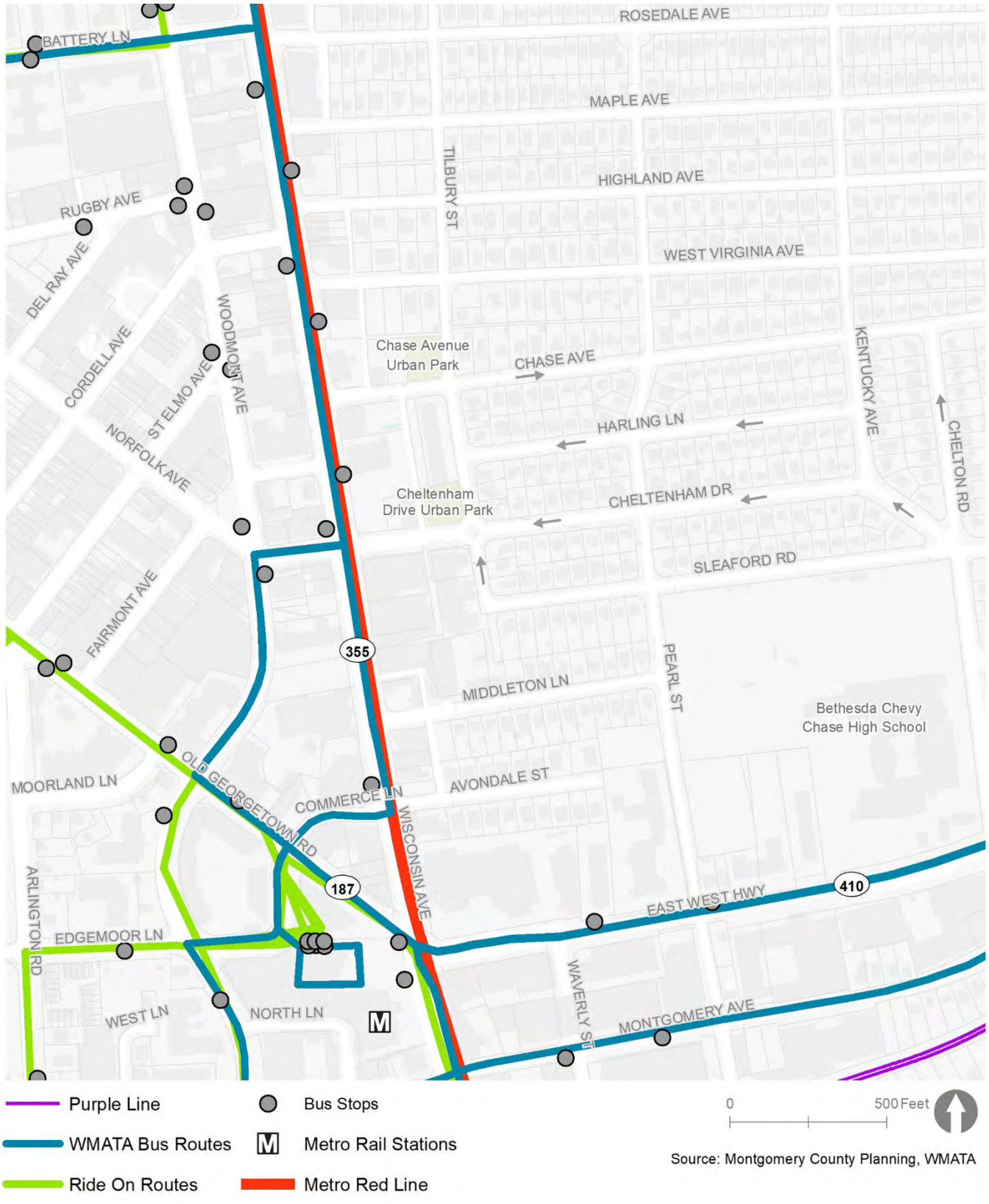


Figure 8: Existing Transit Facilities

Crash Analysis

Crash data was collected through Montgomery County's open data platform. The crash data provides general information collected from all traffic collisions within Montgomery County, collected through the Automated Crash Reporting System of the Maryland State Police. Reported crashes are presented from the last five years (January 2015 through December 24, 2020).

Figure 9 displays crashes categorized by severity. As shown, there are no reported fatal crashes within the study area. Most crashes are clustered along Wisconsin Avenue and Old Georgetown Road. There are fifteen reported crashes within or directly adjacent to the study segment areas. **Table 1** summarizes the reported crashes located along the study segments.

Table 1: Crash Details

Year	Property Damage	Injury	Collision Type	Bicycle/Pedestrians Involved
2015	3	1	3 Sideswipe	1 Bicyclist
			1 Same Direction Right Turn	
2016	2	0	2 Rear End	1 Pedestrian
2017	1	2	1 Same Direction Rear End	1 Bicyclist
			Straight Movement Angle	
2018	1	0	Hit Fixed Object	None
2019	2	3	2 Head on Left Turn	None
			2 Angle	
			Other	
2020	0	0	None	None

Pedestrian and Bicycle Crash History

Figure 10 summarizes the bicycle and pedestrian crashes within the study area. Only three bicycle and/or pedestrian crashes occurred along the study segments. All three crashes occurred along Cheltenham Drive, near Wisconsin Avenue. A summary of each bicycle and pedestrian crash is provided below:

- One bicycle sideswipe occurred in 2015 near the Cheltenham Parking Garage. The crash took place at night, and no injuries were reported.
- One pedestrian same direction rear end crash occurred in 2016 at the south leg of the intersection of Cheltenham Drive and Wisconsin Avenue. The crash occurred in the daytime, and no injuries were reported.
- One bicycle straight movement angle crash occurred in 2017. The crash occurred at the westbound intersection leg of Cheltenham Drive and Wisconsin Avenue, with an injury reported.

Figure 9: Crash Map (2015-2020)

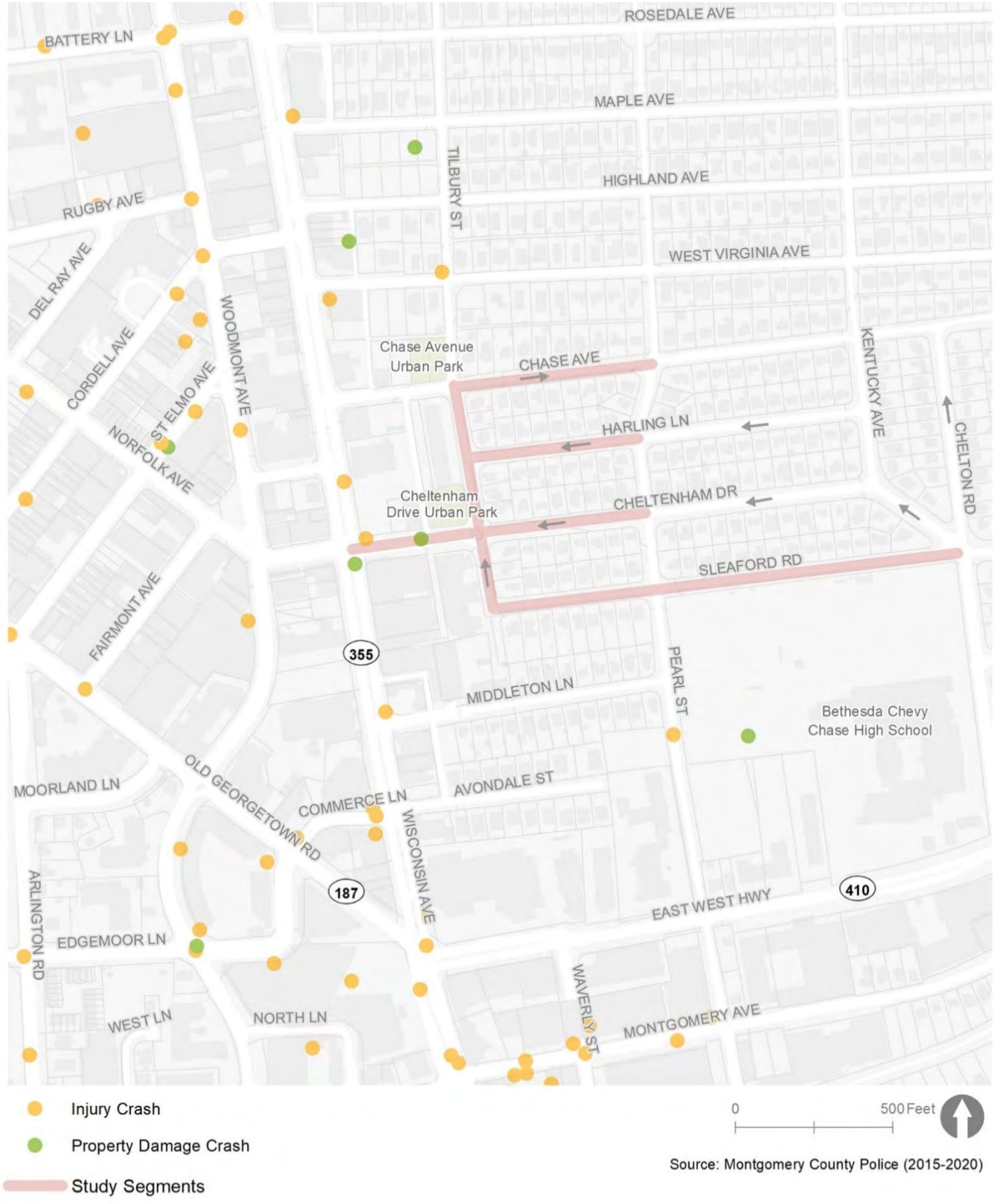


Figure 10: Pedestrian and Bicycle Crash Map (2015-2020)

Roadway Characteristics

Existing roadway characteristics such as functional classification, traffic volumes, traffic speeds, parking, Right-Of-Way (ROW), pavement widths, and the number of lanes were documented through maps and street cross-sections. These roadway characteristics will help establish a baseline and will assist in developing alternatives and assessing impacts. Roadway characteristics will also help determine comfortable routes for people on bikes and what type of bicycle facilities can be designed within pavement widths and ROW. The following section summarizes the findings from the existing roadway evaluation.

Speed

Most streets in the study area are local, neighborhood streets. These streets have a posted speed limit of 25 miles per hour, as shown in **Figure 11**. Narrow streets with low speeds often result in comfortable riding conditions for bicyclists even while sharing the street with vehicular traffic. Generally, streets with speed limits of 25 miles per hour or under are considered low-speed streets that can be shared comfortably with people on bikes without dedicated bike facilities. Some traffic calming treatments have already been installed in and around the study area. These include speed bumps along Chase Avenue, Harling Lane, Cheltenham Drive, Sleaford Road. Locations of these speed bumps are also shown in **Figure 12**.

Traffic Volume and Functional Classification

Figure 13 displays both, average annual daily volumes (AADT) and functional classification for non-local streets in the study area. Wisconsin Avenue, Old Georgetown Road, and East West Highway serve as the study area's principal arterials. These streets carry most of the vehicle throughput and transport vehicles to, from, and through the study area. Woodmont Avenue serves as a major collector and provides an alternate route to Wisconsin Avenue. The rest of the streets in the study area local roads. All the study segments are local streets. Based on the traffic volumes, the number of lanes, and functional classification, Wisconsin Avenue acts as a barrier for low traffic stress east-west bicycle connectivity along Norfolk Avenue and Cheltenham Drive. The intersection of Wisconsin Avenue and Cheltenham Drive/Norfolk Avenue may need to be redesigned to create a comfortable east-west bicycle connection between the two-way separated bike lanes on Woodmont Avenue and Pearl Street Bike Route. The redesign of this intersection is not within the scope of this study.

Parking

On-street parking along streets with limited pavement widths presents challenges when designing dedicated bicycle facilities without major impacts to curbs, drainage, and utilities. On-street and off-street public parking facilities are displayed in **Figure 14**. On-street parking is provided on most of the local streets in the study area, excluding Pearl Street and Tilbury Street. In addition to on-street parking, **Figure 14** displays off-street parking garages and parking lots. Cheltenham Parking Garage is a public garage located at the intersection of Tilbury Street and Cheltenham Drive. There are additional parking garages that are part of the commercial and residential complexes, including the Chevy Chase Acura parking garage, located on the south side of Cheltenham Drive between Tilbury Street and Wisconsin Avenue.

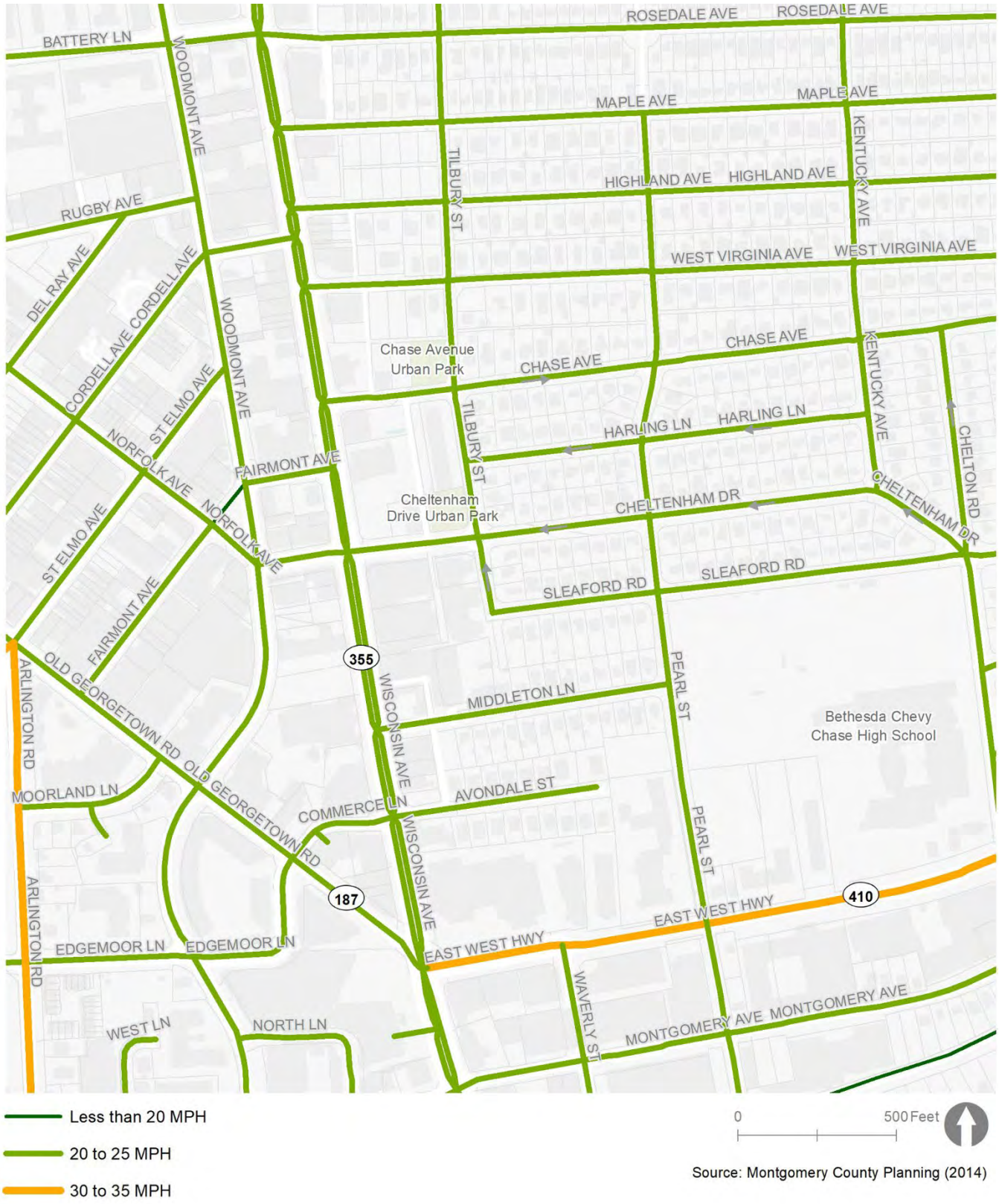


Figure 11: Posted Speeds

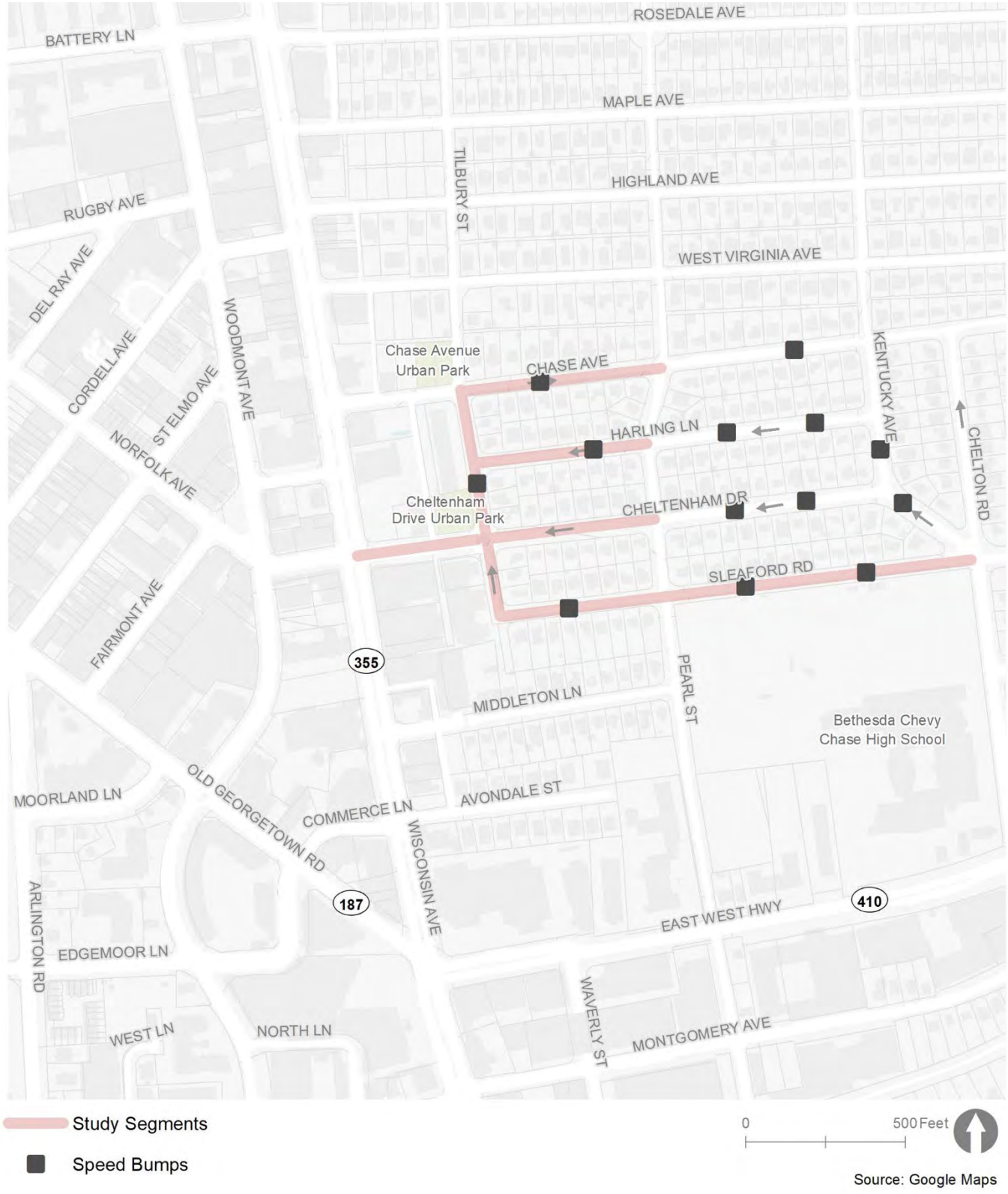


Figure 12: Traffic Calming Treatments

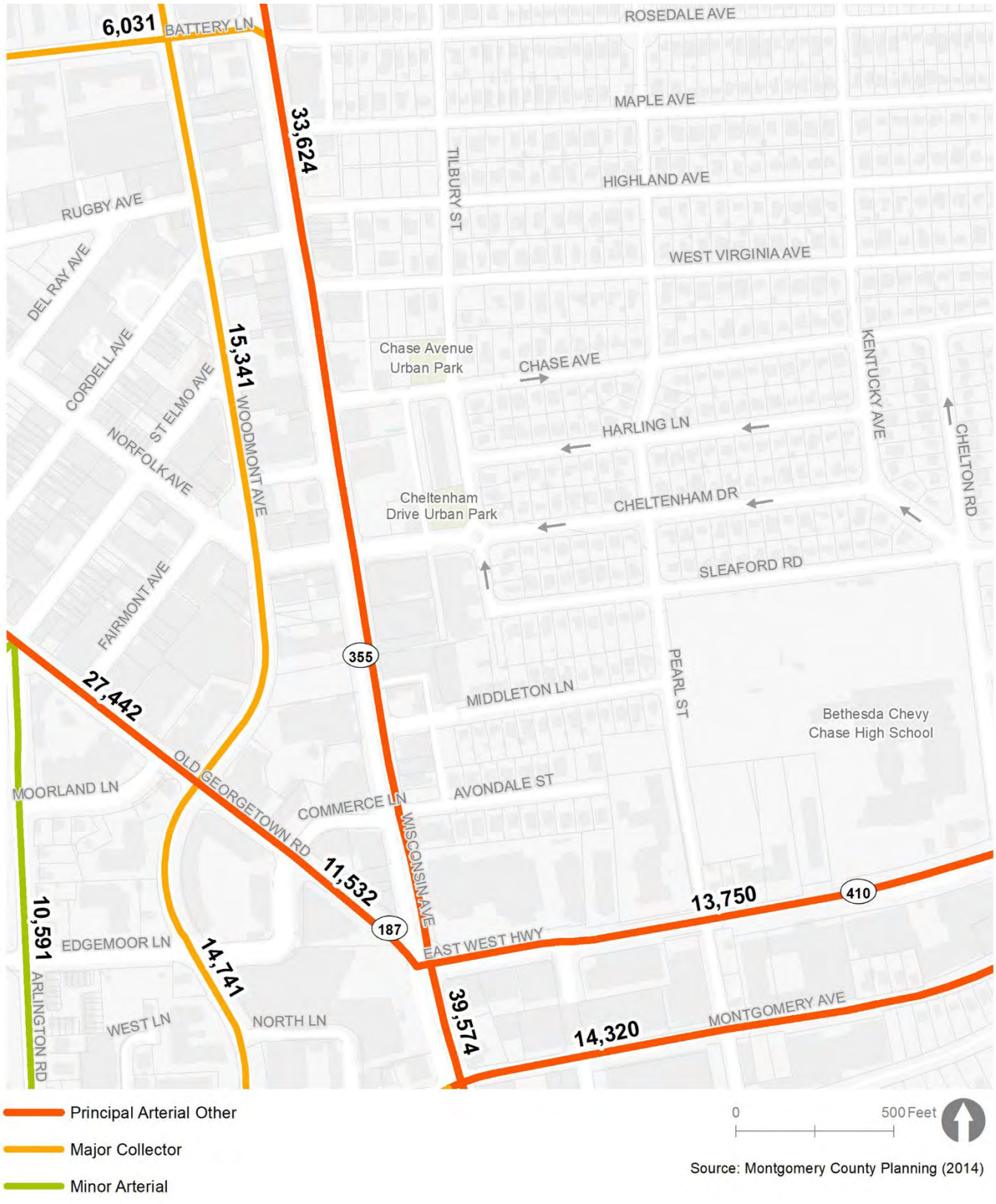


Figure 13: Functional Classification and Average Annual Daily Traffic

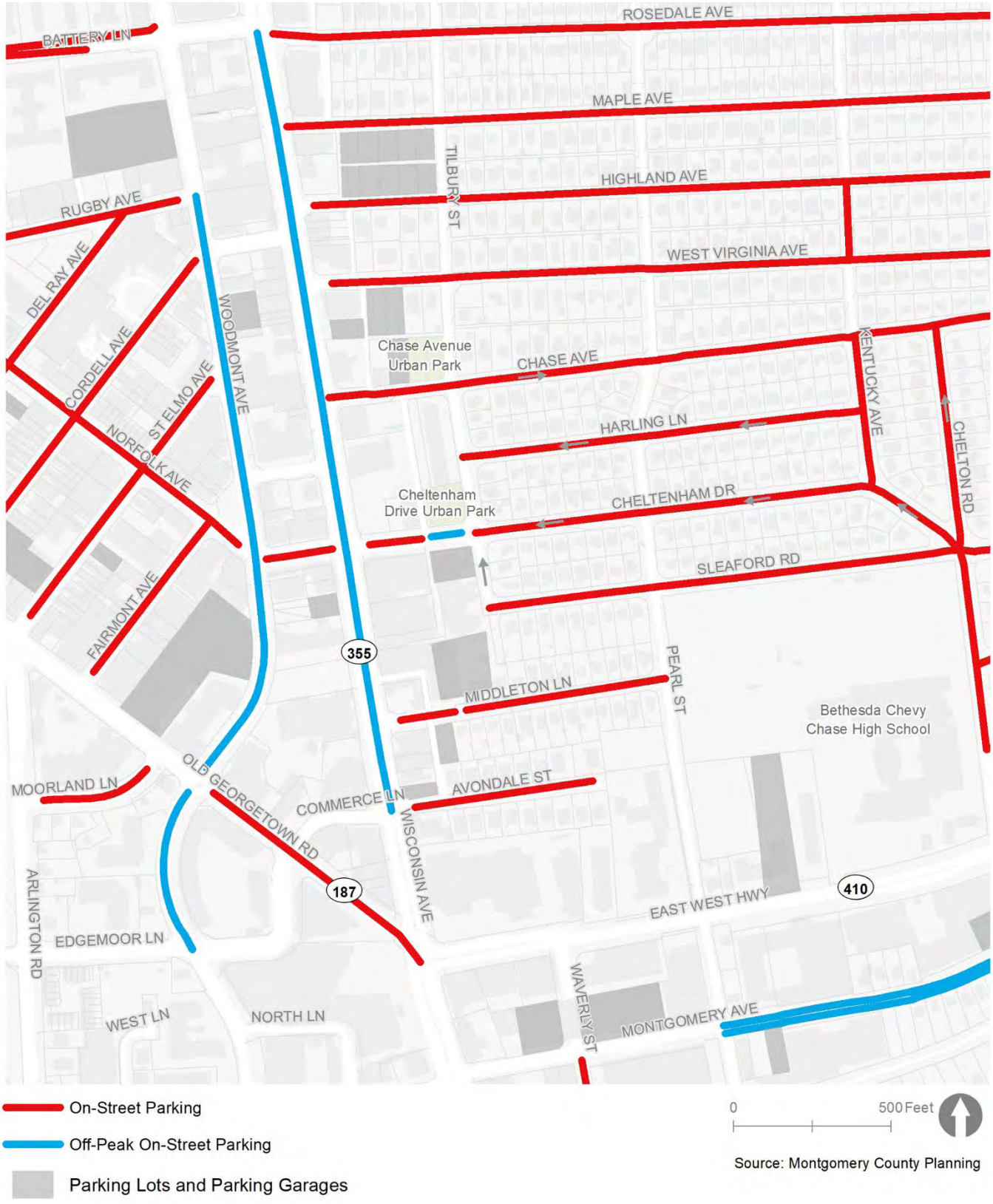


Figure 14: Existing On-Street and Off-Street Parking Locations

Existing Typical Sections

The existing conditions analysis includes a review of the existing typical sections of the study segments. The following pages present the existing typical sections for the following six study segments:

1. **Cheltenham Drive**
    a. From Wisconsin Avenue to the alley (**Figure 15**)
    b. From the alley to Tilbury Street (**Figure 16**)
    c. From Tilbury Street to Pearl Street (**Figure 17**)
2. **Chase Avenue**
    a. From Tilbury Street to Pearl Street (**Figure 18**)
3. **Harling Lane**
    a. From Tilbury Street to Pearl Street (**Figure 19**)
4. **Sleaford Road**
    a. From Tilbury Street to Pearl Street (**Figure 20**)
5. **Pearl Street**
    a. From Sleaford Road to Chase Street **(Figure 21**)
6. **Tilbury Street**
    a. From Sleaford Road to Cheltenham Drive (**Figure 22**)
    b. From Cheltenham Drive to Chase Avenue (**Figure 23**)

1. Cheltenham Drive

The Cheltenham Drive cross-section varies from Wisconsin Avenue to Pearl Street. **Figure 15** displays Cheltenham Drive from Wisconsin Avenue to the alley, just west of Tilbury Street. This cross-section includes a single lane of travel in both directions, a westbound left turn lane onto southbound Wisconsin Avenue, and on-street parking. The on-street parking along this segment is metered and allows for one-hour parking on the north side and two-hour parking on the south side of Cheltenham Drive. Wide sidewalks with landscape buffers and trees are provided on both sides of the street. This segment is a marked Bike Route.

Figure 15: Cheltenham Drive - Wisconsin Avenue to Alley (Looking East)

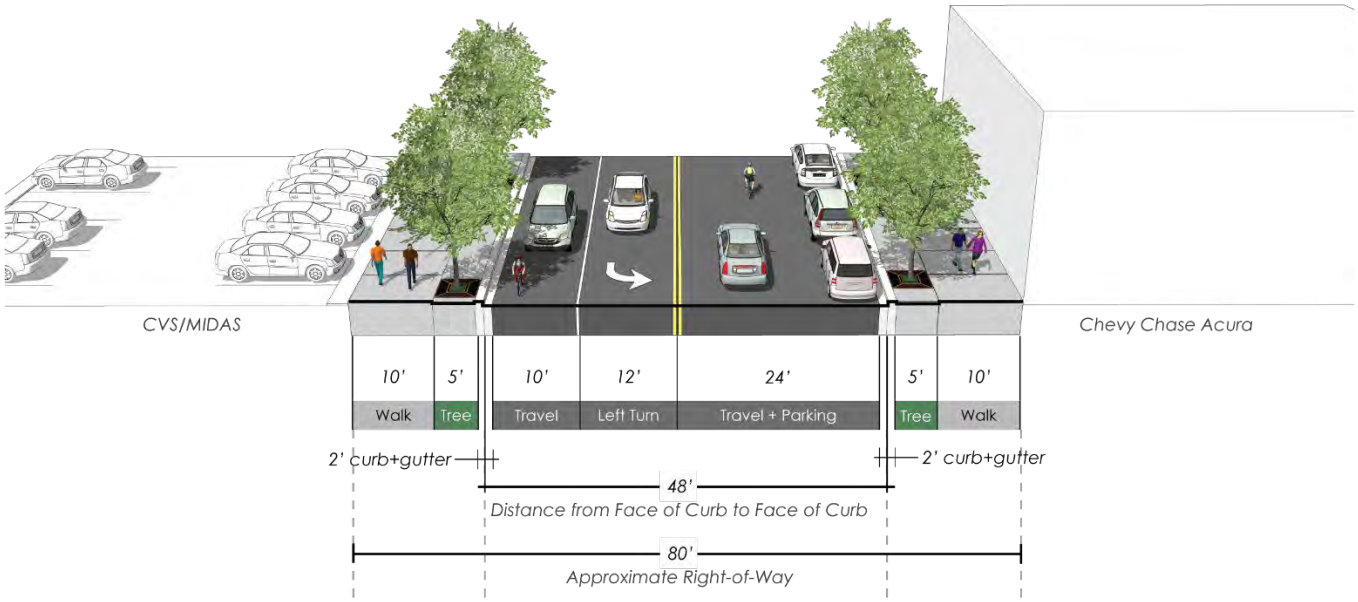


Figure 16 displays Cheltenham Drive from the alley to the neighborhood traffic circle at Tilbury Street. This segment cross-section includes on-street parking with AM/PM peak hour restrictions on the north side of the street. Sidewalks are provided on both sides of the street. This segment is a marked Bike Route.

Figure 16: Cheltenham Drive – Alley to Tilbury Street (Looking East)

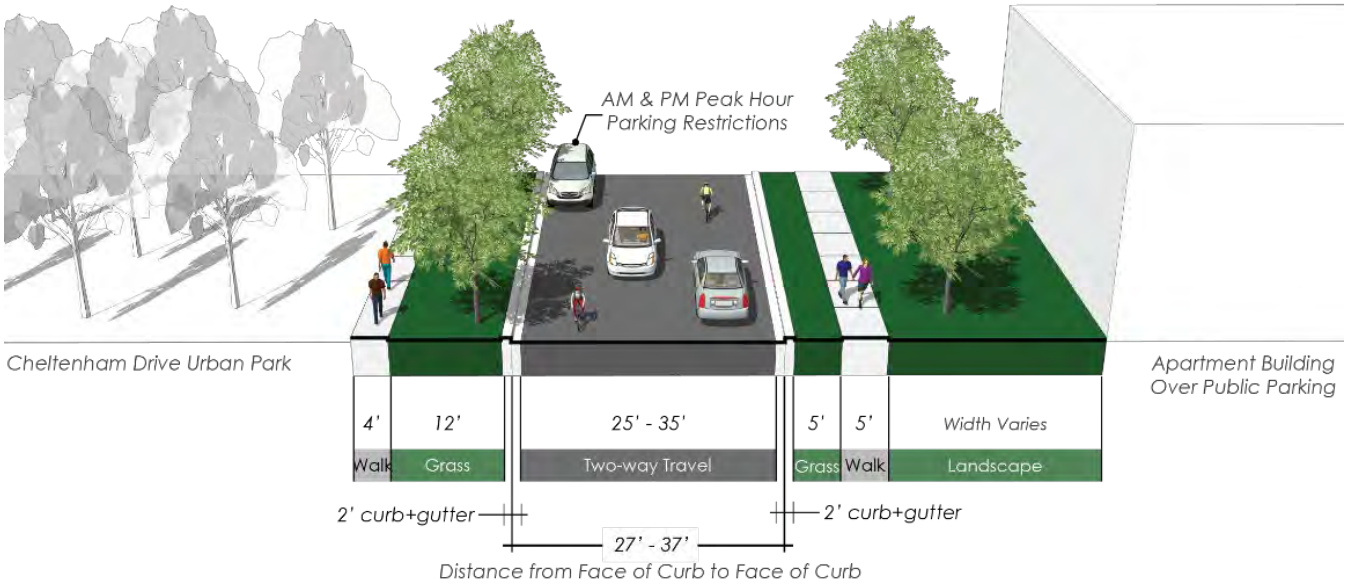
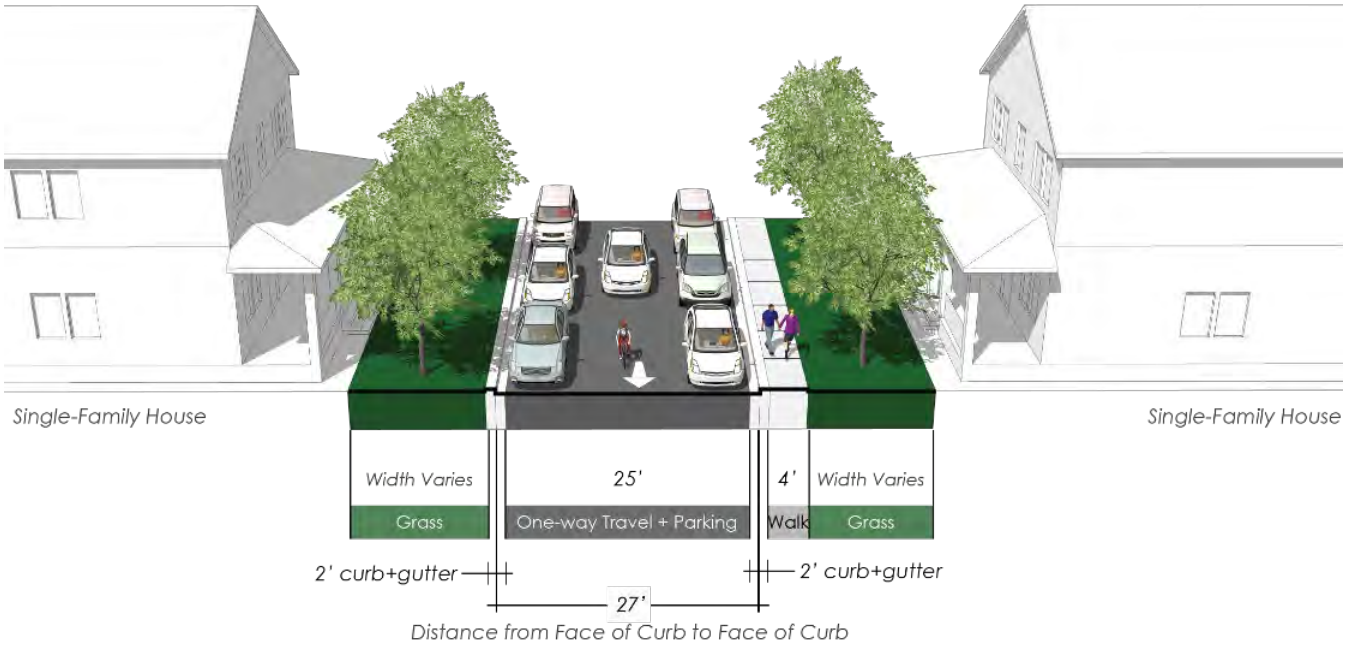


Figure 17 shows the Cheltenham Drive cross-section east of Tilbury Street to Pearl Street. Cheltenham Drive is a westbound one-way street for this segment. The cross-section along this segment of Cheltenham Drive includes a single westbound travel lane and on-street parking on both sides of the street. A sidewalk exists on the south side of the street.

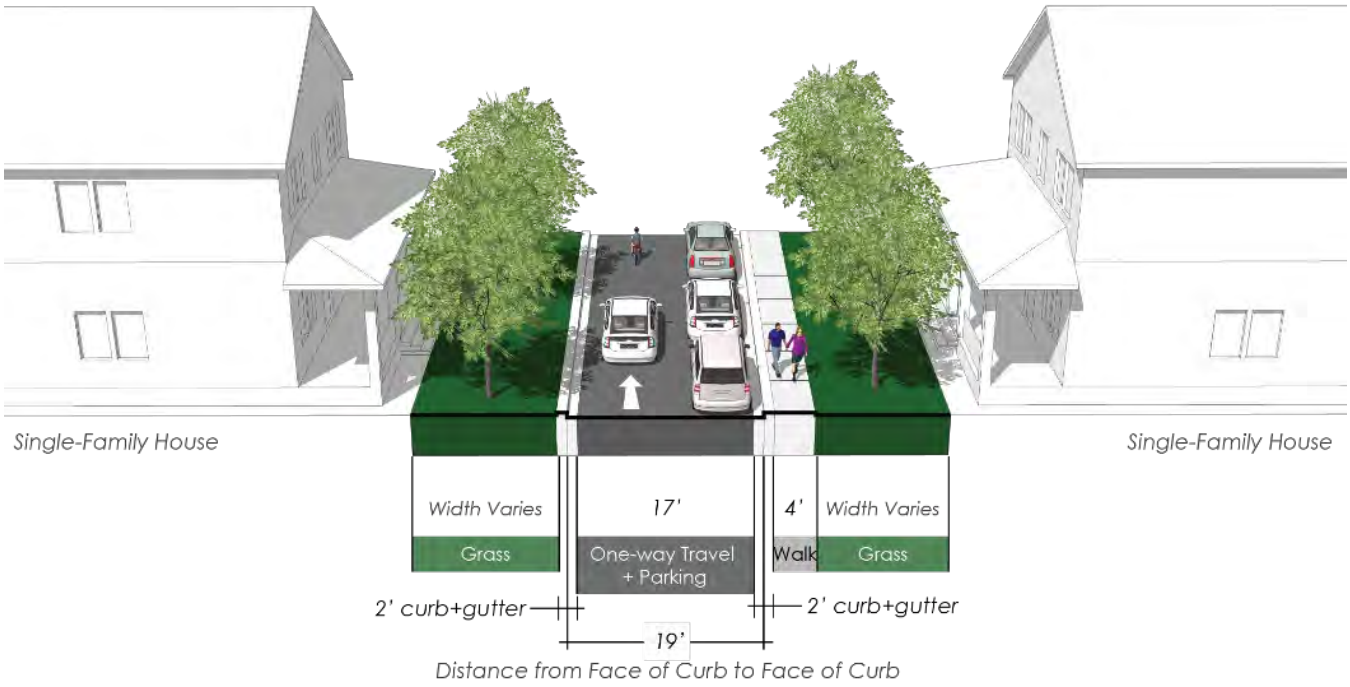
Figure 17: Cheltenham Drive – Tilbury Street to Pearl Street (Looking East)



2. Chase Avenue

Chase Avenue has a consistent cross-section from Tilbury Street to Pearl Street. **Figure 18** shows the existing cross-section, which includes a single eastbound travel lane and on-street parking on the south side of the street. A sidewalk is provided on the south side of Chase Street.

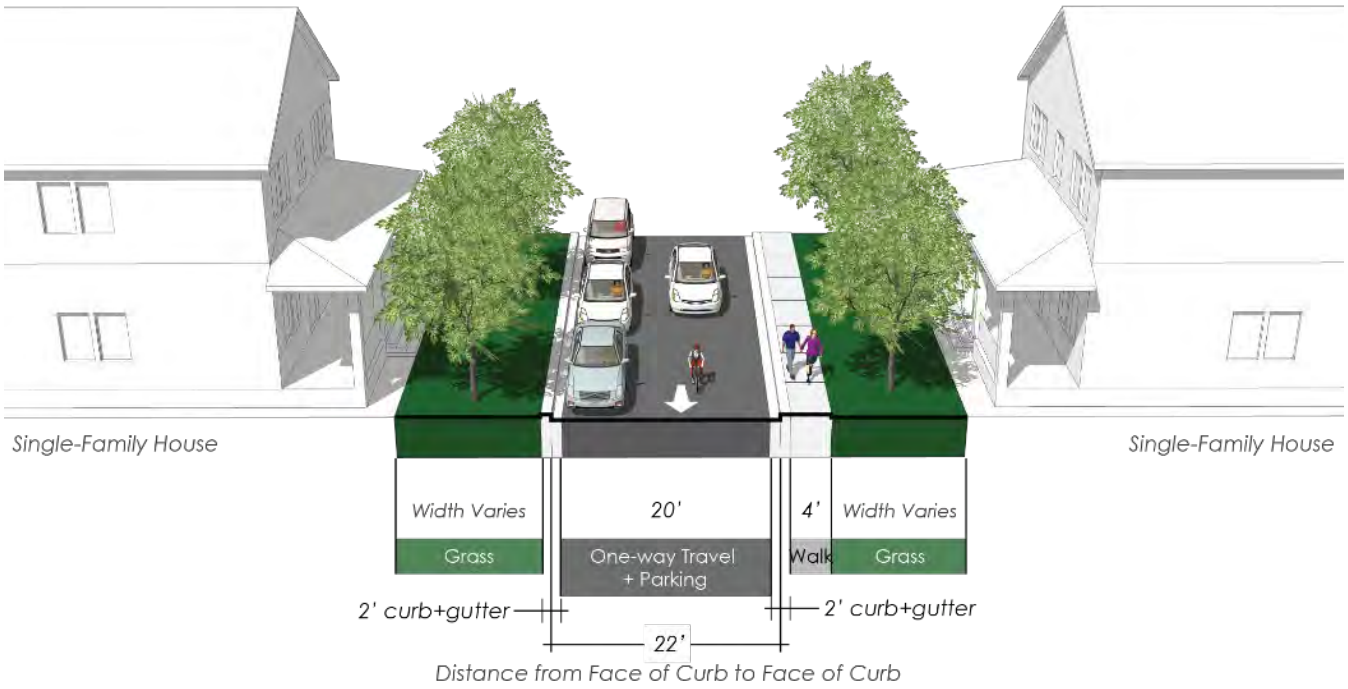
Figure 18: Chase Avenue – Tilbury Street to Pearl Street (Looking East)



3. Harling Lane

Harling Lane has a consistent cross-section from Tilbury Street to Pearl Street. **Figure 19** shows the existing cross-section, which includes a single westbound travel lane and on-street parking on the north side of the street. A sidewalk is provided on the south side of Harling Lane.

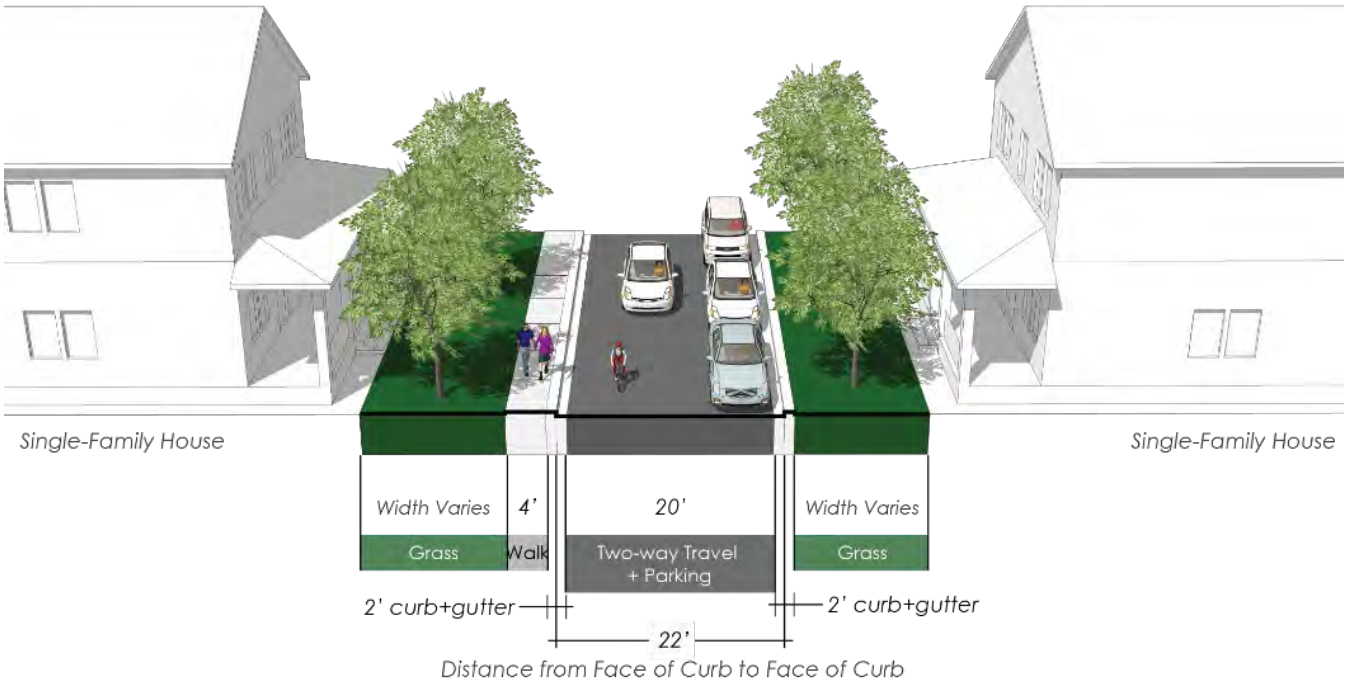
Figure 19: Harling Lane – Tilbury Street to Pearl Street (Looking East)



4. Sleaford Road

Figure 20 shows the existing cross-section for Sleaford Road from Tilbury Street to Pearl Street. Sleaford Road is a two-way narrow yield street and includes a parking lane on the south side. A sidewalk exists on the north side of the street. This segment is also a marked Bike Route.

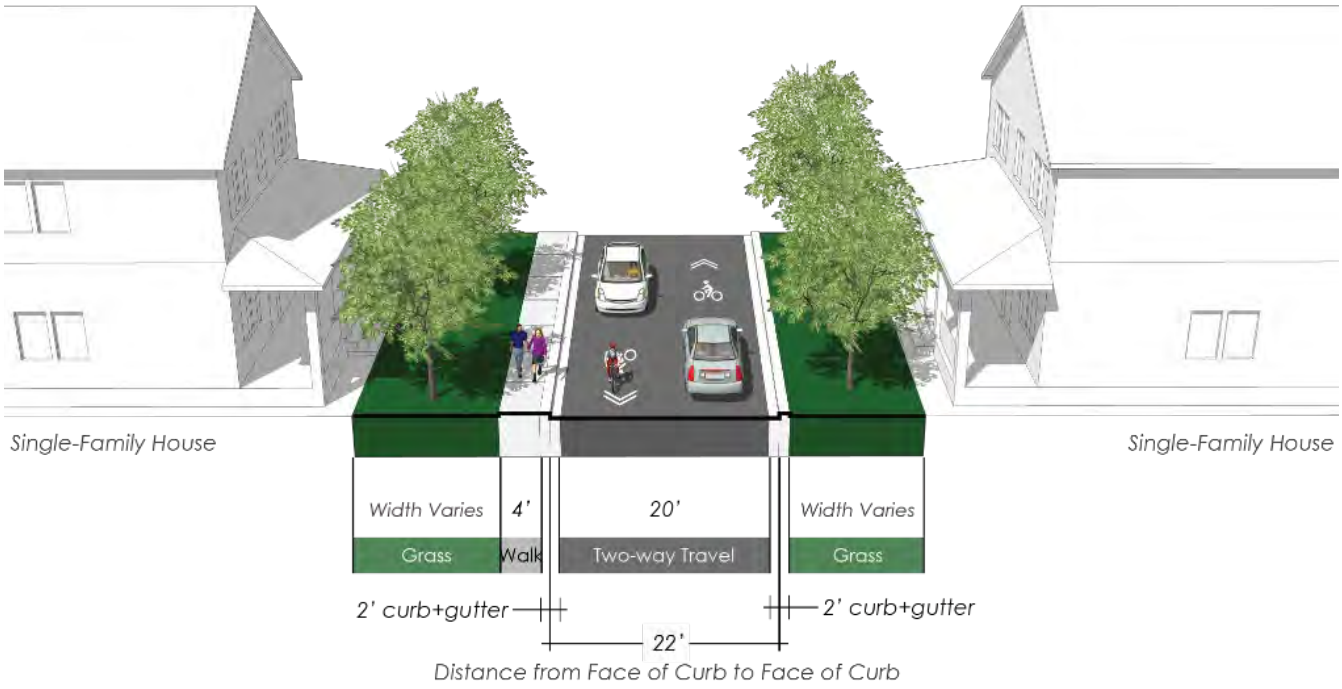
Figure 20: Sleaford Road – Tilbury Street to Pearl Street (Looking East)



5. Pearl Street

Pearl Street's cross-section from Sleaford Road to Chase Street is shown in **Figure 21**. Pearl Street is a marked Bike route with Sharrow marking. Parking is restricted on both sides. Pearl Street is a two-way street and includes a sidewalk on the west side of the street.

Figure 21: Pearl Street –Sleaford Road to Chase Street (Looking North)



6. Tilbury Street

The typical cross-section for Tilbury Street changes at the traffic circle on Cheltenham Drive. **Figure 22** shows the existing cross-section for Tilbury Street from Sleaford Road to Cheltenham Drive. The cross-section along this segment includes a single northbound travel lane. A sidewalk, buffered by a tree-lined landscape buffer, exists on the west side of the street. No on-street parking is allowed along this segment of Tilbury Street. This segment is also a marked Bike Route. However, bike wayfinding signs invite bicyclists to use the sidewalk for contra-flow southbound travel.

Figure 22: Tilbury Street – Sleaford Road to Cheltenham Drive (Looking North)

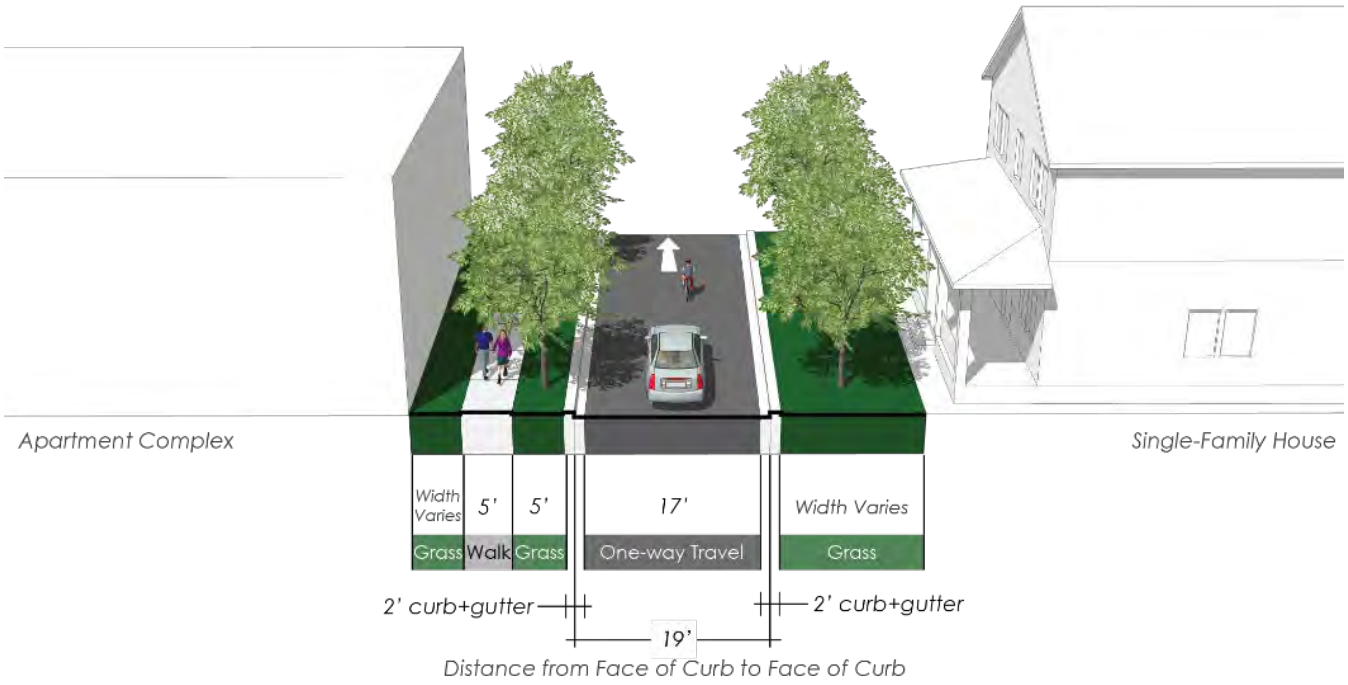


Figure 23 shows the existing cross-section of Tilbury Street from Cheltenham Drive to Chase Avenue. Tilbury Street is a two-way street, north of Cheltenham Drive, and includes a sidewalk on the east side of the street. No on-street parking is allowed, however, there is residential perpendicular, off-street parking on the west side of the street.

Figure 23: Tilbury Street – Cheltenham Drive to Chase Avenue (Looking North)

4. ISSUES AND OPPORTUNITIES

The existing conditions analysis was synthesized to identify the following issues and opportunities. **Figure 24** illustrates these issues and opportunities. This synthesis guided the development and evaluation of various alternatives.

Issues & Opportunities:

- Cheltenham Drive has two distinct land use context zones that can be divided into two sub-segments:
  - Wisconsin Avenue to Tilbury Street: Wider segment commercial/retail mixed-use land uses.
  - Tilbury Street to Pearl Street: Narrower segment with detached single-family residential land use.
- Traffic circle at Cheltenham Drive and Tilbury Street marks the change in the land use and transportation context.
- Cheltenham Drive segment from Wisconsin Avenue to Tilbury Street is a two-way street.
- Cheltenham Drive, Harling Street, and Sleaford Road segments east of Tilbury Street are all west-bound one-way streets.
- Tilbury Street, south of Cheltenham Drive, is a north-bound one-way street.
- Chase Avenue is an east-bound one-way street. It is the only east-bound street within the study area, east of Tilbury Street.
- There are many destinations for bicycle trips that need to be connected in and near the study area:
  - Cheltenham Drive Urban Park
  - Bethesda Chevy Chase High School
  - Georgetown Branch Trail
  - Chase Avenue Urban Park
- Multiple off-street parking lots and garages exist along Cheltenham Drive between Wisconsin Avenue and Tilbury Street.
- Bicycle facility and the street cross-section for Cheltenham Drive will likely need to continue along Norfolk Avenue, west of Wisconsin Avenue, to connect to Woodmont avenue. A two-way separated bicycle facility is currently under construction on the west side of Woodmont Avenue.
- Signalized intersection of Wisconsin Avenue and Cheltenham Drive is a major intersection that may need to be redesigned to accommodate safe and comfortable bike crossings.

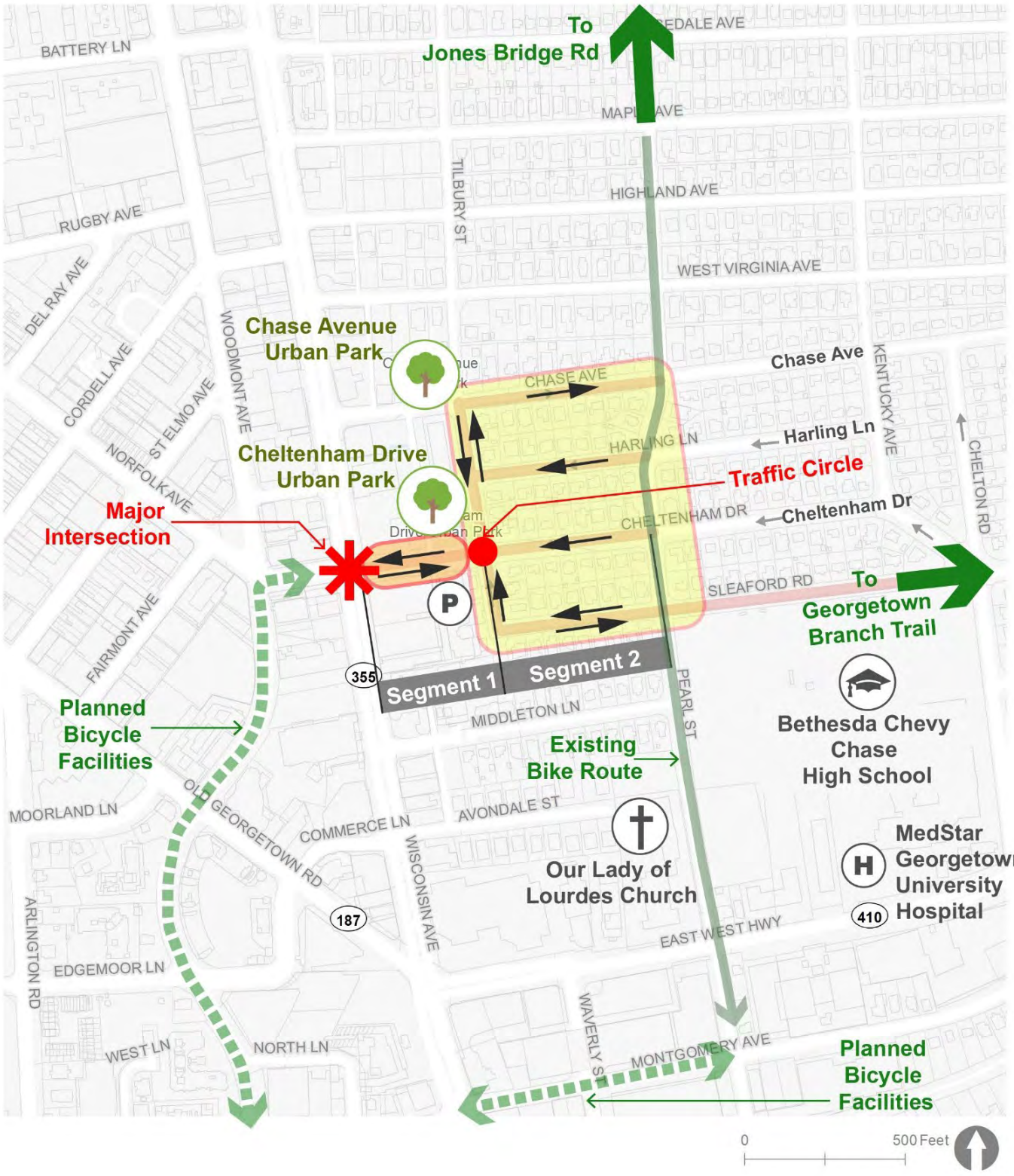
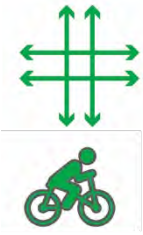


Figure 24: Issues & Opportunities

5. ALTERNATIVES ANALYSIS

Building on the existing conditions analysis and identification of issues and opportunities, the project team developed several network route alternatives and bikeway facility type options for the study segments. The goal of this task was to identify and evaluate several possibilities to connect bicycle facilities from Wisconsin Avenue to Pearl Street. The following two major types of alternatives and options were developed:



- **Network Route Alternatives** to connect Wisconsin Avenue to Pearl Street

- **Bikeway Facility Type Options** for Cheltenham Drive between Wisconsin Avenue and Tilbury Street.

To clearly distinguish, this report refers to network routes as alternatives and bikeway facility types for Cheltenham Drive as options. Three network route alternatives were developed to connect Wisconsin Avenue to Pearl Street. Cheltenham Drive between Wisconsin Avenue and Tilbury Street is a common segment for all the three network route alternatives; since Cheltenham Drive and Wisconsin Avenue is a signalized intersection providing potential for a safe and comfortable bicycle crossing across Wisconsin Avenue to connect with Woodmont Avenue two-way separated bike lanes that are currently under design and construction. Five bikeway facility type options, ranging from a striped conventional bike lane to raised sidewalk-level separated bike lanes, were developed for the segment of Cheltenham Drive between Wisconsin Avenue and Tilbury Street. The project team reviewed several plans and studies to guide the development of network route alternatives and bikeway facility type options, including:

- Bethesda Downtown Plan Design Guidelines (2017)
- Bethesda Downtown Plan Streetscape Standards (2020)
- Montgomery County Complete Streets (2021 Draft)

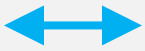
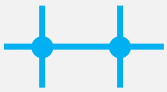
Network Route Alternatives

The project team identified three network route alternatives. These alternatives are different alignments using various study segments. To evaluate these alternatives, the project team developed a list of high-level evaluation criteria or measures and provided ordinal rankings for each alternative. Although the project team realizes that not all of the evaluation measures are of equal importance, to avoid attributing any value judgment, these evaluation measures were not weighted or scaled on their relative importance. The result of this evaluation is not meant to be any form of ranking of alternatives, but this analysis was meant to graphically show the order of magnitude pros and cons for each alternative.

Additionally, the ordinal rankings should not be understood as indicating substantive differences between the results. Moreover, it should be noted that the criteria are not necessarily distinct. For example, evaluation measures such as route length and distance overlap considerably and maybe considered effectively the same. The project team chose to list them separately since they provide additional context to present and evaluate the alternatives as part of the stakeholder and public engagement.

Table 2 shows evaluation measures used to evaluate the three Network Route Alternatives.

Table 2: Network Route Alternatives - Evaluation Measures

Icon	Evaluation Measure	Description
	**Bicycle Route Directness**	Qualitative measure of how direct an alternative is compared to other alternatives to travel between Cheltenham Drive and Wisconsin Avenue intersection and Pearl Street.
	**Number of Intersections**	Calculates total number of intersections along an alternative.
	**Contraflow Travel**	Documents if an alternative includes contraflow travel for bicyclists.
	**Route Length (Feet)**	Calculates total length in feet to travel from Cheltenham Drive and Wisconsin Avenue intersection to Pearl Street.
	**Network Alignment Parking Impacts**	Documents if and how many on-street parking spaces are impacted by an alternative.

The following three network route alternatives were identified and are mapped in **Figure 25**, **Figure 28,** and **Figure 30** :

Network Route Alternative A: Cheltenham Drive + Tilbury Street + Sleaford Road

Alternative A connects Woodmont Avenue to Pearl Street by recommending a contraflow bike lane along the one-way segment of Tilbury Street from Norfolk Avenue to Sleaford Road, as shown in **Figure 25**. The contraflow bike lane would be provided for southbound bicyclists. Northbound bicyclists would be permitted to share the northbound one-way travel lane with vehicles. Shared lane markings and signage would be provided for northbound bicyclists. In this alternative, people biking from Woodmont Avenue east to Pearl Street would ride along the following facilities:

- Separated bike lanes on Norfolk Avenue and Cheltenham Drive from Woodmont Avenue to Tilbury Street. (Common segment for all Network Route Alternatives. Additional details are provided in the Bikeway Type Options section of this chapter).
- Southbound contraflow bike lane and northbound shared travel lane on Tilbury Street from Cheltenham Drive to Sleaford Road.
- Neighborhood greenway with shared bi-directional travel lanes on Sleaford Road from Tilbury Street to Pearl Street.

This Network Route Alternative is the existing assigned bike route. However, currently there are no dedicated southbound bicycle facilities on Tilbury Street. **Figure 26** shows the existing and proposed typical section for Tilbury Street as part of Network Route Alternative A. **Figure 27** shows the existing and proposed typical section for Sleaford Road as part of Network Route Alternative A. **Table 3** shows the assessment of Network Alternative A based on evaluation measures.

Table 3: Network Route Alternative A - Evaluation

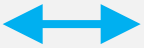
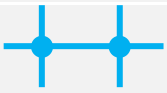
Icon	Evaluation Measure	Assessment
	**Bicycle Route Directness**	**Medium**
	**Number of Intersections**	**2**
	**Contraflow Travel**	**Yes (250 Feet)**
	**Route Length (Feet)**	**1,200 Feet**
	**Network Alignment Parking Impacts**	**No**

Figure 25: Network Route Alternative A

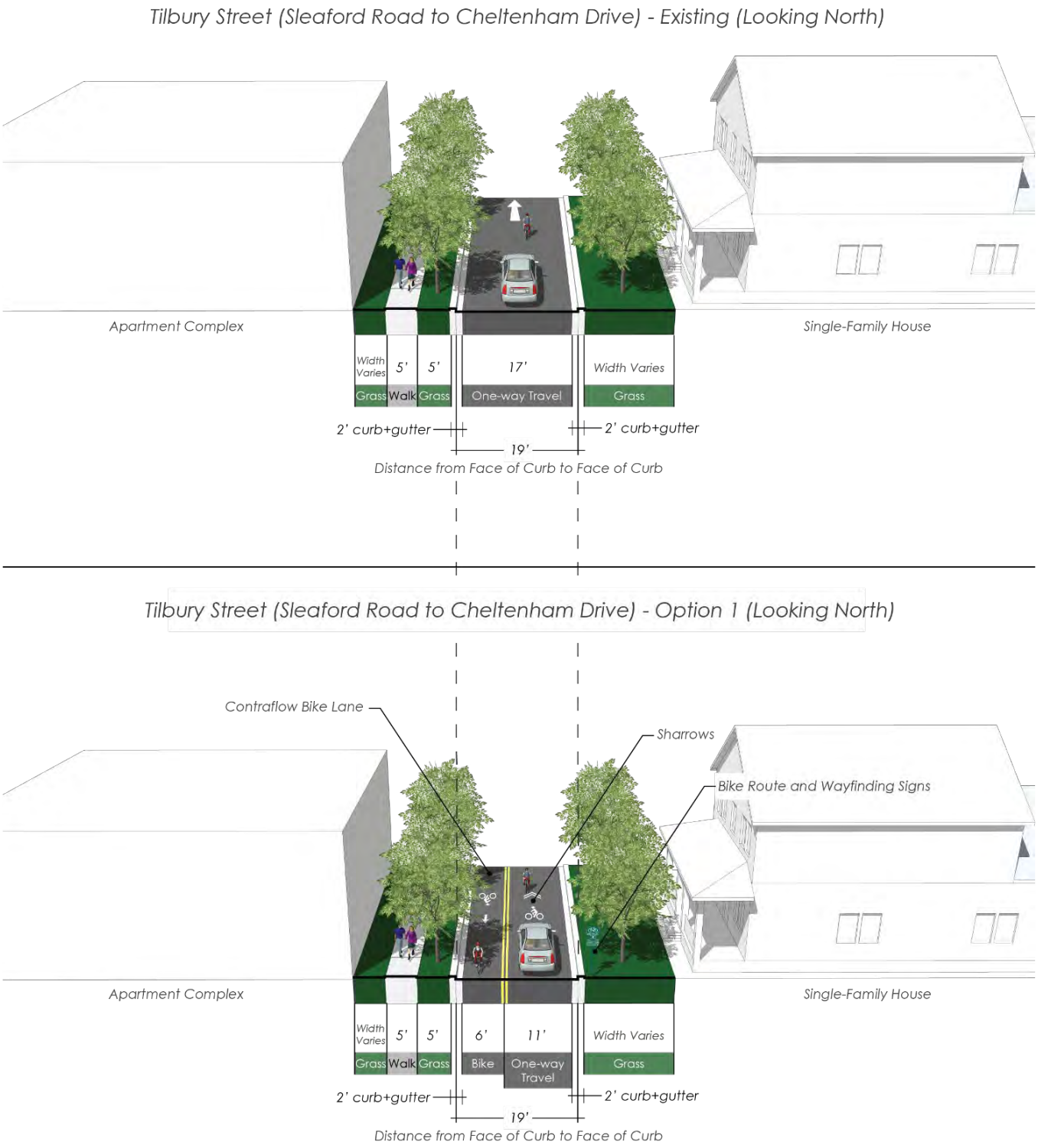


Figure 26: Alternative A – Tilbury Street Typical Section

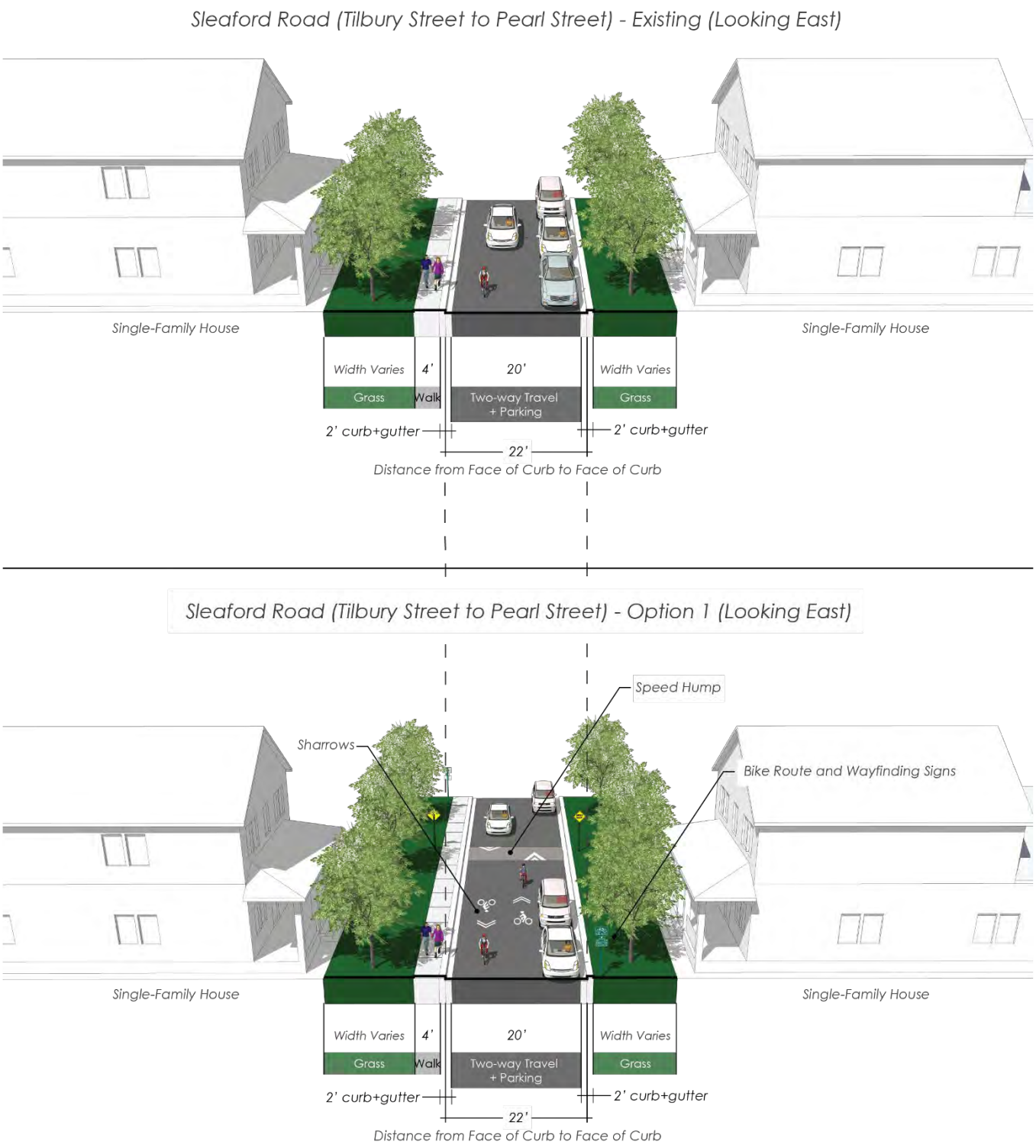


Figure 27: Alternative A - Sleaford Road Typical Section

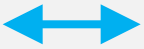
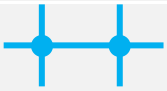
Alternative B: Cheltenham Drive

Alternative B connects Woodmont Avenue to Pearl Street by proposing a contraflow bike lane along a segment of Cheltenham Drive from Tilbury Street to Pearl Street, as shown in **Figure 28**. The contraflow bike lane would be provided for eastbound bicyclists. Westbound bicyclists would be permitted to share the westbound one-way travel lane with vehicles. Shared lane markings and signage would be provided for northbound bicyclists. In this alternative, people biking from Woodmont Avenue east to Pearl Street would ride along the following facilities:

- Separated bike lanes on Norfolk Avenue and Cheltenham Drive from Woodmont Avenue to Tilbury Street. (Common segment for all Network Route Alternatives. Additional details are provided in the Bikeway Type Options section of this chapter).
- Eastbound contraflow bike lane and westbound shared travel lane on Cheltenham Drive from Tilbury Street to Pearl Street.

The eastbound contraflow bike lane in this alternative, impacts 20 on-street parking spaces on the southside of the residential block of Cheltenham Drive between Tilbury Street and Pearl Street. Many houses on this block do not have driveways or any off-street parking and rely on the on-street parking spaces. Therefore, the on-street parking impacts are extremely significant for this alternative. **Figure 29** shows the existing and proposed typical section for Tilbury Street as part of Network Route Alternative B. **Table 4** shows the assessment of Network Alternative B based on evaluation measures.

Table 4: Network Route Alternative B - Evaluation

Icon	Evaluation Measure	Assessment
	**Bicycle Route Directness**	**High**
	**Number of Intersections**	**1**
	**Contraflow Travel**	**Yes (500 Feet)**
	**Route Length (Feet)**	**960 Feet**
	**Network Alignment Parking Impacts**	**Yes (20 Spaces)**

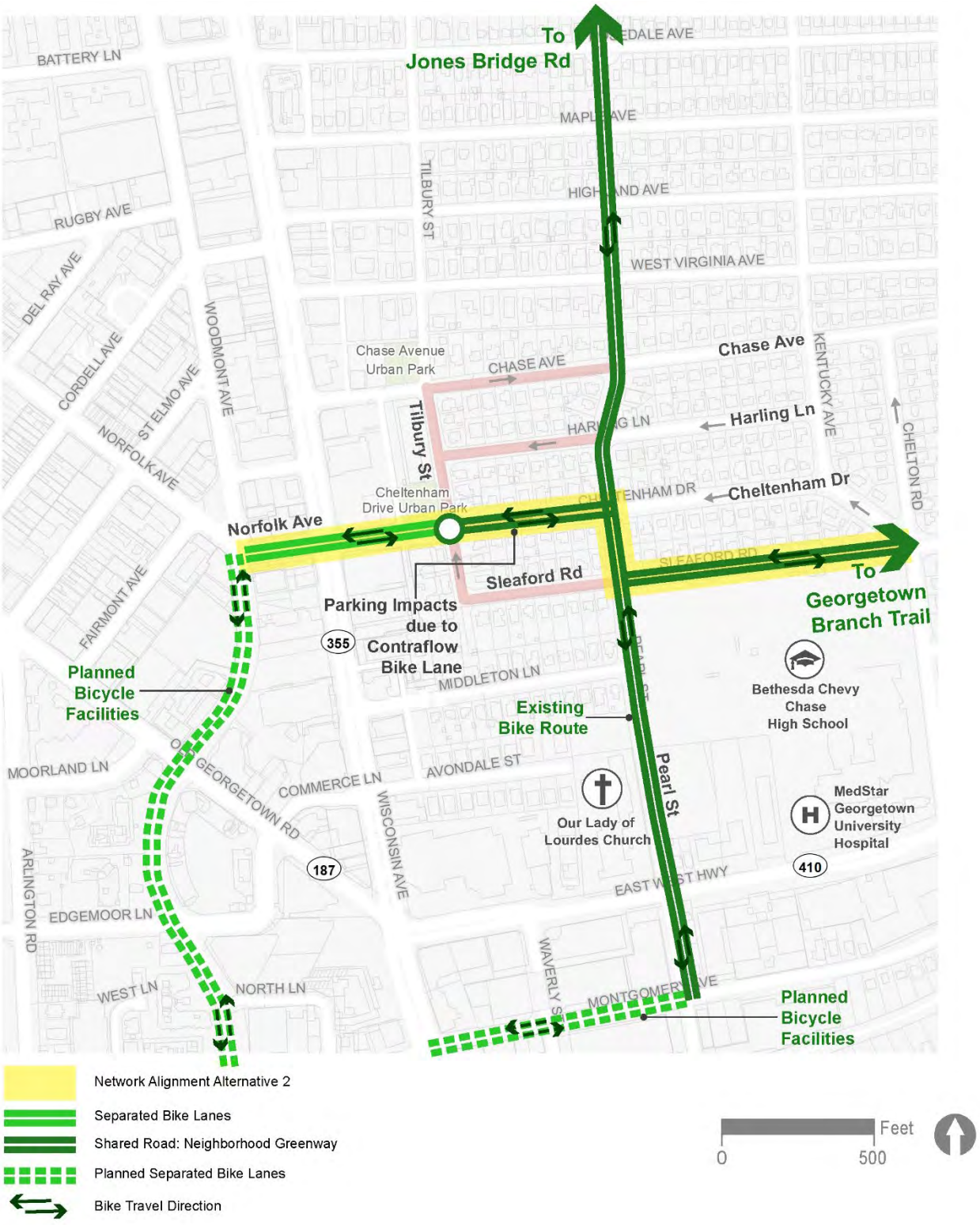


Figure 28: Network Route Alternative B

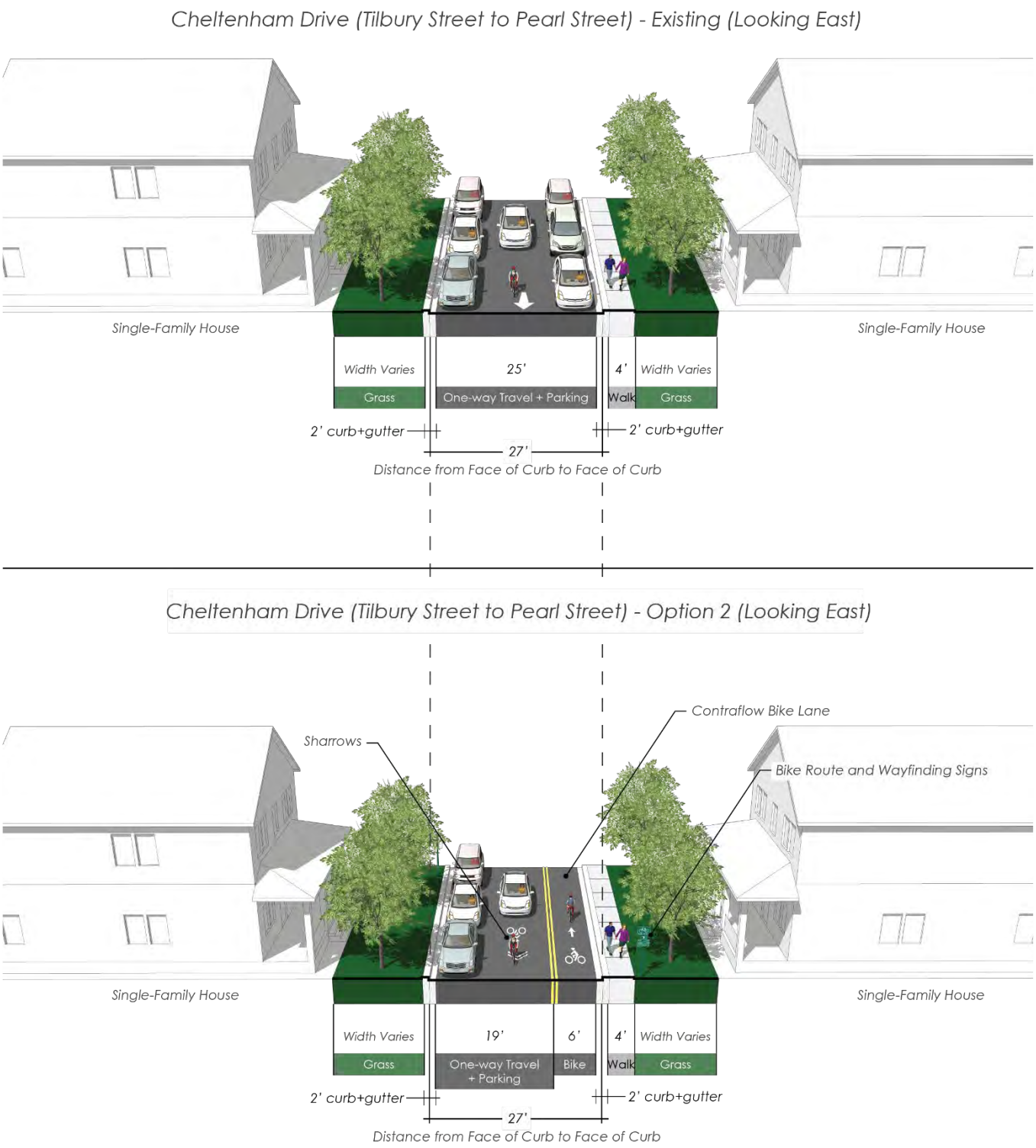


Figure 29: Alternative B – Cheltenham Drive Typical Section

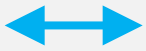
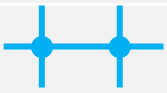
Alternative C: Cheltenham Drive + Tilbury Street + Chase Avenue + Sleaford Road

Alternative C connects Woodmont Avenue to Pearl Street by proposing a network of one-way neighborhood greenway streets, including Tilbury Street, Chase Avenue, and Sleaford Street, as shown in **Figure 30**. Unlike the previous two alternatives that propose contraflow bike lanes, this alternative proposes a network of one-way streets with lanes shared by people biking and driving. In this alternative, people biking from Woodmont Avenue east to Pearl Street would ride along the following facilities:

- Separated bike lanes on Norfolk Avenue and Cheltenham Drive from Woodmont Avenue to Tilbury Street. (Common segment for all Network Route Alternatives. Additional details are provided in the Bikeway Type Options section of this chapter).
- Northbound neighborhood greenway (shared travel lanes) on Tilbury Street from Sleaford Road to Chase Avenue.
- Eastbound neighborhood greenway (shared travel lanes) on Chase Avenue from Tilbury Street to Pearl Street.
- Westbound neighborhood greenway (shared travel lanes) on Sleaford Road from Tilbury Street to Pearl Street.

This alternative would not incur any parking loss. However, the route is slightly longer and less direct than the previous alternatives. **Figure 31** shows the existing and proposed typical section for Tilbury Street as part of Network Route Alternative B. **Figure 32** shows the existing and proposed typical section for Sleaford Road as part of Network Route Alternative B. **Figure 33** shows the existing and proposed typical section for Chase Avenue as part of Network Route Alternative B. **Table 5** shows the assessment of Network Alternative C based on evaluation measures.

Table 5: Network Route Alternative C - Evaluation

Icon	Evaluation Measure	Assessment
	**Bicycle Route Directness**	**Low**
	**Number of Intersections**	**4**
	**Contraflow Travel**	**No**
	**Route Length (Feet)**	**1,500 Feet**
	**Network Alignment Parking Impacts**	**No**

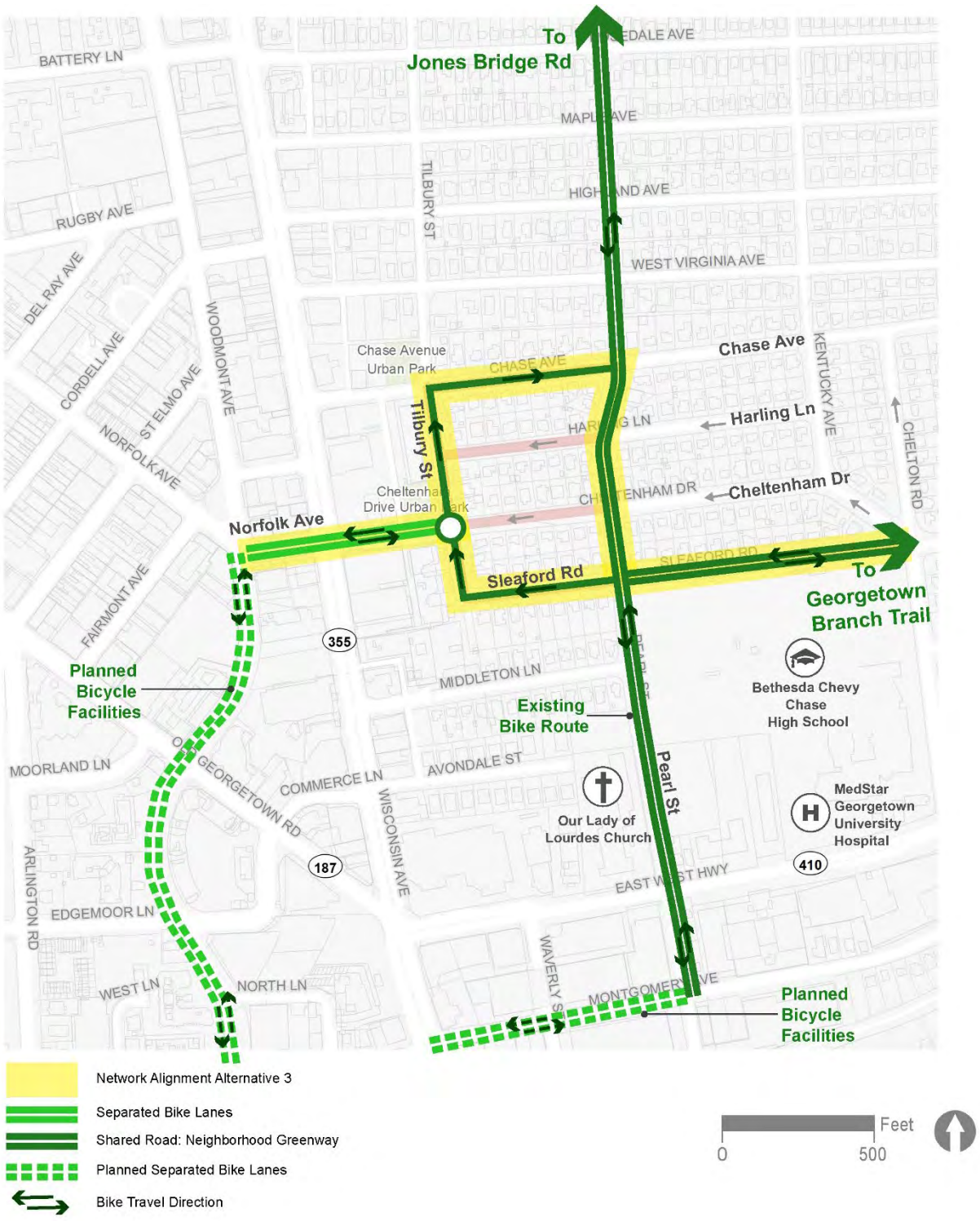


Figure 30: Network Route Alternative C

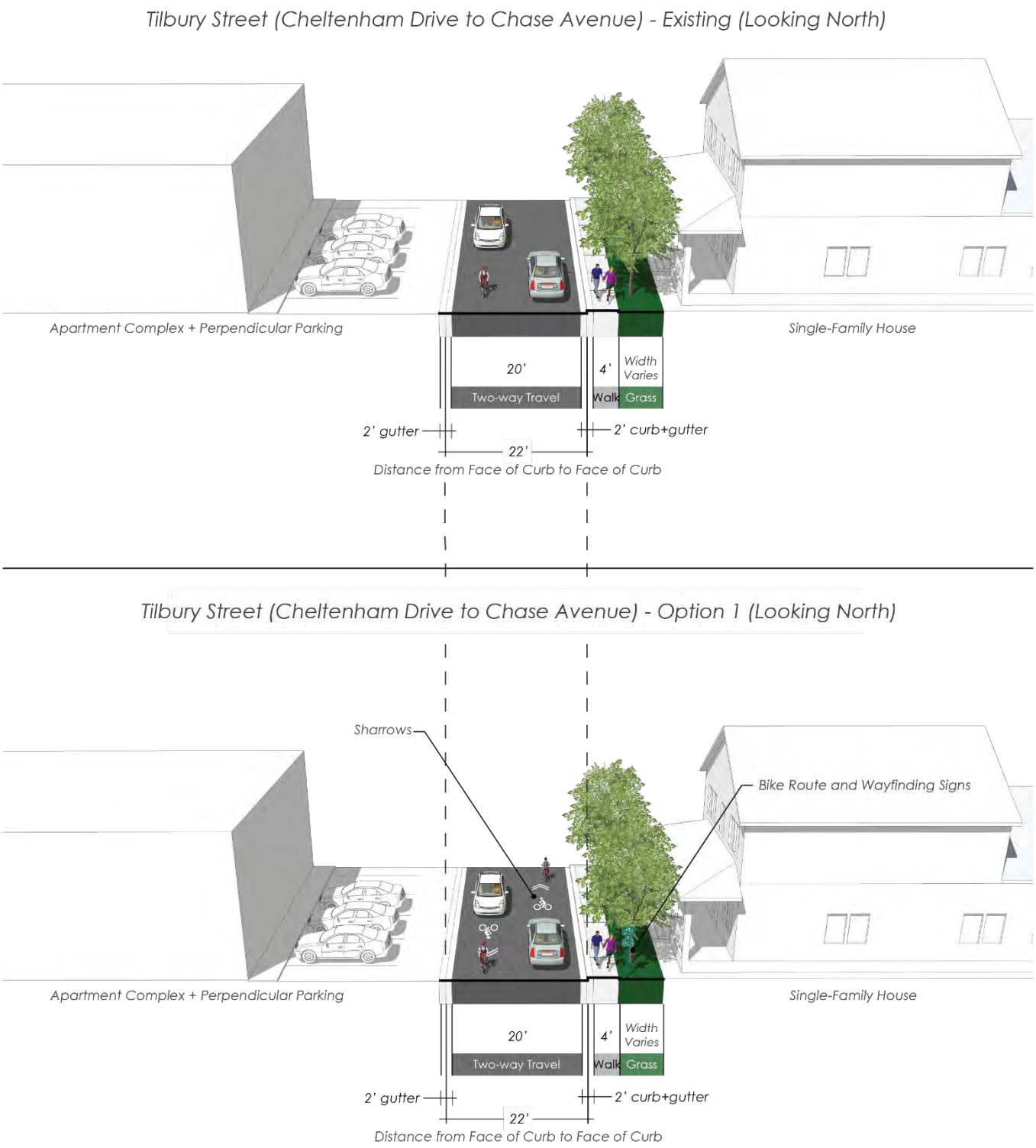


Figure 31: Alternative B – Tilbury Street Typical Section

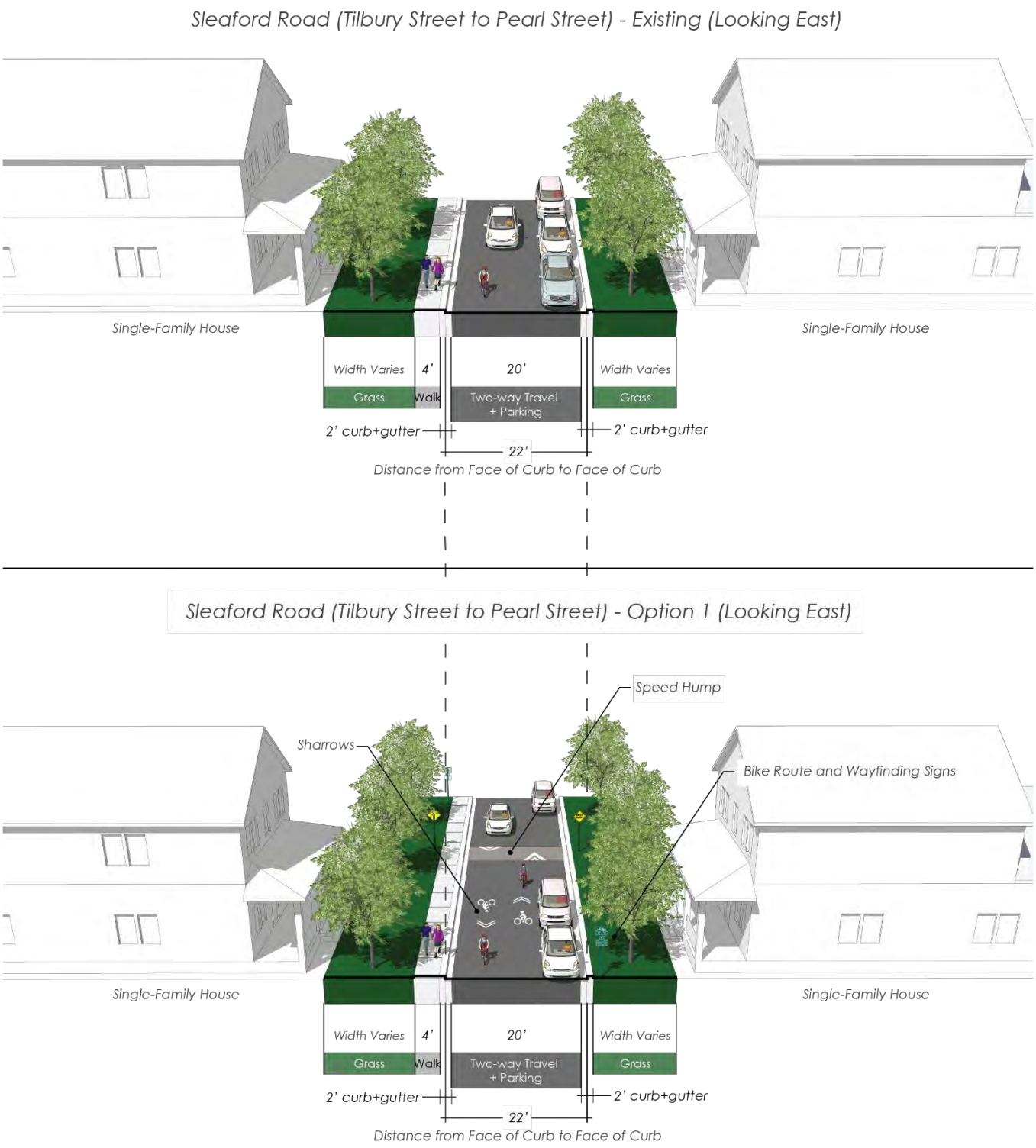


Figure 32: Alternative B – Sleaford Road Typical Section

Figure 33: Alternative B – Chase Avenue Typical Section

Bikeway Facility Types for Neighborhood Streets

Apart from route alignments, these alternatives also identify specific bikeway facility types associated with each of the study segments that form the respective route alternatives. The existing street network, west of Tilbury Street, consists of relatively narrow, mostly one-way streets with on-street parking. Given this context and the recommendations made in the 2018 county-wide Bicycle Master Plan, only two bikeway facility types have been identified for different street segments, west of Tilbury Street. These bikeway facility types include 'neighborhood greenway' and 'contraflow bike lanes'. Additional information about these two bikeway facility types has been provided below.

Neighborhood Greenways (Shared Lanes)

Neighborhood greenways are streets with low motorized vehicle traffic volumes and speeds, designed and designated to give walking and bicycling priority. These streets use signs such as 'Bikes May Use Full Lane', pavement markings such as 'Sharrows' and traffic calming measures to discourage high speed vehicle traffic. People on bikes share travel lanes and ride with vehicular traffic in the same direction. Neighborhood greenways are sometimes also referred to as Bicycle Boulevards, Slow Streets, or Shared Roads. Example images of neighborhood greenways are shown below.

Example of a neighborhood greenway/Bicycle Boulevard in Madison, WI

Source: NACTO

Example of a neighborhood greenway/Bicycle Boulevard in Portland, OR

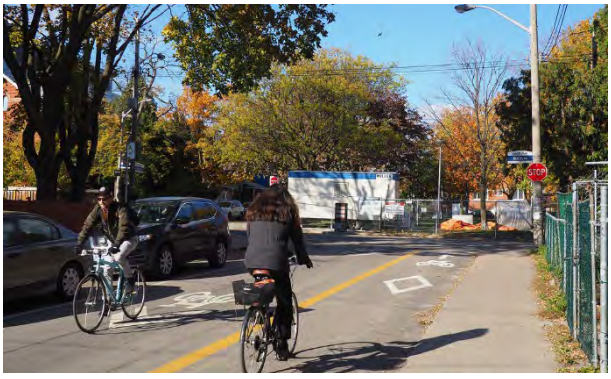
Source: Bermstyle.com

Contraflow Bike Lanes

Two of the three alternatives include contraflow bike lanes to help people biking navigate the network of one-way streets in the study area. Contraflow bike lanes allow people biking to safely ride in the opposite direction of vehicles on a one-way street. Contraflow bike lanes provide a striped bike lane that provides designated space for people biking to travel in the opposite direction that is separate from vehicles. People biking in the same direction as vehicles on a one-way street are encouraged to share the travel lane with vehicles. Example images of contraflow Bike Lanes are shown below.

Example of a contraflow bike lane in Portland, OR

Source: NACTO



Example of a contraflow bike lane in Toronto, ON, Canada

Source: Adam Sweanor

Summary of Network Route Alternatives Evaluation

Figure 34 illustrates all three Network Route Alternatives. **Table 6** shows the overall assessment of all three Network Route Alternatives based on evaluation measures.

Table 6: Network Route Alternative C - Evaluation

Icon	Evaluation Measure	Network Route Alternative A	Network Route Alternative B	Network Route Alternative C
	Bicycle Route Directness	Medium	High	Low
	Number of Intersections	2	1	4
	Contraflow Travel	Yes (250 Feet)	Yes (500 Feet)	No
	Route Length (Feet)	1,200 Feet	960 Feet	1,500 Feet
	Network Alignment Parking Impacts	No	Yes (20 Spaces)	No

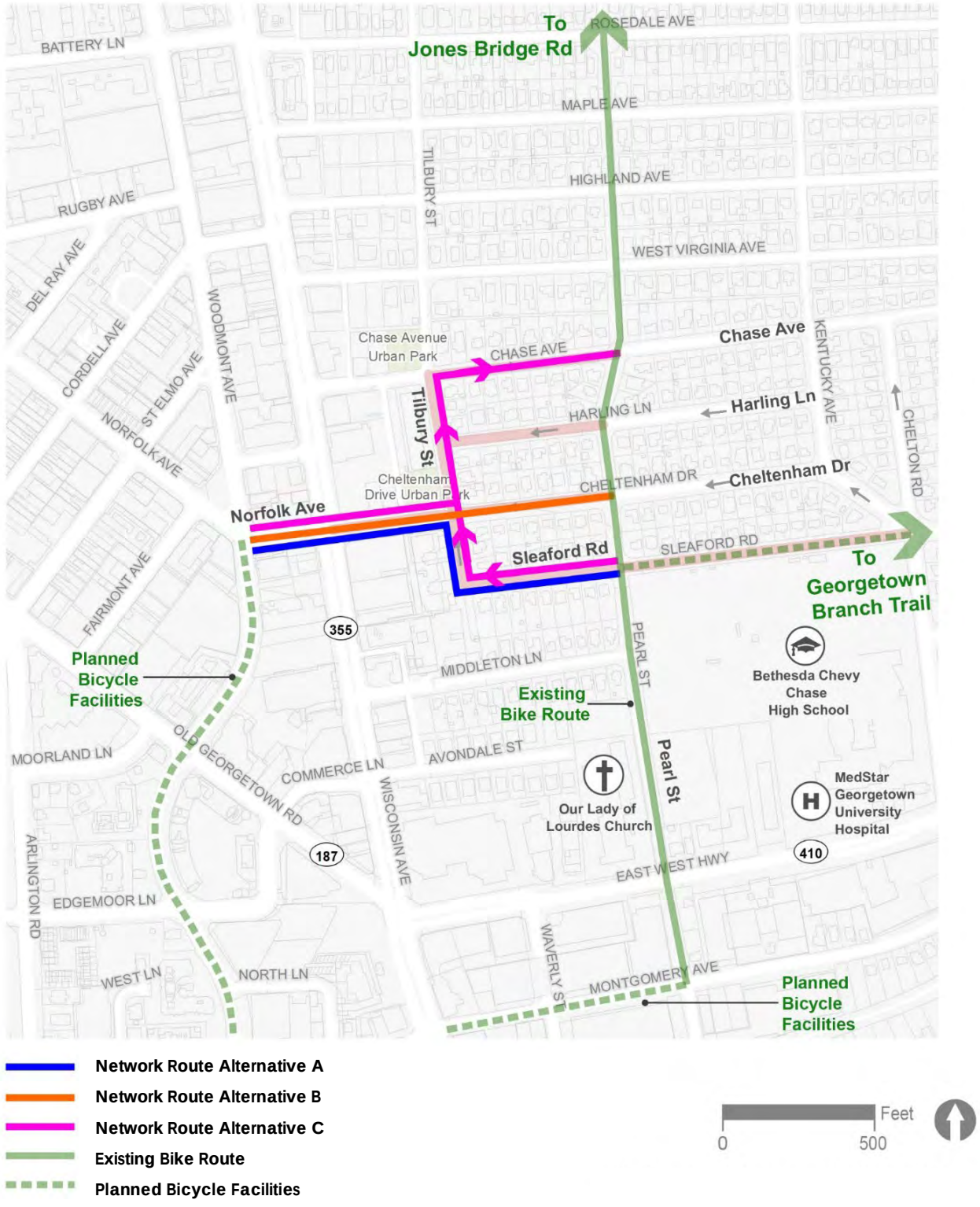


Figure 34: Summary of Network Alignment Alternatives

Bikeway Facility Type Options

For Cheltenham Drive - Wisconsin Avenue to Tilbury Street

In addition to the three Network Route Alternatives presented in the previous section, the project team developed five typical section options for different bikeway facility types for the segment of Cheltenham Drive from Wisconsin Avenue to Tilbury Street. As shown in **Figure 34,** This segment of Cheltenham Drive is common to all the three Network Route Alternatives.

To evaluate these bikeway facility type options, the project team developed a list of high-level evaluation criteria or measures and provided ordinal rankings for each alternative. Although the project team realizes that not all the evaluation measures are of equal importance, to avoid attributing any value judgment, these evaluation measures were not weighted or scaled on their relative importance. The result of this evaluation is not meant to be any form of ranking of options, but this analysis was meant to graphically show the order of magnitude pros and cons for each alternative. Additionally, the ordinal rankings should not be understood as indicating substantive differences between the results. The project team chose these evaluation measures to provide additional context while presenting and evaluating the options as part of the stakeholder and public engagement. **Table 7** shows evaluation measures used to evaluate the five bikeway facility type options for Cheltenham Drive between Wisconsin Avenue and Tilbury Street.

Table 7: Bikeway Facility Type Options - Evaluation Measures

Icon	Evaluation Measure	Description
	Bicycle Comfort	Qualitative measure of how comfortable an interested but concerned adult, or a child feel about riding a bike on a particular bicycle facility.
	Cost	Qualitative measure of order of magnitude cost of constructing a particular bicycle facility.
	Right-of-Way or Drainage & Utility Impacts	High-level assessment based on a need to move curbs, drainage inlets, overhead and underground utilities or private property impacts of constructing a particular bicycle facility.
	Parking Impacts	Documents if and how many on-street parking spaces are impacted by constructing a particular bicycle facility.
	Driveway-Bikeway Conflict	Qualitative measure of conflict between bi-directional bicycle traffic along two-way separated bicycle lanes and wide commercial driveways.
	Signal Redesign/Modification	Assessment of a need to modify or redesign signal at Wisconsin Avenue and Cheltenham Drive to accommodate two-way bicycle traffic on one side of the street.

Cheltenham Drive from Wisconsin Avenue to the alley currently operates as a two-way street with a single travel lane in either direction and a left turn only lane. The street segment has on-street parking on the south side. Ten-foot sidewalks are provided on both sides of the street, alongside a landscaped buffer. All figures illustrating the typical section options include the existing typical section at the top for comparison purposes.

Figure 35 to Figure 39 illustrate the following five bikeway facility type options for Cheltenham Drive between Wisconsin Avenue and Tilbury Street:

Option 1: Conventional Bike Lanes

Option 1 proposes adding conventional striped bike lanes as shown in **Figure 35.** The street configuration would remain unchanged. The eastbound travel lane and the left turn lane width will be narrowed. The existing lane configuration, traffic operations, and on-street parking would remain the same as existing. **Figure 8** shows the assessment of Option 1 based on evaluation measures. **Figure 36** shows a before-and-after photo-morph rendering of Option 1.

Table 8: Bikeway Facility Type Option 1 - Evaluation

Icon	Evaluation Measure	Assessment
	**Bicycle Comfort**	**Low**
	**Cost**	**Low**
	**Right-of-Way or Drainage & Utility Impacts**	**Low**
	**Parking Impacts**	**No**
	**Driveway-Bikeway Conflict**	**Medium**
	**Signal Redesign/Modification**	**No**

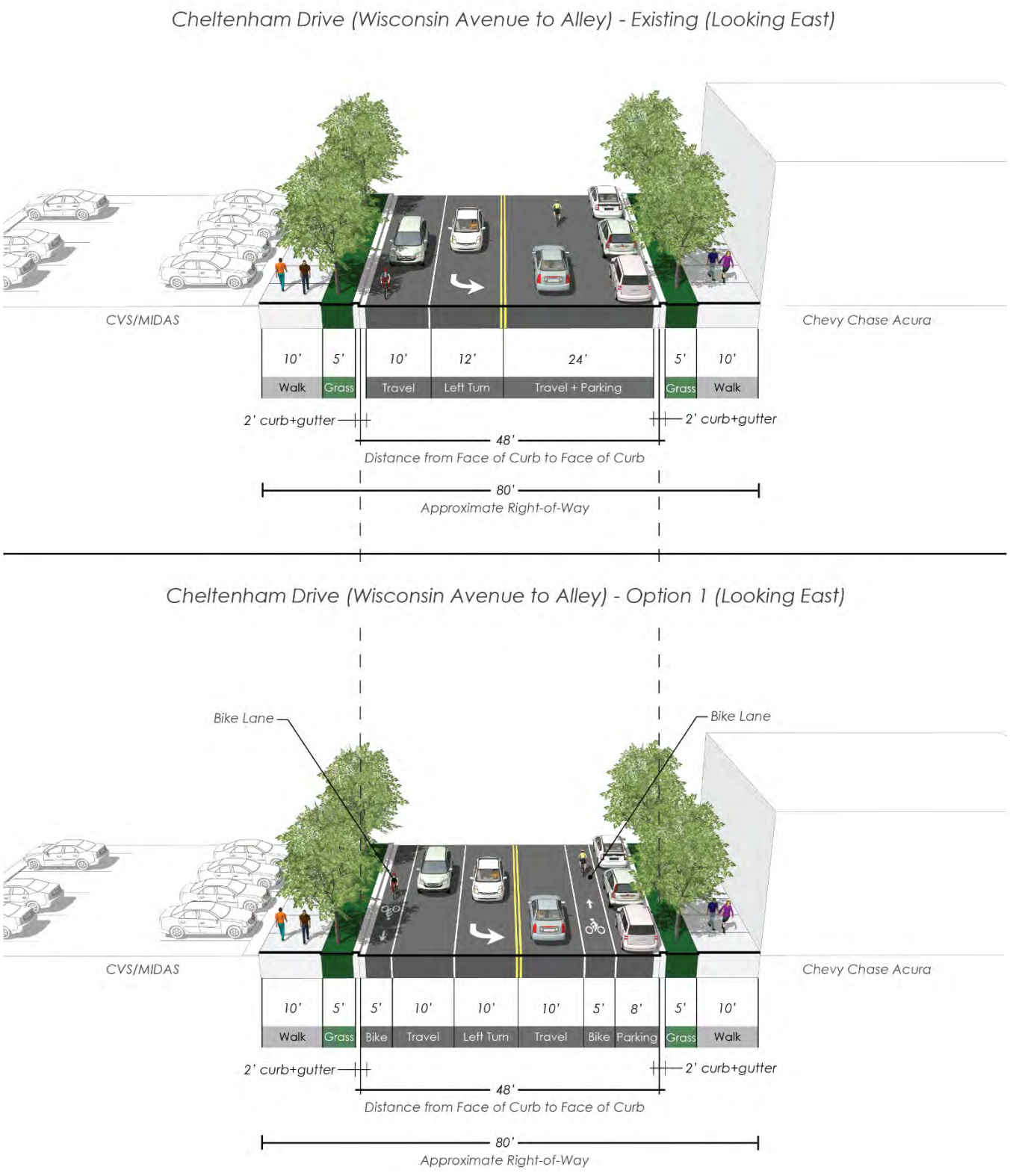


Figure 35: Bikeway Facility Type Option 1 - Conventional Bike Lanes

Existing (Looking East)

Option 1 (Looking East)

Figure 36: Rendering - Bikeway Facility Type Option 1- Conventional Bike Lanes

Option 2: One-way Separated Bike Lanes

Option 2 proposes adding one-way separated bike lanes as shown in **Figure 37**. This option would provide more physical separation between people driving and biking, as compared to Option 1. However, to retain the existing curbs and drainage inlets, this option would require four to six on-street parking spaces to be repurposed for separated bike lanes. The existing lane configuration and traffic operations would remain the same as existing, whereas on-street parking would be removed along this segment of Cheltenham Drive. **Table 9** shows the assessment of Option 2 based on evaluation measures. **Figure 38** shows a before-and-after photo-morph rendering of Option 2.

Table 9: Bikeway Facility Type Option 2 - Evaluation

Icon	Evaluation Measure	Assessment
	**Bicycle Comfort**	**High**
	**Cost**	**Medium**
	**Right-of-Way or Drainage & Utility Impacts**	**Low**
	**Parking Impacts**	**Yes (4 to 6 Spaces)**
	**Driveway-Bikeway Conflict**	**Medium**
	**Signal Redesign/Modification**	**No**

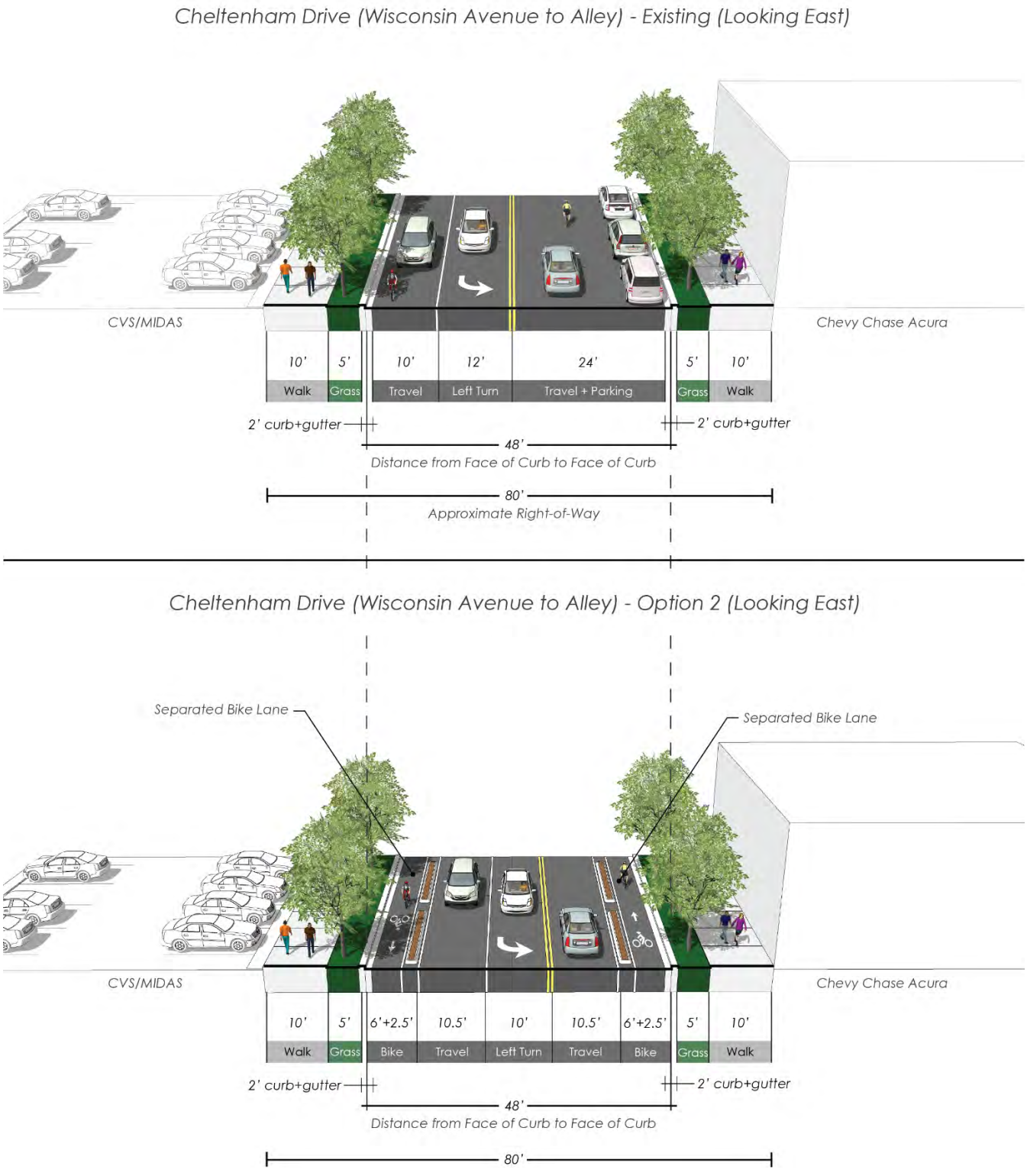


Figure 37: Bikeway Facility Type Option 2 - One-way Separated Bike Lanes

Existing (Looking East)

Option 2 (Looking East)

Figure 38: Rendering - Bikeway Facility Type Option 2 - One-way Separated Bike Lanes

Option 3: Narrow Two-way Separated Bike Lanes With Parking

Option 3 proposes adding a narrow 8-feet wide two-way separated bike lanes on the north side of Cheltenham Drive as shown in **Figure 39.** The 8-feet wide two-way separated bike lanes, or cycle track include a two-foot buffer between the bike lanes and travel lanes to enhance the comfort and safety of people biking. The street configuration would remain unchanged, with lane narrowing for the left turn lane and eastbound travel lane. The existing lane configuration, traffic operations, and on-street parking would remain the same as existing. **Table 10** shows the assessment of Option 3 based on evaluation measures. **Figure 40** shows a before-and-after photo-morph rendering of Option 3.

Table 10: Bikeway Facility Type Option 3 - Evaluation

Icon	Evaluation Measure	Assessment
	**Bicycle Comfort**	**Medium**
	**Cost**	**Medium**
	**Right-of-Way or Drainage & Utility Impacts**	**Low**
	**Parking Impacts**	**No**
	**Driveway-Bikeway Conflict**	**High**
	**Signal Redesign/Modification**	**Yes**

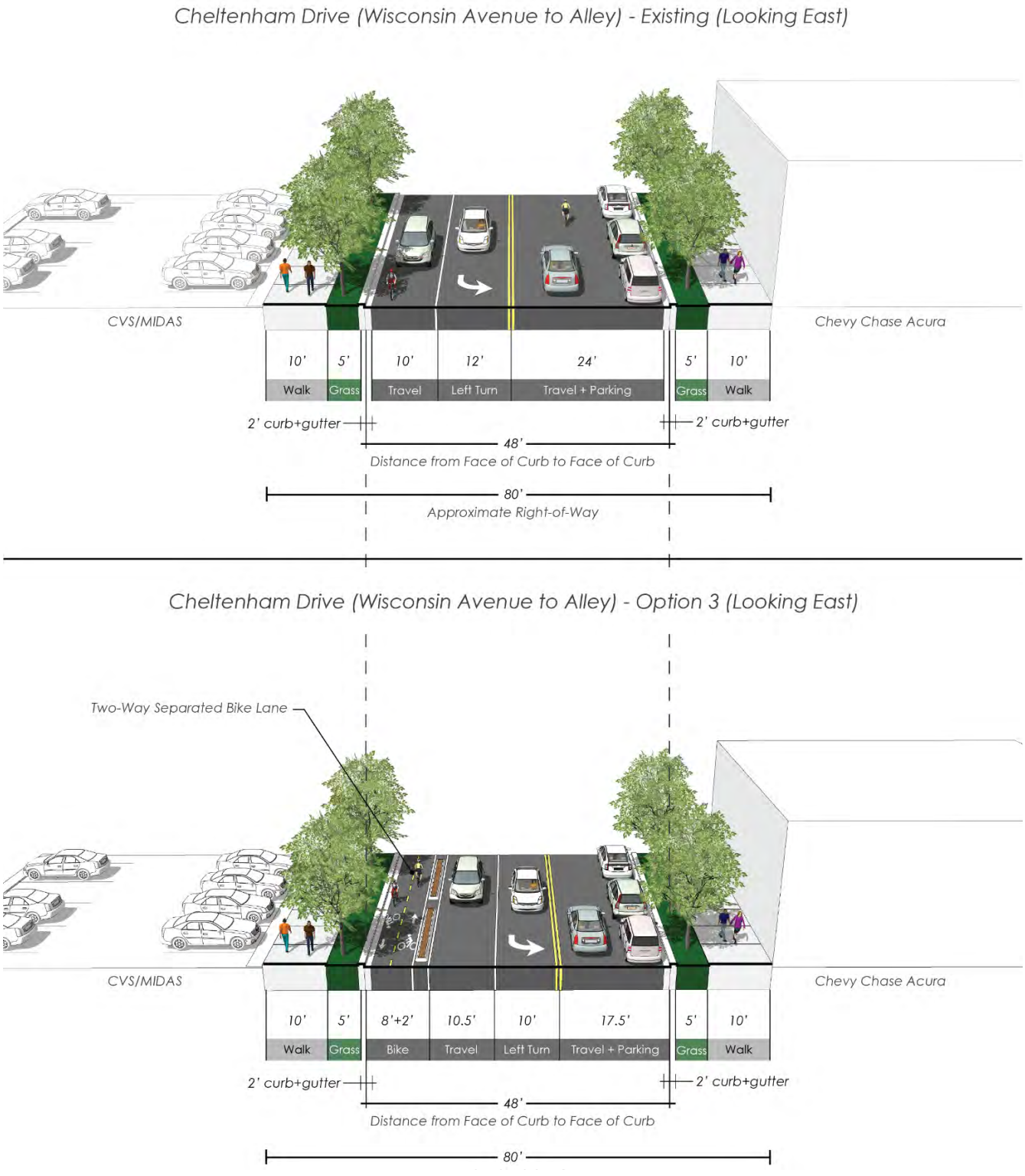


Figure 39: Bikeway Facility Type Option 3 - Narrow Two-way Separated Bike Lanes

Existing (Looking West)

Option 3 (Looking West)

Figure 40: Rendering - Bikeway Facility Type Option 3 - Narrow Two-way Separated Bike Lanes

Option 4: Wide Two-way Separated Bike Lanes with No Parking

Option 4 proposes adding a 12-feet wide two-way separated bike lanes or cycle track on the north side of Cheltenham Drive as shown in **Figure 41**. This two-way separated cycle track would be wider than Option 3 and would provide a wider buffer for physical separation between people biking and driving. In this option, the wider and more comfortable bicycle facility impacts four to six on-street parking spaces along Cheltenham Drive. The existing lane configuration and traffic operations would remain the same as existing, whereas on-street parking would be removed along this segment of Cheltenham Drive. **Table 11** shows the assessment of Option 4 based on evaluation measures. **Figure 42** shows a before-and-after photo-morph rendering of Option 4.

Table 11: Bikeway Facility Type Option 4 - Evaluation

Icon	Evaluation Measure	Assessment
	**Bicycle Comfort**	**High**
	**Cost**	**Medium**
	**Right-of-Way or Drainage & Utility Impacts**	**Low**
	**Parking Impacts**	**Yes (4 to 6 Spaces)**
	**Driveway-Bikeway Conflict**	**High**
	**Signal Redesign/Modification**	**Yes**

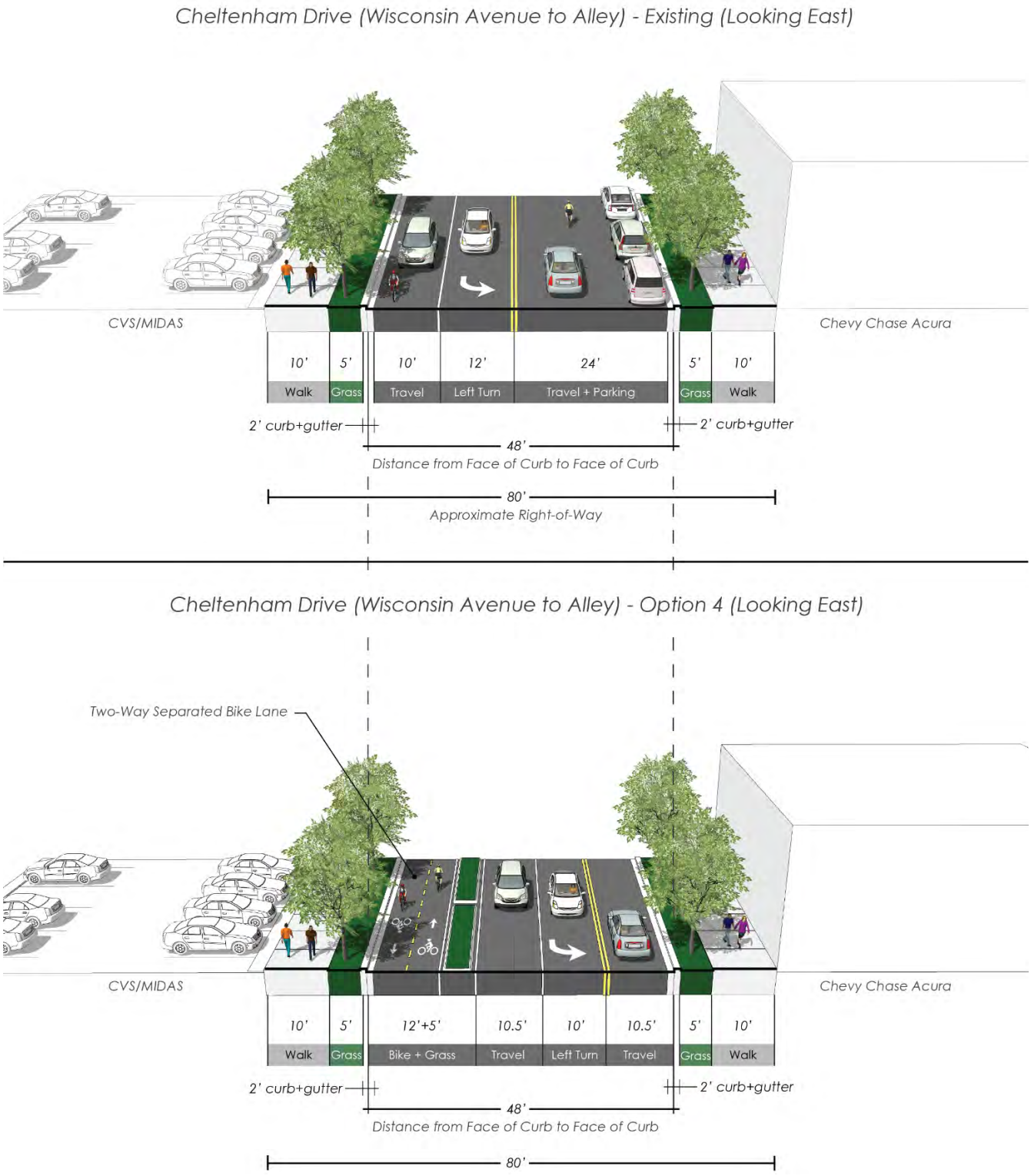


Figure 41: Bikeway Facility Type Option 4 - Wide Two-way Separated Bike Lanes

Existing (Looking West)

Option 3 (Looking West)

Figure 42: Rendering - Bikeway Facility Type Option 4 - Wide Two-way Separated Bike Lanes

Option 5: Two-way Raised Separated Bike Lanes

Option 5 is provided as the long-term option. This option may require additional time and funding as compared to the other four options. Option 5 proposes a two-way raised sidewalk-level separated bike lanes or cycle track on the north side of Cheltenham Drive as shown in **Figure 43**. The two-way separated bike lanes would be constructed at sidewalk height and would be buffered from the travel lanes by a landscape median with street trees. This option requires relocating and reconstructing the northside curb to narrow the curb-to-curb street width from 48-feet to 39-feet to accommodate the proposed bicycle facility. This option proposes maintaining on-street parking and narrowing of the left turn lane and eastbound travel lane. The existing lane configuration, traffic operations, and on-street parking would remain the same as the existing conditions. **Table 12** shows the assessment of Option 5 based on evaluation measures. **Figure 44** shows a before-and-after photo-morph rendering of Option 5.

Table 12: Bikeway Facility Type Option 5 - Evaluation

Icon	Evaluation Measure	Assessment
	**Bicycle Comfort**	**High**
	**Cost**	**High**
	**Right-of-Way or Drainage & Utility Impacts**	**High**
	**Parking Impacts**	**No**
	**Driveway-Bikeway Conflict**	**Low***
	**Signal Redesign/Modification**	**Yes**

*Assuming redesign or closure of some driveways

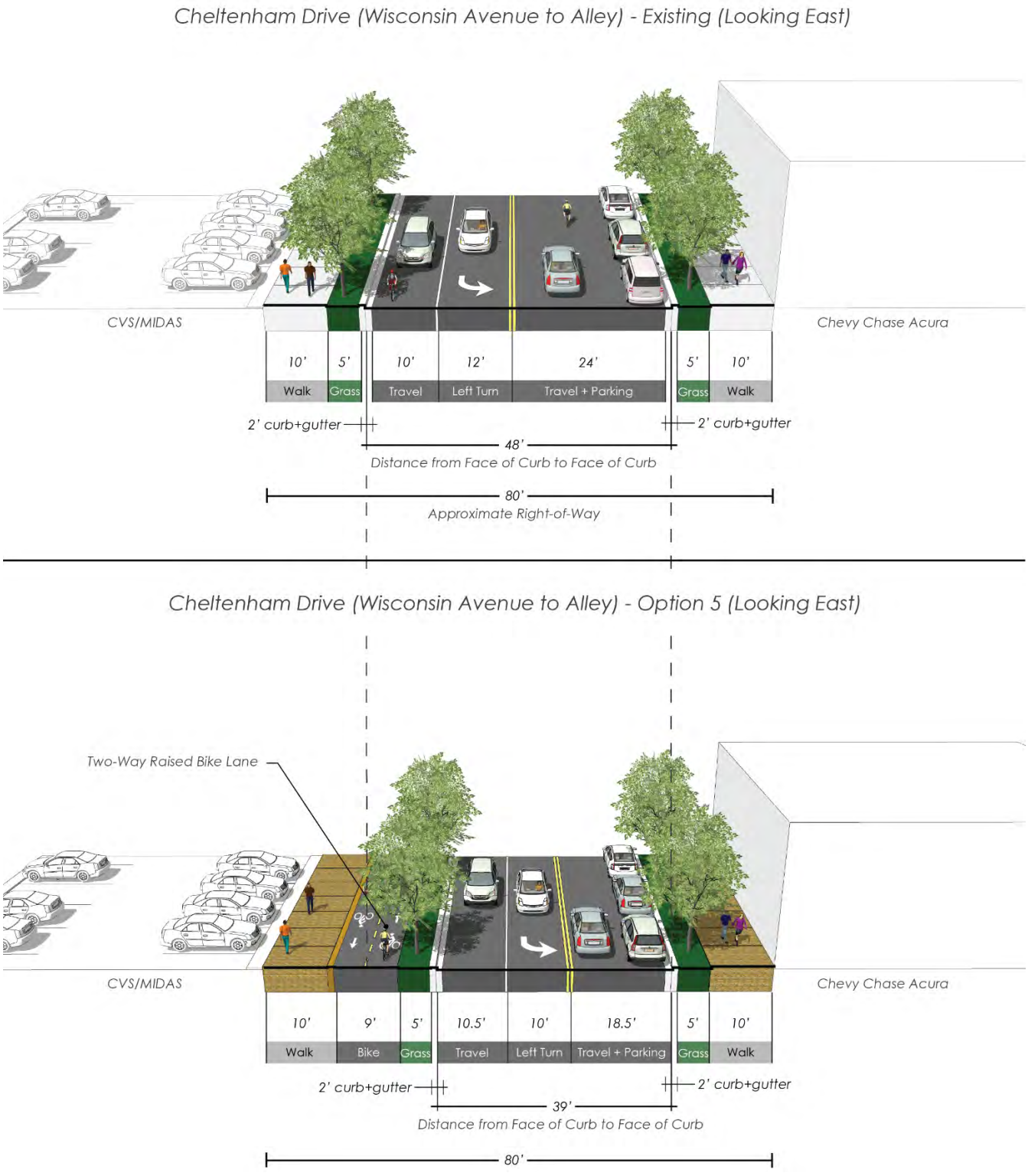


Figure 43: Bikeway Facility Type Option 5 - Two-way Raised Separated Bike Lanes

Existing (Looking West)

Option 3 (Looking West)

Figure 44: Rendering - Bikeway Facility Type Option 5 - Two-way Raised Separated Bike Lanes

Table 13 summarizes the evaluation criteria for each of the five options for bicycle facilities on Cheltenham Drive from Wisconsin Avenue to the alley.

Table 13: Summary of Bicycle Facility Type Options

Cheltenham Drive from Wisconsin Avenue to Alley

Icon	Evaluation Measure	Option 1	Option 2	Option 3	Option 4	Option 5
	Bicycle Comfort	Low	High	Medium	High	High
	Cost	Low	Medium	Medium	Medium	High
	Right-of-Way or Drainage & Utility Impacts	Low	Low	Low	Low	High
	Parking Impacts	No	Yes (4 to 6 Spaces)	No	Yes (4 to 6 Spaces)	No
	Driveway-Bikeway Conflict	Medium	Medium	High	High	Low
	Signal Redesign/Modification	No	No	Yes	Yes	Yes

Cheltenham Drive (Alley to Tilbury Street):

Cheltenham Drive from the alley to Tilbury Avenue is a narrow roadway compared to Cheltenham Drive between Wisconsin Avenue to the alley. This segment currently operates as a two-way street with a single travel lane in either direction. The street segment has on-street parking with AM and PM restrictions on the north side. Four-to-five-foot sidewalks are provided on both sides of the street, alongside a landscaped buffer.

If Options 1 or 2 (one-way bike lanes) are selected for Cheltenham Drive between Wisconsin Avenue and the alley, then the one-way bike lanes option (**Figure 45**) can be selected for this segment of Cheltenham Drive between the alley and Tilbury Street. If Options 3, 4, or 5 (two-way bike lanes) are selected for Cheltenham Drive between Wisconsin Avenue and the alley, then the two-way bike lanes option (**Figure 46**) can be selected for this segment of Cheltenham Drive between the Alley and Tilbury Street.

Option 1: One-way Bike Lanes

Option 1 proposes adding bike lanes on both sides of Cheltenham Drive from the alley to Tilbury Street, as shown in **Figure 45**. The bike lane on the north side of the street is proposed as a raised bike lane at the same height as the sidewalk. The north side bike lane would be separated from vehicles by the landscape buffer. The bicycle lane on the south side of the street is proposed at street-level, directly adjacent to the eastbound travel lane. This option proposes narrowing the vehicular travel lanes and removing the peak hour restricted parking on the north side of the street. The existing lane configuration and traffic operations would remain the same as existing.

Option 2: Two-way Separated Bike Lanes

Option 2 proposes adding raised two-way separated bike lanes or a two-way cycle track on the north side of Cheltenham Drive from the alley to Tilbury Street, as shown in **Figure 46**. The raised two-way bicycle facility would be at the same height as the sidewalk and would be physically separated from the travel lanes by the landscape buffer. This option maintains the existing curb-to-curb street width and maintains on-street parking on the north side of the street. The existing lane configuration and traffic operations would remain the same as existing.

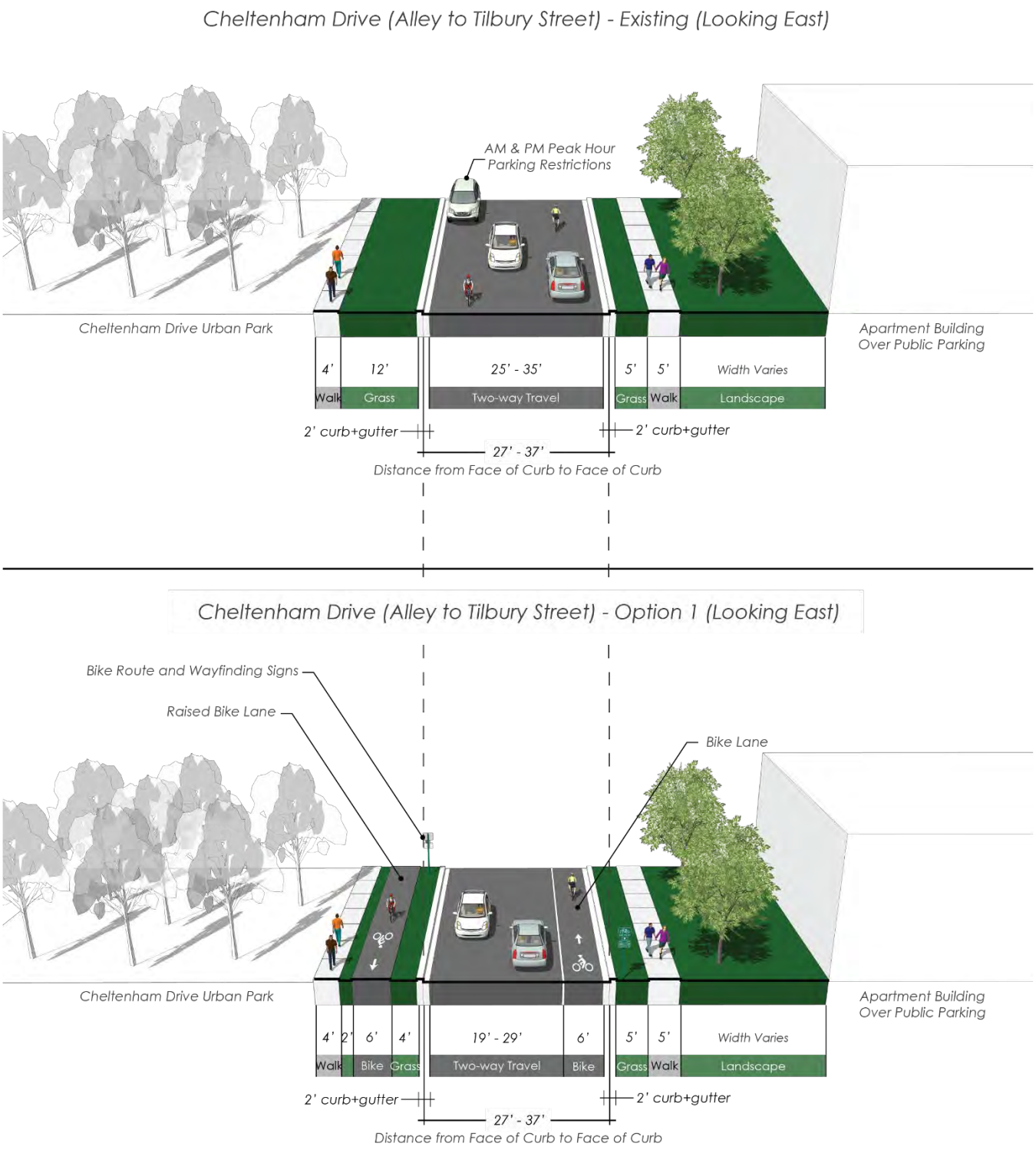


Figure 45: Bikeway Facility Type Option 1 - One-way Bike Lanes

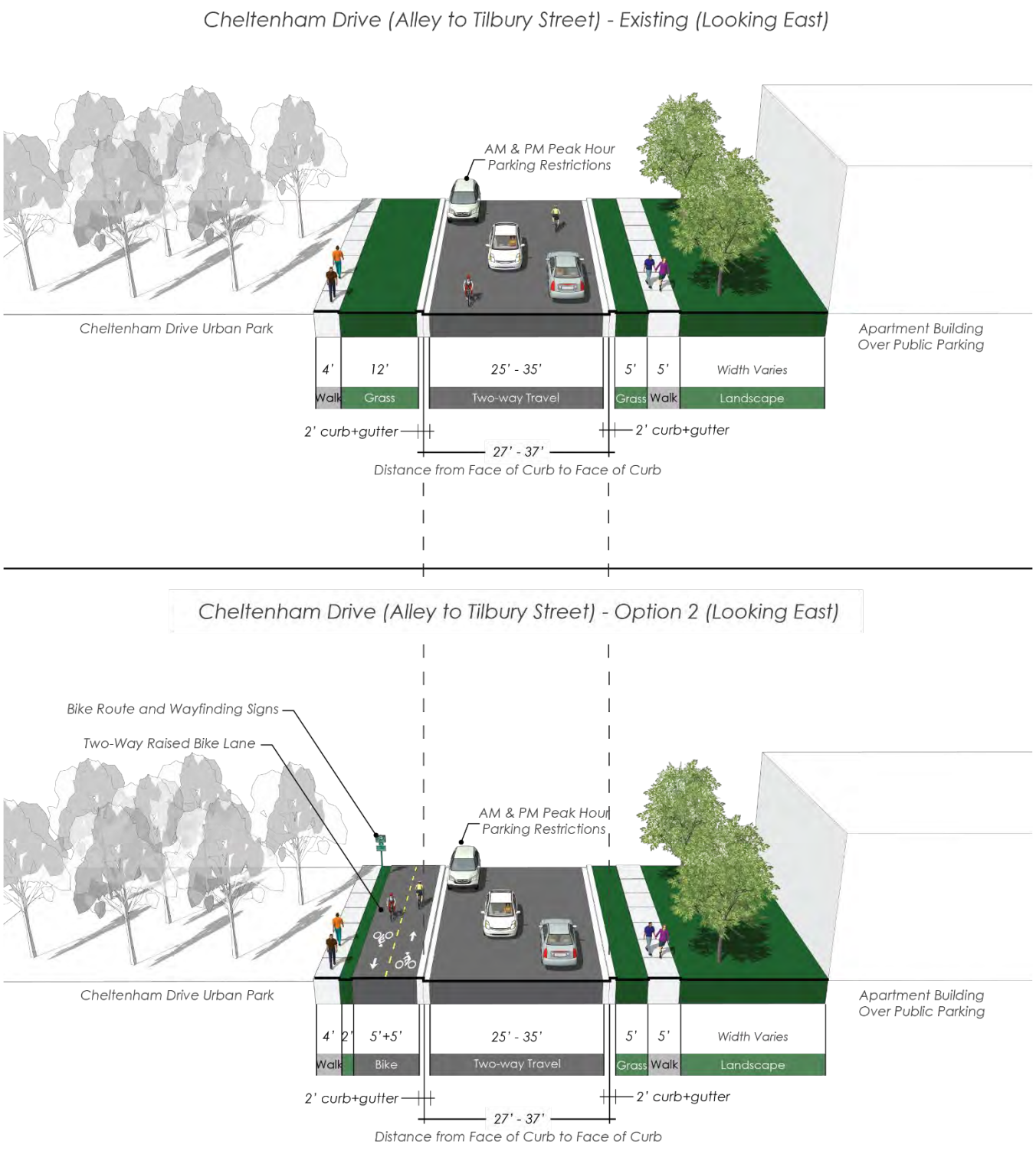


Figure 46: Bikeway Facility Type Option 2 - Two-way Bike Lanes

6. PUBLIC AND STAKEHOLDER ENGAGEMENT

The project team developed multiple virtual engagement tools to gain feedback on project goals and alternatives. Due to the outbreak of COVID-19 and the state-wide stay-at-home order, the project team was unable to host any in-person events, including an in-person public meeting to share and discuss possible futures of the area. The project team arranges several virtual stakeholder meetings and one virtual public meeting. A project website and a public input survey were also created to share information and hear from residents, visitors, employees, stakeholders, and business owners about the project.

Stakeholder Meetings

Stakeholder feedback was a critical component of the project's public engagement approach. The project team met with various stakeholders in the community, including:

- The Montgomery County Bicycle Action Group (MCBAG)
- Commercial property owners and employees along Cheltenham Drive
- M-NCPPC

All meetings took place virtually from February 2021 through December 2021. Information and feedback from the stakeholder meetings are summarized below:

Montgomery County Bicycle Action Group (MCBAG)

The project team met with the MCBAG on February 8, 2021. The MCBAG was created in the 1990s to collect input from citizens interested in recreational and on-road cycling issues. Today, MCBAG consists of citizens interested in bicycling who advise agencies on current issues, programs, and projects relating to cycling in Montgomery County. The stakeholder meeting summary with the MCBAG is provided below:

- Two-way cycle tracks should be considered on longer corridors, such as Woodmont Avenue.
- One-way bike lanes on both sides of the street may be more comfortable and convenient for bicyclists traveling in the same direction as traffic. Bicyclists will need to merge with traffic in the residential areas as part of the bike boulevards.
- Consider removing parking on Cheltenham Drive between Wisconsin Avenue and Tilbury Street to reallocate street space for separated bike lanes. There is off-street public parking available along Cheltenham Drive along this segment.
- MCBAG prefers Network Alternative A – Cheltenham Drive to Tilbury Street (contraflow bike lane) and Sleaford Drive is preferred.
- Shared lanes with traffic calming and signs are appropriate for the residential area.
- MCBAG prefers Bikeway Facility Type Option 2 – One-way separated bike lanes for Cheltenham Drive between Wisconsin Avenue and Tilbury Street

Commercial property owners and employees along Cheltenham Drive

The project team met with a few commercial property owners and employees along Cheltenham Drive. A summary of these stakeholder meetings is provided below:

- On-street parking is well-utilized.
- All commercial properties have off-street parking in the form of parking lots or parking garages for customer parking.
- The property located at 4725 Cheltenham Drive is slated for demolition and redevelopment in the future.
- One property owner expressed concern about the proposed BRT on Wisconsin Avenue causing traffic congestion and on-street parking challenges.
- One property owner expressed interest in implementing temporary installations, rather than permanent changes for bicycle facilities.
- The curbside space in front of the park is used for loading and unloading.
- One property owner opposes any alternative that removes on-street parking.
- Employees of one commercial property preferred Bikeway Facility Type 2– One-way separated bike lanes on both sides of the street that removes four to six on-street parking spaces.
- Employees of one commercial property supported redesigning driveways to slow down turning cars and better design conflict zones between pedestrians, bicyclists, and cars.

Virtual Public Meeting

One virtual public meeting was held on September 30, 2021, with 38 registrants. During the public meeting, presenters from MCDOT and Kittelson & Associates went over the project background, previous plans and studies in the area, the existing conditions, and the design alternatives for the study segments. The meeting was followed by a Q&A session to respond to any immediate questions or comments. Questions and comments were focused around a need for a connected low-stress bicycle network, prioritization methodology, and concern for traffic speeding, safety, and loss of on-street parking. Public meeting presentation slides from the public meeting are added in **Appendix A.**

Additionally, the project team received many public comments via emails. These comments are summarized in **Appendix B**. **Appendix C** includes additional comments that were received through public meeting registration form questions.

Online Survey

The project team developed an online public survey to gather input from the community. The online survey ran for the month of October 2021. A total of 50 people submitted responses. The following paragraphs and tables summarize the survey results in detail.

The survey provided background information about the project, including study area maps, parallel planning efforts, and a link to the existing conditions and alternatives presentation from the public meeting.

Respondents were asked to provide feedback on two main focus areas:

- Bikeway Facility Type Options for Cheltenham Drive from Wisconsin Avenue to the alley
  - Option 1: Conventional Bike Lanes (With On-street Parking)
  - Option 2: One-Way Separated Bike Lanes (Without On-street Parking)
  - Option 3: Two-Way Separated Bike Lanes (With On-street Parking)
  - Option 4: Two-Way Separated Bike Lanes (Without On-street Parking)
  - Option 5: Raised Sidewalk Level Two-Way Separated Bike Lanes (With On-street Parking)
- Network Route Alternatives
  - Alternative A: Cheltenham Drive + Tilbury Street + Sleaford Road
  - Alternative B: Cheltenham Drive
  - Alternative C: Cheltenham Drive + Tilbury Street + Chase Avenue + Sleaford Road

The results from the survey are summarized below.

Cheltenham Drive (Wisconsin to Alley) Bikeway Facility Type Options

Survey respondents were asked to review and rank five bikeway facility types for Cheltenham Drive between Wisconsin Avenue and Tilbury Street in order of preference (1 for most preferred to 5 for least preferred). Option 5: Raised Sidewalk Level Two-Way Separated Bike Lanes (With On-street Parking)

As **Table 14** shows, Option 2 was ranked the highest overall, with an average score of 4.14. Option 2 also received the highest responses (25) as the most preferred option.

Table 14: Cheltenham Drive (Wisconsin to Alley) Options – Top 1 Preference Survey Results

Answer Choices	Rank 1 (Most preferred)	Rank 2	Rank 3	Rank 4	Rank 5 (Least preferred)	Average Score
Option 1: Conventional Bike Lanes	17	11	1	4	17	3.14
Option 2: One-way Separated Bike Lanes	25	16	3	3	3	4.14
Option 3: Two-way Separated Bike Lanes	3	5	13	17	12	2.40
Option 4: Two-way Separated Bike Lanes	2	12	15	16	5	2.80
Option 5: Raised Sidewalk Level Two-Way Separated Bike Lanes	3	6	18	10	13	2.52
Total Responses	50					
Skipped Question	0					

Network Alignment Alternatives – Tilbury Street to Pearl Street

Survey respondents were asked to review and rank three network alignment alternatives for Tilbury Street to Pearl Street in order of preference (1 for most preferred to 3 for least preferred).

As **Table 15** shows, Alternative A was ranked the highest overall, with an average score of 2.66. alternative A also received the highest responses (34) as the most preferred alternative.

Table 15: Cheltenham Drive (Wisconsin to Alley) Options – Top 2 Preference Survey Results

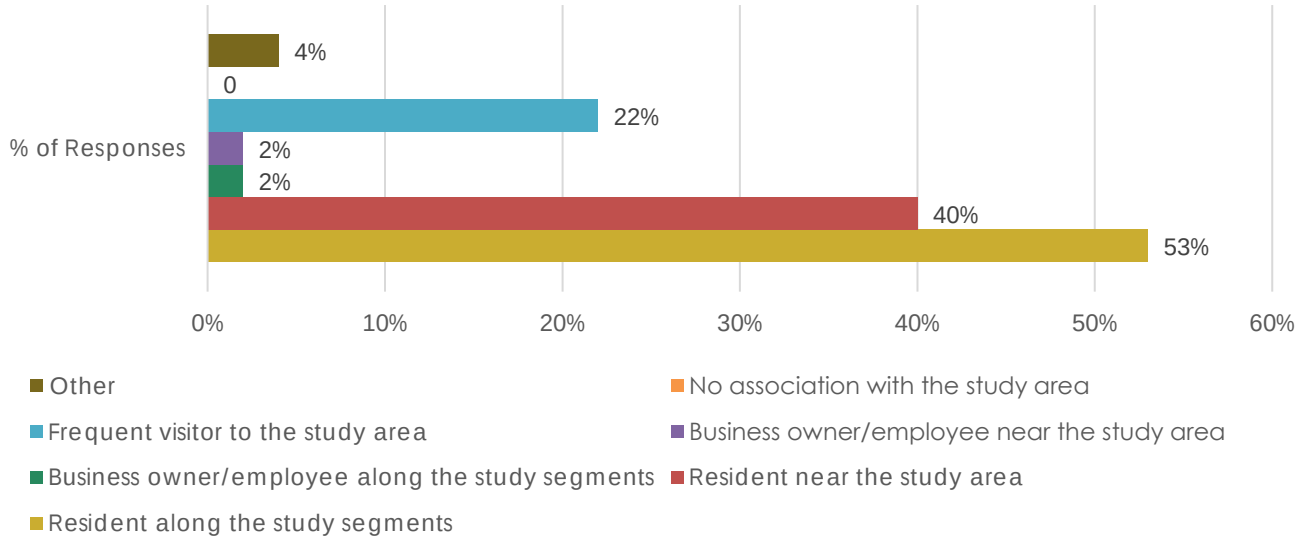
Answer Choices	Rank 1 (Most preferred)	Rank 2	Rank 3 (Least preferred)	Average Score
Alternative A: Cheltenham Drive to Tilbury Street to Sleaford Road	34	10	3	2.66
Alternative B: Cheltenham Drive to Pearl Street to Sleaford Road	12	12	23	1.77
Alternative C: Cheltenham Drive to Tilbury Street (NB) to Chase Avenue (EB) to Sleaford Road (WB)	1	25	21	1.57
Total Responses	47			
Skipped Question	3			

Additionally, the survey included questions for respondents to provide information and additional comments. Other survey responses are summarized below.

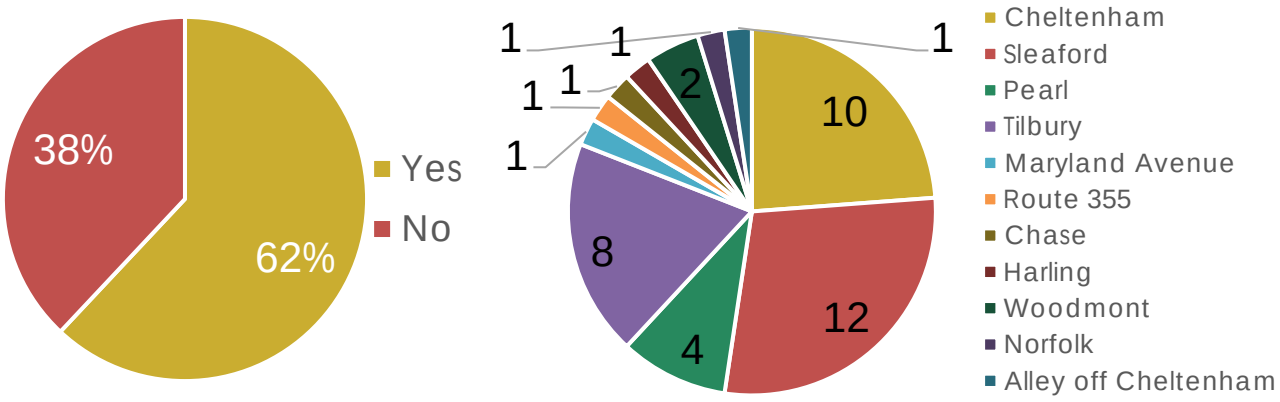
Of the 50 people who responded to the survey, 53% identified themselves as living along the study segments and 40% reported living near the study area. A large percentage of respondents (22%) reported frequent visits to the study area.

One survey question asked respondents if they ride a bicycle in the study area and asked about route preferences. 62% of survey respondents currently ride a bike along the study segments. Common bicycle routes include Sleaford Road, Cheltenham Drive, and Tilbury Street.

Survey Question, "How are you associated with the study area? (Select all that apply)"



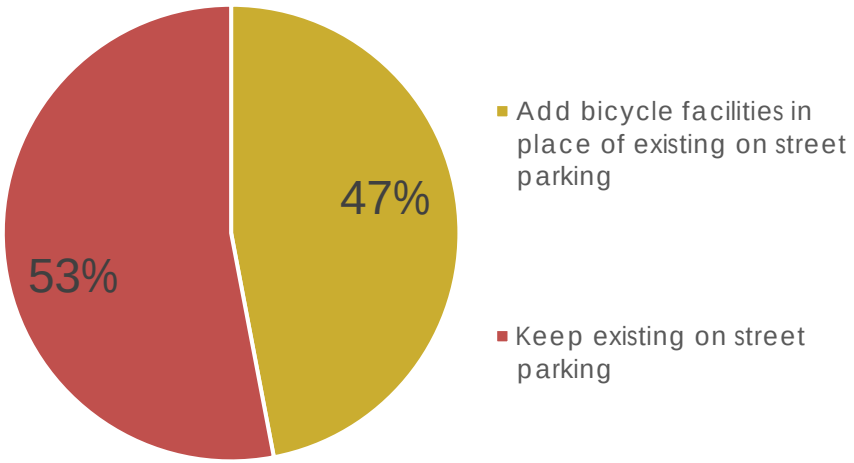
Survey Question, "Do you currently ride a bike along any of the study segments, if yes, which streets do you prefer for riding a bike?"



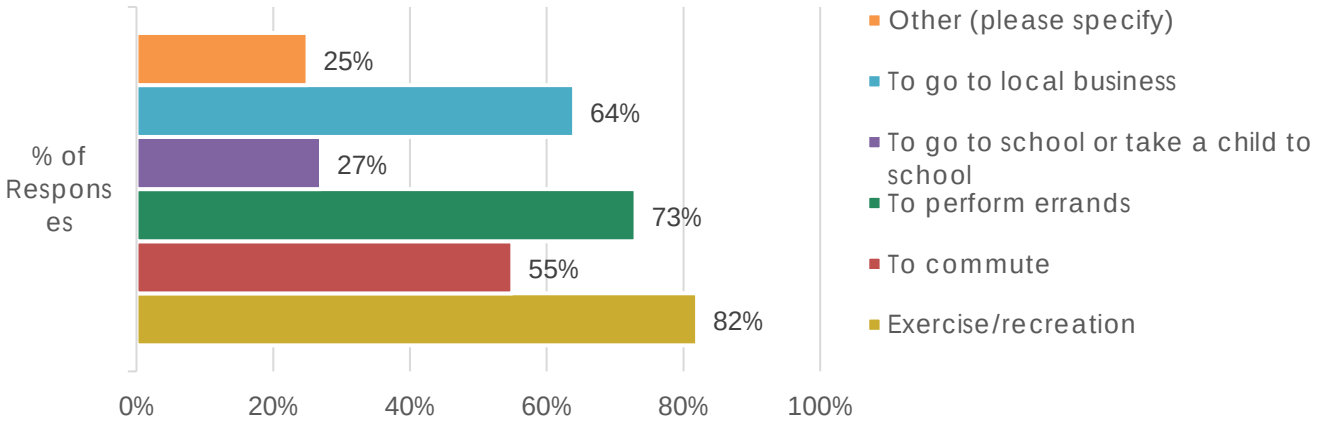
One survey question asked respondents to weigh the importance of on-street residential parking and dedicated bicycle facilities. The survey results show that most respondents (53%) prefer to maintain the existing residential street parking, rather than add bicycle facilities in place of the existing on-street parking.

Another question asked respondents to describe what motivates them to use active transportation. 82% of respondents are motivated to use active transportation to exercise or recreate. 73% of respondents are motivated to perform errands, 64% are motivated to go to local businesses, and 55% of respondents are motivated by commuting.

Survey Question: "If rebuilding Cheltenham Drive to accommodate both parking and dedicated bike facilities is not feasible, would you prefer to add bicycle facilities in place of the existing on street parking?"



Survey Question: "If it were easier to get around without a car, why would you walk, bike or roll? (Select all that apply)"



The main takeaways from the survey results are that most respondents prefer one-way separated bike lanes without on-street parking on Cheltenham Drive and prefer Alternative A for the proposed network alignment (Cheltenham Drive + Tilbury Street + Sleaford Road). Many survey respondents actively bike in the study area for a variety of purposes, including exercise, recreation, running errands, and accessing local businesses. **Appendix D** includes online survey results and comments.

7. RECOMMENDED NETWORK ROUTE ALTERNATIVE & BIKEWAY FACILITY TYPE

The project team analyzed assessment from the evaluation measures, solicited feedback from M-NCPPC, and summarized feedback from stakeholders, community members, survey responses, to determine a recommended alternative. The project team developed a recommended Network Route Alternative to connect bicycle facilities from Wisconsin Avenue to Pearl Street and a recommended bicycle facility type option for Cheltenham Drive between Wisconsin Avenue and Tilbury Street.

Recommended Network Route Alternative

Based on analysis and feedback collected throughout the project, the project team developed a hybrid option combining Network Route Alternative A and B as the recommended Network Route. This hybrid option recommends the following bicycle facilities:

- One-way separated bike lanes on Norfolk Avenue and Cheltenham Drive from Woodmont Avenue to Tilbury Street.
- Southbound contraflow bike lane and northbound shared travel lane on Tilbury Street from Sleaford Road to Cheltenham Drive.
- Neighborhood greenway with shared bi-directional travel lanes on Tilbury Street from Cheltenham Drive to Chase Avenue.
- Neighborhood greenway with shared bi-directional travel lanes on Sleaford Road from Tilbury Street to Pearl Street.
- Neighborhood greenway with shared bi-directional travel lanes on Chase Avenue from Tilbury Street to Pearl Street.
- Redesign of the traffic circle at Cheltenham Drive and Tilbury Street to include:
    - A new bike ramp at northwest corner to allow westbound bicycle traffic from circle to westbound Cheltenham Drive.
    - A bike slot at southwest corner to allow eastbound right turn for bicyclists onto southbound contraflow bike lane.
    - Add wayfinding signs to direct northbound bicyclists on Tilbury Street and Chase Avenue, north of Cheltenham Drive, and southbound bicyclists on Tilbury Street and Sleaford Road, south of Cheltenham Drive

Figure 47 shows the recommended hybrid network route alternative. **Figure 48** shows the existing and recommended typical section for Tilbury Street from Sleaford Road to Cheltenham Drive. **Figure 49** shows the existing and recommended typical section for Tilbury Street from Cheltenham Drive to Chase Avenue. **Figure 51** shows the existing and recommended typical section for Sleaford Road from Tilbury Street to Pearl Street. **Figure 51** shows the existing and recommended typical section for Chase Avenue from Tilbury Street to Pearl Street.

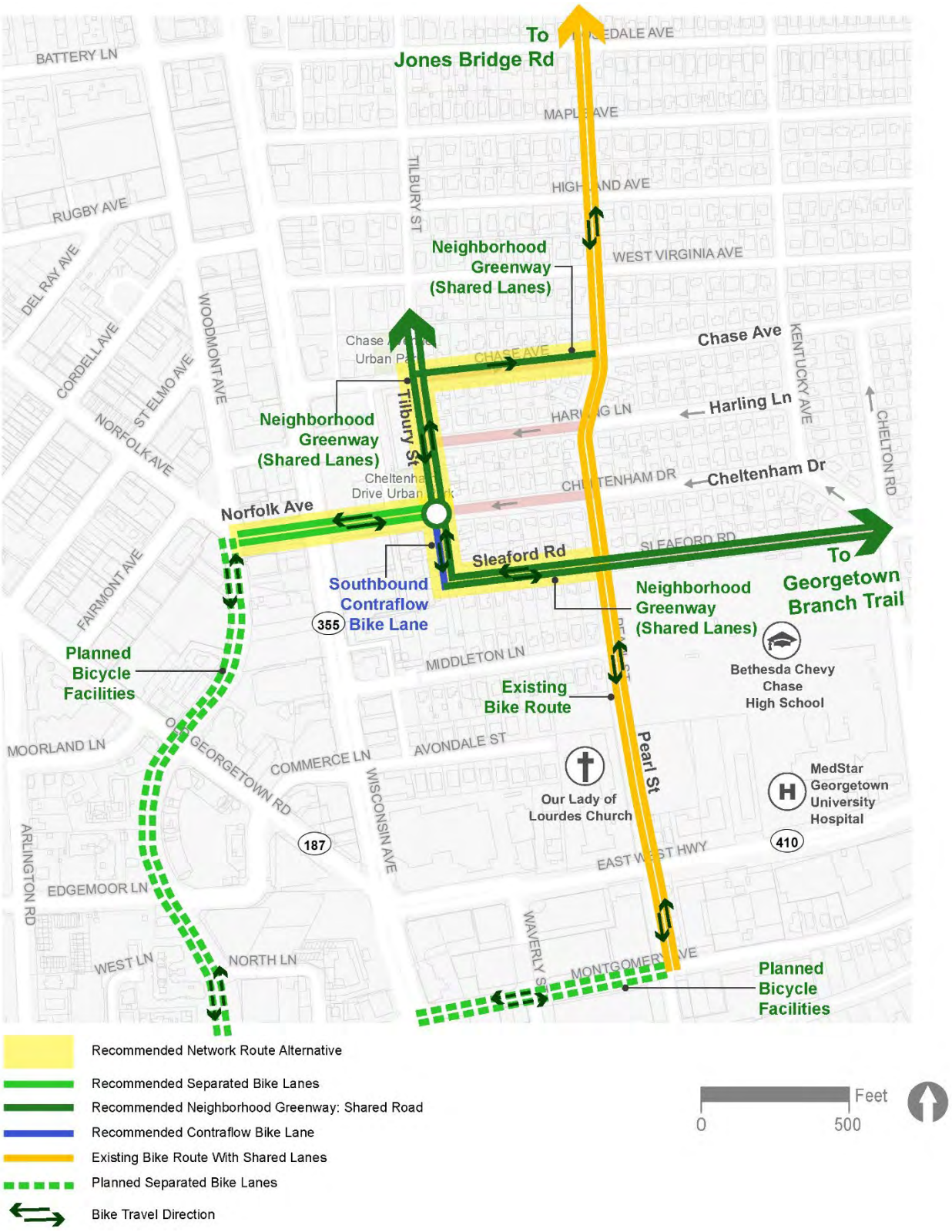


Figure 47: Recommended Network Route Alternative

Figure 48: Recommended Typical Section for Tilbury Street (Sleaford Road to Cheltenham Drive)

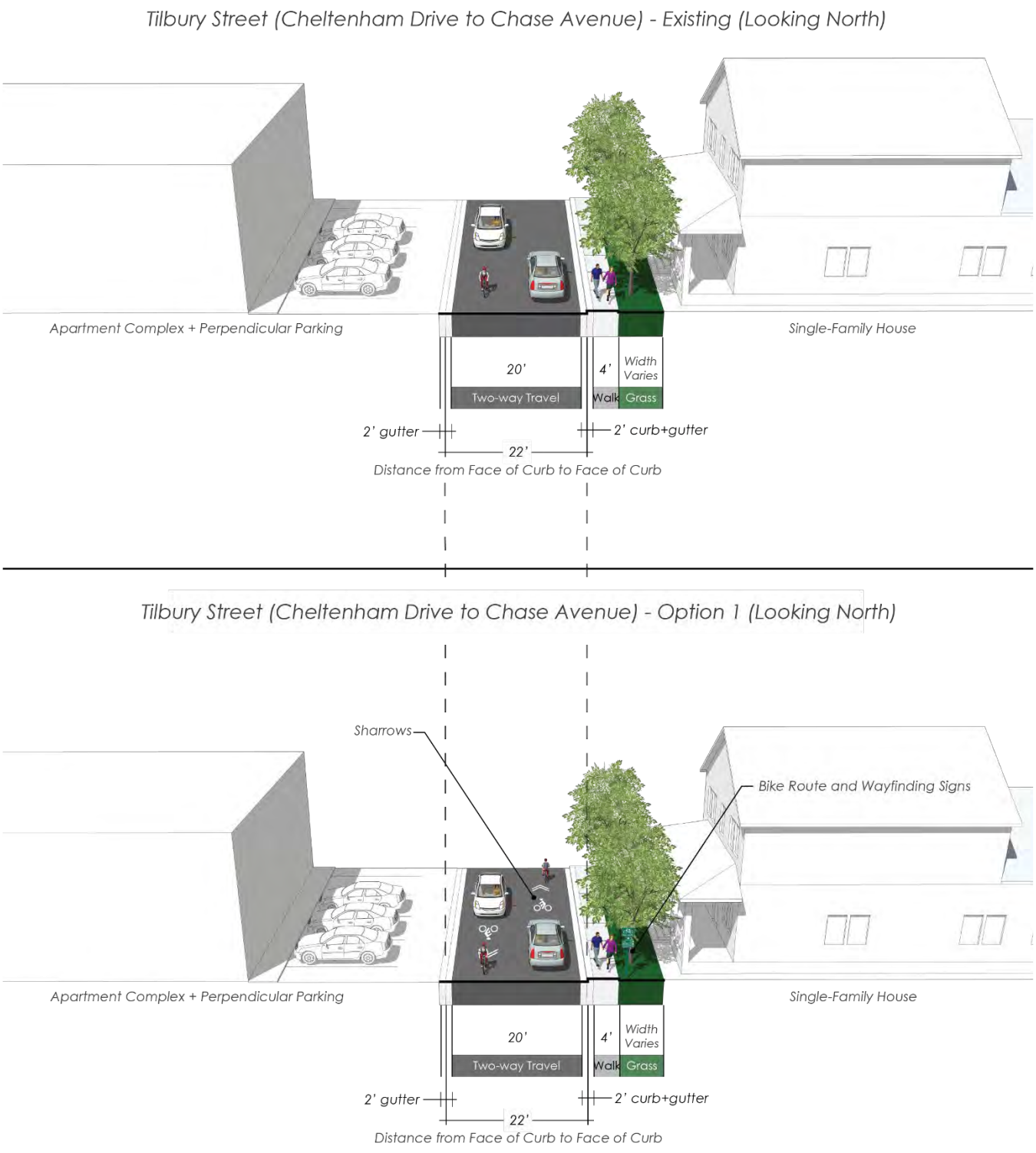


Figure 49: Recommended Typical Section for Tilbury Street (Cheltenham Drive to Chase Avenue)

Figure 50: Recommended Typical Section for Sleaford Road (Tilbury Street to Pearl Street)

Figure 51: Recommended Typical Section for Chase Avenue (Tilbury Street to Pearl Street)

Recommended Bicycle Facility Type Option

Based on analysis and feedback collected throughout the project, the project team recommended Bikeway Facility Type Option 2 – One-way Separated Bike Lanes as the bikeway facility type along Cheltenham Drive between Wisconsin Avenue and the alley. Correspondingly, the project team recommended Option 1 – one-way bike lanes for Cheltenham Drive between the alley and Tilbury Street.

Figure 52 shows the existing and recommended typical section for Cheltenham Drive between Wisconsin Avenue and the alley. **Figure 53** shows the existing and recommended typical section for Cheltenham Drive between the alley and Tilbury Street.

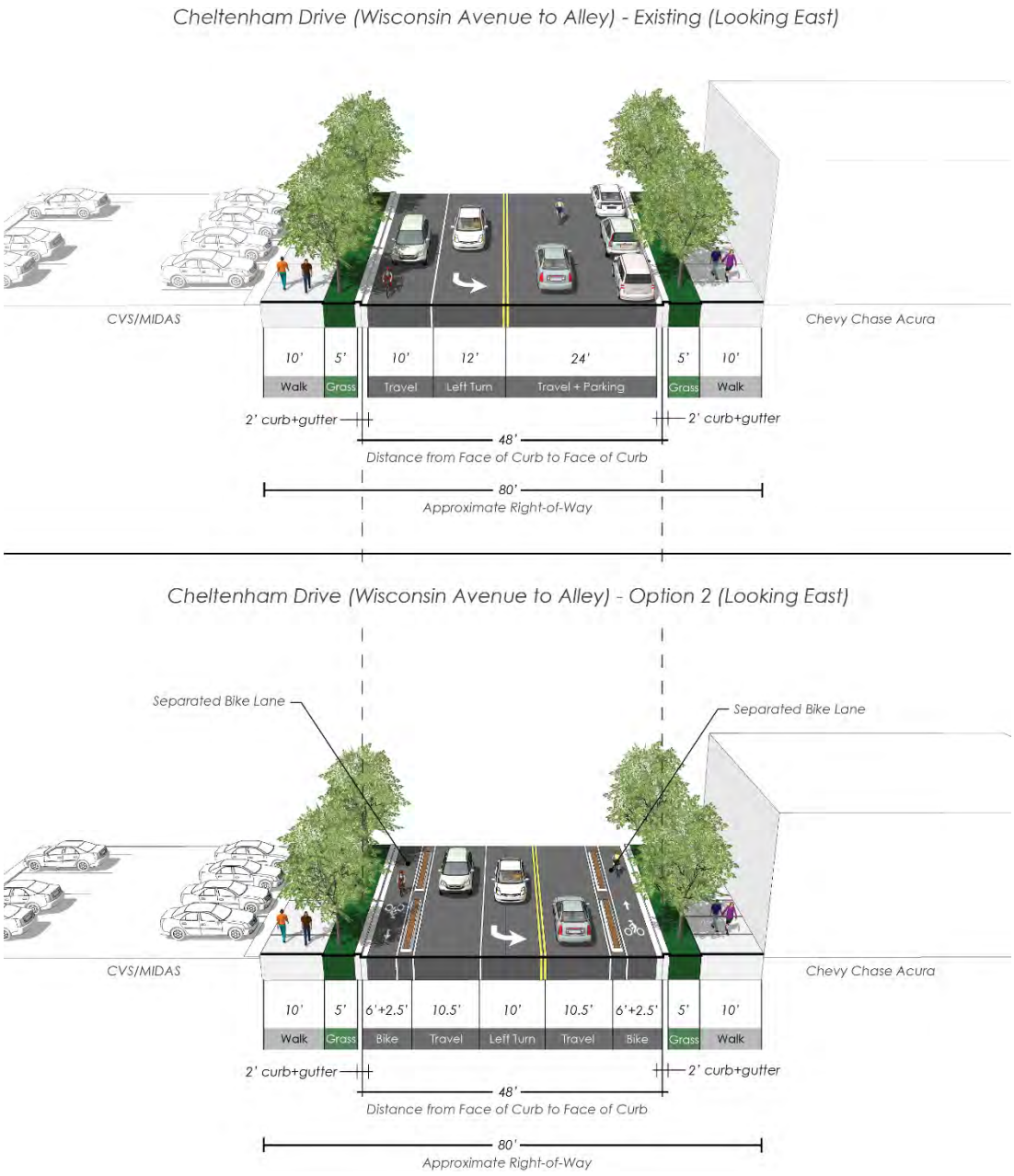


Figure 52: Recommended Typical Section for Cheltenham Drive (Wisconsin Avenue to Alley)

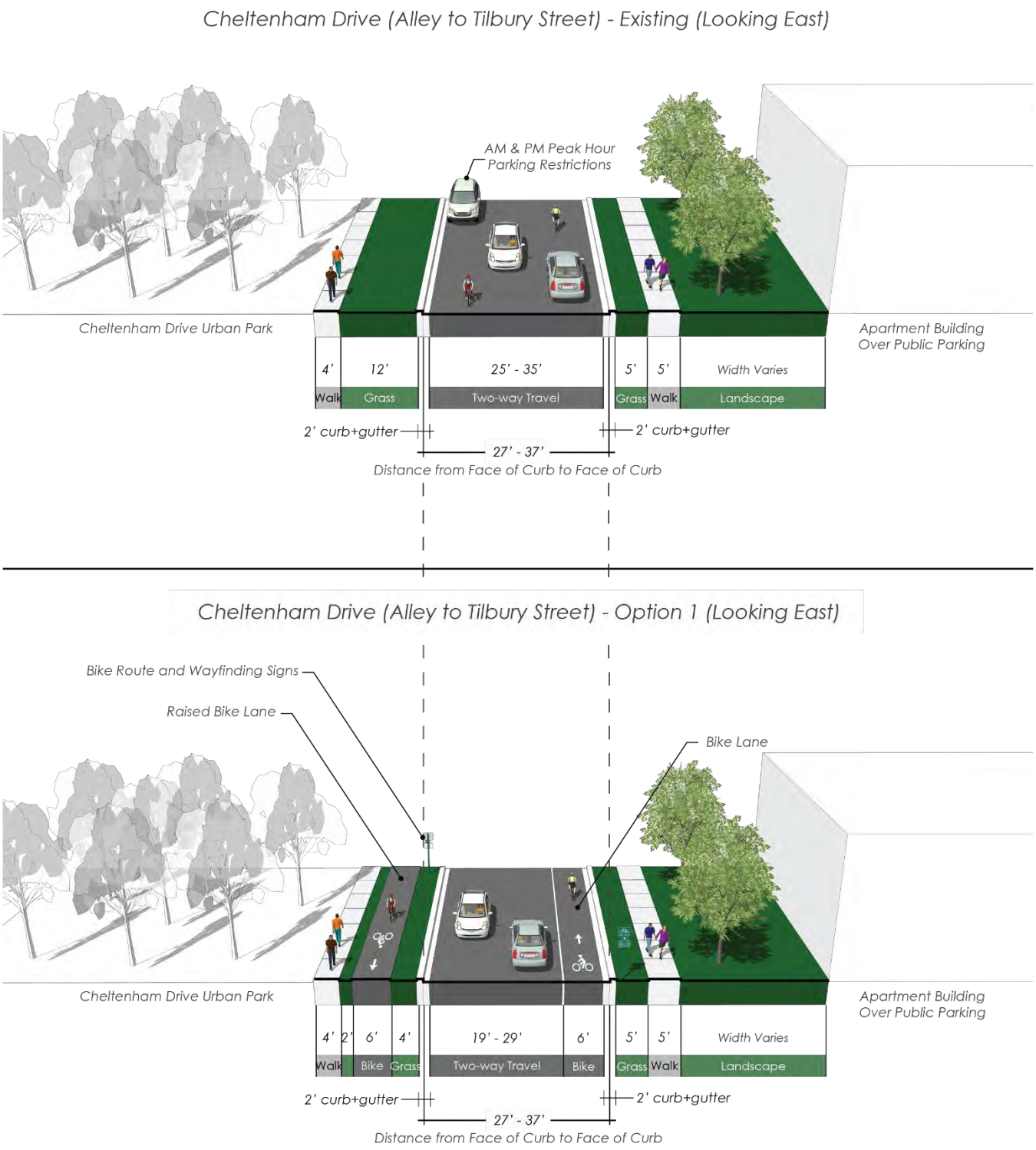


Figure 53: Recommended Typical Section for Cheltenham Drive (Alley to Tilbury Street)

8. NEXT STEPS

The project team has identified the following next steps to advance this project:

- Coordinate with the property owners and developers of the property located at 4725 Cheltenham Drive and their consultant team to develop engineering design of recommended bikeway facility type for the northern side of Cheltenham Drive between Wisconsin Avenue and Tilbury Street.

- Advance recommendations made in this feasibility study through preliminary and final engineering design phases.

- Continue to engage elected officials, Planning Board members, agencies, major stakeholders, and community members through the design development process as part of preliminary and final engineering design phases.

9. APPENDIX


BIKE ROUTE
Georgetown
Branch Trail
Detour
Bethesda
Cheltenham Drive Park
M-NCPPC Montgomery County
4701 Cheltenham Drive

100 Edison Park Drive
4th Floor
Gaithersburg, MD 20878

100 M St SE
Suite 910
Washington, DC 20003