Multimodal Transportation Assessment

Crystal Towers

Arlington, Virginia

July 26, 2022

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Executive Summary

The following report is a Multimodal Transportation Assessment (MMTA) for the Crystal Towers development in the Crystal City area of Arlington, Virginia.

Site Location and Study Area

The proposed development site is located in the Crystal City area of Arlington, Virginia and is bounded by 15th Street S. to the north, S. Eads Street to the east, 18th Street S. to the south, and S. Fern Street to the west, as shown in Figure 2. The study area includes the same general extents.

The vehicular study area consists of nine (9) intersections along 15th Street S., S. Eads Street, 18th Street S., and S. Fern Street, as vetted and approved by Arlington County.

The development site is located at the existing Crystal Towers Apartments complex. The site is currently zoned as RA4.8: Multiple-Family Dwelling District and is shown as a high-medium residential land use in the GLUP.

Proposed Project

The proposed development will construct a new multifamily and retail project at the existing Crystal Towers site. The development will include a 11-story residential building with ground floor retail (the “residential building), plus a separate 1-story retail building (the “retail building”). The development will include a total of approximately 209 residential units and approximately 28,000 square feet of ground-floor retail.

The development will provide approximately 41 parking spaces in a below-grade parking garage in the residential building which will be accessed from the existing below-grade garage at Crystal Towers. Additional spaces in the existing Crystal Towers garage will also serve residents of the new building. 30 spaces within the existing Crystal Towers surface parking lot will be designated to serve the ground floor retail, and 10 spaces within the surface parking lot will be designated as residential visitor parking for the new residential building.

The below-grade garage in the residential building will be connected internally to the existing below-grade garage at Crystal Towers; vehicles will access the new garage from the existing Crystal Towers garage. The existing northern Crystal Towers garage entry near S. Eads Street will be closed as a result of the proposed development. The existing Crystal Towers garage exit near S. Eads Street will also be closed. The existing southern Crystal Towers garage exit near 18th Street S. will be converted into a two-way access point into the garage and will serve as the primary access point for both the existing Crystal Towers garage and the proposed below-grade garage in the residential building.

The existing pick-up/drop-off loop adjacent to the existing Crystal Towers Apartments lobby will be eliminated with the construction of the new residential building. A new pick-up/drop-off loop will be provided in front of the new residential building; this loop will be accessed via a two-way driveway on S. Eads Street in approximately the same location as the existing site driveway on S. Eads Street. A one-way driveway will be provided which connects the new pick-up/drop-off loop to the existing surface parking near 18th Street S.; this driveway will allow vehicles in the pick-up/drop-off loop to circulate internally through the site to exit via the driveways on 18th Street S. or S. Fern Street.

Access to the portions of the surface parking lot that will remain with the proposed development will occur at the site driveways on 18th Street S., S. Fern Street, and the two northernmost site driveways on S. Eads Street. Vehicles will access the proposed garage entry from these 18th Street S., S. Fern Street, and S. Eads Street driveways by circulating through the site’s surface parking lots.

Access to the residential building loading will be provided via internal circulation from the existing site driveway on 18th Street S. Access to the retail building loading will be provided via the northernmost driveway off S. Eads Street.

The proposed development will provide two (2) 40-foot loading berths in the residential building and one (1) 40-foot loading berth and one (1) 30-foot loading berth in the retail building. The number of on-site loading facilities will accommodate the practical needs of the development.

Policies and Goals

The Arlington County Master Transportation Plan (MTP), adopted in 2011 and updated in 2019, outlines goals to improve various modes of transportation throughout the County. Similarly, the Crystal City Sector Plan, adopted by the County Board in 2010, developed a series of goals and objectives specifically for Crystal City. The Crystal Towers development achieves several of the goals and policies of both the MTP, Sector Plan, and other guiding documents for the County.

The Pentagon City Sector Plan, which was approved in February 2022, and accompanying transportation analysis, which was released in November 2021, identifies potential improvements to

the multi-modal transportation system to better accommodate additional trips generated by future redevelopment.

Multi-Modal Overview

Transit

The subject site is well-served by transit:

- The development is located 0.1 miles from the Crystal City Metro Station, 0.6 miles from the Pentagon City Metro Station, and 0.4 miles from VRE.
- There are 19 bus stops within a quarter-mile of the site. These stops are directly served by WMATA (Metrobus), Metroway, and Arlington Transit (ART), OmniRide, Fairfax Connector, and Loudoun County Commuter routes.
- Future planned transit improvements in the vicinity of the site include an extension of the transitway as part of the Transitway Extension to Pentagon City. These will further improve transit access by providing additional facilities and connectivity via Metroway.
- Metroway is a premium bus service that connects the Pentagon City, Crystal City, and Potomac Yards neighborhood (National Landing), as well as the Braddock Road neighborhood in Alexandria, VA. Metroway buses travel in mixed traffic adjacent to the site along Crystal Drive and in other segments; however, there are also sections of the route in Crystal City and Potomac Yards where Metroway buses operate in dedicated bus-only lanes. The nearest stop to the site is at the Crystal City Metro Station.

Pedestrian

The site is surrounded by a well-connected pedestrian network. Pedestrian facilities around the site provide a quality walking environment, with some deficiences. Of note, there are sidewalks closed due to construction along S. Eads Street, 15th Street S., and S. Elm Street to the north of the site. Additionally, no sidewalks are located along the west side of S. Clark Street north of 15th Street S. Some residential streets in the neighborhood to the southwest of the project site are also missing sidewalks. Despite these deficiencies, all primary pedestrian destinations are accessible via routes with sidewalks, most of which meet Arlington County and ADA standards.

As a result of the development, pedestrian facilities will be improved along the site frontage on S. Eads Street to meet or exceed Arlington County and ADA standards. This includes improvements to the sidewalk along the site frontage along S. Eads Street that meet or exceed width requirements and provide a more inviting pedestrian environment.

Bicycle

The site has access to several on- and off-street bicycle facilities, including protected bike lanes on portions of S. Eads Street and S. Hayes Street, and bike lanes on 15th Street S., 18th Street S., S. Hayes Street, portions of 12th Street S., and Crystal Drive which connect to the Mt. Vernon Trail to the east and Four Mile Run Trail to the south.

The recently adopted Bicycle Element of the Arlington County Master Transportation Plan identifies 15th Street S. as a Primary Bicycling Corridor. The plan makes the following recommendations:

- Reconstruct Army Navy Drive to include bi-directional, protected bicycle lanes from S. Joyce Street to 12th Street S.
- Construct an off-street cycle track connecting the planned Army Navy Drive protected bicycle lane at 12th Street S. to 18th Street S. and the Crystal City Metrorail station
- Reconstruct 18th Street S. between Richmond Highway (Rt. 1) and Crystal Drive to include an enhanced on-street bicycle facility and improve the connection with the Crystal City Connector Trail. Also identified in the Crystal City Sector Plan.
- Upgrade the existing bicycle lanes on S. Joyce Street and 15th Street S. between Army Navy Drive and S. Hayes Street to include more separation from motor vehicle traffic.
- Develop an enhanced bicycle facility on S. Fern Street between the Pentagon reservation and 18th Street South.

The Crystal City Bike Network includes recommendations for new bicycle facilities, including the following in the vicinity of the site:

- Southbound protected bicycle lane on Crystal Drive between 18th Street S. and 23rd Street S.
- Northbound, contraflow protected bicycle lane on S. Clark Street between 23rd Street S. and 20th Street S.
- Two-way cycle track on S. Clark Street between 23rd Street and 27th Street.
- Protected or buffered/partially buffered eastbound and westbound bicycle lanes on 15th Street S., 18th Street S. and 23rd Street S.

A number of planned or approved projects will improve bicycle infrastructure and connectivity in the vicinity of the proposed development:

- As part of the Army Navy Drive Complete Street project, a two-way cycle track will be installed along the south side of Army Navy Drive between S. Joyce Street and 12th Street S.
- As part of the S. Eads Street Complete Street project, buffered bicycle lanes will also be installed on the east side of S. Eads Street from Army Navy Drive to 12th Street S.
- As part of the S. Eads Street Protected Bicycle Lanes Extension and Metropolitan Park 6, 7, 8 project, protected bicycle lanes will be installed along both sides of S. Eads Street from 12th Street S. to 15th Street S. and the S. Eads Street and 15th Street S. intersection will be reconfigured as a protected intersection.
- As part of the 12th Street S. Complete Street project, shared lanes are planned from S. Hayes Street to Clark Street/Long Bridge Drive.
- As part of the 15th Street S./S. Clark-Bell Street Realignment project, an off-street trail will be installed along the west side of S. Clark Street between 12th Street S. and 18th Street S.
- As part of the 18th Street South Complete Street Project, protected bicycle lanes will be installed along both sides of 18th Street S. from S. Fern Street to S. Eads Street.
- As part of the PenPlace development, a northbound protected bike lane will be provided along the eastern side of S. Fern Street between Army Navy Drive and 12th Street S., and a southbound protected bike lane will be provided along the western side of S. Fern Street between Army Navy Drive and 11th Street S./Site Driveway.

Two additional bicycle infrastructure improvements are planned in the study area as part of other planned projects:

- As part of the 23rd Street Realignment project, eastbound and westbound protected bike lanes will be added on 23rd Street S. between Crystal Drive and S. Clark Street, improving east-west connectivity. The project will also add two (2) protected intersection corners along 23rd Street S., the southeast corner of S. Clark Street and 23rd Street S. and the northwest corner of Crystal Drive and 23rd Street S. Protected intersection corners improve sightlines and provide more separation between bicycles and vehicles. The project will also add a bike box on the westbound approach of the S. Clark Street and 23rd Street S. intersection.
- As part of the 2000 and 2001 S. Bell Street project, the segment of S. Clark Street between 20th Street S. and the project's proposed Connector Road will be removed. The project will also provide a bike lane along the proposed Connector Road and the S. Bell Street extension. Per the County's proposed Crystal City Bike Network, the existing bike lane on S. Clark Street between 20th Street S. and 23rd Street S. will be shifted from the west side of S. Clark Street to the east side of S. Clark Street. This shift will connect to the bicycle facilities provided by the 2000 and 2001 S. Bell project, providing a continuous northbound bicycle connection between 20th Street S. and 23rd Street S.

Vehicular

The site is accessible from several principal arterials such as Route 1, VA-27 (Washington Boulevard), VA-244 (Columbia Pike), and VA-110. The arterials create connections to I-395, I-66, George Washington Memorial Parkway, and ultimately the Capital Beltway (I-495) and I-95. These principal arterial roadways bring vehicular traffic within half-mile of the site, at which point minor arterials, collectors, and local roads can be used to access the site directly.

Existing Conditions

Intersection capacity analyses were performed for the morning and afternoon peak hours at study area intersections. Synchro version 10 was used to analyze the study intersections based on the *Highway Capacity Manual* (HCM) 2000 methodology.

The existing conditions analysis shows that many intersections and movements operate at an acceptable level of service during the morning and afternoon peak hours. However, of the 9 intersections in the study area, one (1) intersection has one or more movements that operate at levels beyond Level of Service (LOS) E or better in one or more peak hour. LOS E is typically used as the acceptable LOS threshold in the County; although LOS F is generally accepted in urbanized areas if vehicular improvements would be a detriment to safety or to non-auto modes of transportation. The capacity analysis results also show that four (4) intersections have 95th percentile queues that exceed the available storage length in one or more peak hour in existing conditions.

Travel Demand Assumptions

Mode split (also called mode share) is the percentage of travelers using a particular type (or mode) of transportation when traveling. The main source of mode split information for this report was based on Census data using Traffic Analysis Districts (TADs) and data contained in the Crystal City Multimodal

Transportation Study, the WMATA Ridership Survey, and the Arlington County Mode Share Assumptions for Crystal City. The following mode splits were assumed in the analysis, as vetted and approved by Arlington County:

- Residential
  - Auto – 27%, Transit – 61%, Bike – 5%, Walk – 7%
- Neighborhood-Serving Retail
  - Auto – 5%, Transit – 15%, Bike – 5%, Walk – 75%

Weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) Trip Generation, 10th Edition.

Residential trip generation is based on the development program of 209 residential dwelling units. The proposed residential building includes nine (9) levels of residential units, with retail on the ground level. Residential trip generation was calculated based on ITE Land Use 221 (Multifamily Housing – Mid-Rise), using the setting/location of Dense Multi-Use Urban, splitting trips into different modes using assumptions outlined in the mode split section of this report.

Retail trip generation is based on the development program of 28,000 square feet of neighborhood-serving ground floor retail. Retail trip generation was calculated based on ITE's baseline vehicular trips for Land Use 820 (Shopping Center), using the setting/location of General Urban/Suburban (limited data is available for person trips), splitting trips into different modes using assumptions outlined in the mode split section of this report.

Future Improvements

A number of planned transportation improvements in the vicinity of the Crystal Towers development are expected to be complete by 2025. The full list of improvements is detailed in the report, but examples include:

- 18th Street South Complete Street Project
- Metropolitan Park 6, 7, and 8
- PenPlace

Future Traffic Operations

A capacity analysis was developed to compare the future roadway network without the proposed development to the future roadway network with the proposed development. Intersection capacity analyses were performed for the morning and afternoon peak hours at study area intersections. Synchro version 10 was used to analyze the study intersections based on the *Highway Capacity Manual* (HCM) 2000 methodology.

Traffic projections for 2025 are based on existing volumes, plus traffic generated by approved nearby background developments to account for local growth, regional growth, and traffic generated by the proposed development. The methodology of using background development trips to account for local growth is consistent with other MMTAs in Arlington County and has been vetted and approved by the County.

Mitigations

Mitigation measures were identified based on Arlington County standards and as outlined in the approved scoping document. The proposed development is considered to have an impact at an intersection if any of the following conditions are met:

- The overall intersection or any movement operates at LOS F in the future conditions with the proposed development where it operates at LOS E or better in the background conditions without the proposed development;
- The overall intersection or any movement operates at LOS F during the background condition and the delay increases by more than 10% in the future conditions with the proposed development; or
- If any 95th percentile queue length in the future condition exceeds the available capacity where it does not in the background conditions or increases by more than 150 feet where it already exceeds the available capacity in the background conditions.

Following these guidelines, mitigation measures were explored and included the following recommendation(s):

- Adjustments to signal timings at three (3) intersections.

With these mitigations in place, the analysis shows that traffic operations with the proposed development will improve or are consistent with the Background scenario at many intersections.

Transportation Management Plan

A Transportation Management Plan (TMP) will be provided for the project based on the County's requirements, and a framework for a TMP is included in this report. This TMP will include typical components such as the establishment of a TMP coordinator, the distribution of transit literature, the establishment of ride-sharing programs, and the on-site sale of discounted fare media. Management measures taken by the proposed Crystal Towers development can be monitored and adjusted as needed

to continually create opportunities to reduce the amount of vehicular traffic generated by the site.

Summary and Recommendations

This report concludes that the proposed development will not have a detrimental impact to the surrounding transportation and roadway network, assuming that all planned site design elements and recommended mitigation measures are implemented.

The development has many positive elements contained within its design that minimize potential transportation impacts, including:

- The proposed development's close proximity to the Crystal City Metro Station Crystal City VRE Station, and multiple bus lines.
- Improvements to the pedestrian facilities adjacent to the site that meet or exceed Arlington County and ADA requirements.
- The inclusion of secure-long-term bicycle parking meeting zoning requirements.
- The installation of short-term bicycle parking spaces along the site frontage on S. Eads Street that meet zoning requirements.
- A Transportation Management Plan (TMP) that aims to reduce the demand of single-occupancy, private vehicles to/from the proposed development during peak period travel times or shifts single-occupancy vehicular demand to off-peak periods.

Introduction

This report presents the findings of a Multimodal Transportation Assessment (MMTA) conducted for the proposed Crystal Towers development in Arlington, VA.

The development site is located at the existing Crystal Towers Apartments complex. The proposed development would develop two additional buildings on the site: a 11-story residential building with ground floor retail (the "residential building), and a separate 1-story retail building (the "retail building"). The development will include a total of approximately 209 residential units and approximately 28,000 square feet of ground-floor retail. The proposed project build-out year is 2025.

The site is currently zoned as RA4.8: Multiple-Family Dwelling District and is shown as a high-medium residential land use in the GLUP.

Purpose of Study

The purpose of this study is to evaluate the transportation network in the vicinity of the site and identify any potential transportation impacts that may result from the proposed redevelopment. Elements of this report include a description of the proposed development, an evaluation of the existing multimodal transportation network, and evaluations of the future transportation network with and without the proposed development.

Study Tasks

The following tasks were completed as part of this study:

- A scoping form dated May 9, 2022 was submitted by Gorove Slade to Arlington County and accepted on May 10, 2022. This scope includes discussions about the parameters of the study and relevant background information. A copy of the signed scoping document is included in the Technical Appendix.
- Traffic counts at the study area intersections were conducted on October 2, 2019, November 19, 2019, and March 24, 2022, during the morning and evening peak periods.
- As outlined in the scoping document, a number of proposed developments in the vicinity of the site were assumed to be in place for the Background (2025) and Future (2025) Conditions.
- Proposed site traffic volumes were generated based on the methodology outlined in Trip Generation, 10th Edition published by the Institute of Transportation Engineers (ITE).
- Intersection capacity analyses were performed using the software package Synchro, Version 10 based on the Highway Capacity Manual (HCM) methodology. Traffic analyses were performed for existing conditions (2022) and future conditions (2025) with and without development.
- A Transportation Management Plan framework was developed as a TMP will be necessary to meet County requirements.

Project Summary

Site Location

The project site is located in the Crystal City area of Arlington, Virginia. Figure 1 shows the regional location of the project. The project site is bounded by 15th Street S. to the north, S. Eads Street to the east, 18th Street S. to the south, and S. Fern Street to the west. The site location is shown in Figure 2.

Parcel Information

The project site is located on two parcels occupied by the existing Crystal Towers complex. A parcel map showing the location of the property is presented in Figure 3.

General Land Use Plan Recommendations

According to Arlington County's General Land Use Plan (GLUP), this site is listed as a high-medium residential land use. The GLUP map for the site is shown in Figure 4. The site is currently zoned RA4.8: Multiple-Family Dwelling District. The zoning map is shown in Figure 5.

Proposed Site Plan

The development site is located at the existing Crystal Towers Apartments complex. The proposed development would develop two additional buildings on the site: a 11-story residential building with ground floor retail (the "residential building), and a separate 1-story retail building (the "retail building"). The development will include a total of approximately 209 residential units and approximately 28,000 square feet of ground-floor retail. The development will provide approximately 41 parking spaces in a below-grade parking garage in the residential building which will be accessed from the existing below-grade garage at Crystal Towers. Additional spaces in the existing Crystal Towers garage will serve residents of the new building. 30 spaces within the existing Crystal Towers surface parking lot will be designated to serve the ground floor retail, and 10 spaces within the surface

parking lot will be designated as residential visitor parking for the new residential building. The proposed build-out year is 2025. The proposed site plan is shown in Figure 6 and Figure 7.

Scope and Limits of the Study Area

The study area is generally bounded by S. Fern Street to the west, S. Eads Street to the east, 15th Street S. to the north, and 18th Street S. to the south. The following intersections were identified for inclusion in the vehicular study area, as shown in Figure 8.

1. 15th Street S. and S. Fern Street
2. 15th Street S. and S. Elm Street
3. 15th Street S. and S. Eads Street
4. S. Fern Street and Crystal Towers Driveway
5. S. Eads Street and Crystal Towers Driveway (N)
6. S. Eads Street and Crystal Towers Driveway (S)
7. 18th Street S./S. Hayes Street and S. Fern Street
8. 18th Street S. and Crystal Towers Driveway
9. 18th Street S. and S. Eads Street

Data Sources

Sources of data for this study include Arlington County, the Institute of Transportation Engineers (ITE) Trip Generation, 10th Edition, Census Transportation Planning Products (CTPP), Dweck Properties, bKL Architecture, Bowman Consulting, and the office files and field reconnaissance efforts of Gorove Slade Associates, Inc.

Contents of Study

This report contains 10 chapters as follows:

- Study Area Overview
  This chapter reviews the area near and adjacent to the project and includes an overview of the site location.
- Transit
  This chapter summarizes the existing and future transit service adjacent to the site, reviews how the project's transit demand will be accommodated, outlines impacts, and presents recommendations as needed.
- Pedestrian Facilities
  This chapter summarizes existing and future pedestrian access to the site, reviews walking routes to and from the project site, outlines impacts, and presents recommendations as needed.
- Bicycle Facilities
  This chapter summarizes existing and future bicycle access to the site, reviews the quality of cycling routes to and from the project site, outlines impacts, and presents recommendations as needed.
- Project Design
  This chapter reviews the transportation components of the project, including the site plan and access.
- Travel Demand Assumptions
  This chapter outlines the travel demand of the proposed project. It summarizes the expected mode splits and multimodal trip generation of the project.
- Traffic Operations
  This chapter provides a summary of the existing roadway facilities and an analysis of the existing and future roadway capacity in the study area. It summarizes the routing assumptions used in the analysis. This chapter highlights the vehicular impacts of the project, including presenting mitigation measures for minimizing impacts as needed.
- Transportation Management Plan
  This chapter outlines the components of the proposed development's Transportation Management Plan (TMP).
- Safety Review
  This chapter reviews the findings of a crash data analysis of adjacent intersections and frontage of the proposed project.
- Summary and Conclusions
  This chapter presents a summary of the recommended mitigation measures by mode and presents overall findings and conclusions.

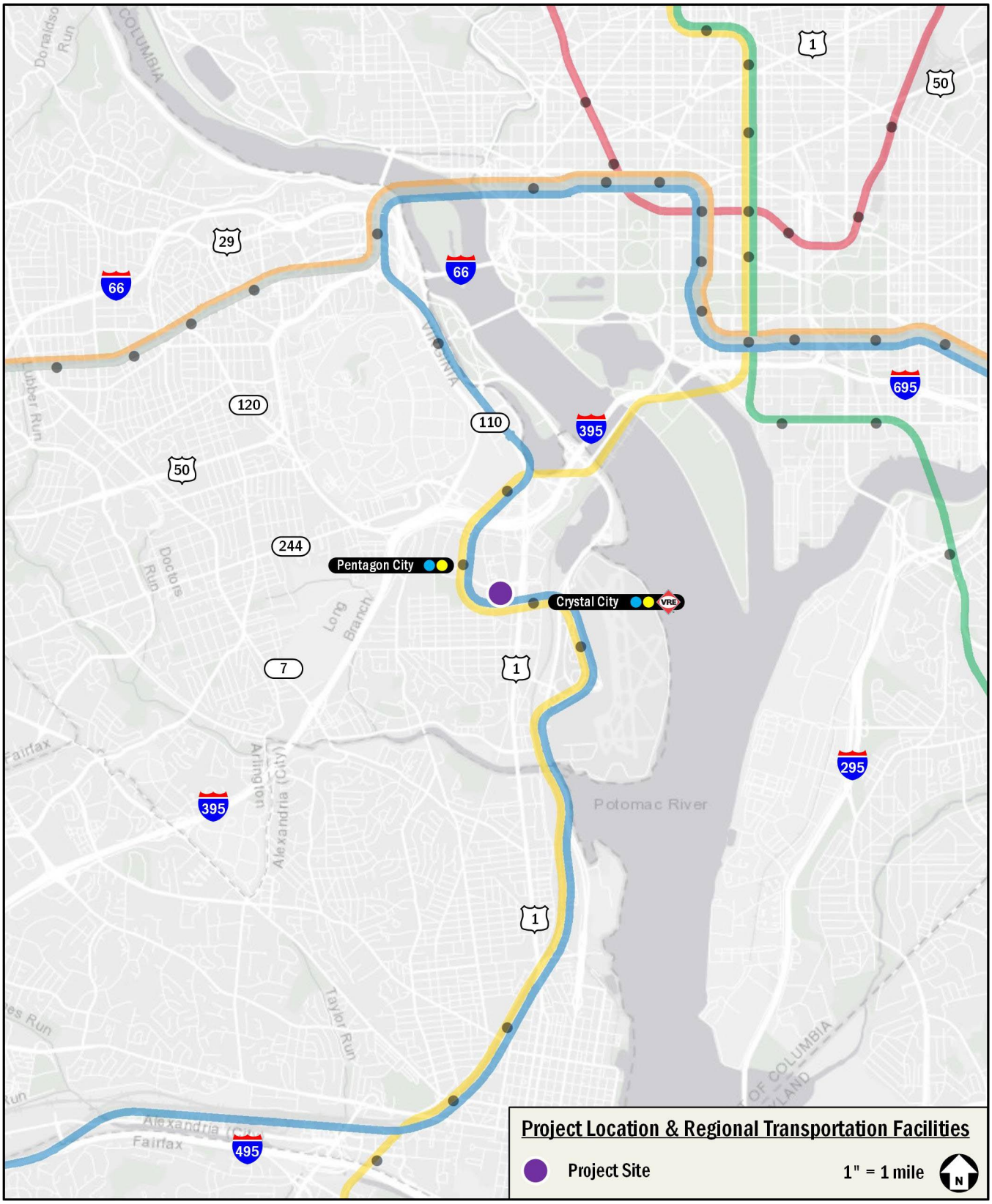

Figure 1: Major Regional Transportation Facilities

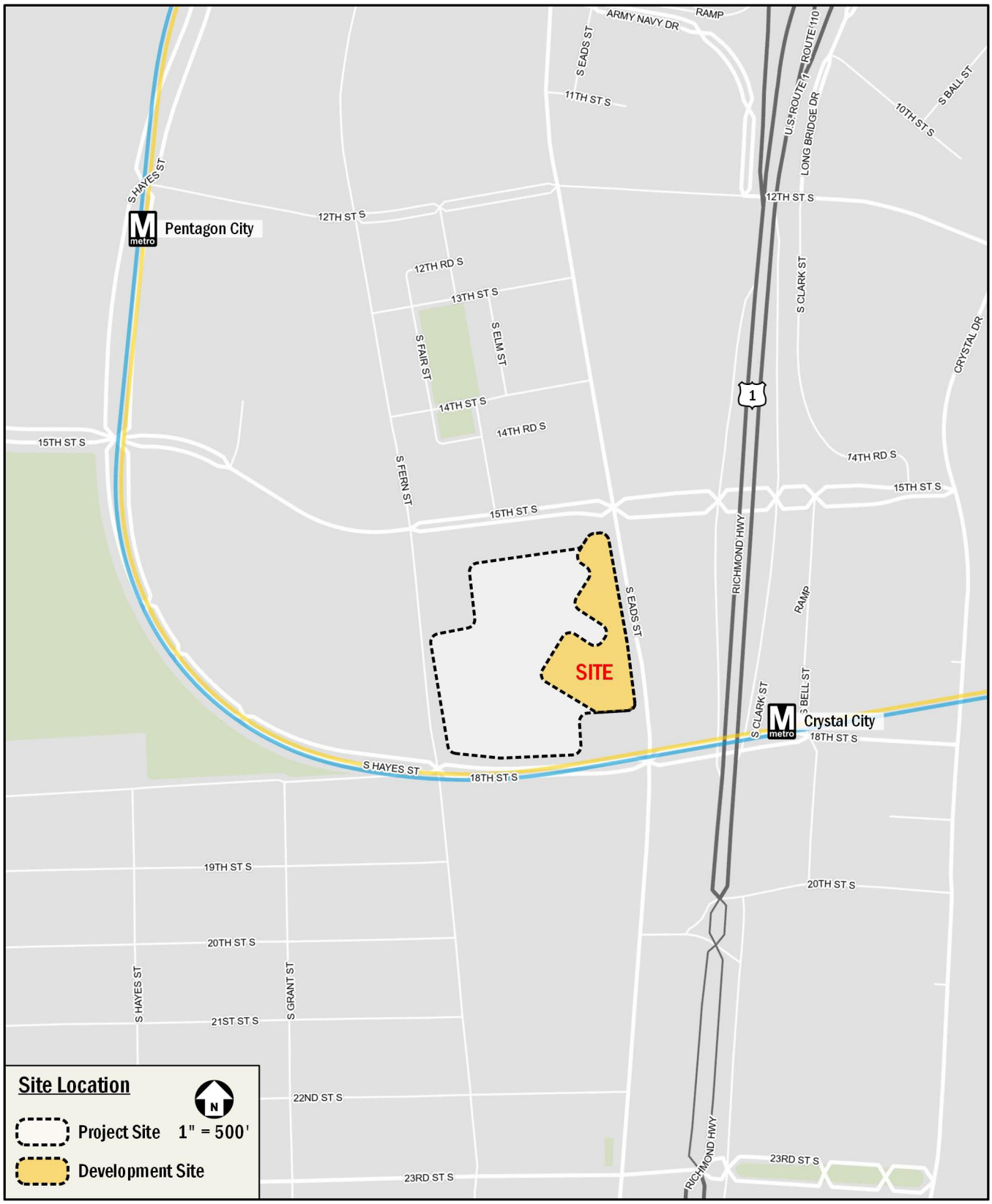

Figure 2: Site Location

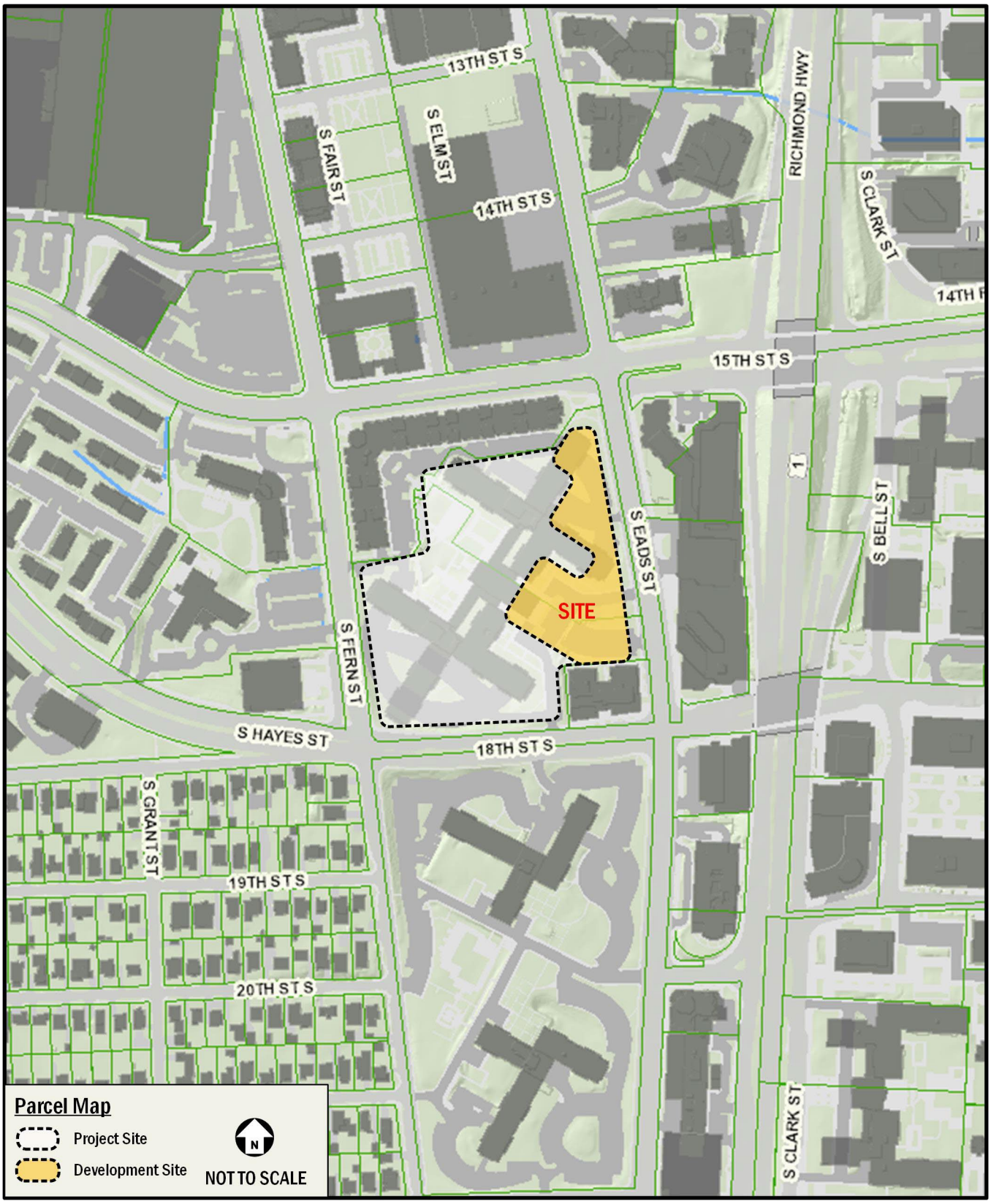

Figure 3: Parcel Map (Source: Arlington County Real Estate Map, January 2022)

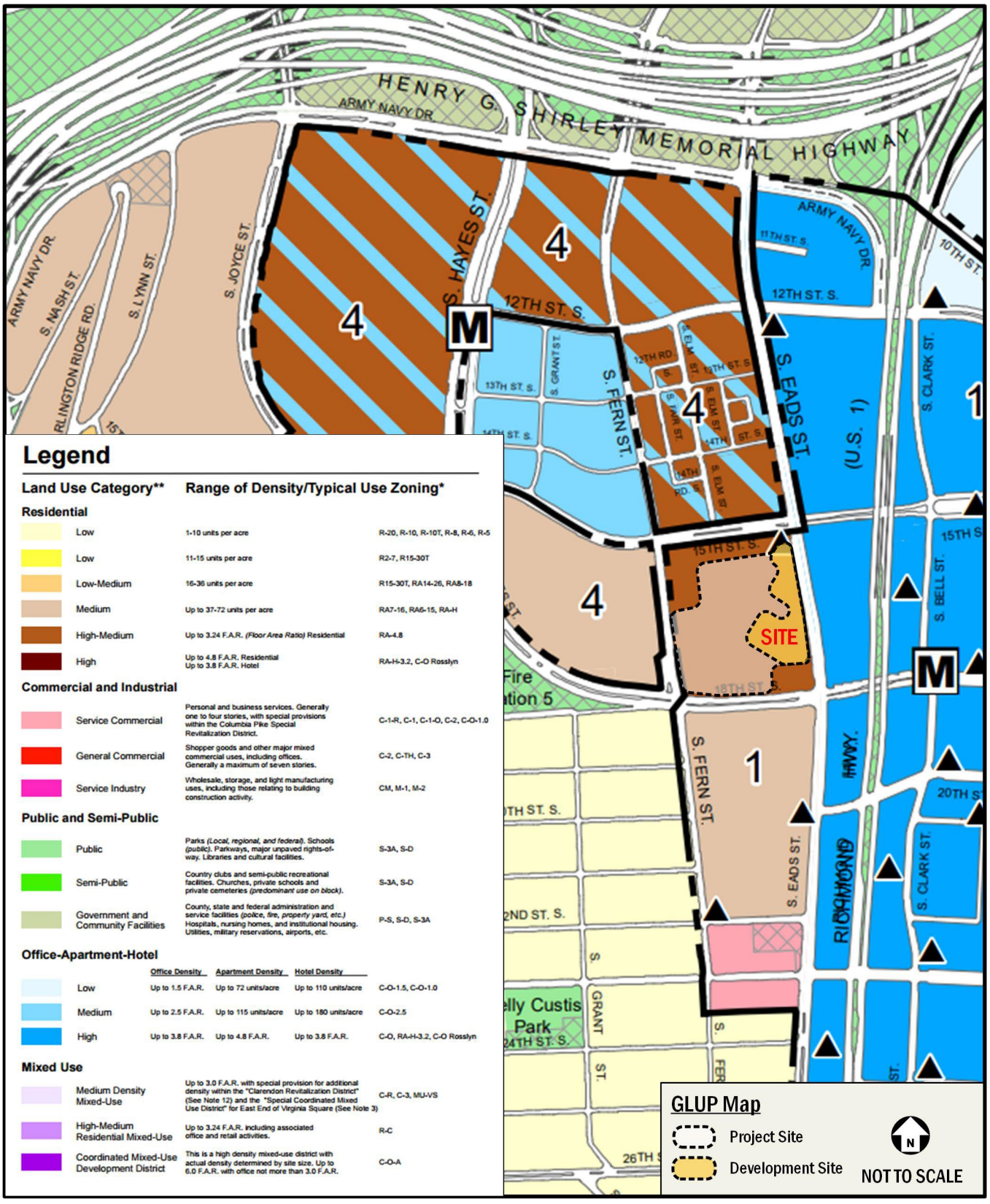

Figure 4: Planned Land Uses (Source: Arlington General Land Use Plan (GLUP), April 2021)

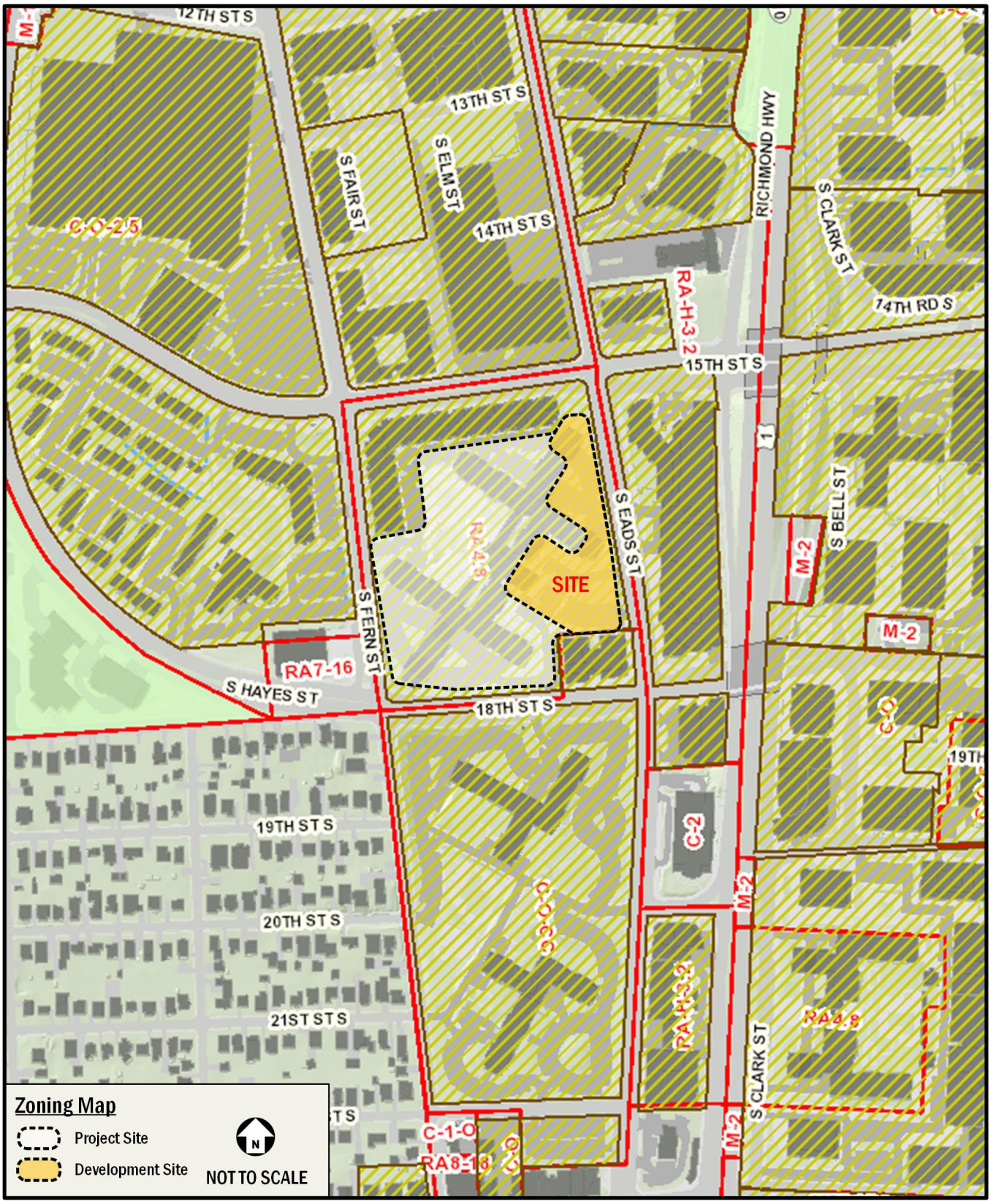

Figure 5: Zoning Map (Source: Arlington County)

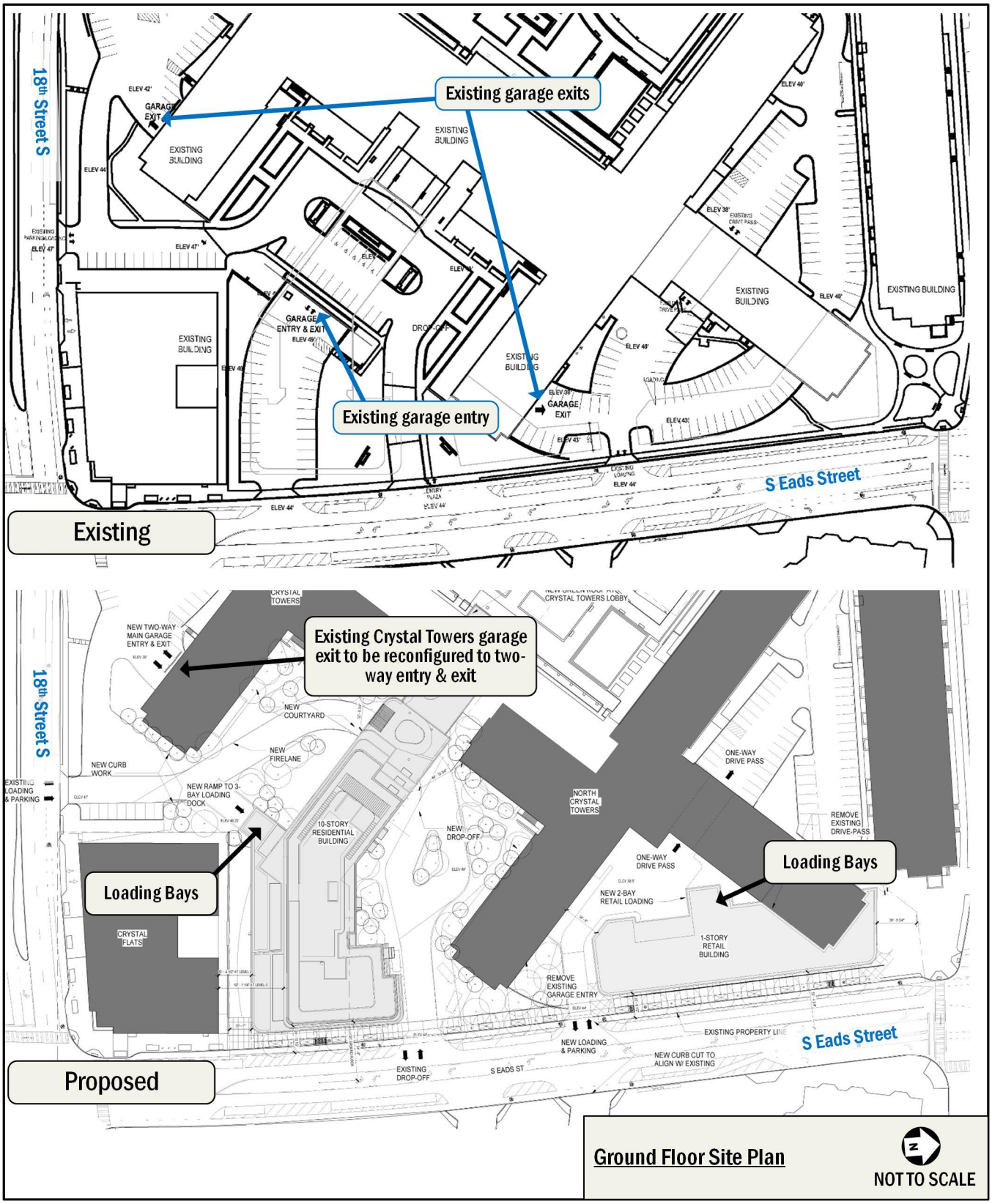

Figure 6: Ground Floor Site Plan

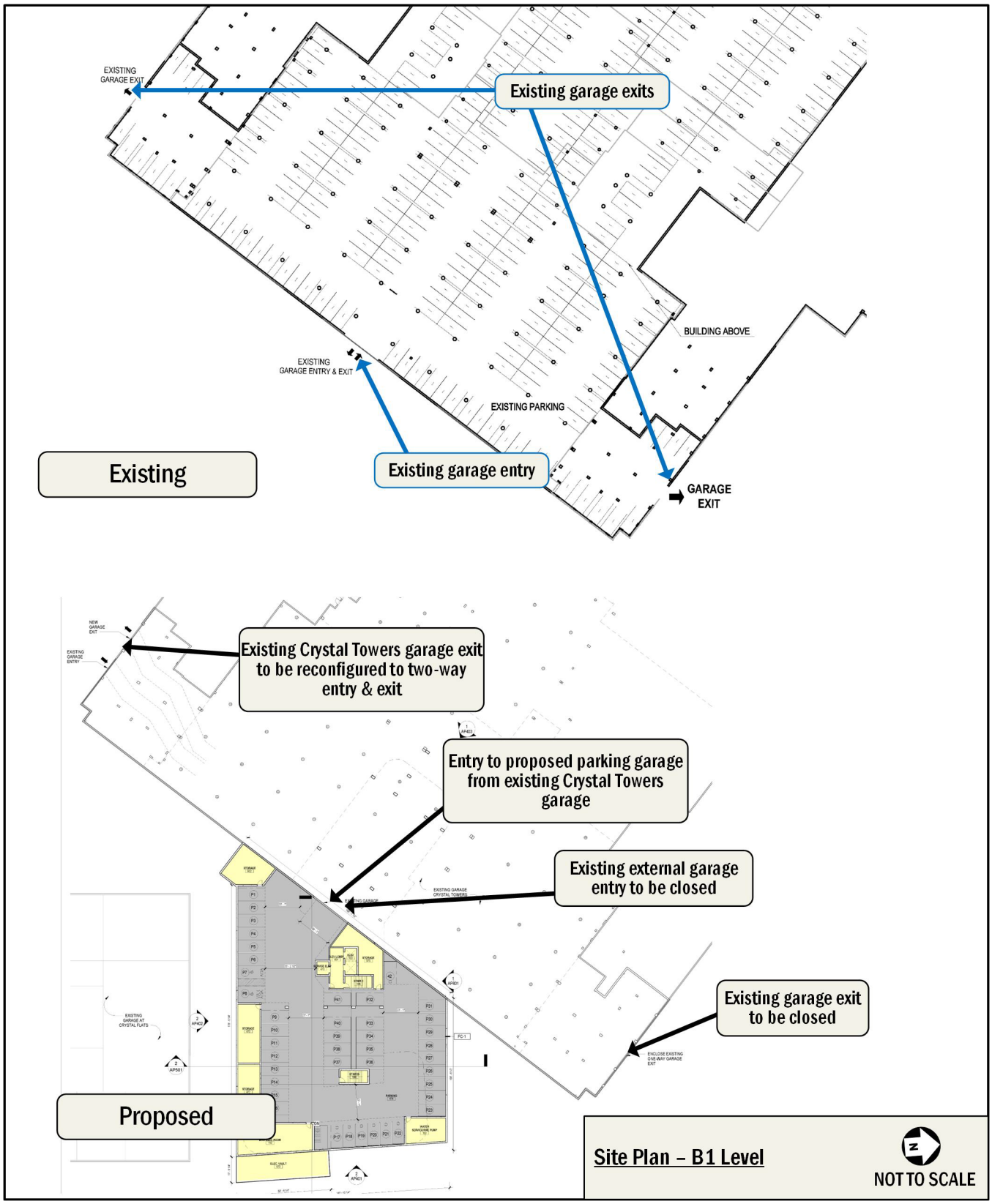

Figure 7: Site Plan – B1 Level

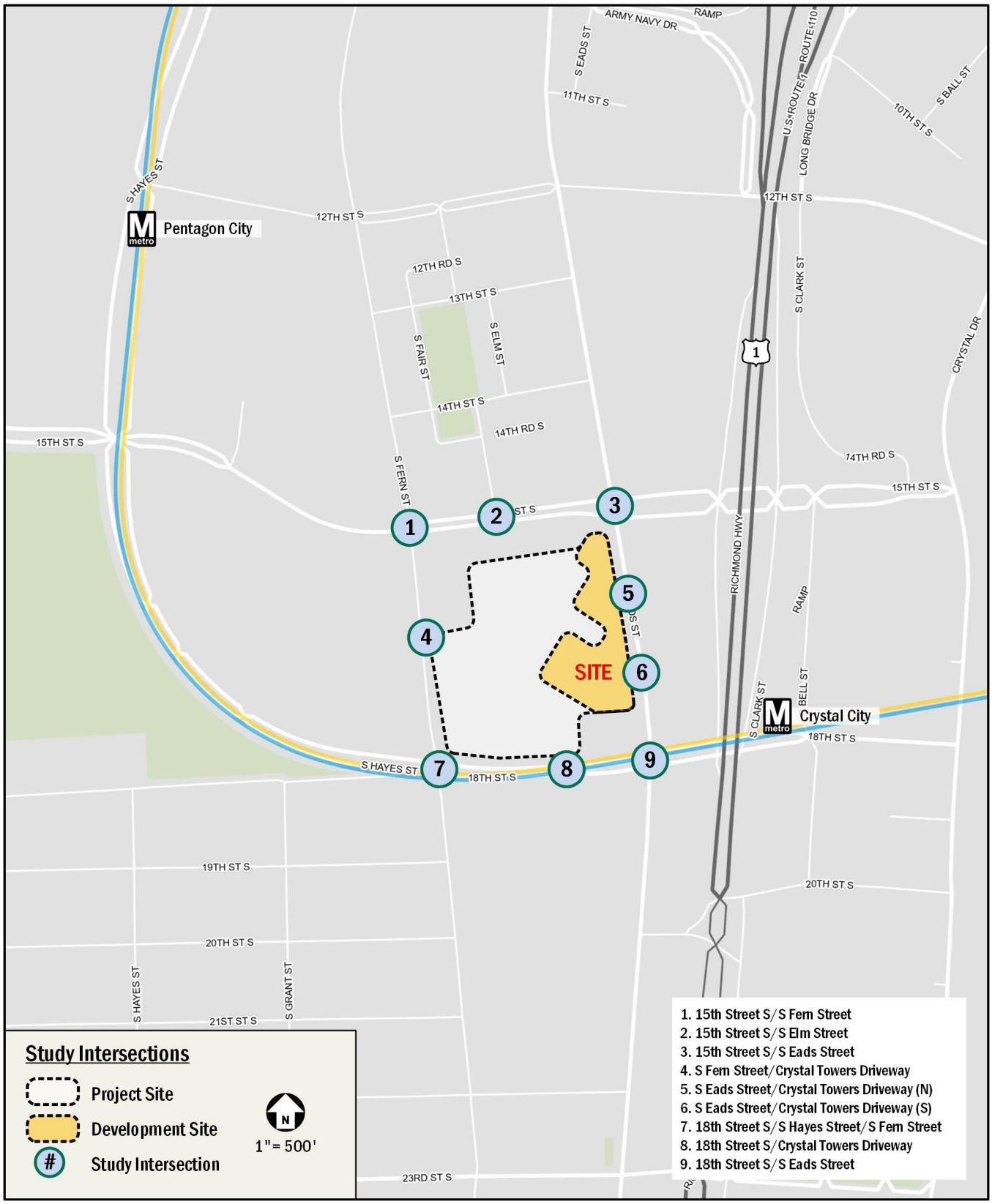

Figure 8: Study Intersections

Study Area Overview

This chapter reviews the existing conditions of the surrounding transportation network and includes an overview of the site location, including a summary of the major transportation characteristics of the area and of future regional projects. Detailed characteristics of each mode and their subsequent study areas will be defined in the following chapters.

The following conclusions are reached within this chapter:

- The site is surrounded by an extensive regional and local transportation system that will accommodate the residents, employees, and patrons of the proposed development.
- The site is well-served by public transportation with access to the Metrorail's Blue and Yellow Lines and several local and regional bus lines.
- The site is surrounded by a well-connected pedestrian environment. In the vicinity of the site, sidewalks generally meet standards recommended by the Arlington County Master Transportation Plan with some gaps in the system.
- The site has access to several on- and off-street bicycle facilities, including bike lanes on S. Eads Street, 12th Street S., S. Hayes Street, 15th Street S., 18th Street S., S. Bell Street, and Crystal Drive which connect to the Mt. Vernon Trail to the north and Four Mile Run Trail to the south.
- Several local initiatives will positively impact the study area, including the S. Eads Street Complete Street project, Army Navy Drive Complete Street project, the 12th Street S. Complete Street project, the 18th Street S. Complete Street project, the 15th Street S. pedestrian improvements project, and the Route 1 Multimodal Improvements Study.

Major Transportation Features

Overview of Regional Access

Under existing conditions, the proposed development site has ample access to regional vehicular and transit-based transportation options, as shown in Figure 1, that connect the site to destinations within Virginia, the District, and Maryland.

The site is accessible from several principal arterials such as Route 1, VA-27 (Washington Boulevard), VA-244 (Columbia Pike), and VA-110. The arterials create connections to I-395, I-66, George Washington Memorial Parkway, and ultimately the Capital Beltway (I-495) and I-95. These principal arterial roadways bring vehicular traffic within half-mile of the site, at which point minor arterials, collectors, and local roads can be used to access the site directly.

The site has access to the Blue and Yellow Lines via the Crystal City Metro Station, which provide connections to areas in Virginia, the District, and Maryland. The Blue Line connects Springfield, VA with Largo, MD and the Yellow Line connects Huntington, VA with Greenbelt, MD, with both lines providing access to the District core. Both lines provide connections to the Red Line, which provides a direct connection to Union Station, a hub for commuter rail – such as Amtrak, MARC, and VRE – in addition to all additional Metrorail lines, allowing for access to much of the DC Metropolitan area. The site is located approximately 0.4 miles west of the Crystal City VRE station.

The proposed development is located approximately 0.3 miles from the Mount Vernon Trail, an 18-mile off-street bicycle trail running along the Potomac River from George Washington's Mount Vernon estate to Theodore Roosevelt Island, just across the river from downtown Washington, DC. The Mount Vernon Trail connects to the W&OD, Four Mile Run, and Custis Trails in Arlington County, as well as the Capital Crescent Trail in Washington, DC, providing regional bicycle connectivity to Rosslyn and the District. A detailed review of existing bicycle infrastructure is provided in a later chapter of this report.

Overall, the site has access to several regional roadways, transit, and bicycle options, making it convenient to travel between the site and destinations in the Virginia, the District, and Maryland.

Overview of Local Access

There are several local transportation options near the site that serve vehicular, transit, walking, and cycling trips under existing conditions, as shown on Figure 9.

In addition to several principal arterials, the site is served by a local vehicular network that includes several minor arterials and collectors such as S. Eads Street, S. Fern Street, 18th Street S., 15th Street S., S. Hayes Street, and 23rd Street S. In addition, there is an existing network of local roadways that provide access to the site.

Several bus systems provide local transit service in the vicinity of the site, including connections to several neighborhoods within Virginia, the District, and additional Metro stations. As shown in Figure 9, there are multiple bus routes that serve the site. In the

vicinity of the site the majority of routes travel along 15th Street S., S. Eads Street, and 18th Street S.

There are existing bicycle facilities that connect the site to areas within Arlington, Virginia, and the District, most notably the Mount Vernon Trail. There are bicycle lanes on 15th Street S., S. Hayes Street, Crystal Drive, and 18th Street S., and buffered or protected bike lanes along portions of S. Eads Street and S. Hayes Street. There are also shared lanes on S. Bell Street and signed bicycle routes along S. Fern Street, S. Clark Street, and portions of 18th Street S. A detailed review of existing and proposed bicycle facilities and connectivity is provided in a later chapter of this report.

In the vicinity of the site, most sidewalks meet Americans with Disabilities Act (ADA) standards and standards recommended by the Arlington Master Transportation Plan. Anticipated pedestrian routes, such as those to public transportation stops, retail zones, nearby residential areas, and community amenities, provide well-connected pedestrian facilities. A detailed review of existing and proposed pedestrian access and infrastructure is provided in a later chapter of this report.

Overall, the site is surrounded by an extensive local transportation network that allows for efficient transportation options via transit, bicycle, walking, or vehicular modes.

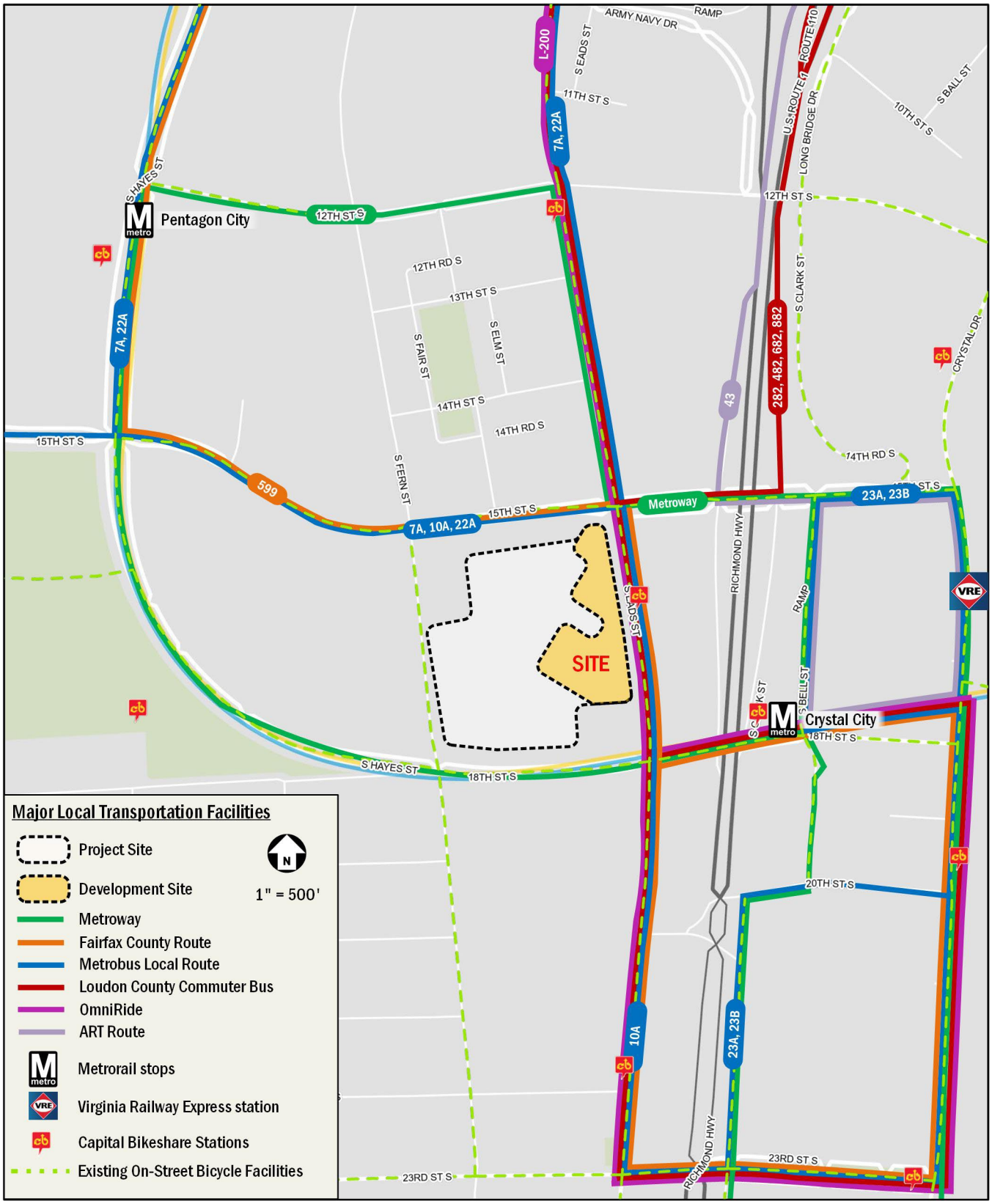

Figure 9: Major Local Transportation Facilities

Car-sharing

Car-sharing service in Arlington is provided by Zipcar. This is a private company that provides registered users access to a variety of automobiles. Zipcar has designated spaces for their vehicles. Four (4) Zipcar locations are located within a quarter-mile of the site. These locations and the number of available vehicles are listed in Table 1.

Table 1: Carshare Locations

Zipcar Carshare Location	Number of Vehicles
Acadia at Metropolitan Park Apartments (13th Street S. & S. Fair Street)	1 vehicle
Meridian at Pentagon City (1221 S. Eads Street)	1 vehicle
S. Fern Street and 15th Street S.	2 vehicles
S. Eads Street and 15th Street S.	3 vehicle
Total	**7 vehicles**

E-Scooters and Dockless E-Bicycles

Five (5) electric-assist scooter (e-scooter) and electric-assist bicycle (e-bike) companies provide Shared Mobility Device (SMD) service in Arlington County: Bird, Helbiz, Lime, Link/Superpedestrian, and Spin. These SMDs are provided by private companies that give registered users access to a variety of e-scooter and e-bike options. These devices are used through each company-specific mobile phone application. Many SMDs do not have designated stations where pick-up/drop-off activities occur like with Capital Bikeshare; instead, many SMDs are parked in public space, most commonly in the "furniture zone" (the portion of sidewalk between where people walk and the curb, often where you'll find other street signs, street furniture, trees, parking meters, etc.). At this time, SMD pilot/demonstration programs are underway in Arlington County, the District, Fairfax County, the City of Alexandria, and Montgomery County.

Walk Score and Bike Score

Walkscore.com is a website that provides scores and rankings for the walking, biking, and transit conditions for an area. This project site is located in an area that has a walk score of 88 (or "Very Walkable"), transit score of 76 (or "Excellent Transit"), and a bike score of 86 (or "Very Bikeable"). Figure 10 shows the neighborhood borders in relation to the site location and displays a heat map for walkability and bikeability.

The site is situated in an area with a "very walkable" walk score because of the abundance of neighborhood serving retail locations, where daily errands can be completed by walking.

The proposed development is located in an area with an "excellent transit" transit score because of its proximity to the Pentagon City Metro Station and the Crystal City Metro Station as well as its proximity to other bus lines.

The site is situated in an area with a "very bikeable" bike score due to its proximity to low volume roadways, a number of bike lanes and trails, including the Mount Vernon Trail, and flat topography.

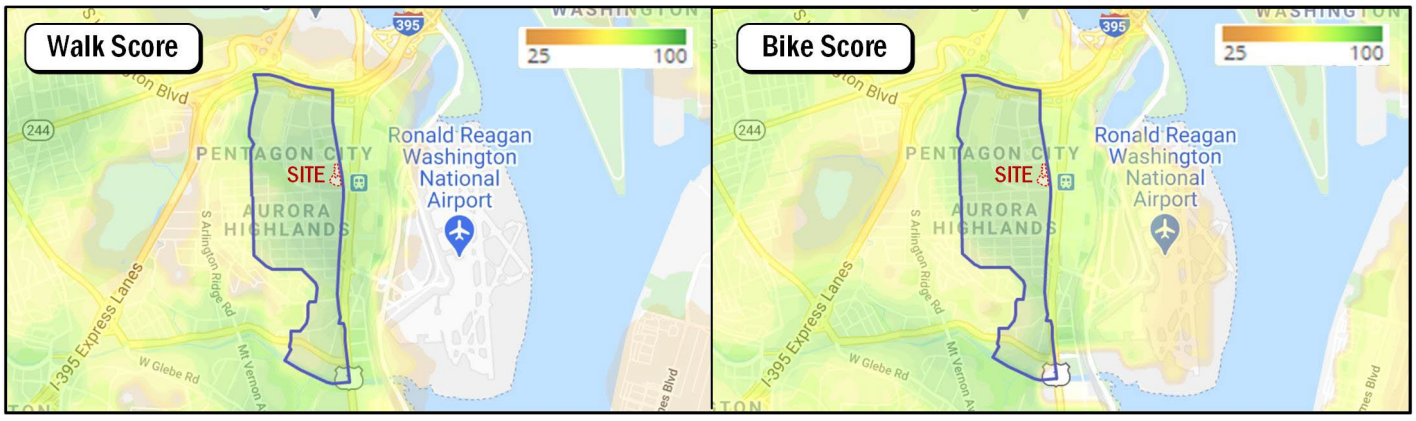

Figure 10: Summary of Walkscore and Bikescore

Future Projects

There are several County-wide initiatives, local initiatives, and planned improvements located in the vicinity of the site. These planned projects are summarized below.

County-wide Initiatives

Arlington Master Transportation Plan (2011)

The Arlington County Master Transportation Plan (MTP), adopted in 2011 and updated in 2019, outlines goals to improve various modes of transportation throughout the County. The MTP identifies goals and objectives for each mode to improve safety and access for all users, particularly for pedestrians, bicyclists, and transit users. The Arlington Master Transportation Plan's recommended policies for transportation in the County that apply to the Crystal Towers development are outlined as follows:

- Streets (2016) – The County will address the street system and enhance the transportation network by: (1) Utilizing the plan's street typology to guide street planning and ensure each street type supports the general policies of complete streets and adjacent land uses; (2) Including appropriate facilities to meet and balance the needs of all modes; (3) Constructing/converting some local streets to a pedestrian priority or a shared street; (4) Accommodating travel growth through shifts to non-auto modes; (5) Designing streets to favor lower vehicular speeds; and (6) Maintaining a grid-style network to enhance connectivity. The planned improvements included in the MTP in the vicinity of the site are shown in Figure 11.
- Transit (2016) – The County will address the transit system by: (1) Developing a Premium Transit Network of high-frequency service connecting major destinations; (2) Operating a Secondary Transit Network of fixed route services that improves access to destinations across Arlington; (3) Making transit more accessible and convenient to all through enhanced facilities and transit-oriented land use policies; (4) Improving Metrorail services and stations; and (5) Expanding pedestrian access to transit facilities.
- Pedestrian (2011) – The County will address the pedestrian system by: (1) Completing the walkway network with appropriate facilities on both sides of arterial streets and at least one side of neighborhood streets; (2) Upgrading existing pedestrian facilities to comply with current standards; (3) Implementing measures aimed at changing motorist behavior to manage vehicular speed and minimize vehicle/pedestrian conflicts; and (4) Developing strategies to encourage more people to walk.
- Bicycle (2019) – The County will address the bicycle system by: (1) Making existing streets safer and more comfortable for bicycling by all users; (2) Expanding travel safety education programs; (3) Providing a network of low-traffic-stress bicycle routes that connect all land uses; (4) Accommodating bicycle infrastructure as part of all street improvement projects; (5) Establishing bicycles as a mainstream travel mode; and (6) Encouraging bicycle facilities, including parking, showers, and lockers. The improvements planned for the bicycle facilities surrounding the site as part of the Plan are shown in Figure 12.
- Parking and Curb Space (2009) – The County will address the parking system by: (1) Prioritizing the use of curb space, matching the various types of uses to the most appropriate locations; (2) Promoting on-street parking within residential neighborhoods and on commercial streets to calm traffic; (3) Ensuring the minimum parking needs are met and limit excessive parking; (4) Discouraging off-street surface parking; and (5) Allowing reduced parking space requirements for new developments in close proximity to frequent transit service and requiring enhanced TDM measures.
- Transportation Demand Management (2008) – The County will address transportation demand management by: (1) Incorporating comprehensive TDM plans for all site plans to minimize vehicular trips and maximize the use of other modes; (2) Exploring strategies and incentives to achieve TDM measures in existing private buildings; and (3) Applying TDM programs to non-work travel, as well as commuting, through marketing strategies.

A number of elements in the proposed development are consistent with these policies:

- Pedestrian:
  - Improvements to the adjacent sidewalks.
- Bicycle:
  - Short-term bicycle parking will be provided along the site frontage on S. Eads Street.
  - Secure, long-term bike parking will be provided in a bike room on the ground floor of the proposed residential building.
- Parking and Curb Space:
  - On-site parking will be located in an off-street, below-grade parking garage.

- Transportation Demand Management:
  - A TMP will be implemented for the development to discourage auto travel and encourage the travel by other modes.

The MTP also identifies the following recommendations in the vicinity of the Crystal Towers development:

- Transit:
  - Expansion of the Crystal City/Potomac Yard transitway into Pentagon City, currently running adjacent to the development site.
- Bicycle:
  - Reconstruct Army Navy Drive to include bi-directional, protected bicycle lanes from S. Joyce Street to 12th Street S.
  - Construct an off-street cycle track connecting the planned Army Navy Drive protected bicycle lane at 12th Street S. to 18th Street S. and the Crystal City Metrorail station.
  - Reconstruct 18th Street S. between Richmond Highway (Rt. 1) and Crystal Drive to include an enhanced on-street bicycle facility and improve the connection with the Crystal City Connector Trail. Also identified in the Crystal City Sector Plan.
  - Upgrade the existing bicycle lanes on S. Joyce Street and 15th Street S. between Army Navy Drive and S. Hayes Street to include more separation from motor vehicle traffic.
  - Develop an enhanced bicycle facility on S Fern Street between the Pentagon reservation and 18th Street South.

In direct relation to the Crystal Towers development, these recommendations would create additional multi-modal capacity and connectivity to/from the site.

Local Initiatives

Crystal City Sector Plan (2010)

The Crystal City Sector Plan, adopted in 2010, outlines the vision to transform Crystal City with more ground floor retail, high-quality office space, and more housing options through improvements to existing street, sidewalk, and bicycle networks. The key transportation-related goals of the Sector Plan include:

- Creating a high-quality public realm that strengthens the sense of community
- Providing a mix of office, residential, retail, cultural, and civic uses
- Preserving the integrity of the single-family neighborhoods
- Enhancing multimodal access and connectivity

The Crystal Towers development is consistent with the outlined goals. The development includes ground floor retail and residential units and provides ample bicycle accommodations on-site. Additionally, recommendations in the Sector Plan may positively impact the connectivity of the development to the surrounding areas. Recommendations include bicycle lanes on Army Navy Drive, S. Eads Street, and 12th Street S., cycle tracks on S. Clark Street/S. Bell Street, and signed bicycle routes on S. Fern Street, 12th Street S., and 15th Street S.

Pentagon City Sector Plan (2019)

Arlington County initiated the Pentagon City Planning Study in 2019 to help guide future development in Pentagon City and define the capacity for the future growth in the Pentagon City Phased Development Site Plan (PDSP). As part of this project, a transportation analysis was conducted that evaluates a series of preliminary land use scenarios and serves as the foundation for the planning study. The draft report for the study, released in January 2022, identifies potential improvements to the multi-modal transportation system to better accommodate additional trips generated by future redevelopment. While the Crystal Towers development is located in Crystal City, just outside of the Pentagon City Plan's extents, there are a number of recommended improvements that will improve multimodal connectivity in the vicinity of the site:

- Minimum 8 ft clear zone for passage along sidewalks on S. Fern Street, S. Eads Street, and 15th Street S.
- Separated bikeways on S. Eads Street, enhanced bicycle facilities on S. Fern Street, a trail or multi-use path along S. Clark Street/S. Bell Street, and separated bikeways along 15th Street S.
- Creation of the Green Ribbon, which at full build-out would create approximately three (3) miles of new or improved pedestrian walks and four (4) acres of new public park space.

Crystal City Multimodal Transportation Study (2010)

The Crystal City Multimodal Transportation Study is a supporting document of the Crystal City Sector Plan that further evaluates the existing and future multimodal transportation network in Crystal City. The study highlights recommendations to improve accommodations for all travel modes, including a Complete Streets program, with recommendations for sidewalks,

crosswalks, bicycle lanes, transit facilities, on-street parking, and left-turn lanes.

Given that the Crystal Towers development is located in Crystal City, multiple recommendations are made near the development. The study recommends: (1) 7- to 8-foot-wide parallel parking lanes on sections of S. Eads Street; (2) Extension of bicycle lanes along S. Eads Street from 15th Street S. to 23rd Street S.; and (3) On-street signed bicycle routes along S. Eads Street from 15th Street S. to Army Navy Drive, S. Fern Street from 15th Street S. to 12th Street S., and 15th Street S. from S. Fern Street to Crystal Drive.

22202 Study (2016)

In response to community concerns regarding the development impacts in Crystal City and Pentagon City, Arlington County completed a study including transportation material, data, and plans for the 22202 Zip Code. The study presents data on past, present, and projected vehicular traffic and multimodal trends for the entire zip code. Among the data presented in the report is the Journey to Work Mode Split information by census tract, which shows a 35% auto mode split in the Crystal City area and a 28% auto mode split in the Pentagon City area, which supports the mode splits assumed in this report.

Planned Improvements

S. Eads Street Complete Street (2014)

Arlington County began implementing a S. Eads Street complete streets project between 12th Street S. and 23rd Street S. in 2014. This project included the conversion of the four-lane roadway into three lanes, with two through vehicular travel lanes, a center two-way left turn lane, and new protected bicycle facilities. Pedestrian crossings were improved and parking lanes were reconfigured. The next phase of the project includes improvements along S. Eads Street between 12th Street S. and Army Navy Drive.

In direct relation to the Crystal Towers development, improvements will include a new protected bicycle lane, sidewalk, streetscape, and lighting near the development on S. Eads Street, improving the multimodal connectivity to/from the site.

Army Navy Drive Complete Street (2017)

The Army Navy Drive Complete Street project will reconfigure Army Navy Drive between S. Joyce Street and 12th Street S. to create a multimodal complete street, featuring enhanced transit, bicycle, and pedestrian facilities. This project will include a physically separated two-way bicycle lane along the south side of Army Navy Drive, shorter and safer pedestrian crossings, and will accommodate future dedicated transit lanes. Vehicular travel lanes will be reduced where appropriate and will be narrowed for a slower urban context. The project will also extend the Crystal City Potomac Yard Transitway into Pentagon City by adding one dedicated transit lane in each direction along Army Navy Drive between S. Joyce Street and S. Hayes Street. Vehicular travel lanes will be reduced where appropriate and narrowed to promote a slower, urban environment. The existing raised medians will be re-built as planted medians. The project is expected to be complete by 2024.

In direction relation to the Crystal Towers development, improvements will include a new separated two-way bicycle lane on Army Navy Drive, reduced vehicular travel lanes, and enhanced pedestrian facilities near the development, improving the multimodal connectivity to/from the site.

12th Street S. Complete Street (2016)

This project is planned in conjunction with the Crystal City Potomac Yard Transitway extension and will include landscaping, sidewalk, curb ramp, crosswalk, and lighting improvements. New transportation facilities include dedicated center-running transit lanes, shared bicycle lanes west of Army Navy Drive, and a two-way cycle track east of Army Navy Drive.

In direct relation to the Crystal Towers development site, plans for the 12th Street S. Complete Street project show dedicated center-running transit lanes extending along 12th Street S., shared lane marking for bicycles, and new transit stations on 12th Street S., improving multimodal connectivity to/from the site.

Crystal City Transitway Extension (2019)

This project is the planned extension of the Crystal City Potomac Yard Transitway north and west into Pentagon City. It will add 1.1 miles to the existing 4.5-mile transitway, providing high-frequency, premium transit service between the Braddock Road Metrorail station and the Pentagon City Metrorail station. The project will be separated into a 12th Street S. segment, from Long Bridge Drive to S. Hayes Street, a Crystal Drive segment, from 15th Street S. to 12th Street S. and Long Bridge Drive, and a S. Hayes Street segment, from 12th Street S. to Army Navy Drive.

As part of the 12th Street S. segment of the project, the project will add dedicated bus lanes, mixed traffic lanes, traffic signal upgrades, and three (3) new transitway stations on 12th Street S. from the intersection of S. Hayes Street and 12th Street S. to the intersection of Long Bridge Drive and 12th Street S. New eastbound and westbound transitway stations will be provided at S. Elm Street and a new eastbound station will be provided at S. Hayes Street. The 12th Street S. segment is currently in the design phase.

As part of the Crystal Drive segment of the project, the project will add curbside rush hour bus-only lanes on Crystal Drive from the intersection of 15th Street S. and Crystal Drive to the intersection of 12th Street S. and Long Bridge Drive. The project will also add two (2) new transitway stations. One (1) station will be located on the east side of Crystal Drive at 15th Street S. and one (1) station will be located on the north side of 12th Street S. at Long Bridge Drive. The Crystal Drive segment is currently under construction and is anticipated to be complete by April 2023.

As part of the S. Hayes Street segment of the project, the transitway will connect to WMATA's planned Pentagon City Center bus bays project on Army Navy Drive. The S. Hayes Street segment is currently in the design phase.

In direct relation to the Crystal Towers development, the project will improve transit access to the site from the north by increasing the amount of dedicated transit lanes and stations near the site.

18th Street South Complete Street Project (2019)

Arlington County began implementing an 18th Street S. complete streets project between S. Eads Street and S. Fern Street in 2019. The project will rebuild this segment of 18th Street S. to extend the existing protect bicycle lanes on S. Hayes Street to the east. The project will also rebuild the intersection of 18th Street S. and S. Fern Street to remove an existing slip lane and reduce crossing distances. The project is currently under construction, with an anticipated completion in 2023.

In direct relation to the Crystal Towers development, the project will improve bicycle connectivity to/from the site and promote pedestrian safety and connectivity in the vicinity of the site.

15th Street South Pedestrian Improvements (2021)

As part of the Crystal City Sector Plan, 15th Street S. was identified for improvements to improve access between the Crystal City Metro station and areas to the west. Arlington County has been developing designs to upgrade the pedestrian streetscape on 15th Street S. between S. Eads Street and Richmond Highway. Potential improvements under consideration include upgrading sidewalk and pedestrian ramps, realigning and shortening crosswalks, and landscaping improvements. The project is scheduled to begin construction in Summer 2022 and complete construction in Fall 2023.

Route 1 Multimodal Improvements Study (2021)

The Route 1 Multimodal Improvements Study (Phase 1), published by VDOT in October 2021, aims to identify opportunities for enhanced multimodal connectivity through Pentagon City and Crystal City. The study recommends that Route 1 be integrated within the urban fabric of Pentagon City and Crystal City as a multimodal, urban boulevard consistent with the context of existing and future development.

The study recommends bringing Route 1 down to grade at the existing grade-separated intersections of 15th Street S. and 18th Street S. The recommended at-grade alternative for Route 1 between 12th Street S. and 23rd Street S. includes a total of six-lanes plus left turn lanes at 15th Street S., no left turn lanes at 18th Street S., a wide median, and a wide, urban sidewalk.

Phase 2 of the study began in December 2021 and will include an updated analysis of the recommended alternative, a comprehensive TDM strategy to reduce future volumes along Route 1 and mitigate future congestion, and additional exploration of feasibility.

In direct relation to the Crystal Towers development, the recommended changes to Route 1 would improve safety and accessibility within the Pentagon City/Crystal City neighborhood. Additionally, the improvements identified as part of the Route 1 Multimodal Improvements Study would enhance multimodal connectivity between Pentagon City and Crystal City.

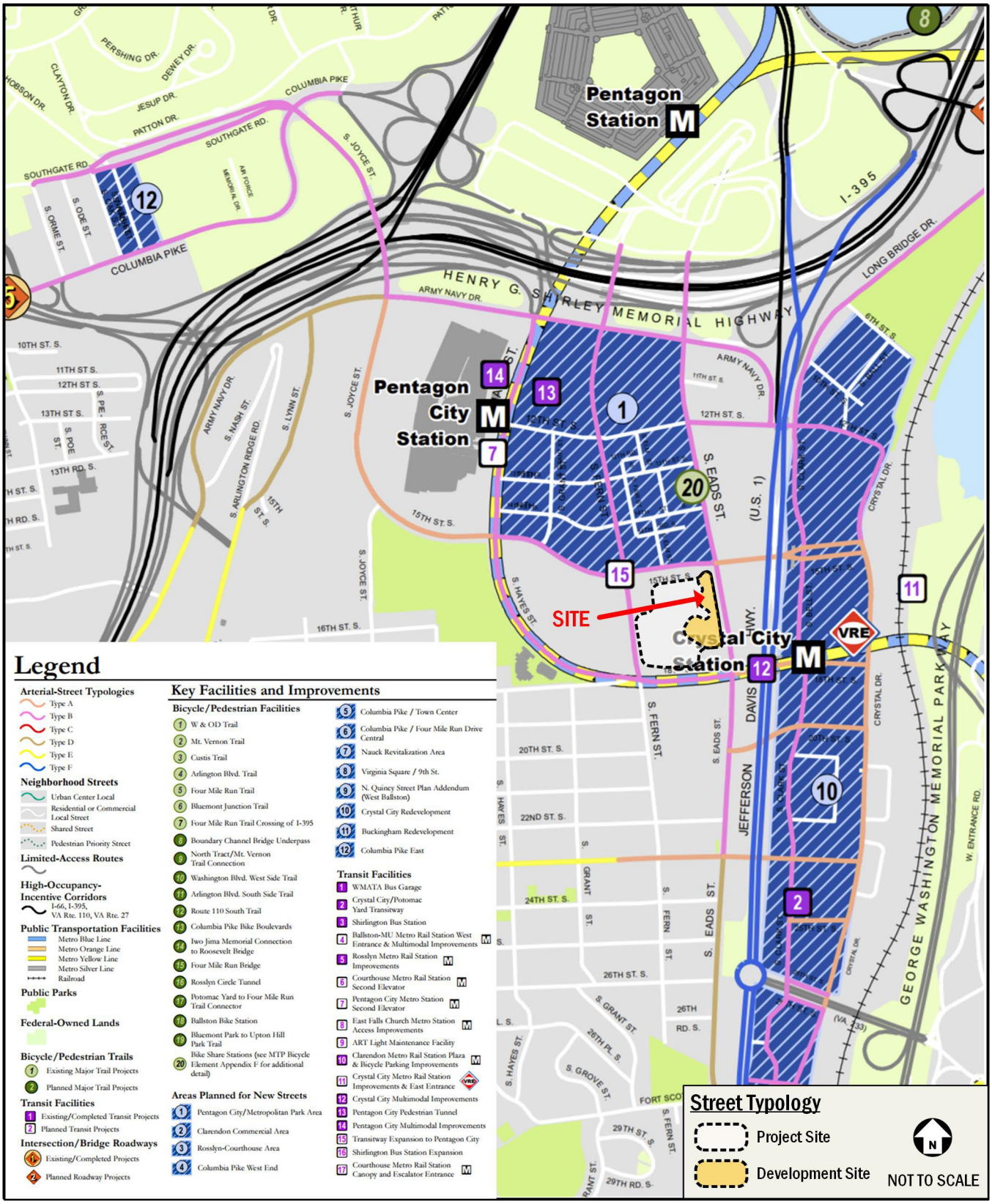

Figure 11: Street Typology (Source: Arlington Master Transportation Plan, 2011)

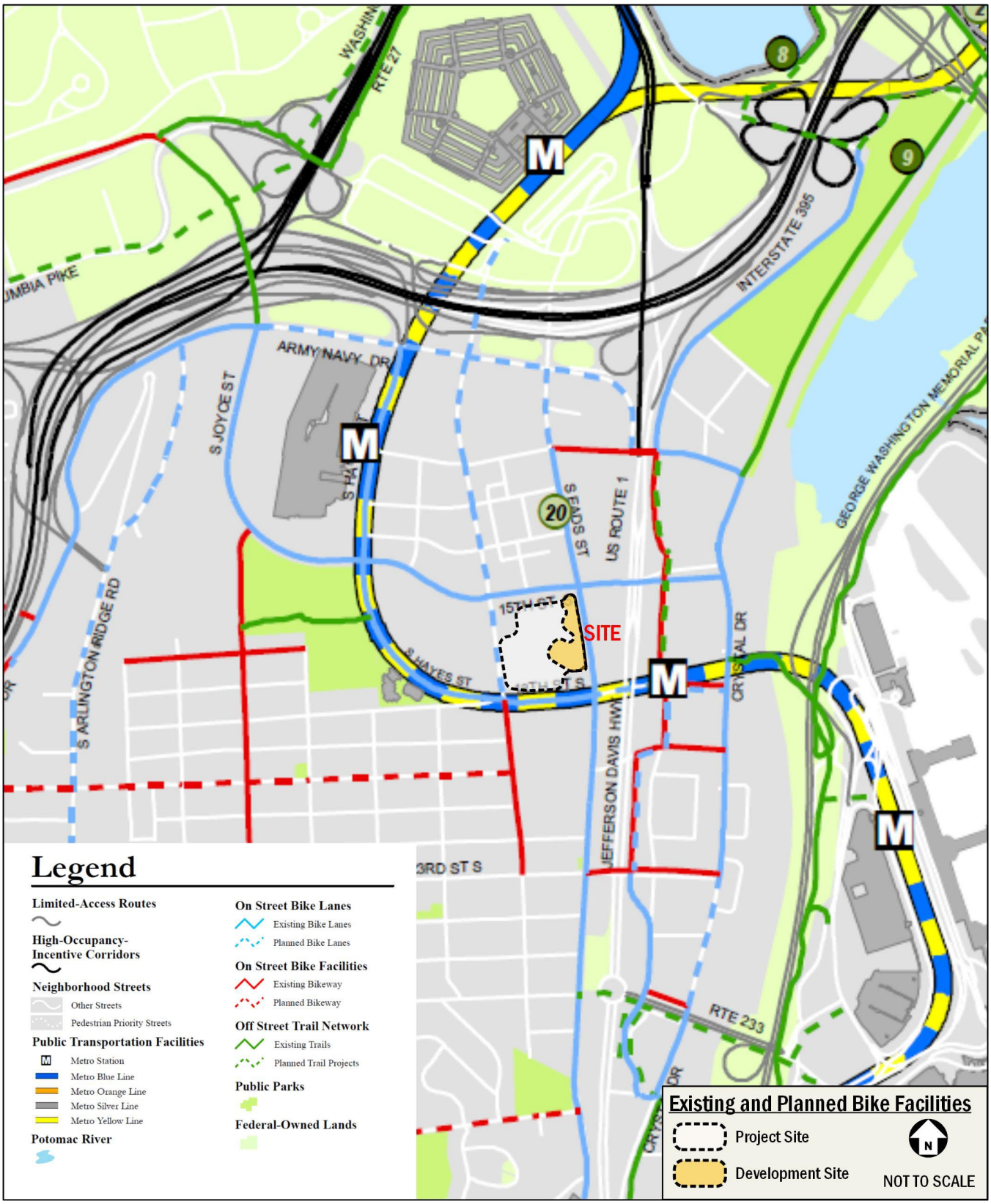

Figure 12: Existing and Planned Bike Facilities (Source: Arlington Master Transportation Plan, 2019)

Project Design

This chapter reviews the transportation components of the Crystal Towers development, including the proposed site plan and access points. It includes descriptions of the site's vehicular access, loading, parking, bicycle, and pedestrian facilities.

The proposed development site is located in the Crystal City area of Arlington, Virginia and is bounded by 15th Street S. to the north, S. Eads Street to the east, 18th Street S. to the south, and S. Fern Street to the west. The site location is shown in Figure 2. The proposed site plan for the redevelopment is shown in Figure 6 and Figure 7.

The proposed development will construct a new multifamily and retail project at the existing Crystal Towers site. The development will include a 11-story residential building with ground floor retail (the "residential building), plus a separate 1-story retail building (the "retail building"). The development will include a total of approximately 209 residential units and approximately 28,000 square feet of ground-floor retail.

The development will provide approximately 41 parking spaces in a below-grade parking garage in the residential building which will be accessed from the existing below-grade garage at Crystal Towers. Additional spaces in the existing Crystal Towers garage will also serve residents of the new building. 30 spaces within the existing Crystal Towers surface parking lot will be designated to serve the ground floor retail, and 10 spaces within the surface parking lot will be designated as residential visitor parking for the new residential building.

Adjacent Roadways

Consistent with the Crystal City Sector Plan, the proposed development will provide improved multimodal infrastructure along the adjacent roadways.

S. Eads Street

As part of the proposed development, S. Eads Street will be improved between 15th Street S. and 18th Street S. along the eastern frontage of the development site. S. Eads Street is envisioned to be an urban, tree-lined street that provides a safe pedestrian environment and accommodates multiple modes. Streetscape elements that contribute to this include a protected bicycle lane and on-street parking lanes along the west side of S. Eads Street, and wide sidewalks. The proposed development will provide a 16-foot sidewalk and a 6-foot bicycle lane protected by a 3-foot raised median on the west side of S. Eads Street along the site frontage. Figure 13 shows the typical cross-section and design elements that can be expected along S. Eads Street as part of the proposed development.

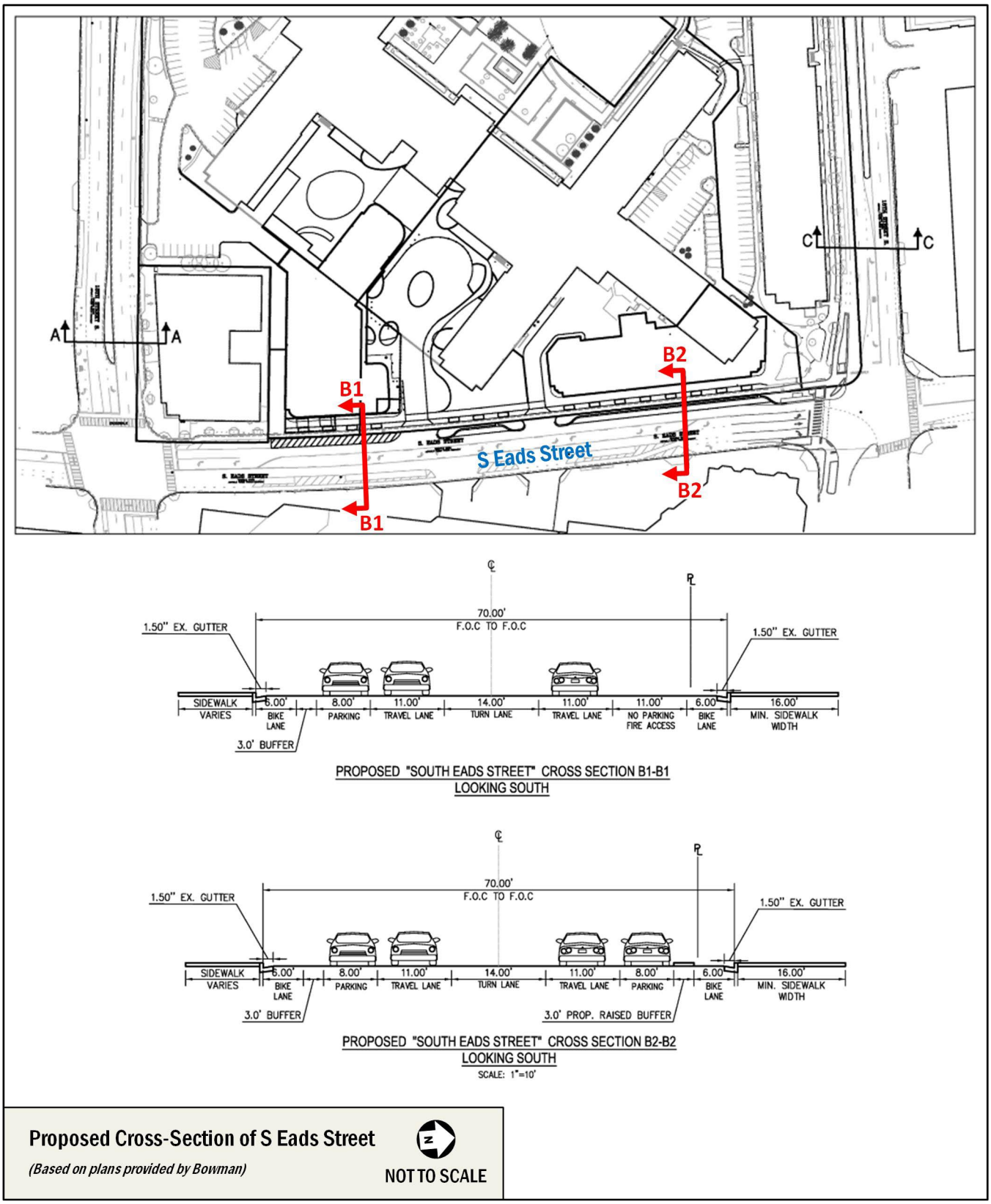

Figure 13: Proposed Cross-Section of S. Eads Street

Site Access and Circulation

Pedestrian Access

The primary pedestrian access to the residential and retail buildings are shown in Figure 14. Access to the residential building will occur primarily off of S. Eads Street. Access to the retail components will also occur primarily off of S. Eads Street. A circulation plan showing expected pedestrian routes is shown in Figure 15.

Bicycle Access

Bicycle access to the secure long-term bicycle parking on the ground floor of the residential building will primarily be from the S. Eads Street. Short-term bicycle parking spaces will be placed along the site frontage on S. Eads Street. Bicycle access to the site is primarily expected to occur via S. Eads Street for all uses. A circulation plan showing expected bicycle routes is shown in Figure 15.

Vehicular Access

The below-grade garage in the residential building will be connected internally to the existing below-grade garage at Crystal Towers; vehicles will access the new garage from the existing Crystal Towers garage. The existing northern Crystal Towers garage entry off of S. Eads Street will be closed as a result of the proposed development. The existing Crystal Towers garage exit off of S. Eads Street will also be closed. The existing southern Crystal Towers garage exit off of 18th Street S. will be converted into a two-way access point into the garage and will serve as the primary access point for both the existing Crystal Towers garage and the proposed below-grade garage in the residential building.

The existing pick-up/drop-off loop adjacent to the existing Crystal Towers Apartments lobby will be eliminated with the construction of the new residential building. A new pick-up/drop-off loop will be provided in front of the new residential building; this loop will be accessed via a two-way driveway on S. Eads Street in approximately the same location as the existing site driveway on S. Eads Street. A one-way driveway will be provided which connects the new pick-up/drop-off loop to the existing surface parking near 18th Street S.; this driveway will allow vehicles in the pick-up/drop-off loop to circulate internally through the site to exit via the driveways on S. 18th Street S. or S. Fern Street.

Access to the portions of the surface parking lot that will remain with the proposed development will occur at the site driveways on 18th Street S., S. Fern Street, and the two northernmost site driveways on S. Eads Street. Vehicles will access the proposed garage entry from these 18th Street S., S. Fern Street, and S. Eads Street driveways by circulating through the site's surface parking lots.

Access to the residential building loading will be provided via internal circulation from the existing site driveway on 18th Street S. Access to the retail building loading will be provided via a driveway off S. Eads Street.

Access to the below-grade garage and loading facilities is shown on Figure 14. A circulation plan showing expected vehicular routes is shown in Figure 15 and Figure 16.

Loading

Per the Zoning Ordinance, the following outlines the loading facility requirements for land uses of the development:

- Residential
  Multifamily uses with more than 50 dwelling units are required to provide one (1) loading space for each 200 units.
- Retail
  Buildings with over 3,000 square feet of retail space are required to provide one (1) loading space, with one (1) additional space for more than 15,000 square feet and one (1) additional space for more than 50,000 square feet.

Per these requirements, and based on a development program of 209 residential units and 28,000 square feet of retail, the proposed development is required to provide two (2) loading spaces for the residential component and two (2) loading spaces for the retail component. The proposed development will provide two (2) 40-foot loading berths in the residential building and one (1) 40-foot loading berth and one (1) 30-foot loading berth in the retail building. The number of on-site loading facilities will accommodate the practical needs of the development.

Figure 6 shows the locations of the loading berths and service/delivery spaces within the building.

Parking

Based on the Arlington County Zoning Ordinance, the following outlines the vehicular parking requirements for the proposed

development, under RA4.8, Multiple-Family Dwelling District requirements:

- Residential
  One and one-eighth (1.125) spaces for the first 200 dwelling units and one (1) space for each additional dwelling unit.
- Retail
  One (1) space per 250 square feet of floor area on the first floor and one (1) space per 300 square feet of floor area located elsewhere in the building.

Residential Parking

Per the Zoning Ordinance, the proposed development is required to provide 234 parking spaces for residential use. However, the County Board adopted the Off-Street Parking Guidelines for Multi-Family Residential Projects in November 2017 which reduce this parking requirement. These guidelines recognize that a lower on-site parking ratio may be appropriate for a project, among other considerations, and may range from 0.2 to 0.6 spaces per unit depending on a project site's distance to Metro. Based on the site location and per these guidelines, a minimum of 0.3 spaces per unit are required for the proposed development. These guidelines also require 0.05 visitor parking spaces for the first 200 dwelling units. Per these guidelines, the proposed development is required to provide 63 parking spaces for residential use and 10 parking spaces for residential visitor use, for a total of 73 parking spaces. Consistent with these guidelines, the proposed development will provide 73 parking spaces for the residential component, 10 of which will be designated as visitor parking spaces.

Retail Parking

Per the Zoning Ordinance, the proposed development is required to provide 112 parking spaces for retail use. The proposed development will provide 30 spaces for retail use. The amount of on-site parking will meet the practical needs of the development while promoting the use of non-auto modes of travel to and from the proposed development.

The proposed development will provide 103 parking spaces to serve the retail and residential components. The below-grade garage in the residential building will provide 41 residential tenant parking spaces. The existing Crystal Towers garage will provide 22 parking spaces to serve residential building tenants. The existing Crystal Towers surface parking lot will provide 30 parking spaces to serve the retail component of the development and 10 parking spaces to serve as visitor parking for the residential component of the development. A summary of the proposed parking supply is shown in Table 2.

Table 2: Proposed Parking Allocation

Spaces Required		Spaces Provided		
		New Residential Garage	Existing Crystal Towers Garage	Crystal Towers Surface Lot
Residential	234 spaces	41 spaces	22 spaces	10 spaces
Retail	112 spaces	-	-	30 spaces
Total	**346 spaces**	**103 spaces**		

Curbside Management

A review of the existing curbside management was conducted and is shown on Figure 17. Currently, on-street parking is provided along S. Eads Street east of the site, providing on-street parking along the eastern frontage of the site. On-street parking along S. Eads Street will remain with the proposed development; parking will be prohibited along the portion of S. Eads Street fronting the residential building to allow for fire access. The proposed on-street parking is shown on Figure 18.

Bicycle and Pedestrian Facilities

Bicycle Facilities

Bicycle Parking

Per the Standard Site Plan Conditions, the following outlines the bicycle parking requirements for land uses of the development:

- Residential
  Provide one (1) long-term space for every 2.5 residential dwelling units; and one (1) short-term space for every 50 residential dwelling units.
- Retail
  Provide one (1) long-term space for every 25,000 square feet of retail space; and two (2) short-term spaces for every 10,000 square feet of the first 50,000 square feet of retail space and one (1) additional space for every 12,500 square feet of additional space.

Per these requirements, the proposed development is required to provide 84 long-term spaces for residential use and two (2) long-term spaces for retail use. The proposed development will provide 127 long-term bicycle parking spaces, meeting zoning requirements. Secure long-term bicycle parking for the

development will be located in the ground floor of the residential building and will be shared between residential and retail uses.

Per these requirements, the proposed development is required to provide five (5) short-term bicycle spaces for residential use and six (6) spaces for retail use. The proposed development will provide 12 short-term bicycle spaces, meeting zoning requirements. Short-term bicycle parking spaces will be placed along the site frontage on S. Eads Street.

Bicycle Showers and Lockers

Per the Standard Site Plan Conditions, the following outlines the bicycle shower and locker requirements for the retail uses of the development:

- Showers
  1) Within residential buildings, retail space equal to or greater than 25,000 square feet and less than 50,000 square feet, provide a minimum of one (1) unisex shower; for retail space greater than 50,000 square feet, provide a minimum of one (1) shower per gender.
- Lockers
  For every required employee bicycle parking space, either:
  1) A minimum of one (1) clothes storage locker per gender shall be installed in gender-specific changing rooms; or
  2) A minimum of one (1) clothes locker shall be installed adjacent to, but outside of changing rooms.

Bicycle Showers

Per these requirements, one (1) unisex shower is required to be provided for the retail component of the proposed development. The proposed development will provide at least one (1) unisex shower for this purpose.

Bicycle Lockers

Per these requirements, the proposed development is required to provide two (2) lockers for retail employee use. The proposed development will provide at least two (2) lockers for this purpose.

Pedestrian Facilities

The existing pedestrian facilities around the site provide a quality walking environment with minimal sidewalk width deficiencies. Pedestrian facilities directly surrounding the site will be improved along the eastern frontage of the project on S. Eads Street.

These facilities will provide a more inviting pedestrian environment and comply with the improvements laid out in the Arlington Master Transportation Plan.

New pedestrian facilities are expected to meet or exceed Arlington County requirements with an emphasis on pedestrian safety and comfort. This includes pedestrian plaza space and sidewalks that meet or exceed the width requirements.

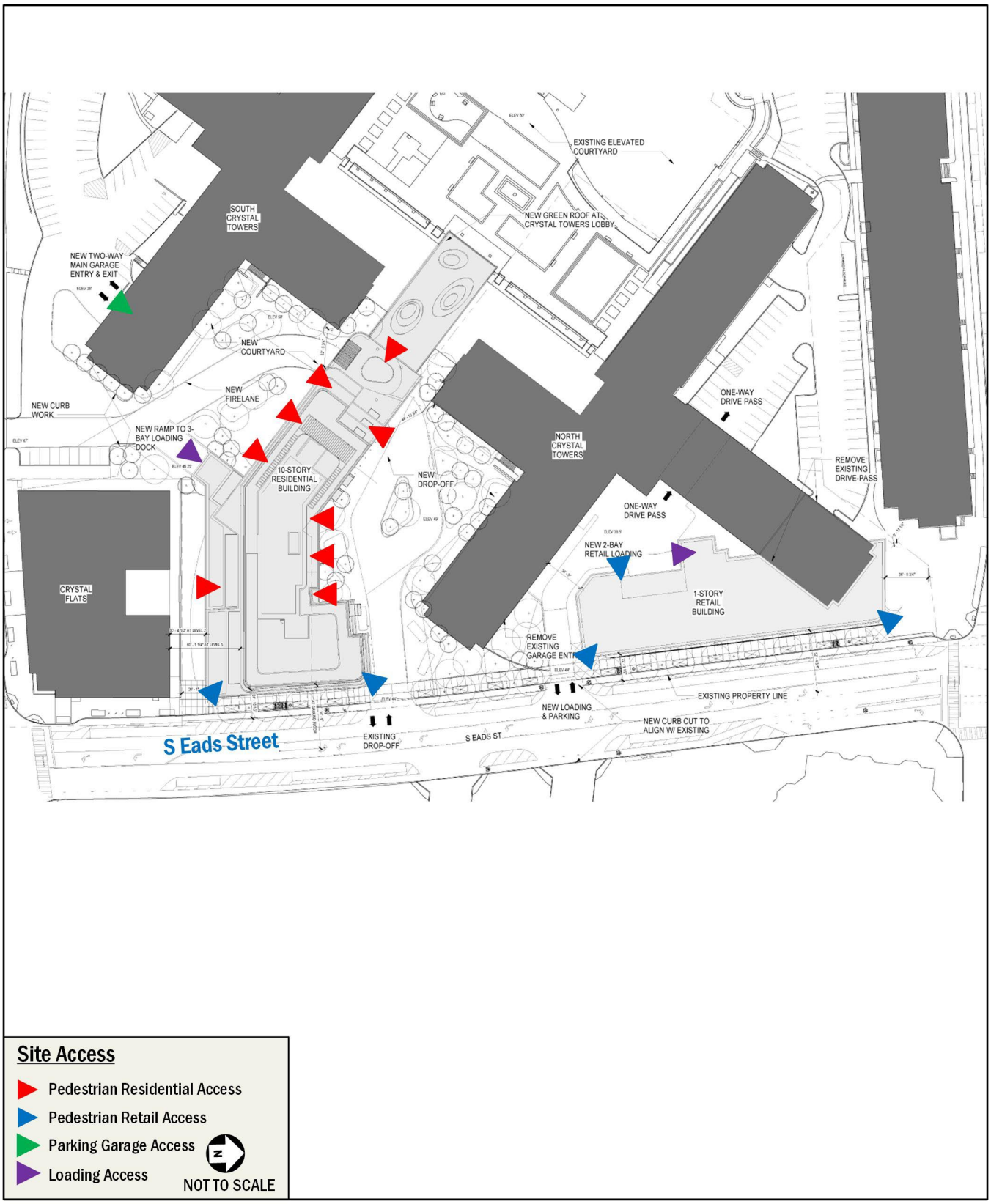

Figure 14: Site Access

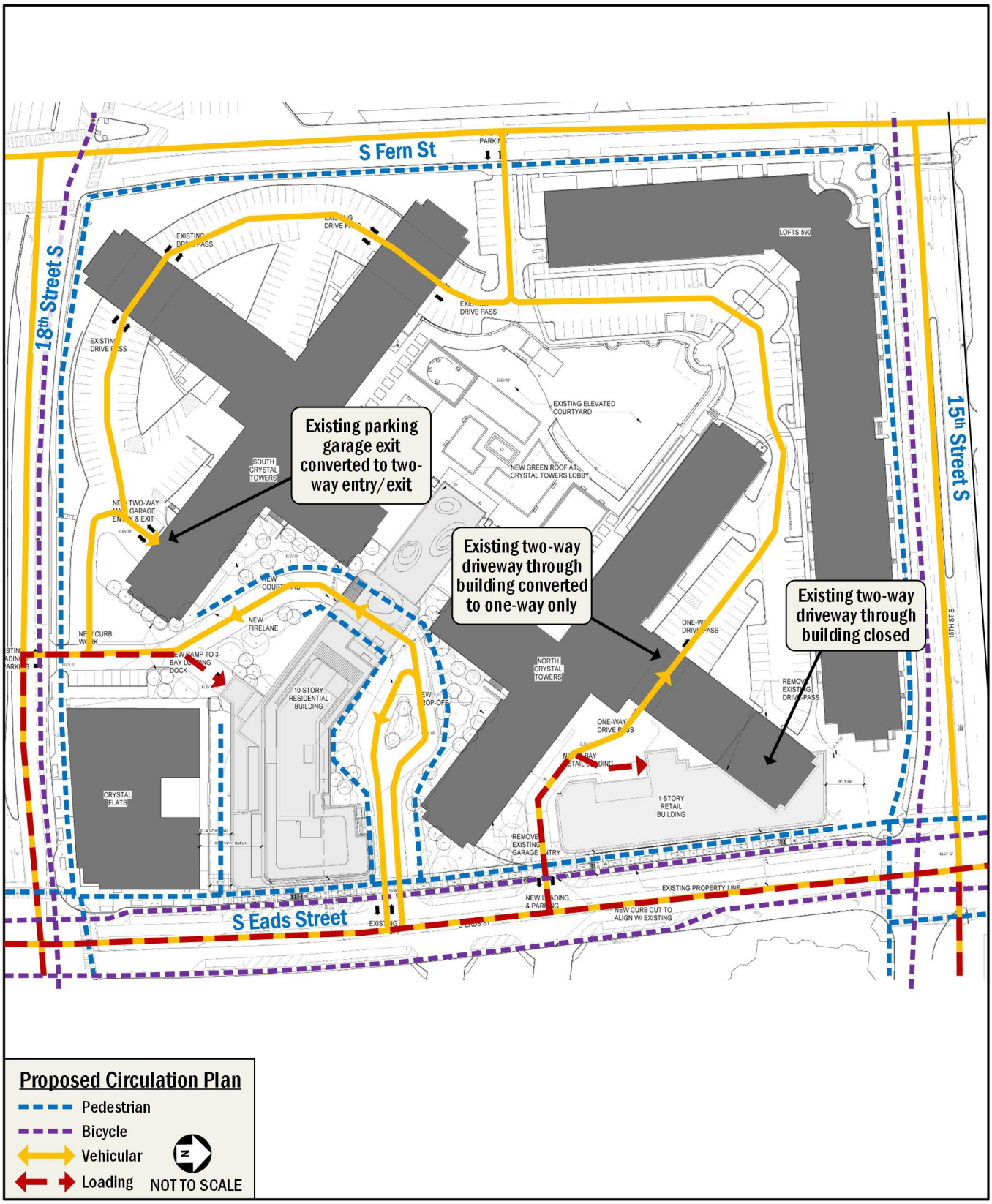

Figure 15: Proposed Circulation Plan

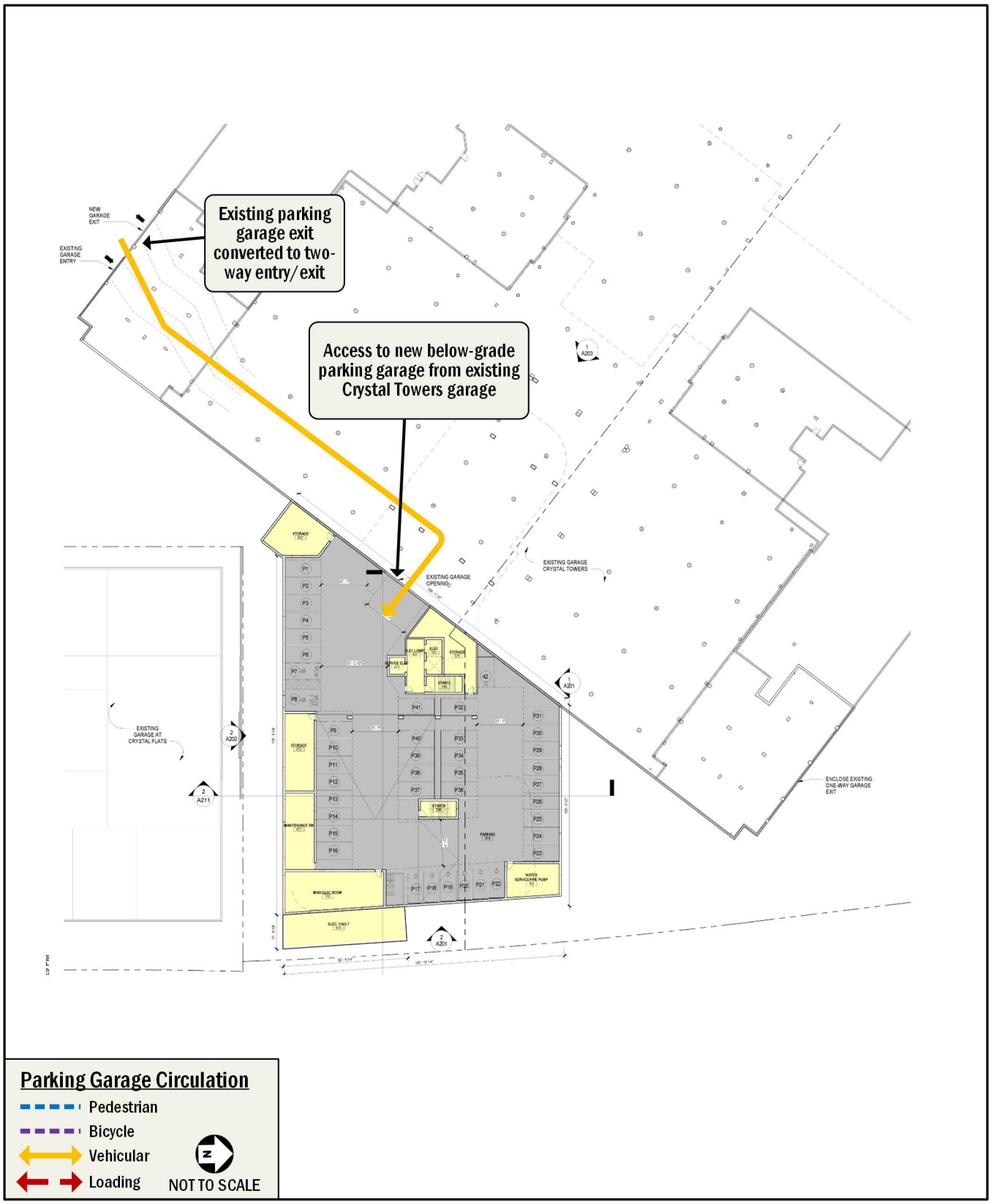

Figure 16: Parking Garage Circulation

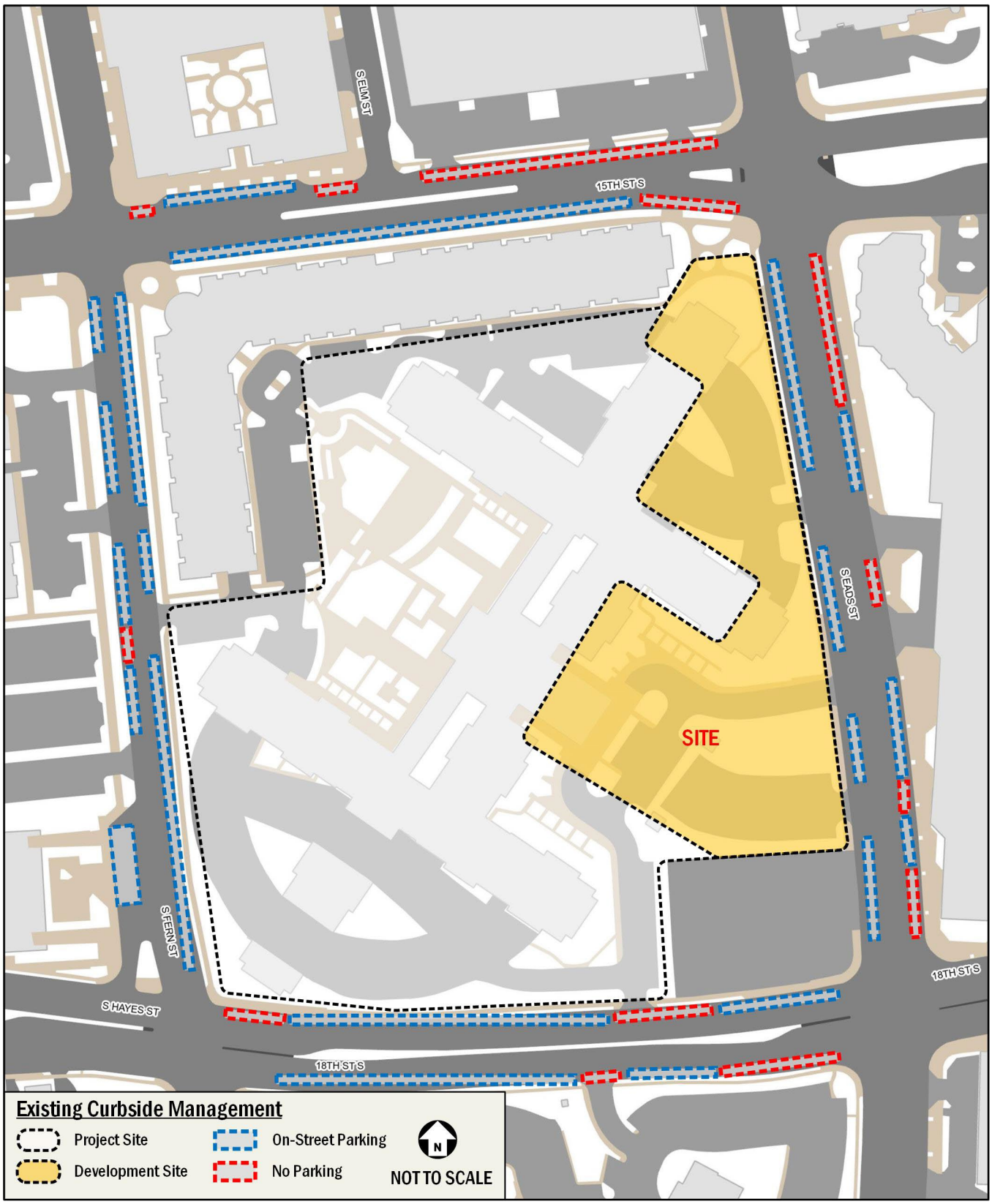

Figure 17: Existing Curbside Management

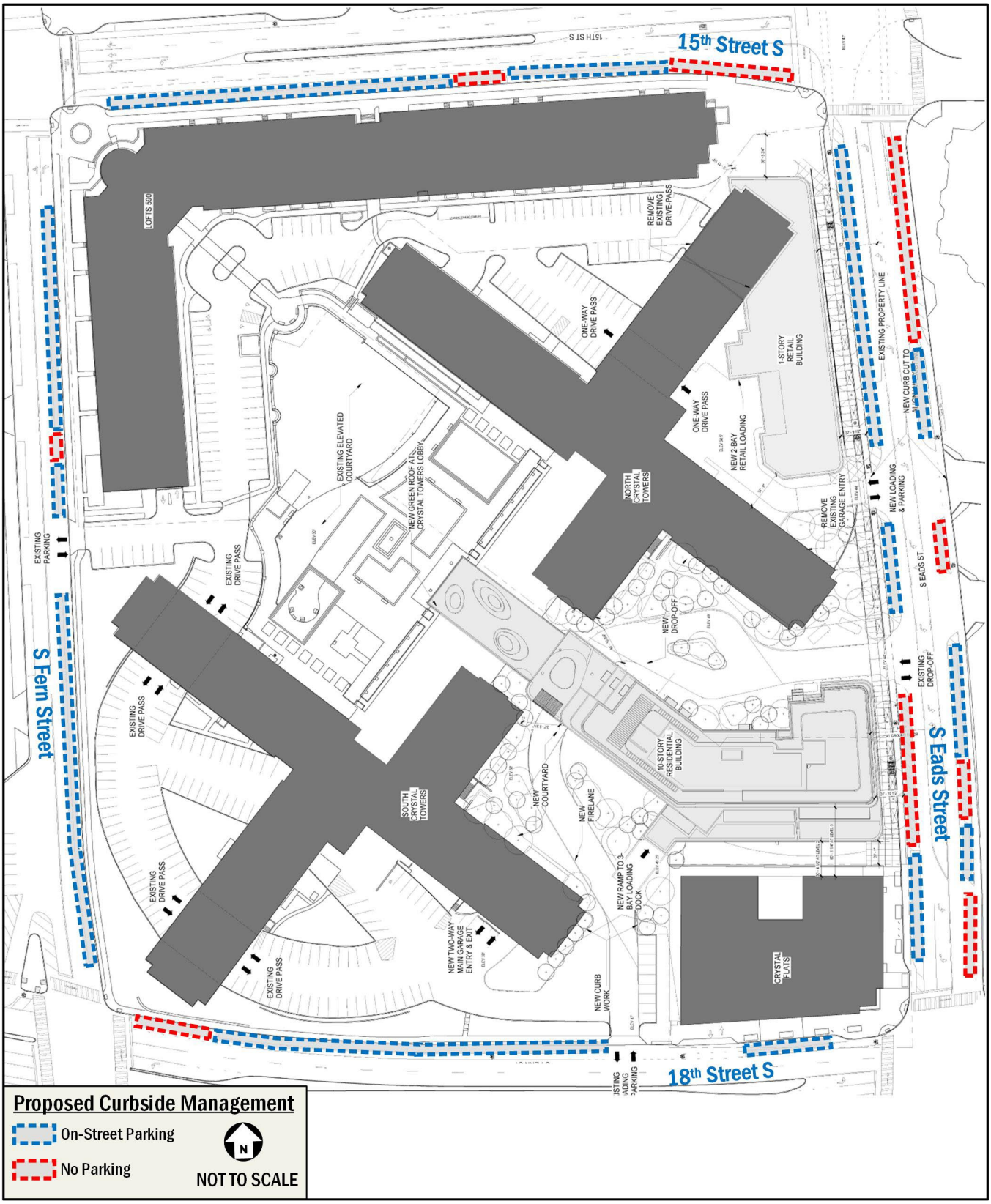

Figure 18: Proposed Curbside Management

Transit

This chapter discusses the existing and proposed transit facilities in the vicinity of the site, accessibility to transit, and evaluates the overall transit impacts of the project.

The following conclusions are reached within this chapter:

- The development has excellent access to transit.
- The development is located 0.1 miles from the Crystal City Metro Station, 0.6 miles from the Pentagon City Metro Station, and 0.4 miles from VRE.
- There are 19 bus stops within a quarter-mile of the site. These stops are directly served by WMATA (Metrobus), Metroway, and Arlington Transit (ART), OmniRide, Fairfax Connector, and Loudoun County Commuter routes.
- Future planned transit improvements in the vicinity of the site include an extension of the transitway as part of the Transitway Extension to Pentagon City. These will further improve transit access by providing additional facilities and connectivity via Metroway.

The site is well-served by numerous transit options under existing conditions. Combined, these transit services provide local, citywide, and regional transit connections and link the site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 19 identifies the major transit routes, stations, and stops in the study area.

Metrorail Service

The site is located approximately 0.1 miles from the Crystal City Metro Station and 0.6 miles from the Pentagon City Metro Station. The Crystal City Metro station is located east of the development site between 15th Street S. and 18th Street S. on S. Bell Street. It can be reached by walking south from the site on S. Eads Street and east on 18th Street S. The Pentagon City Metro station is located northwest of the development site between 12th Street S. and 15th Street S. on S. Hayes Street. It can be reached by walking via S. Eads Street, 15th Street S., and S. Hayes Street. There are sidewalks, curb ramps, and crosswalks along both routes, providing a quality walking environment to and from the Metro stations.

The Crystal City Metro Station and Pentagon City Metro Station serve the Blue and Yellow Lines. The average daily ridership at the Pentagon City and Crystal City stations in 2019 was approximately 12,500 and 11,700 boardings on weekdays, respectively, according to the WMATA Ridership Data Portal.

The Blue Line travels north from Springfield, VA to Rosslyn then continues east to Largo, MD. Trains run approximately every 8 minutes during the morning and afternoon peak periods. They run about every 12 minutes during weekday non-peak periods, every 20 minutes on weekday evenings after 9:30pm, and every 12-20 minutes on weekends. The Yellow Line travels north from Huntington, VA to the Pentagon, east to the District core, and continues north to Greenbelt. Trains run approximately every 8 minutes during the morning and afternoon peak periods. They run about every 12 minutes during weekday non-peak periods, every 20 minutes during weekday evenings after 9:30pm, and every 12-20 minutes on weekends.

Figure 21 shows the average annual weekday passenger boardings for Metro stations in the 22202 Zip Code area from 1977, when the system opened, to 2015. Metrorail ridership in 22202 zip code is down 18% from its peak in 2010 and 2011. Ridership throughout the entire system is down five percent. According to the 22202 Transportation Study, three factors have contributed to the decline in ridership including high office vacancy rates in Crystal City from Base Realignment and Closure (BRAC), changes to Blue Line service (Rush Plus/Silver Line), and an overall decrease in rider satisfaction by Metrorail users. The decline in boardings at the stations near the site indicates there is available capacity. WMATA has initiated the Back2Good plan to improve safety, reduce delays, and build rider confidence in Metrorail. Since its implementation, Metrorail has reached its highest on-time performance in the recent years. The proposed development will implement Transportation Demand Management (TDM) measures that will incentivize the use of non-auto modes of travel, including Metrorail, and discourage the use of single-occupancy auto modes of travel.

In order to accommodate the projected increase in demand at the Crystal City Metro Station as a result of redevelopment in Crystal City, a second entrance is planned for the station. The new entrance will provide improved access from Crystal Drive, the VRE station, and the nearby Metroway station. The project will also include improvements and upgrades to elevator and lobby facilities at the station. The second entrance is planned to open in 2025.

Bus Service

A review of the existing Metrobus stops within a quarter-mile radius of the site, detailing individual bus stop amenities and conditions, is shown in Table 3. There are 19 bus stops within

one quarter-mile of the site: five (5) on S. Eads Street, four (4) on 15th Street S., four (4) on S. Bell Street, three (3) on 18th St S, two (2) on Crystal Drive, and one (1) on 20th Street S. These stops are served by five (5) WMATA (Metrobus) routes, one (1) ART route, one (1) OmniRide route, one (1) Fairfax Connector route, one (1) Loudoun County Commuter Bus route. Metroway bus service is available from the Crystal City Metro station.

The site is served by several bus lines and routes along multiple primary corridors. These bus lines connect the site to many areas of Virginia and the District, including several Metrorail stations serving all of the six (6) Metrorail lines. Table 4 shows a summary of the bus route information for the routes that serve the site, including service hours, headway, and distance to the nearest bus stop.

Table 5 presents the average weekday peak hour boarding and alighting information for the bus stops previously detailed. This information is based on WMATA ridership data provided by Arlington County for 2017. Existing peak hour boarding and alighting information for these bus stops is shown on Figure 21.

Crystal City Potomac Yard Metroway

Metroway is an enhanced bus route that provides a connection between the Crystal City Metro, Pentagon City Metro, and Braddock Road Metro, traveling through Pentagon City, Crystal City, and Potomac Yards. Arlington's section of Metroway opened in April 2016 and includes an all-day dedicated transit lane through Potomac Yard, a peak period transit lane through Crystal City, and seven new transit stations. The Potomac Yard Line provides 4.5 miles of service between the Crystal City, Pentagon City, and Braddock Road Metro stations with faster, more reliable bus service along the Route 1 corridor, with a ridership of approximately 2,400 passengers per day.

Metroway buses travel in a dedicated lane adjacent to the site along Crystal Drive and in other segments; however, there are also sections of the route in Crystal City and Potomac Yard where Metroway buses operate in mixed traffic. The nearest stop to the site is at 18th Street S. and S. Bell Street at the Crystal City Metro Station bus bay.

Planned Transit Facilities

Improvements to transit facilities will be made as part of the Army Navy Drive Complete Street project, the 12th Street S. Complete Street project, and the Pentagon City Transitway Extension project.

- As part of the Army Navy Drive Complete Street project, improvements will include a dedicated transit-only lane in each direction extending along Army Navy Drive between S. Joyce Street and S. Hayes Street.
- As part of the 12th Street S. Complete Street project, improvements will include dedicated center-running transit-only lanes extending along 12th Street S. from Army Navy Drive to S. Hayes Street.
- As part of the Crystal Drive segment of the Transitway Extension to Pentagon City project, improvements will initially include curbside rush hour bus-only lanes from 15th Street S. to 12th Street S. and Long Bridge Drive and five (5) new transitway stations, with two (2) additional stations included in later phases.

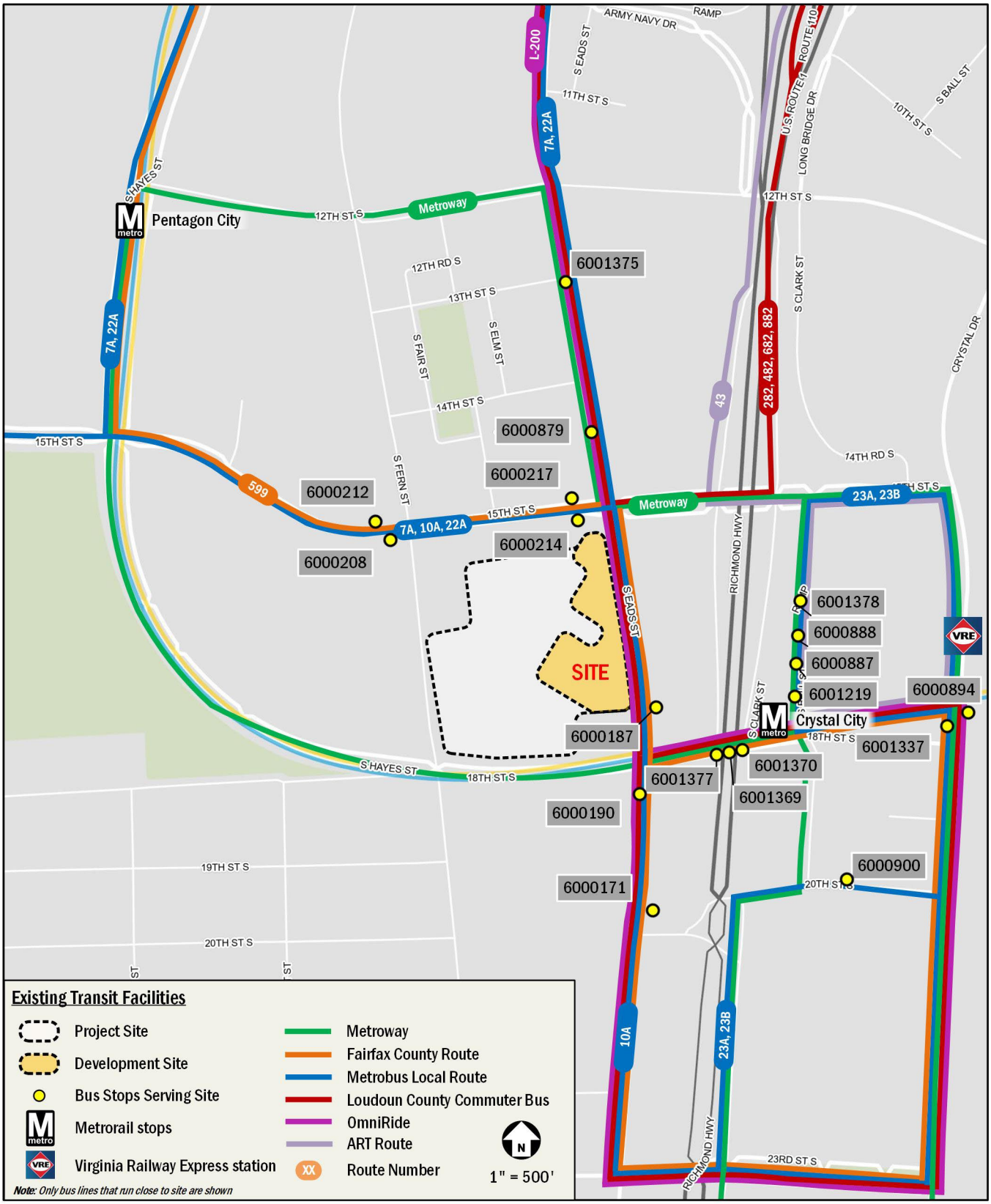

Figure 19: Existing Transit Service

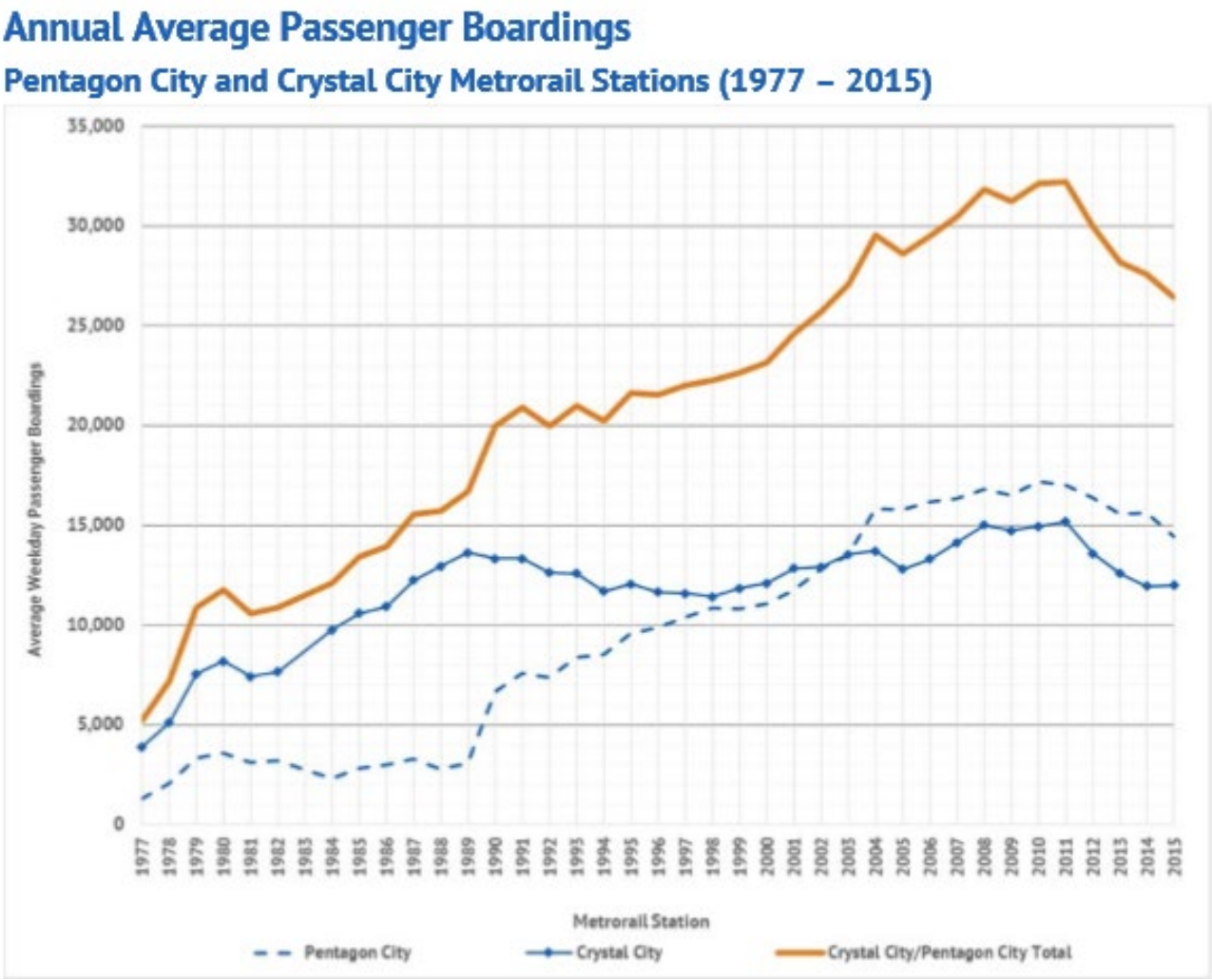

Figure 20: Annual Metro Ridership at Pentagon City and Crystal City Metro Stations (Source: 22202 Transportation Study)

Table 3: Bus Stop Inventory

Location	Stop ID	Buses Served	Stop Condition
S. Eads Street & 13th Street S.	6001375	7A, 22A	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, no seating, no shelter, trash receptacle
S. Eads Street & 14th Road S	6000879	*Closed due to construction*	*Closed due to construction*
15th Street S. & S. Fern Street	6000212	7A, 10A, 22A, 599	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, seating, no shelter, no trash receptacle
15th Street S. & S. Fern Street	6000208	7A, 10A, 22A, 599	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, information case, seating, shelter, trash receptacle
15th Street S. & S. Eads Street	6000217	*Closed due to construction*	*Closed due to construction*
15th Street S. & S. Eads Street	6000214	10A, 599	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, no seating, no shelter, no trash receptacle
S. Eads Street & 18th Street S.	6000187	10A, 599	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, information case, no seating, no shelter, no trash receptacle
S. Eads Street & 18th Street S.	6000190	10A	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, seating, shelter, no trash receptacle
S. Eads Street & 20th Street S.	6000171	10A	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, information case, no seating, no shelter, no trash receptacle
18th Street S. & Route 1	6001377	L-200	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, seating, shelter, trash receptacle
18th Street S. & Route 1	6001369	282, 482, 682, 882	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, seating, shelter, trash receptacle
18th Street S. & Route 1	6001370	599	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, seating, shelter, trash receptacle
S. Bell Street & 18th Street S.	6001378	43	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, seating, shelter, trash receptacle
S. Bell Street & 18th Street S.	6000888	23A, 23B	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, seating, shelter, trash receptacle
S. Bell Street & 18th Street S.	6000887	Metroway (NB)	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, seating, shelter, trash receptacle
S. Bell Street & 18th Street S.	6001219	Metroway (SB)	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, seating, shelter, trash receptacle
Crystal Drive & 18th Street S.	6001337	*Closed due to construction*	*Closed due to construction*
Crystal Drive & 18th Street S.	6000894	Metroway, 23A, 23B	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, information case, seating, shelter, trash receptacle
20th Street S. & Crystal Dr	6000900	23A, 23B	Sign, ADA clearance, acceptable sidewalk clearance, street lighting, no information case, no seating, no shelter, no trash receptacle

Table 4: Bus Route Information

Route Number	Route Name	Service Hours	Headway	Walking Distance to Nearest Bus Stop
7A	Landmark-North Fairlandria Line	Weekdays: 4:41AM-2:27AM Weekend: 5:20AM-2:21AM	12-30 min	0.3 miles, 6 minutes
10A	Alexanrdia-Pentagon Line	Weekdays: 4:25AM-2:46AM Weekend: 5:25AM-2:20AM	20-60 min	0.1 miles, 2 minutes
22A	Barcroft-South Fairlington Line	Weekdays: 4:41AM-2:27AM Weekend: 5:20AM-2:21AM	57-63 min	0.2 miles, 4 minutes
23A	McLean-Crystal City Line	Weekdays: 9:06PM-1:21AM Weekend: 6:06AM-12:52AM	29-88 min	0.2 miles, 4 minutes
23B	McLean-Crystal City Line	Weekdays: 5:26AM-2:30AM Weekend: 7:04AM-2:37AM	21-60 min	0.2 miles, 4 minutes
Metroway	Potomac Yard Line	Weekdays: 5:30AM-10:24PM Weekend: 6:30AM-11:03PM	12-27 min	0.2 miles, 4 minutes
599	Pentagon-Crystal City Express Line	Weekdays: 6:14AM-8:44AM, 3:32PM-6:02PM	20-35 min	< 0.1 miles, < 1 minutes
L-200	Lake Ridge-Pentagon & Crystal City	Weekdays: 6:21AM-7:55AM, 12:16PM-6:39PM	27-51 min	0.1 miles, 2 minutes
282	Dulles South & East Gate	Weekdays: 6:54AM-7:24AM	30 min	0.1 miles, 2 minutes
482	Leesburg & Dulles North	Weekdays: 6:39AM-8:43AM	24-36 min	0.1 miles, 2 minutes
682	Dulles South & East Gate	Weekdays: 3:19PM-4:04PM	45 min	0.1 miles, 2 minutes
882	Leesburg & Dulles North	Weekdays: 2:50PM-5:35PM	30-45 min	0.1 miles, 2 minutes
43	Court House-Rosslyn-Crystal City	Weekdays: 6:02AM-11:51PM	10-20 min	0.2 miles, 4 minutes

Table 5: Bus Stop Boarding and Alighting Weekday Information – Peak Hours

Stop	Stop ID	Routes Served	AM Peak Period		PM Peak Period		Daily Boardings	Daily Alightings
			Boardings	Alightings	Boardings	Alightings		
S. Eads Street & 13th Street	6001375	7A	0	0	0	0	0	0
		7F	0	0	0	0	0	0
		7Y	35.6	28.2	0	0	37.9	29.5
		10N	0	0	0	0	0.2	0
		22A	0	0	0	0	0.3	0.1
S. Eads Street & 15th Street	6000879	7A	0	0	0	0	0	0
		7F	0	0	0	0	0	0
		7Y	15.5	13.7	0	0	16.7	15.5
		10N	0	0	0	0	0	1
		22A	0	0	0	0	1.2	0.3
15th Street & Fern Street (EB)	6000212	7A	0	0	0	0	0	0
		7F	0	0	0	0	0	0
		10A	1.1	4.5	3.1	5.3	7.3	17.3
		10N	0	0	0	0	0.3	0
		22A	0	0	0.4	0	2.7	0.4
15th Street & Fern Street (EB)	6000208	7A	0	0	0	0	0	0
		7F	0	0	0	0	0	0
		10A	3.5	1.1	8.6	1.8	26.4	5.9
		22A	0	0	0	0	1.4	7.3
15th Street & S. Eads Street	6000217	10A	0	7	2	2	2	18
		10N	NA	NA	NA	NA	0	0
15th Street & S. Eads Street (EB)	6000214	10A	1.4	0.7	13.3	0.6	21.5	3.2
S. Eads Street & 18th Street (NB)	6000187	10A	0	35	3	8	5	78
S. Eads Street & 20th Street S.	6000171	10A	0	5	1	1	2	11
S. Bell Street & 18th Street (Bus Bay B)	6000888	23A	NA	NA	NA	NA	7	2
		23B	6	16	26	15	56	63
S. Bell Street & 18th Street (Bus Bay C)	6000887	MWY	3	223	16	182	37	514
S. Bell Street & 18th Street (Bus Bay D)	6001219	10N	NA	NA	NA	NA	0	0
		MWY	210	16	324	10	696	37
Crystal Drive & 18th St S	6000894	10N	NA	NA	NA	NA	0	0
		23A	NA	NA	NA	NA	0	0
		23B	0	4	0	4	0	14
		MWY	1	22	1	18	3	47
20th Street & Crystal Drive	6000900	23A	NA	NA	NA	NA	2	0
		23B	1	0	10	0	15	1

WMATA Ridership Data provided by Arlington County
NA: Ridership data unavailable

Figure 21: Peak Boardings and Alightings by Stop

Pedestrian Facilities

This chapter summarizes the existing and future pedestrian access to the site and reviews walking routes to and from the site.

The following conclusions are reached within this chapter:

- The existing pedestrian infrastructure surrounding the site provides a quality walking environment. There are sidewalks along the majority of primary routes to pedestrian destinations with few gaps in the system.
- Planned and proposed improvements to the pedestrian infrastructure surrounding the site will improve pedestrian comfort and connectivity.

Pedestrian Study Area

Pedestrian facilities within a quarter-mile of the site were evaluated as well as routes to nearby transit facilities, including routes to the Crystal City Metro Station to the east. The site is also accessible to transit options such as the two (2) bus stops along 15th Street S. immediately north of the site, the two (2) bus stops located at the intersection of S. Eads Street and 18th Street S., and the Crystal City VRE station. Existing pedestrian facilities surrounding the site provide comfortable walking routes to and from nearby transit options.

Figure 22 shows expected pedestrian pathways, walking time and distances, and barriers or areas of concern. Route 1 bifurcates through Crystal City from north to south. Although Route 1 is not a full pedestrian barrier, it presents challenges for pedestrians by limiting east-west connection points to approximately once every 1000 feet.

Figure 23 shows the 10-minute, 20-minute, and 30-minute walk travel shed for the proposed development. Within a 10-minute walk, the proposed development has access to several destinations including public transportation stops, Metro stations served by the Blue and Yellow lines, the Crystal City Shops, the Crystal City VRE Station, Virginia Highlands Park, retail zones, nearby residential neighborhoods, and community amenities. Within a 20-minute walk, the proposed development has access to destinations such as residential neighborhoods to the south and west, Long Bridge Park, and the Fashion Center at Pentagon City. Within a 30-minute walk, the proposed development has access to destinations including Ronald Reagan Washington International Airport, Mount Vernon Trail, Arlington Cemetery, and residential neighborhoods to the south and west.

Existing Pedestrian Facilities

A review of pedestrian facilities surrounding the proposed development shows that many facilities provide a quality walking environment. Figure 24 shows a detailed inventory of the existing pedestrian infrastructure surrounding the site. Sidewalks, crosswalks, and curb ramps are evaluated based on the guidelines set forth by the Arlington County, and ADA standards. Sidewalk and buffer widths and recommendations are shown in Table 6. It should be noted that the sidewalk widths shown in Figure 24 reflect the total sidewalk widths based on observations in the field taken from curb to building, with pinch points and locations with a clear width of less than four (4) feet noted.

ADA standards require that curb ramps be provided wherever an accessible route crosses a curb and must have a detectable warning. Additionally, curb ramps shared between two crosswalks is not desired. As shown in Figure 24, under existing conditions the majority of curb ramps meet ADA standards.

Within the study area, the majority of roadways have existing sidewalks on both sides, with few deficiencies. Of note, there are sidewalks closed due to construction along S. Eads Street, 15th Street S., and S. Elm Street to the north of the site. Additionally, no sidewalks are located along the west side of S. Clark Street north of 15th Street S. Some residential streets in the neighborhood to the southwest of the project site are also missing sidewalks. Despite these deficiencies, all primary pedestrian destinations are accessible via routes with sidewalks, most of which meet Arlington County and ADA standards.

Overall, the site is situated within an urban transportation network, with quality pedestrian access. Figure 25 shows the existing pedestrian peak hour volumes at study area intersections. The most heavily-used crosswalk in the study area is across the northern leg of the intersection of S. Eads Street and 18th Street S., mostly likely as a result of its proximity to the Crystal City Metro Station to the east.

Planned Pedestrian Facilities

As a result of the development, pedestrian facilities along the street frontage of the site will be improved to meet or exceed Arlington County and ADA standards. This includes improvements of sidewalks along the site frontage along S. Eads

Street that meet or exceed width requirements and provide a more inviting pedestrian environment.

Additional improvements will be made as part of the S. Eads Street, 18th Street S., 12th Street S., and Army Navy Drive Complete Street projects, as well as nearby developments. Planned and proposed pedestrian improvements are shown in Figure 26.

Table 6: Sidewalk Recommendations per Arlington County Master Transportation Plan

Street Name	Section	Minimum Sidewalk Width	Minimum Sidewalk Width Met	Sidewalk Width*	Minimum Buffer Width	Minimum Buffer Width Met	Buffer Width*
S. Grant Street	18th Street S. to 19th Street S.	4-6 ft	N	None	2-4 ft	N	None
S. Fern Street	12th Street S. to 15th Street S.	6-12 ft	Y	6 ft	6 feet	N	4 ft
S. Fern Street	15th Street S. to 18th Street S.	6-12 ft	N	7 ft	6 feet	N	4 ft
S. Fern Street	18th Street S. to 23rd Street S.	4-6 ft	Y	4 ft	2-4 ft	N	0 ft
S. Fair Street	12th Road S. to 14th Road S	6-8 ft	Y	6 ft	4-6 feet	Y	6 ft
14th Road S.	S. Fair Street to S. Elm Street	6-8 ft	Y	9 ft	4-6 feet	Y	6 ft
S. Elm Street	14th Street S. to 15th Street S.	6-8 ft	Y	None	4-6 feet	N	None
S. Eads Street	12th Street S. to 15th Street S.	6-12 ft	Y	8 ft	6 feet	Y	7 ft
S. Eads Street	15th Street S. to 18th Street S.	6-12 ft	Y	6 ft	6 feet	N	2 ft
S. Eads Street	18th Street S. to 20th Street S.	6-12 ft	N	4 ft	6 ft	N	3 ft
S. Eads Street	20th Street S. to 23rd Street S.	6-12 ft	N	< 5 ft	6 ft	N	2 ft
Route 1	20th Street S. to 23rd Street S.	6 ft	Y	11 ft	8+ ft	N	4 ft
S. Bell Street	15th Street to 20th Street S.	6-12 ft	Y	8 ft	6 ft	Y	6 ft
S. Clark Street	12th Street S. to 15th Street S.	6-12 ft	N	None	6 ft	N	None
S. Clark Street	20th Street S. to 23rd Street S.	6-12 ft	N	< 5 ft	6 ft	N	0 ft
14th Street S.	S. Fern Street to S. Elm Street	6-8 ft	Y	9 ft	4-6 feet	Y	6 ft
15th Street S.	S. Hayes Street to S. Fern Street	6-12 ft	Y	6 ft	6 feet	Y	6 ft
15th Street S.	S. Fern Street to S. Eads Street	6-12 ft	Y	9 ft	6 feet	N	4 ft
15th Street S.	S. Eads Street to Crystal Drive	10-16 ft	Y	12+ ft	6 feet	Y	None
S. Hayes Street	15th Street S. to 18th Street S.	6-12 ft	N	< 5 ft	6 feet	Y	7 ft
18th Street S.	S. Hayes Street to S. Fern Street	4-6 ft	N	None	2-4 ft	N	None
18th Street S.	S. Fern Street to S. Eads Street	6-12 ft	Y	6 ft	6 feet	N	2 ft
18th Street S.	S. Eads Street to S. Bell St	10-16 ft	N	7 ft	6 ft	N	0 ft
18th Street S.	S. Bell Street to Crystal Drive	10-16 ft	N	8 ft	6 ft	N	0 ft
19th Street S.	S. Grant St to S. Fern St	4-6 ft	Y	< 5 ft	2-4 ft	Y	3 ft
20th Street S.	S. Grant St to S. Fern St	4-6 ft	Y	< 5 ft	2-4 ft	Y	3 ft
20th Street S.	S. Eads Street to Route 1	10-16 ft	Y	10 ft	6 ft	N	4 ft
20th Street S.	Route 1 to Crystal Drive	10-16 ft	Y	10 ft	6 ft	N	4 ft

* Widths based most narrow measurement along either side of roadway section

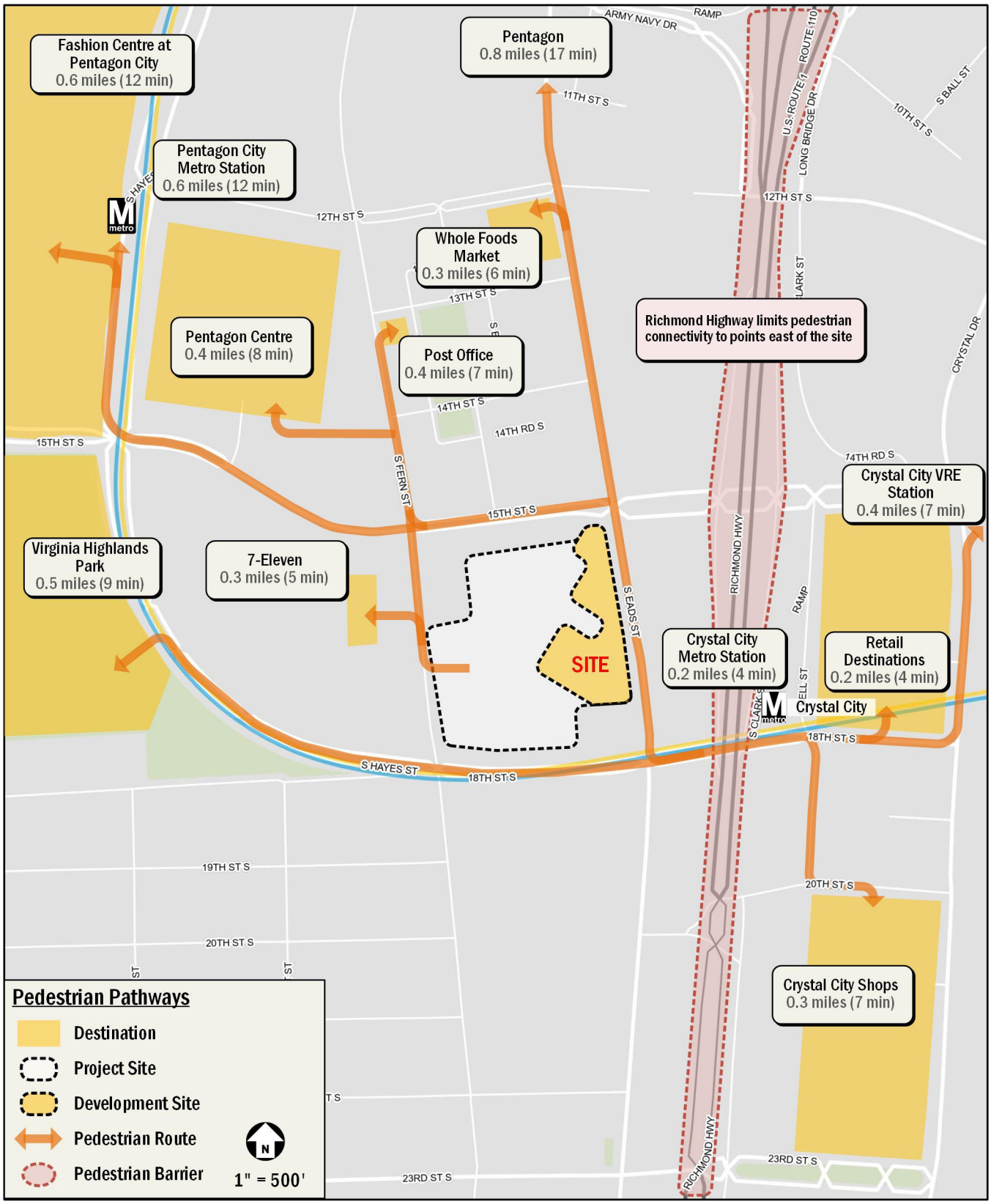

Figure 22: Pedestrian Pathways

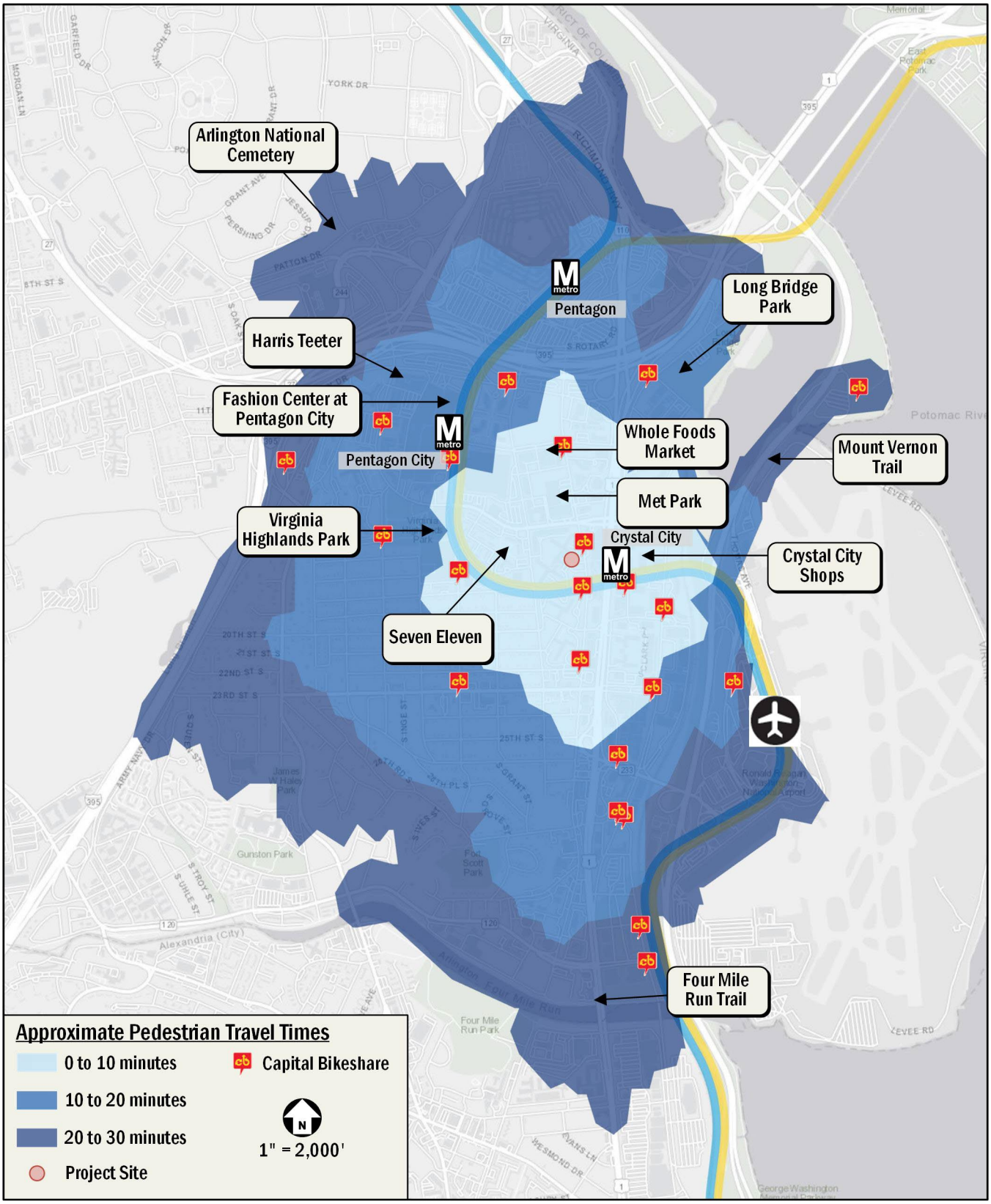

Figure 23: Approximate Pedestrian Travel Times

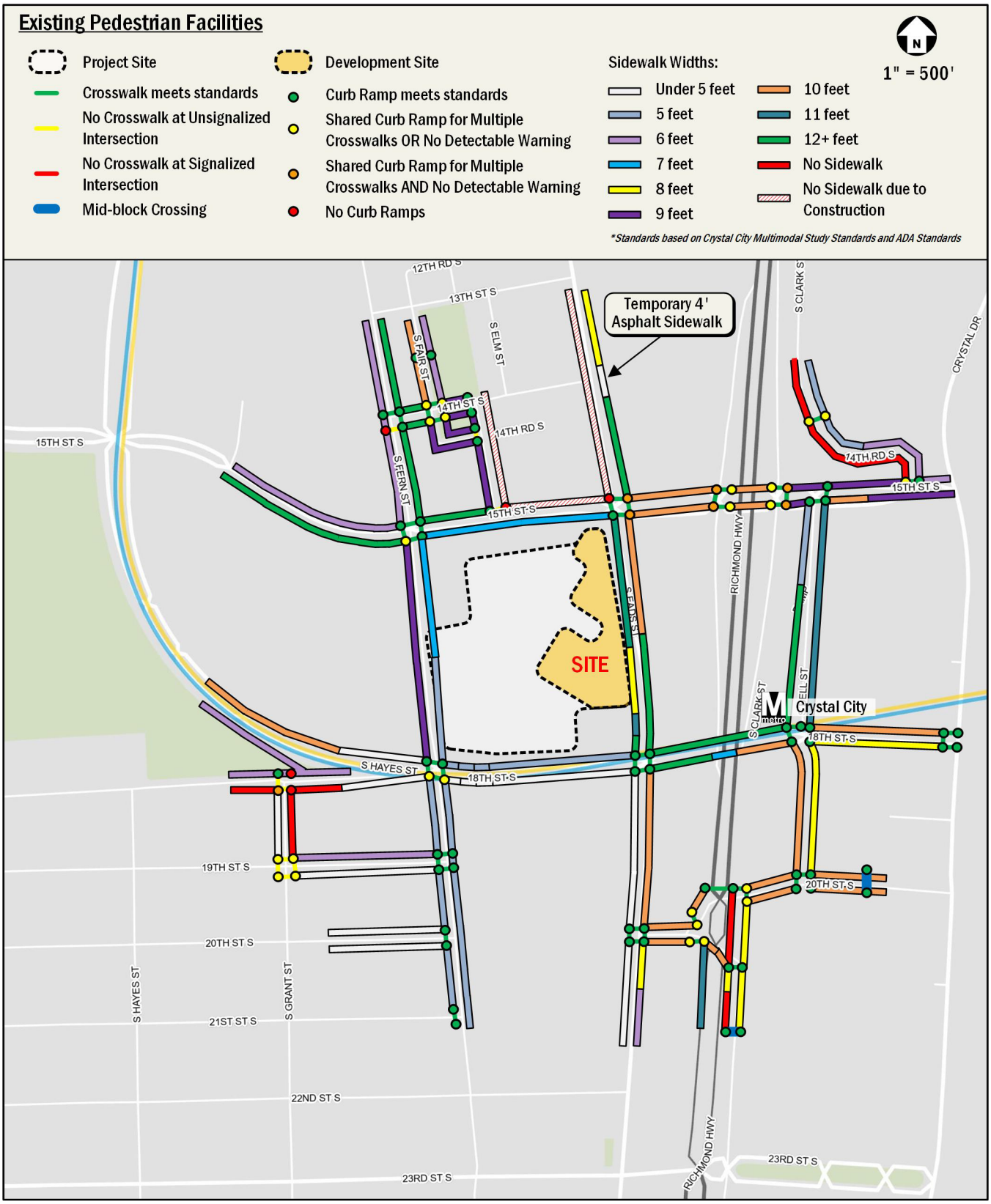

Figure 24: Existing Pedestrian Facilities

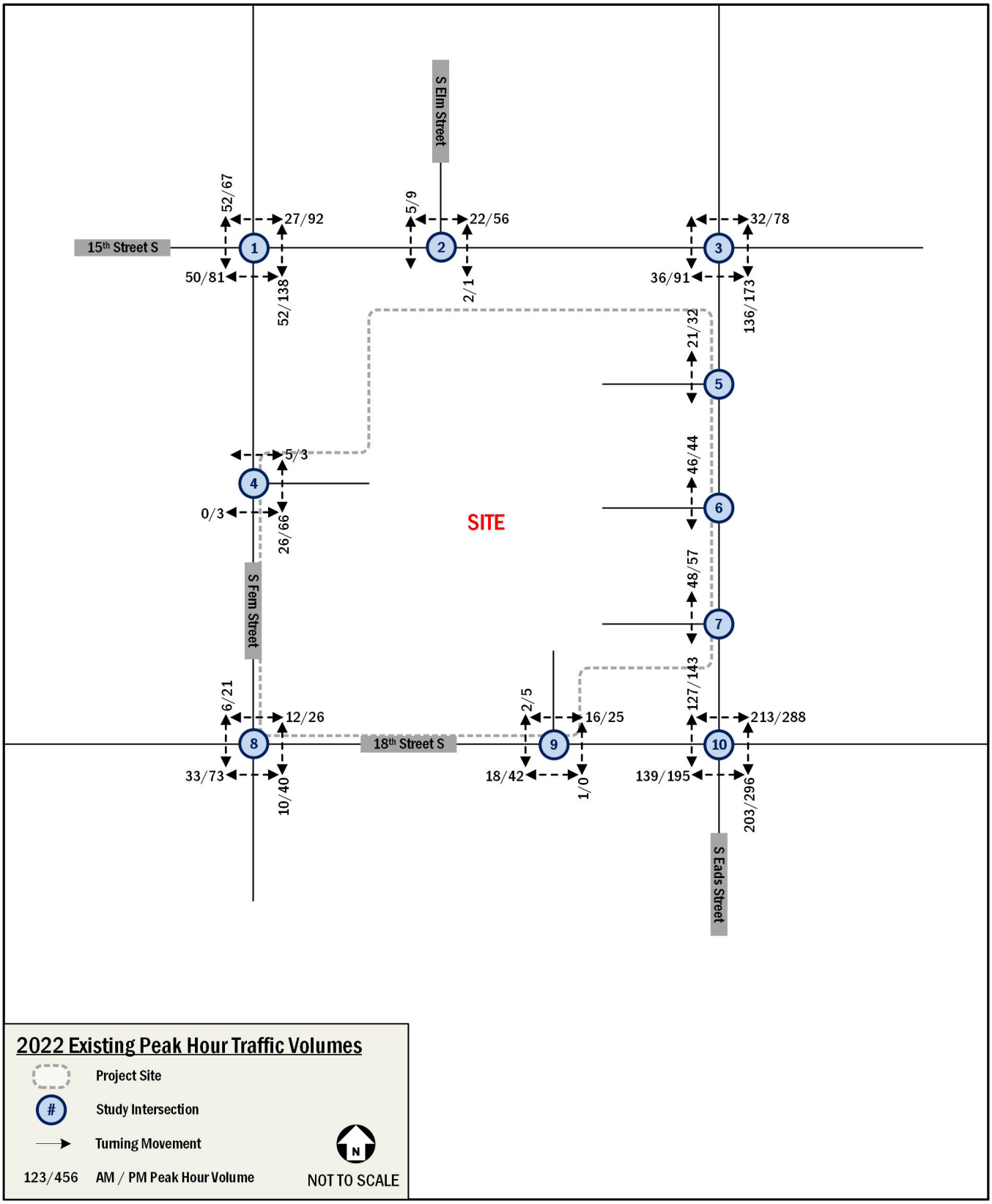

Figure 25: 2022 Existing Peak Hour Pedestrian Volumes

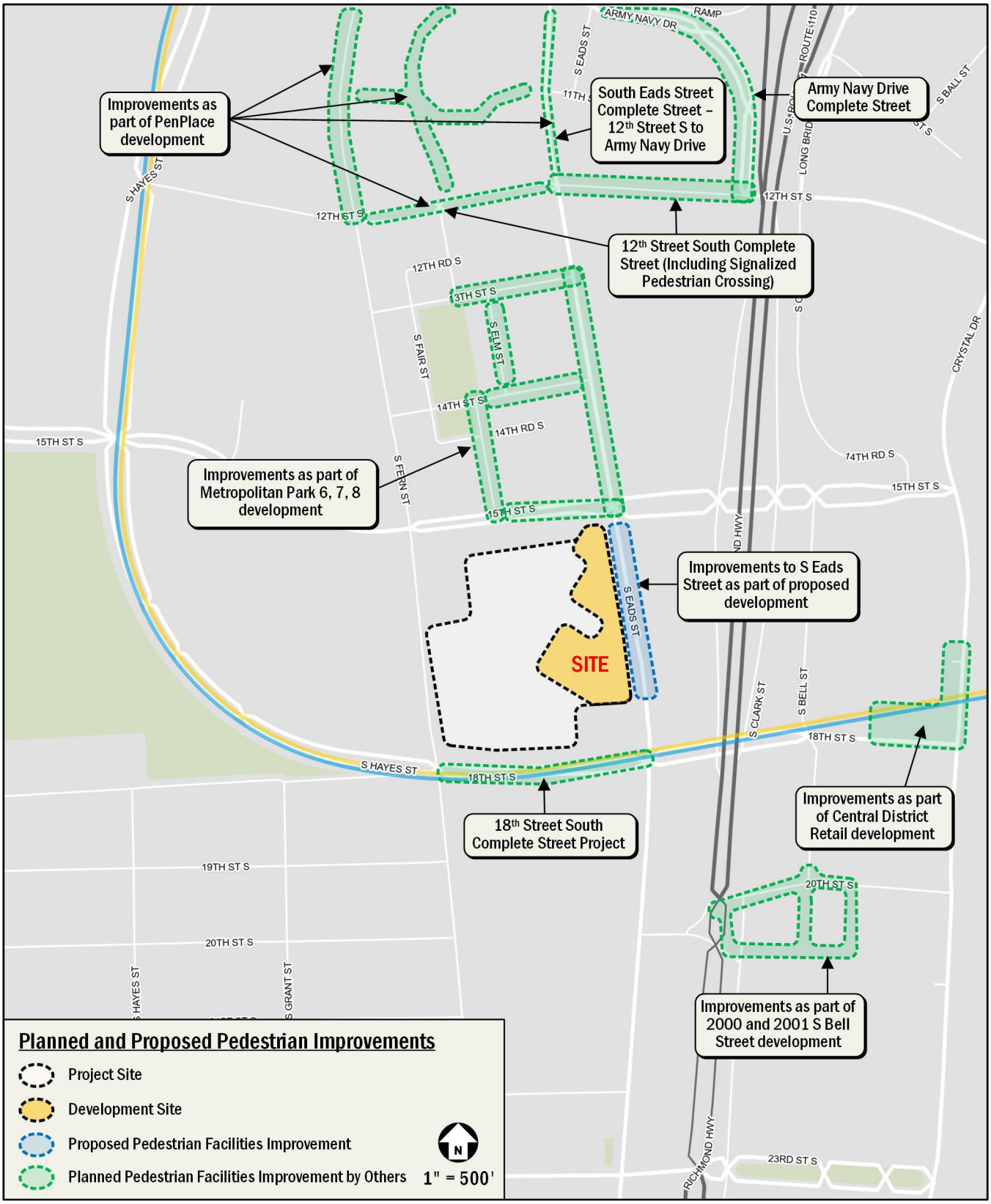

Figure 26: Planned and Proposed Pedestrian Improvements

Bicycle Facilities

This chapter summarizes existing and future bicycle access, and reviews the quality of cycling routes to and from the site.

The following conclusions are reached within this chapter:

- The site has access to several on- and off-street bicycle facilities, including buffered bike lanes on portions of S. Eads Street and bike lanes on portions of Crystal Drive, S. Clark Street, and 18th Street S. which connect to the Mt. Vernon Trail to the east and Four Mile Run Trail to the south.
- Future planned and proposed projects in the vicinity of the site include protected bicycle lanes along S. Eads Street, S. Fern Street, and 18th Street S., bicycle lanes on Army Navy Drive, bicycle lanes and a multi-use path along S. Bell Street, and share lanes on 12th Street S. These will further improve bicycle access and connectivity by upgrading the bicycle facilities existing on along these routes.
- As part of the proposed development, short-term bicycle parking spaces will be provided along the site frontage along S. Eads Street. Long-term bicycle parking spaces, showers, and lockers will be provided for use of residential tenants and retail employees.

Existing Bicycle Facilities

The site has access to several existing on- and off-street bicycle facilities, including:

- protected bike lanes on S. Eads Street;
- bike lanes on 15th Street S., 18th Street S., S. Hayes Street, portions of 12th Street S., and Crystal Drive; and
- shared lanes on portions of 12th Street S., portions of 15th Street S., and S. Bell Street.

Figure 27 shows the existing facilities within the study area. These bike facilities connect to the Mt. Vernon Trail to the north and Four Mile Run Trail to the south.

Arlington County publishes an annual Bicycle Comfort Level Map highlighting the most comfortable bicycle routes throughout Arlington County. The map uses a rating system of “perception of comfort” to show which routes are most comfortable. Routes are rated as ‘Easy’, ‘Medium’, ‘Challenging’, ‘Expert Level’, or ‘Prohibited’. The most recent publication of the map (2020) shows bicycle routes in the vicinity of the site rated as ‘Easy’, ‘Medium’ and ‘Challenging’. S. Eads Street between 12th Street S. and 23rd Street S. and 18th Street S. between S. Fern Street and S. Eads Street are rated as ‘Easy.’ S. Hayes Street north of 15th Street S., 18th Street S. east of S. Eads Street, and S. Eads Street north of 12th Street S. are rated as ‘Medium,’ and 15th Street S. is rated as ‘Challenging’ within the study area.

No bicycle parking is provided along the frontage of the site along S. Eads Street under existing conditions. Short-term bicycle racks are available along the west side of S. Eads Street immediately south of the project site and at the Crystal City Metro Station.

Figure 28 shows the 10-minute, 20-minute, and 30-minute bicycle travel shed for the proposed development. Within a 10-minute bicycle ride, the proposed development has access to several destinations including the Mount Vernon and Four Mile Run trails, public transportation stops, Metro stations served by the Blue and Yellow lines, the Crystal City VRE Station, retail zones, residential neighborhoods, and community amenities. Within a 20-minute bicycle ride, the proposed development has access to destinations in the District, Arlington, and Alexandria such as Custis Trail, Arlington Memorial Bridge, Lincoln Memorial, residential neighborhoods, and retail zones. Within a 30-minute bicycle ride, the proposed development is accessible to most of Arlington and Alexandria, and several destinations in the District including Downtown, and the Southwest Waterfront.

Capital Bikeshare

In addition to personal bicycles, the Capital Bikeshare program provides additional cycling options for residents and patrons of the proposed development. The Bikeshare program has placed over 550 Bikeshare stations across Washington, DC, Arlington County, VA, City of Alexandria, VA, Montgomery County, MD, Fairfax County, VA, Prince George’s County MD, and most recently the City of Falls Church, VA, with over 4,300 bicycles provided. There are three (3) existing Capital Bikeshare stations with 49 available bicycle docks within a quarter-mile of the site, located along S. Eads Street and 18th Street S. There are 11 additional stations are located within one half-mile of the site.

E-Scooters and Dockless E-Bicycles

Five (5) electric-assist scooter (e-scooter) and electric-assist bicycle (e-bike) companies provide Shared Mobility Device (SMD) service in Arlington County: Bird, Helbiz, Lime, Link/Superpedestrian, and Spin. These SMDs are provided by private companies that give registered users access to a variety of e-scooter and e-bike options. These devices are used through each company-specific mobile phone application. Many SMDs

do not have designated stations where pick-up/drop-off activities occur like with Capital Bikeshare; instead, many SMDs are parked in public space, most commonly in the “furniture zone” (the portion of sidewalk between where people walk and the curb, often where you’ll find other street signs, street furniture, trees, parking meters, etc.). At this time, SMD pilot/demonstration programs are underway in Arlington County, the District, Fairfax County, the City of Alexandria, and Montgomery County.

Planned Bicycle Facilities

Existing bike facilities have been recommended by the Arlington Master Transportation Plan and Crystal City Sector Plan to be upgraded in the future, as shown on Figure 12, including adding bicycle lanes along Army Navy Drive between S. Joyce Street and 12th Street S., adding bicycle lanes along S. Eads Street between Army Navy Drive and 12th Street S., adding bicycle lanes along S. Fern Street between the Pentagon Transit Center and 18th Street S., and adding off-street bicycle facilities along S. Clark Street/S. Bell Street between 12th Street S. and 18th Street S.

The recently adopted Bicycle Element of the Arlington County Master Transportation Plan identifies 15th Street S. as a Primary Bicycling Corridor. The plan makes the following recommendations:

- Reconstruct Army Navy Drive to include bi-directional, protected bicycle lanes from S. Joyce Street to 12th Street S.
- Construct an off-street cycle track connecting the planned Army Navy Drive protected bicycle lane at 12th Street S. to 18th Street S. and the Crystal City Metrorail station
- Reconstruct 18th Street S. between Richmond Highway (Rt. 1) and Crystal Drive to include an enhanced on-street bicycle facility and improve the connection with the Crystal City Connector Trail. Also identified in the Crystal City Sector Plan.
- Upgrade the existing bicycle lanes on S. Joyce Street and 15th Street S. between Army Navy Drive and S. Hayes Street to include more separation from motor vehicle traffic.
- Develop an enhanced bicycle facility on S. Fern Street between the Pentagon reservation and 18th Street S.

In December 2020, County staff developed recommendations for a bicycle network that provides new north-south bicycle facilities along with improvements to east-west streets in Crystal City. Following public input in 2021, the updated Recommended Crystal City Bike Network includes:

- Southbound protected bicycle lane on Crystal Drive between 18th Street S. and 23rd Street S.
- Northbound, contraflow protected bicycle lane on S. Clark Street between 23rd Street S. and 20th Street S.
- Two-way cycle track on S. Clark Street between 23rd Street and 27th Street.
- Protected or buffered/partially buffered eastbound and westbound bicycle lanes on 15th Street S., 18th Street S. and 23rd Street S.

Several bicycle infrastructure improvements are planned in the study area as parts of other planned projects:

- As part of the Army Navy Drive Complete Street project, separated two-way bicycle lanes will be installed along the south side of Army Navy Drive between S. Joyce Street and 12th Street S.
- As part of the S. Eads Street Complete Street project, buffered bicycle lanes will also be installed on the east side of S. Eads Street from Army Navy Drive to 12th Street S.
- As part of the S. Eads Street Protected Bicycle Lanes Extension and Metropolitan Park 6, 7, 8 project, protected bicycle lanes will be installed along both sides of S. Eads Street from 12th Street S. to 15th Street S. and the S. Eads Street and 15th Street S. intersection will be reconfigured as a protected intersection.
- As part of the 12th Street S. Complete Street project, shared lanes are planned from S. Hayes Street to Clark Street/Long Bridge Drive.
- As part of the 15th Street S./S. Clark-Bell Street Realignment project, an off-street trail will be installed along the west side of S. Clark Street between 12th Street S. and 18th Street S.
- As part of the 18th Street South Complete Street Project, protected bicycle lanes will be installed along both sides of 18th Street S. from S. Fern Street to S. Eads Street.
- As part of the PenPlace project, a northbound protected bike lane will be added along the along the eastern side of S. Fern Street between Army Navy Drive and 12th Street S., and a southbound protected bike lane will be added along the western side of S. Fern Street between Army Navy Drive and 11th Street S./Site Driveway.

Two additional bicycle infrastructure improvements are planned in the study area as part of other planned projects:

- As part of the 23rd Street Realignment project, eastbound and westbound protected bike lanes will be added on 23rd Street S. between Crystal Drive and S. Clark Street, improving east-west connectivity. The project will also add two (2) protected intersection corners along 23rd Street S., the southeast corner of S. Clark Street and 23rd Street S. and the northwest corner of Crystal Drive and 23rd Street S. Protected intersection corners improve sightlines and provide more separation between bicycles and vehicles. The project will also add a bike box on the westbound approach of the S. Clark Street and 23rd Street S. intersection.
- As part of the 2000 and 2001 S. Bell Street project, the segment of S. Clark Street between 20th Street S. and the project's proposed Connector Road will be removed. The project will also provide a bike lane along the proposed Connector Road and the S. Bell Street extension. Per the County's proposed Crystal City Bike Network, the existing bike lane on S. Clark Street between 20th Street S. and 23rd Street S. will be shifted from the west side of S. Clark Street to the east side of S. Clark Street. This shift will connect to the bicycle facilities provided by the 2000 and 2001 S. Bell project, providing a continuous northbound bicycle connection between 20th Street S. and 23rd Street S.

The proposed development will include both short- and long-term bicycle parking spaces. The proposed development will provide at least five (5) short-term bicycle parking spaces for residential use and six (6) short-term bicycle spaces for retail use, meeting zoning requirements. The proposed development will provide at least 84 long-term bicycle parking spaces for residential use and two (2) long-term bicycle parking spaces for retail employee use, meeting zoning requirements. Secure long-term bicycle parking for the development will be located on the ground floor level of the retail building. Short-term bicycle parking spaces will be placed along the frontage of the site on S. Eads Street. The proposed development will provide at least two (2) lockers and one (1) unisex shower, meeting zoning requirements.

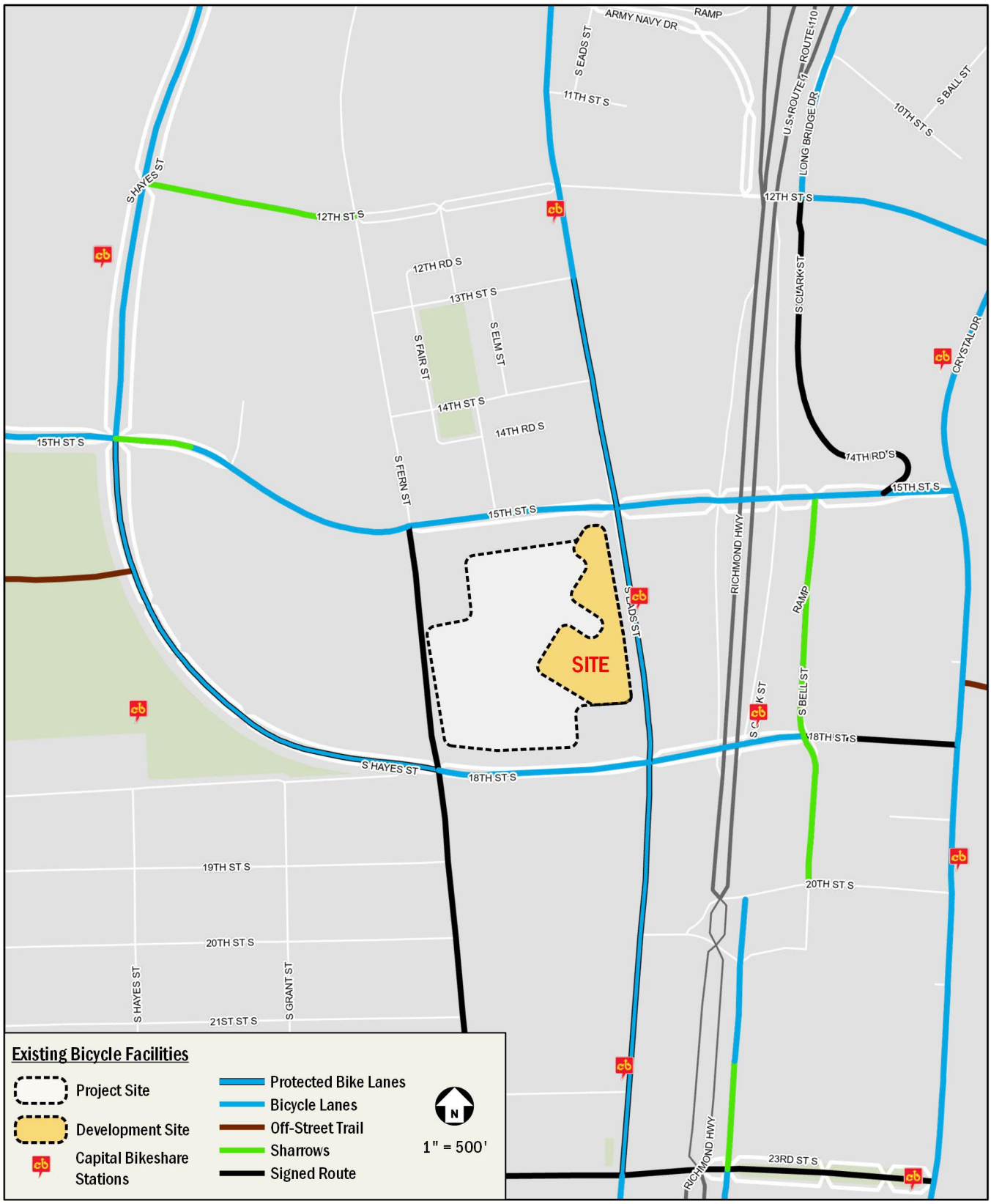

Figure 27: Existing Bicycle Facilities

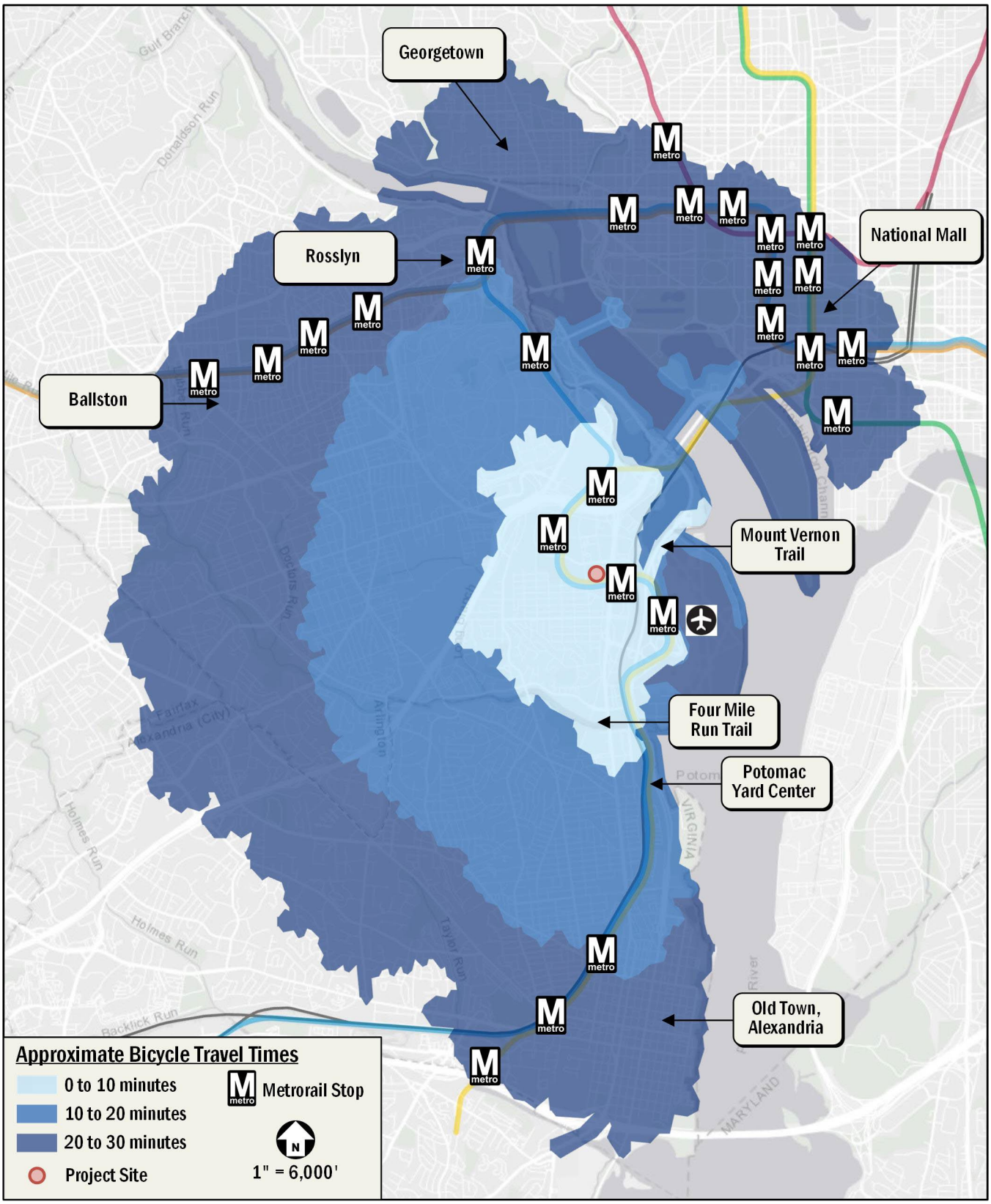

Figure 28: Approximate Bicycle Travel Times

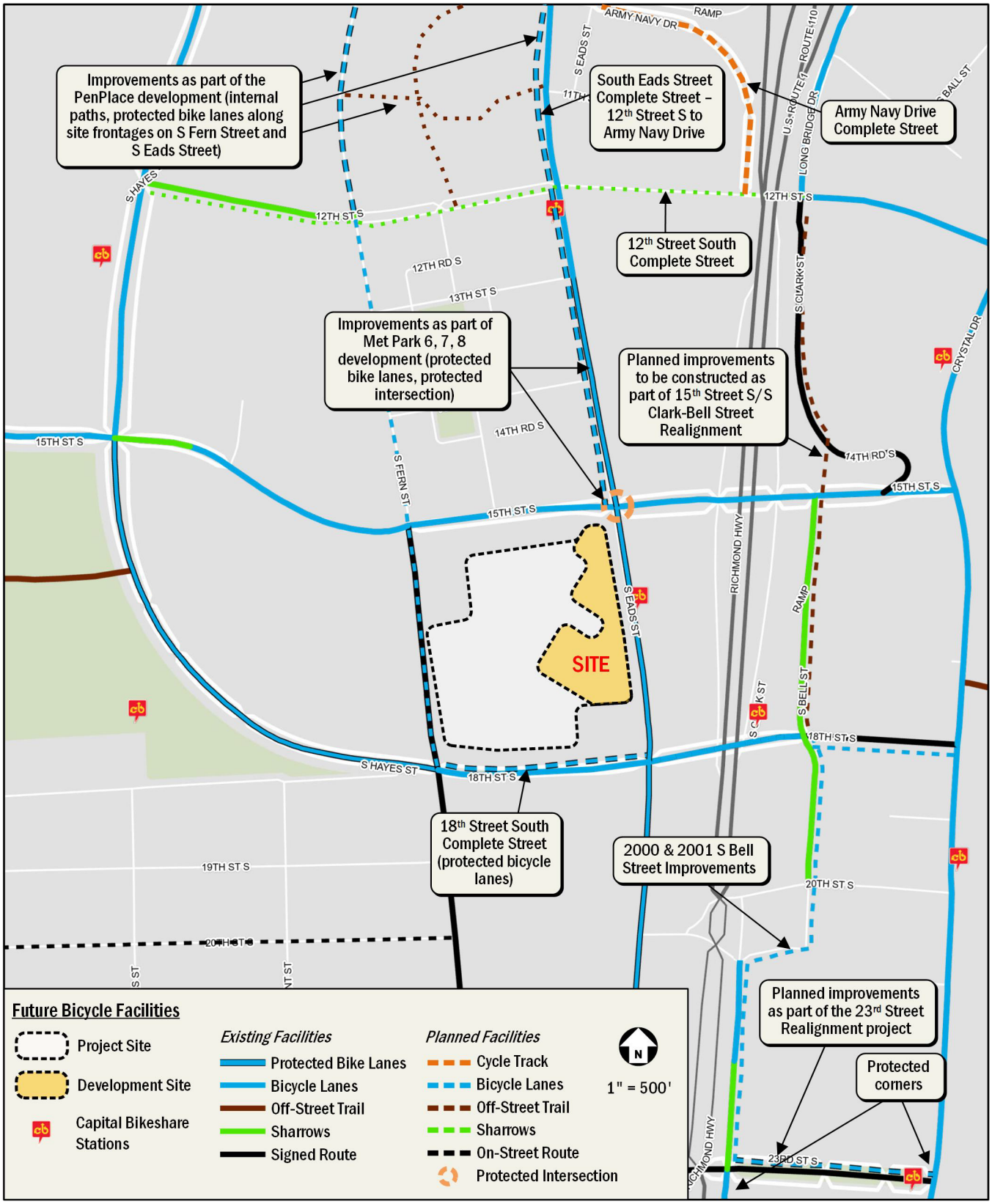

Figure 29: Future Bicycle Facilities

Travel Demand Assumptions

This chapter outlines the transportation demand of the proposed Crystal Towers development. It reviews the expected mode splits, multimodal trip generation, and the trip distribution and routing assumptions, which forms the basis for the chapters that follow.

Mode Split Methodology

Mode split (also called mode share) is the percentage of travelers using a particular type (or mode) of transportation when traveling. The main source of mode split information for this report was based on Census data using Traffic Analysis Districts (TADs) and data contained in the Crystal City Multimodal Transportation Study, the WMATA Ridership Survey, and the Arlington County Mode Share Assumptions for Crystal City.

Residential Mode Splits

Residential mode splits were primarily based on Census data at the TAD level for commuters with origins in the TAD. Figure 30 shows the TAD used in the analysis in relation to the proposed development and Figure 31 shows the destinations of driving commuters with origins in the project TAD. Table 7 summarizes the data that was used to establish the residential mode split assumptions for this report.

Table 7: Summary of Residential Mode Split Data

Information Source	Mode				
	SOV	Carpool	Transit	Bike/ Walk	Telecommute/ Other
Census Transportation Planning Products (TAZ 21502)	35%	1%	50%	9%	5%
Residential Mode Splits used in Crystal Mall Block TIS (Dec. 2017)	35%		65%		---
Census Data (Tract 1035.03)	39%	3%	43%	9%	6%
22202 Transportation Study – Journey to Work (for Crystal City Core)	34%	3%	50%	9%	4%
22202 Transportation Study – Journey to Work (for Pentagon City Core)	28%	2%	53%	7%	4%
WMATA Ridership Survey (average for Crystal City Station Area)	47%		46%	7%	10%
WMATA Ridership Survey (Suburban inside the Beltway)	39%		49%	12%	---
Arlington County Mode Share Assumption for Crystal City (Productions)	32%		59%	9%	---
Arlington County Mode Share Assumption for Pentagon City (Productions)	27%		64%	9%	---

Neighborhood Retail Mode Splits

Neighborhood retail mode splits were primarily based on information contained in WMATA's 2005 *Development-Related Ridership Survey*. Table 8 summarizes the data that was used to establish the neighborhood retail mode split assumptions for this report.

Table 8: Summary of Neighborhood Retail Mode Split Data

Information Source	Mode				
	SOV	Carpool	Transit	Bike/ Walk	Telecommute/ Other
WMATA Ridership Survey (Crystal City Shops)	27%		37%	36%	---
WMATA Ridership Survey (Crystal Plaza Shops)	24%		41%	35%	---

The site has multiple bus stops in the vicinity and one (1) Metro station near the site. It is expected that a significant portion of trips will be by Metrorail, bus, bicycle, or on foot during the morning and afternoon peak hours, rather than by personal vehicle. Based on this, the auto mode splits for the development were determined to be 27% for the residential component and 5% for the neighborhood-serving retail component. These mode splits are consistent with the recently-approved Pentagon City Sector Plan, which identifies as a policy goal that single-occupancy vehicle trips can make up no more than 30% of trips for residential uses and 5% of trips for retail uses associated with future redevelopment. The proposed mode splits were vetted and approved by Arlington County during the scoping process. Table 9 shows the mode split for the development.

Table 9: Summary of Mode Split Assumptions by Land Use

Land Use	Mode			
	Auto	Transit	Bike	Walk
Residential	27%	61%	5%	7%
Retail	5%	15%	5%	75%

Trip Generation Methodology

Weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) Trip Generation, 10th Edition.

Residential trip generation is based on the development program of 209 residential dwelling units. The proposed residential building includes nine (9) levels of residential units, with retail on the ground level. Residential trip generation was calculated based on ITE Land Use 221 (Multifamily Housing – Mid-Rise), using the setting/location of Dense Multi-Use Urban, splitting trips into different modes using assumptions outlined in the mode split section of this report.

Neighborhood-serving retail trip generation is based on the development program of 28,000 square feet of neighborhood-serving ground floor retail across the entire development. Retail trip generation was calculated based on ITE's baseline vehicular trips for Land Use 820 (Shopping Center), using the setting/location of General Urban/Suburban (limited data is available for person trips), splitting trips into different modes using assumptions outlined in the mode split section of this report.

A summary of the net new multi-modal trip generation for the proposed development as compared to the existing uses on site is shown in Table 10 for the weekday morning and weekday afternoon peak hours. Detailed trip generation calculations are included in the Technical Appendix.

Table 10: Multi-Modal Trip Generation

Mode	Land Use	Quantity	AM Peak Hour			PM Peak Hour		
			In	*Out*	*Total*	*In*	*Out*	*Total*
Auto	Residential	209 du	4 veh/hr	20 veh/hr	24 veh/hr	14 veh/hr	5 veh/hr	19 veh/hr
	Retail	28,000 sf	1 veh/hr	0 veh/hr	1 veh/hr	3 veh/hr	2 veh/hr	5 veh/hr
	Net New		**5 veh/hr**	**20 veh/hr**	**25 veh/hr**	**17 veh/hr**	**7 veh/hr**	**24 veh/hr**
Transit	Residential	209 du	11 ppl/hr	53 ppl/hr	64 ppl/hr	36 ppl/hr	16 ppl/hr	52 ppl/hr
	Retail	28,000 sf	4 ppl/hr	3 ppl/hr	7 ppl/hr	14 ppl/hr	15 ppl/hr	29 ppl/hr
	Net New		**15 ppl/hr**	**56 ppl/hr**	**71 ppl/hr**	**50 ppl/hr**	**31 ppl/hr**	**81 ppl/hr**
Bike	Residential	209 du	1 ppl/hr	4 ppl/hr	5 ppl/hr	3 ppl/hr	1 ppl/hr	4 ppl/hr
	Retail	28,000 sf	1 ppl/hr	1 ppl/hr	2 ppl/hr	5 ppl/hr	5 ppl/hr	10 ppl/hr
	Net New		**2 ppl/hr**	**5 ppl/hr**	**7 ppl/hr**	**8 ppl/hr**	**6 ppl/hr**	**14 ppl/hr**
Walk	Residential	209 du	1 ppl/hr	6 ppl/hr	7 ppl/hr	4 ppl/hr	2 ppl/hr	6 ppl/hr
	Retail	28,000 sf	22 ppl/hr	13 ppl/hr	35 ppl/hr	70 ppl/hr	76 ppl/hr	146 ppl/hr
	Net New		**23 ppl/hr**	**19 ppl/hr**	**42 ppl/hr**	**74 ppl/hr**	**78 ppl/hr**	**152 ppl/hr**

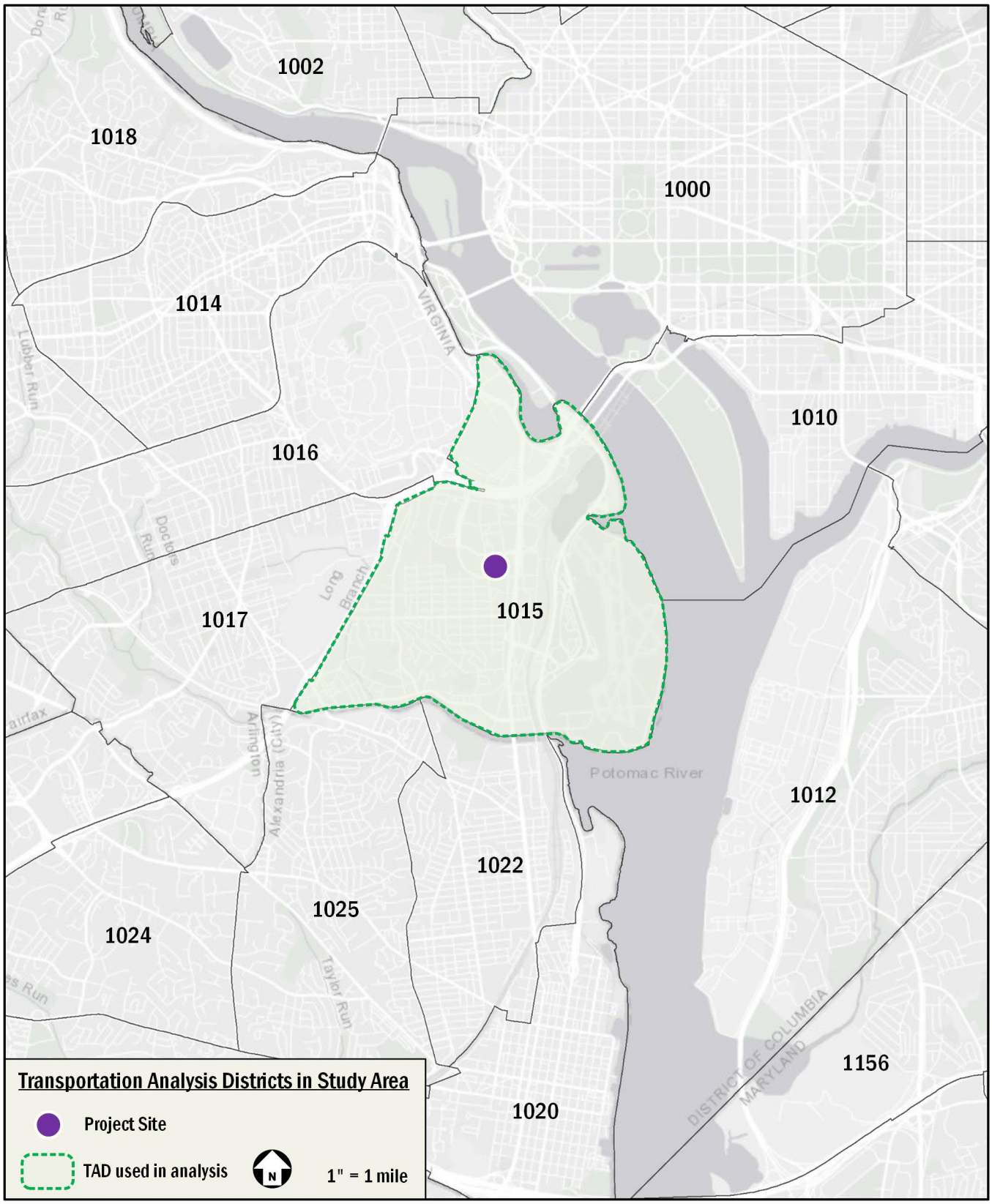

Figure 30: Transportation Analysis District (TAD) in Study Area

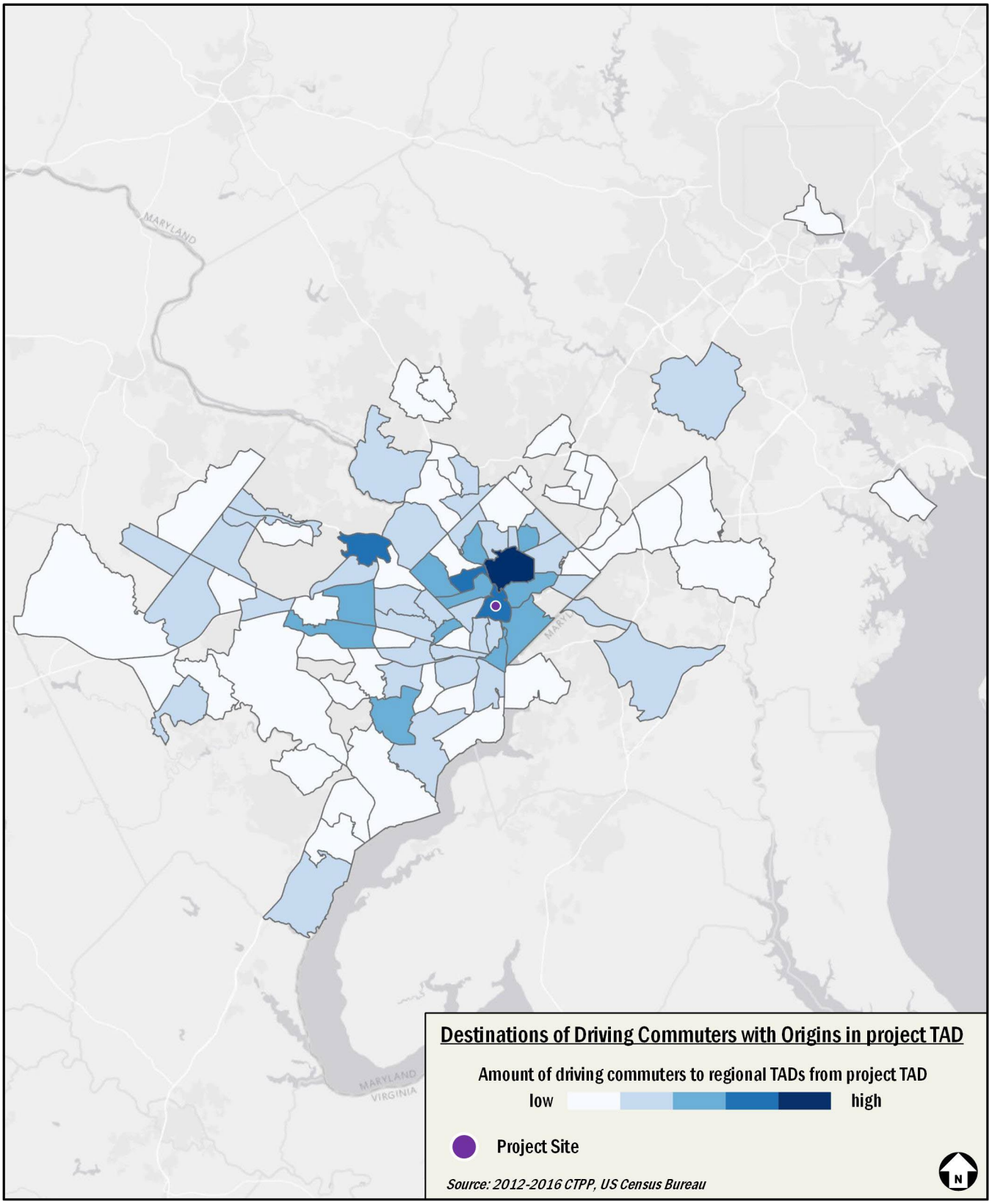

Figure 31: Destinations of Driving Commuters with Origins in project TAD

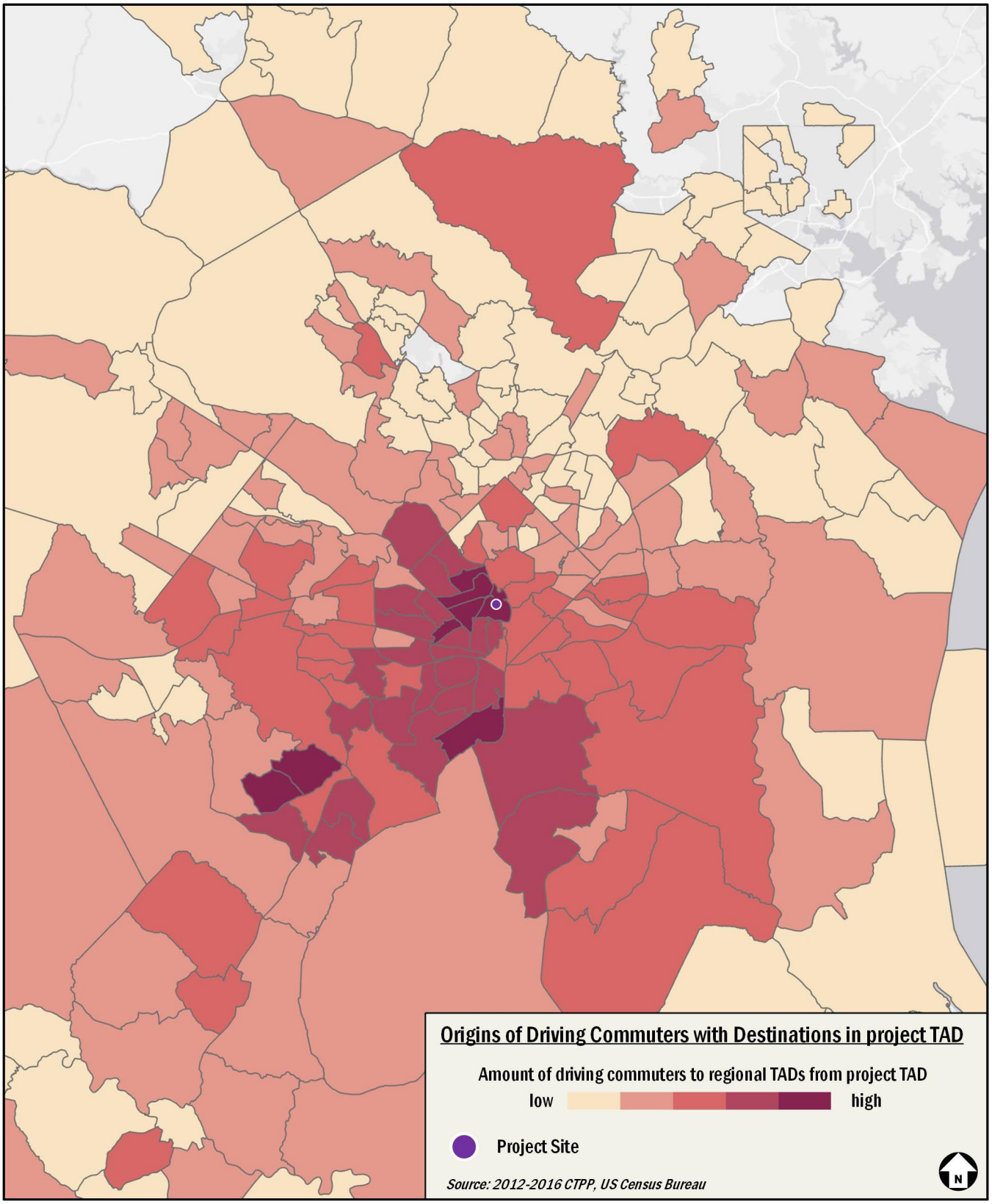

Figure 32: Origins of Driving Commuters with Destinations in project TAD

Traffic Operations

This chapter provides a summary of an analysis of the existing and future roadway capacity in the study area for the 2025 analysis year. Included is an analysis of potential vehicular impacts of the Crystal Towers development and a discussion of potential improvements.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the proposed development on the study area roadways; and
- Discuss potential improvements and mitigation measures to accommodate the additional vehicular trips.

The capacity analysis focuses on the morning and afternoon commuter peak hours, as determined by the existing traffic volumes in the study area.

The proposed development is considered to have an impact at an intersection within the vehicular study area if any of the following conditions are met:

- The overall intersection or any movement operates at LOS F in the future conditions with the proposed development where it operates at LOS E or better in the background conditions without the proposed development;
- The overall intersection or any movement operates at LOS F during the background condition and the delay increases by more than 10% in the future conditions with the proposed development; or
- If any 95th percentile queue length in the future condition exceeds the available capacity where it does not in the background conditions or increases by more than 150 feet where it already exceeds the available capacity in the background conditions.

The following conclusions are reached within this chapter:

- There are impacts to two (2) study intersections as a result of the proposed development.
- Mitigation measures were analyzed and discussed at this intersection, of which feasible solutions were recommended for implementation given Arlington County approval.
- Overall, this report concludes that the project will not have a detrimental impact to the surrounding transportation network.

Study Area, Scope, & Methodology

This section outlines the assumptions used to develop the existing and future roadway capacity analyses, including volumes, roadway geometries, and traffic operations. The scope of the analysis contained within this report was discussed with and approved by Arlington County staff. The general methodology of the analysis follows national and Arlington County guidelines on the preparation of transportation impact evaluations of site development.

Capacity Analysis Scenarios

The vehicular capacity analyses are performed to determine if the proposed development will lead to adverse impacts on traffic operations. This is accomplished by comparing future scenarios: (1) without the proposed development (referred to as the Background conditions) and (2) with the development approved and constructed (referred to as the Future conditions).

Specifically, the roadway capacity analysis examined the following scenarios:

1. 2022 Existing Conditions
2. 2025 Future Conditions without the development (2025 Background)
3. 2025 Future Conditions with the development (2025 Future)

Study Area

The study area of the analysis is a set of intersections where detailed capacity analyses are performed for the scenarios listed above. The set of intersections included are those intersections most likely to have potential impacts or require changes to traffic operations to accommodate the proposed development.

Based on the projected future trip generation and the location of the site access points, as agreed to in this report's scoping agreement, the following intersections were chosen for analysis:

1. 15th Street S. and S. Fern Street
2. 15th Street S. and S. Elm Street
3. 15th Street S. and S. Eads Street
4. S. Fern Street and Crystal Towers Driveway
5. S. Eads Street and Crystal Towers Driveway (N)
6. S. Eads Street and Crystal Towers Driveway (S)

7. 18th Street S./S. Hayes Street and S. Fern Street
8. 18th Street S. and Crystal Towers Driveway
9. 18th Street S. and S. Eads Street

Figure 8 shows the vehicular study area intersections. Roadway characteristics, including classification, number of lanes, speed limit, the presence of on-street parking and average daily traffic volumes (ADT) are outlined in Table 11.

Table 11: Existing Roadway Network

Roadway	Classification*	Lanes	Speed	On-Street Parking	ADT**
S. Eads Street	Major Collector (VDOT) Arterial Type B (Arlington)	2-3	30 mph	Yes	7,300
S. Fern Street	Major Collector (VDOT) Arterial Type B (Arlington)	2-4	25 mph	Yes	5,800
15th Street S.	Minor Arterial (VDOT) West of Fern, East of Eads – Arterial Type A East of Hayes, West of Eads – Arterial Type B	2-3	30 mph	Yes	12,000
18th Street S.	Minor Arterial (VDOT) East of Eads – Arterial Type A (Arlington) East of Fern, West of Eads – Arterial Type B	2	25 mph	Yes	8,300

* From VDOT and Arlington GIS
** VDOT ADT Data from 2019
NA – Data unavailable

Traffic Volume Assumptions

The following section reviews the traffic volume assumptions and methodologies used in the roadway capacity analyses.

Existing Traffic Volumes

The existing traffic volumes are comprised of turning movement count data, provided by Arlington County, which was collected in October and November 2019 as part of the Pentagon City PDSP. This data was supplemented by turning movement counts collected at the existing site driveways on Thursday, March 24, 2022. Existing volumes were balanced where appropriate. Based on the average peak hours from all of the count data, the system peak hours assumed were 8:00 AM to 9:00 AM for the morning peak hour and 4:45 PM to 5:45 PM for the afternoon peak hour. The existing turning movement counts, without volume balancing, are included in the Technical Appendix.

The existing peak hour traffic volumes for intersections within the vehicular study area are shown in Figure 33.

2025 Traffic Volumes

2025 Background Traffic Volumes (without the proposed development)

Traffic projections for the 2025 Background Conditions consist of the existing volumes with the addition of growth along local roadways in the study area in 2025. This local growth is accounted for by traffic generated by developments expected to be completed prior to 2025 (known as background developments), which is the expected buildout year for the proposed development.

Background Developments (2025)

Following industry methodologies, a background development must meet the following criteria to be incorporated into the analysis:

- Be located in the study area, defined as having an origin or destination point within the cluster of study area intersections;
- Have entitlements; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, nine (9) developments were included in the 2025 Background Conditions scenario. These developments are:

1. Crystal House Lofts
2. Crystal Drive Central District Retail
3. 1770 Crystal Drive Office
4. Century Center
5. Metropolitan Park 6, 7, 8
6. PenPlace
7. 101 12th Street S.
8. 2000 and 2001 S. Bell Street
9. Verizon Site

The location of the background developments included in the 2025 Background Conditions scenario in relation to the proposed Crystal Towers development is shown in Figure 34. Transportation studies were available for the majority of the background developments included in the 2025 Background Conditions. Details on each of the background developments included in the 2025 Background Conditions are presented below:

1. **Crystal House Lofts:** Located in the Pentagon City area and bounded by 18th Street S. to the north, S. Eads Street to the east, 22nd Street S. to the south, and S. Fern Street to the west, the approved Crystal House development will raze a portion of an existing parking lot and redeveloped it with 798 residential dwelling units. The expected build-out year is 2026. The Crystal House development is expected to generate 130 weekday AM peak hour vehicle trips and 153 weekday PM peak hour vehicle trips based on the Traffic Impact Study prepared by Wells & Associates dated October 19, 2018.
2. **Crystal Drive Central District Retail**: Located in the Crystal City area and bounded by 15th Street S. to north, 18th Street S. to the south, S. Bell Street to the west, and Crystal Drive to the east, the approved Crystal Drive Central District Retail development will improve upon the existing site with the addition of approximately 5,200 square feet of office space, 10,300 square feet of retail, 17,500 square feet of grocery, and a movie theatre with approximately 940 seats. The retail portion will be spread throughout the block, including a new two-story building at the corner of 18th Street and

Crystal Drive, and an expansion to 1550 Crystal Drive to accommodate the proposed grocery. Construction was completed on portions the project in 2021. The specialty grocer opened in July 2022 and the proposed movie theater is expected to open in late 2022. The development is expected to generate 56 net weekday AM peak hour vehicle trips and 322 net weekday PM peak hour vehicle trips based on the Traffic Impact Study prepared by Gorove Slade Associates dated October 13, 2017.

3. **1770 Crystal Drive Office:** Located in the Crystal City area on the northwest corner of the intersection of 18th Street S. and Crystal Drive, the existing 272,000 square foot office building was vacant when turning movement counts were collected. As such, vehicular trips were added to the network to account for the 1770 Crystal Drive Office site being vacant when turning movement counts were collected. To determine the number of trips generated by the vacant office space, ITE's Trip Generation, 10th Edition was used, with mode splits based on nearby developments that have recently been studied. During the AM peak hour 86 vehicle trips were added to the network and during the weekday PM peak hour 86 vehicle trips were added to the network.
4. **Century Center:** Located in the Crystal City area at the southwest corner of the intersection of Crystal Drive and 23rd Street S., the approved Century Center development will maintain the existing parking garage and retail on site and redevelop the existing office space with a new residential tower containing approximately 300 dwelling units. The expected build out year was initially projected to occur in 2019; however, construction has not yet begun. The Century Center development is expected to generate 53 weekday AM peak hour vehicle trips and 64 weekday PM peak hour vehicle trips based on the Traffic Impact Study prepared by Gorove Slade Associates dated January 10, 2017.
5. **Metropolitan Park 6, 7, 8**: Located in the Pentagon City area and bounded by 13th Street S. to north, 15th Street S. to the south, S. Elm Street to the west, and S. Eads Street to the east, the approved Metropolitan Park 6, 7, 8 development will raze the existing warehouse space and redevelop to include two buildings with approximately 2.1 million square feet of office space and 55,000 square feet of neighborhood-serving ground floor retail. The expected build out year is 2023. The development is expected to generate 558 net weekday AM peak hour vehicle trips and 524 net weekday PM peak hour vehicle trips based on the Traffic Impact Study prepared by Gorove Slade Associates dated October 22, 2019.
6. **PenPlace**: Located in the Pentagon City area and bounded by Army Navy Drive to the north, 12th Street S. to the south, S. Eads Street to the east, and S. Fern Street to the west, the approved PenPlace development will include four (4) buildings with approximately 2.8 million square feet of office space, 391,800 square feet of amenity space, 14,600 square feet of daycare, 94,400 square feet of neighborhood-serving ground floor retail space, and 26,500 square feet of community space. The expected build out year is 2025. The development is expected to generate 867 weekday AM peak hour vehicle trips and 821 weekday PM peak hour vehicle trips based on the Traffic Impact Study prepared by Gorove Slade Associates dated February 11, 2022.
7. **101 12th Street S.**: Located in the Crystal City area and bounded by 10th Street S. to the north, CSX tracks to the east, 12th Street S. to the south, and a commercial property to the west, the approved 101 12th Street S. development will include one mixed-use building with approximately 234,500 square feet of office space and 5,200 square feet of neighborhood-serving ground floor retail space. The expected build out year is 2023. The development is expected to generate 76 weekday AM peak hour vehicle trips and 79 weekday PM peak hour vehicle trips based on the Traffic Impact Study prepared by Gorove Slade Associates dated October 22, 2020.
8. **2000 and 2001 S. Bell Street:** Located in the Crystal City area along 20th Street S. between S. Clark Street and Crystal Drive. The development will raze the existing office building and redevelop to include two buildings with approximately 786 residential dwelling units and 29,600 square feet of ground-floor retail. The expected build out year is 2025. Trip generation was calculated based on ITE Land Use 222 (Multifamily Housing – High-Rise), using the setting/location of Center City Core, ITE Land Use 820 (Shopping Center), using the setting/location of General Urban/Suburban, and ITE Land Use 710 (General Office Building), using

the setting Center City Core. The development is expected to generate 94 net weekday AM peak hour vehicle trips and 98 net weekday PM peak vehicle trips based on the Traffic Impact Study prepared by Gorove Slade Associates dated February 12, 2021.

9. **Verizon Site**: Located in the Crystal City area and bounded by S. Eads Street to the west, 11th Street S. to the north, existing office and residential buildings to the east, and 12th Street S. to the south, the approved Verizon Site development will raze the existing telecommunications facility and redevelop to include one mixed-use building with approximately 306 dwelling units and 10,908 square feet of neighborhood-serving ground floor retail. The expected build out year is 2022. The development is expected to generate 42 net weekday AM peak hour vehicle trips and 40 net weekday PM peak hour vehicle trips based on the Traffic Impact Study prepared by Gorove Slade Associates dated July 19, 2019.

Trips generated by the approved background developments are included in the Technical Appendix. The traffic volumes generated by background developments were added to the existing traffic volumes in order to establish the 2025 Background traffic volumes. Trip distribution assumptions for the background developments were based on the distributions included in their respective studies or based on those determined for the proposed development and altered where necessary based on anticipated travel patterns. The traffic volumes for the 2025 Background conditions are shown in Figure 35.

Table 12: Traffic Generated by 2025 Background Developments

Development	Trip Generation					
	AM Peak Hour			PM Peak Hour		
	In	*Out*	*Total*	*In*	*Out*	*Total*
Crystal House Lofts [1]						
Total New Vehicle-Trips	37	93	130	92	61	153
Crystal Drive Central District Retail [2]						
Total New Vehicle-Trips	36	20	56	118	204	322
1770 Crystal Drive Office [3]						
Total New Vehicle Trips	117	17	134	22	117	139
Century Center [4]						
Total New Vehicle-Trips	10	43	53	42	22	64
Metropolitan Park 6, 7, 8 [5]						
Total New Vehicle Trips	485	73	558	87	437	524
PenPlace [6]						
Total New Vehicle Trips	723	144	867	173	648	821
101 12th Street S. [7]						
Total New Vehicle Trips	66	10	76	14	65	79
2000 and 2001 S. Bell Street [8]						
Total New Vehicle Trips	2	92	94	73	25	98
Verizon Site [9]						
Total New Vehicle Trips	12	30	42	23	17	40
Total Background Trips	**1,527**	**656**	**2,183**	**781**	**1,676**	**2,457**

(1): Extracted from Crystal House III TIA (05.24.2017) prepared by Wells + Associates.
(2): Extracted from Central District Retail Phase I & 1770 Crystal Drive Residential TIS (10.13.2017) prepared by Gorove Slade Associates.
(3): 241 18th Street is 77% occupied and 1770 is currently empty and both will be 100% occupied by 2023. Trip Generation was performed to determine the number of trips that will be generated when the offices are fully occupied.
(4): Extracted from Century Center TIS (01.10.2017) prepared by Gorove Slade Associates.
(5): Extracted from Metropolitan Park 6, 7, 8 MMTA (10.22.2019) prepared by Gorove Slade Associates.
(6): Extracted from PenPlace MMTA (02.11.2022) prepared by Gorove Slade Associates.
(7): Extracted from 101 12th Street S. MMTA (10.22.2020) prepared by Gorove Slade Associates.
(8): Extracted from 2000 and 2001 S. Bell Street MMTA (02.12.2021) prepared by Gorove Slade Associates.
(9): Extracted from Verizon Site MMTA (07.19.2019) prepared by Gorove Slade Associates.

2025 Future Traffic Volumes

The 2025 Future Conditions traffic volumes consist of the 2025 Background volumes with the addition of the traffic volumes generated by the proposed development (site-generated trips). Thus, the 2025 Future Conditions traffic volumes include traffic generated by: the existing volumes, background developments, and the proposed development.

Trip distribution and assignments for site-generated traffic was primarily determined using existing volumes, anticipated traffic patterns, and other recent studies conducted in the area. The proposed development will close the existing garage entrance off of S. Eads Street, as well as an existing garage exit, also off of S. Eads Street. The existing garage exit located off of 18th Street S. will be converted to a two-way entry/exit point and will serve as the new access point for all garage-bound site trips. As a result, some existing site trips were re-routed to the site driveways on 18th Street S. and S. Fern Street. A summary of the re-routed existing site trip volumes is shown in Figure 36. The primary origin of outbound and destination of inbound vehicular trips for residential component of the proposed development was the new two-way garage entry/exit point off of 18th Street S. Retail trips were assumed to approach the proposed retail surface parking spaces via the driveway on S. Eads Street, and were assumed to exit the retail surface parking by circulating internally through the site to the driveways on S. Fern Street and 18th Street S. A summary of the inbound and outbound trip distribution assumptions is shown on Figure 37 for the proposed development.

Trip distribution and assignment assumptions were vetted and approved by Arlington County. Based on the trip distribution and

assignment assumptions, site-generated trips were distributed though the study area intersections. The site-generated traffic volumes for the 2025 build-out year are shown on Figure 38. The 2025 Future Conditions traffic volumes, which are comprised of existing volumes, background developments, and the proposed development are shown on Figure 39.

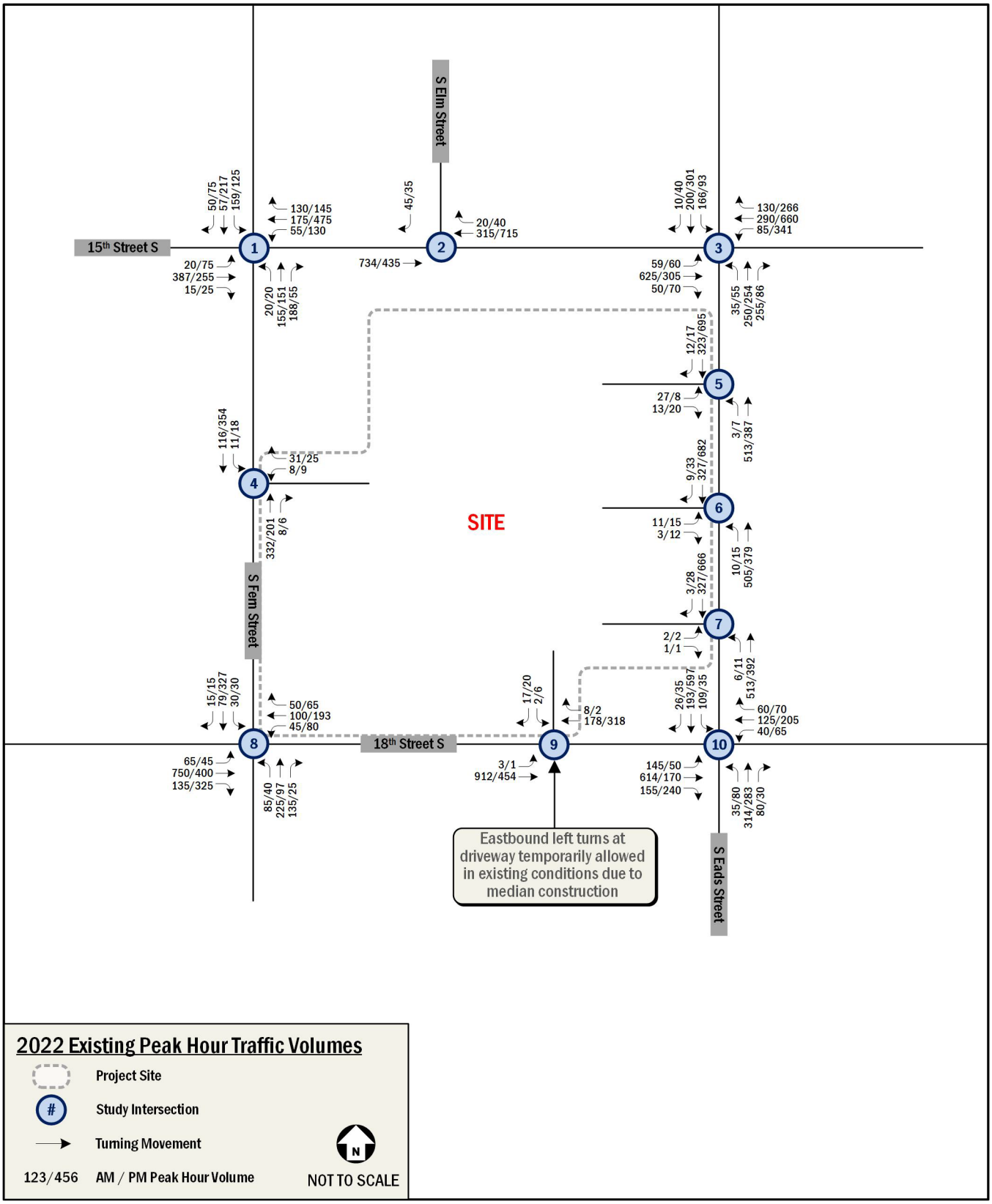

Figure 33: 2022 Existing Peak Hour Traffic Volumes

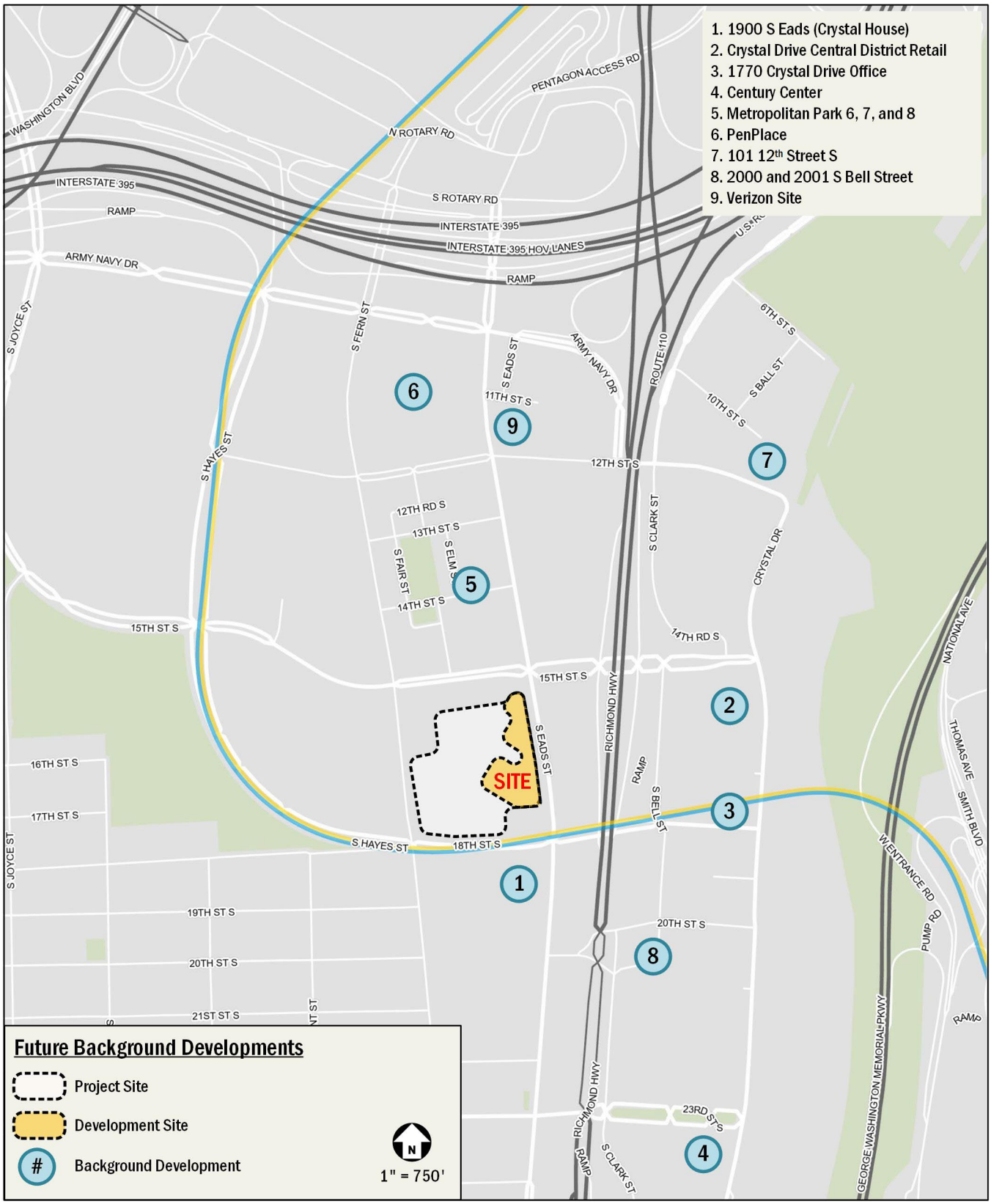

Figure 34: Future Background Developments

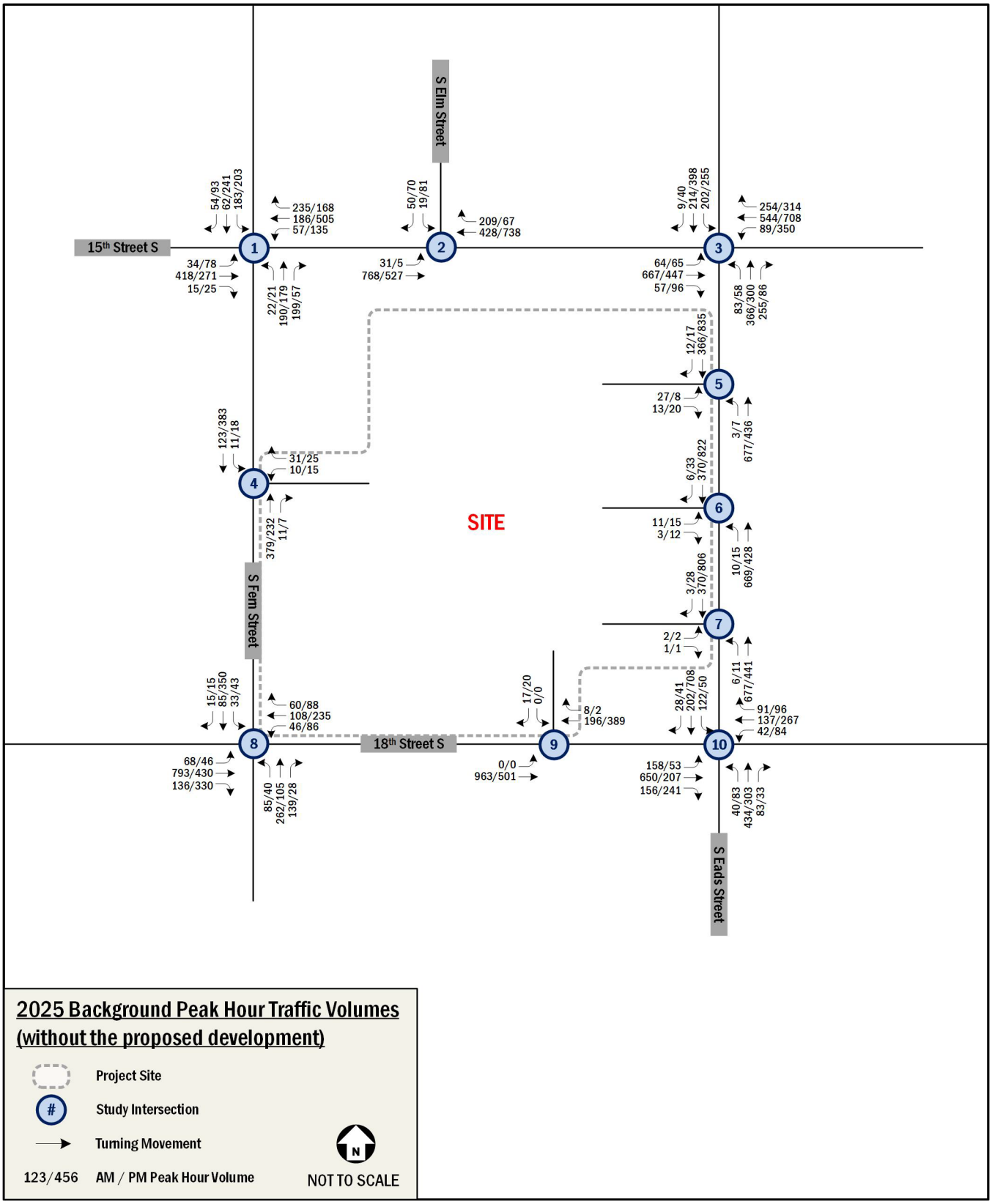

Figure 35: 2025 Background Peak Hour Traffic Volumes (without the proposed development)

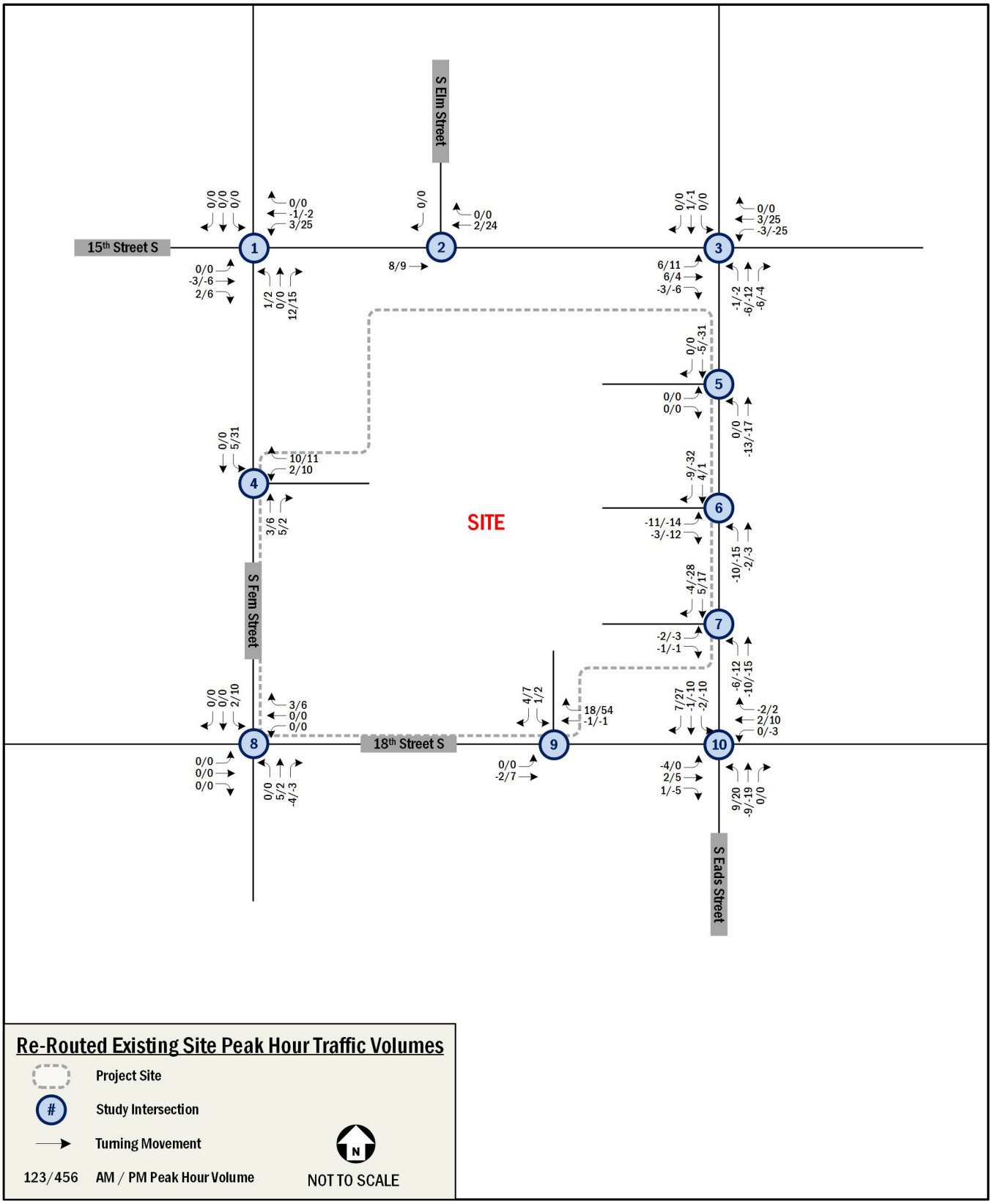

Figure 36: Re-Routed Existing Site Peak Hour Traffic Volumes

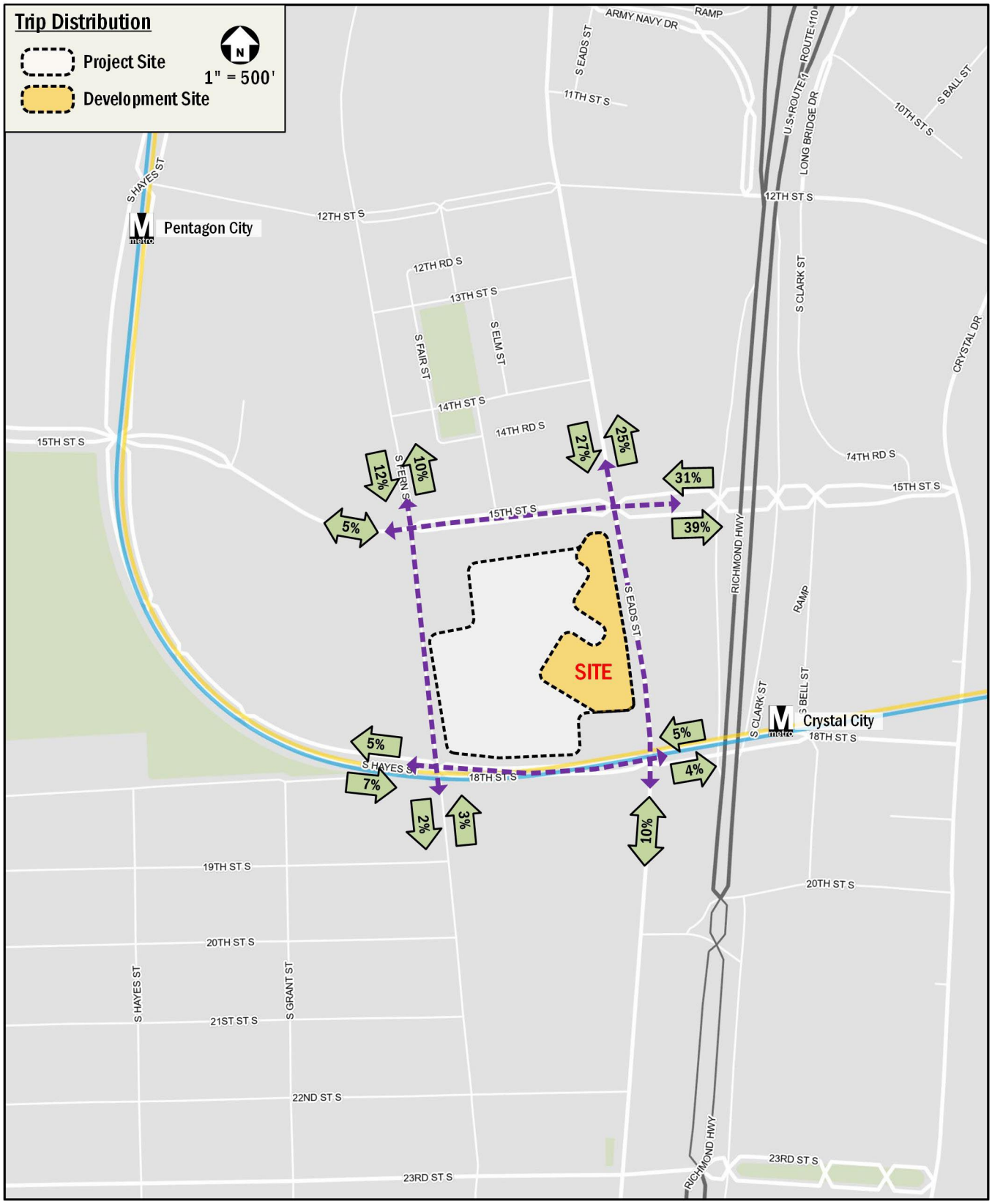

Figure 37: Inbound and Outbound Trip Distribution/Assignment

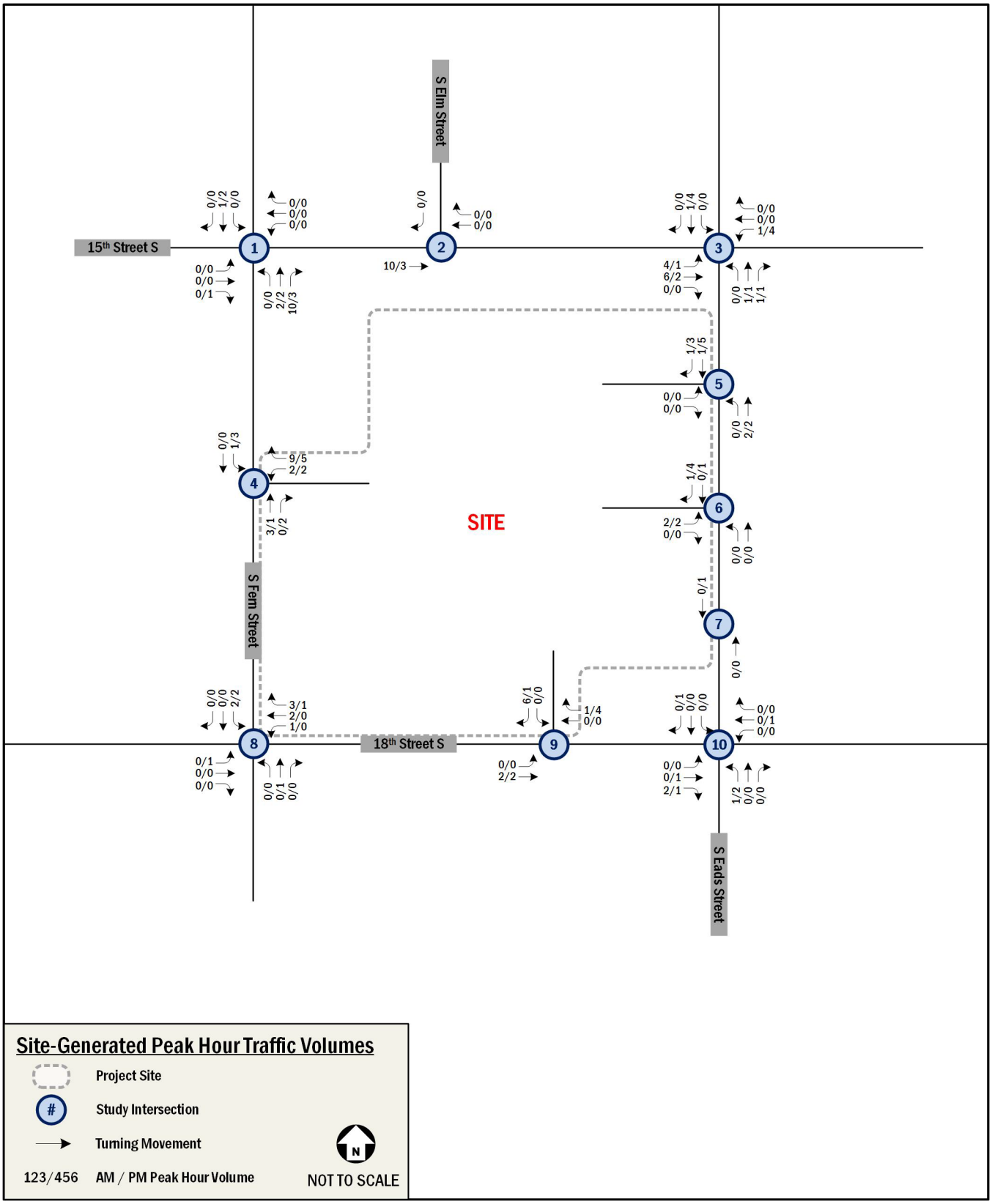

Figure 38: 2025 Site-Generated Peak Hour Traffic Volumes

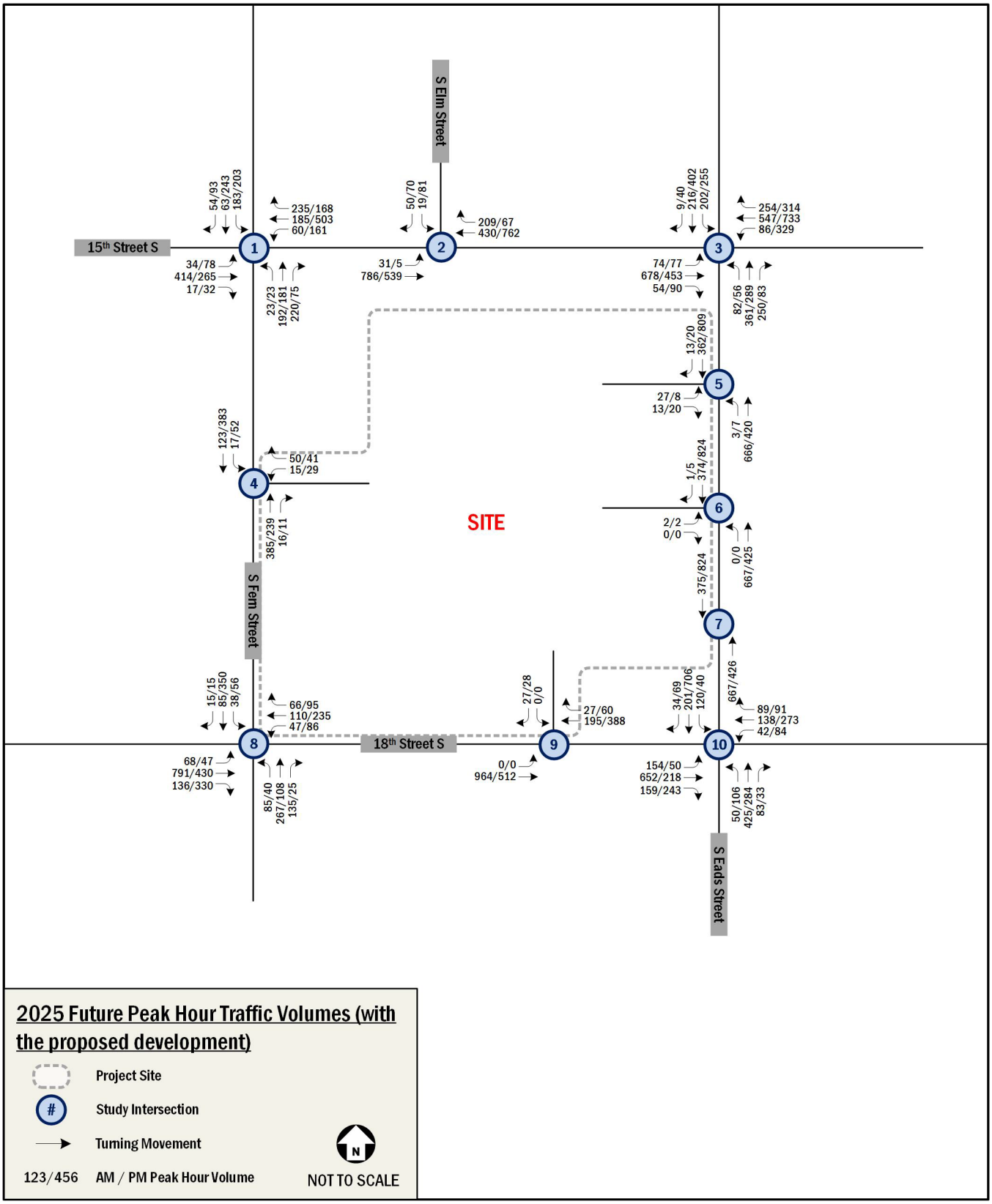

Figure 39: 2025 Future Peak Hour Traffic Volumes (with the proposed development)

Geometry and Operations Assumptions

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses.

2022 Existing Geometry and Operations Assumptions

The geometry and operations assumed in the existing conditions scenario are those present when the main data collection occurred. Gorove Slade made observations and confirmed the existing lane configurations and traffic controls at the intersections within the study area. Existing signal timings and offsets were obtained from Arlington County and confirmed during field reconnaissance.

A description of the roadways within the study area is presented below in Table 11. The existing local roadway network including lane configurations and intersection control is detailed in and illustrated in Figure 40.

2025 Background Geometry and Operations Assumptions (without the proposed development)

Following industry standard methodologies, a background improvement must meet the following criteria to be incorporated into the analysis:

- Be funded; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, a number of geometry improvements were included in the 2025 Background scenario. Roadway improvements that are part of the 18th Street Complete Street, Metropolitan Park 6, 7, and 8, and PenPlace projects were incorporated into the 2025 Background Conditions scenario.

18th Street South Complete Street Project

The 18th Street South Complete Street project includes the following changes to roadway geometry and operations to 18th Street S.:

1. The configuration of the S. Fern Street and 18th Street S. intersection to include:
    - Reconfiguration of the southbound approach from one slip lane for right turns and one left/thru lane to one left/thru/right lane.
    - Reconfiguration of the westbound approach from one left-turn lane, two thru lanes, and one right-turn lane to one left/thru lane and one thru/right lane.
    - Reconfiguration of the northbound approach from one left/thru lane and one right-turn lane to one left/thru/right lane.
    - Reconfiguration of the eastbound approach from one left-turn lane, two thru lanes, and one right-turn lane to one left/thru lane, one thru lane, and one right-turn lane.
2. The configuration of the S. Eads Street and 18th Street S. intersection to include:
    - Reconfiguration of the eastbound approach from one left-turn lane, two thru lanes, and one right-turn lane to one left-turn lane, one thru lane, and one thru/right lane.

Metropolitan Park 6, 7, and 8

The Metropolitan Park 6, 7, and 8 project includes the following changes to roadway geometry and operations to S. Eads Street and 15th Street S.:

1. The signalization and reconfiguration of the S. Elm Street and 15th Street S. intersection to break the existing median and convert:
    - The eastbound approach from two thru lanes to one left-turn lane and two thru lanes; and
    - The southbound approach from one right-turn lane to one left-turn lane and one right-turn lane.
2. S. Eads Street and 15th Street S. will be reconfigured as a protected intersection. Each intersection approach is configured with the following:
    - The eastbound approach will include one left-turn lane, one thru lane, and one thru/right lane.
    - The westbound approach will include one left-turn lane, one thru lane, and one thru/right lane.
    - The northbound approach will include one left-turn lane, one thru lane, and one right-turn lane.
    - The southbound approach will include one left-turn lane, one thru lane, and one right-turn lane.

PenPlace

The PenPlace project includes the following changes to roadway geometry and operations to S. Eads Street, S. Fern Street, and 15th Street S.:

1. The modification of the S. Fern Street and 15th Street S. intersection to convert the southbound left-turn movement from permissive to permissive-protected phasing.
2. The modification of the S. Eads Street and 15th Street S. intersection to include:
    - Signal timing and phasing modification to convert the eastbound left-turn movement from permissive to permissive-protected phasing.
    - Signal timing and phasing modification to convert the westbound left-turn movement from permissive to permissive-protected phasing.

Lane configurations and traffic controls for the 2025 Background Conditions are shown in Figure 41.

2025 Future Geometry and Operations Assumptions (with the proposed development)

The configurations and traffic controls assumed in the 2025 Future Conditions are based on the 2025 Background Conditions with the addition of the proposed development.

The proposed development will eliminate the existing site driveway on S. Eads Street at the location of the proposed residential building. No other changes to geometry are proposed as part of the proposed development.

There are no proposed changes to signal timing as part of the proposed development . Signal timings assumed in the Lane configurations and traffic controls for the 2025 Future Conditions are shown in Figure 42.

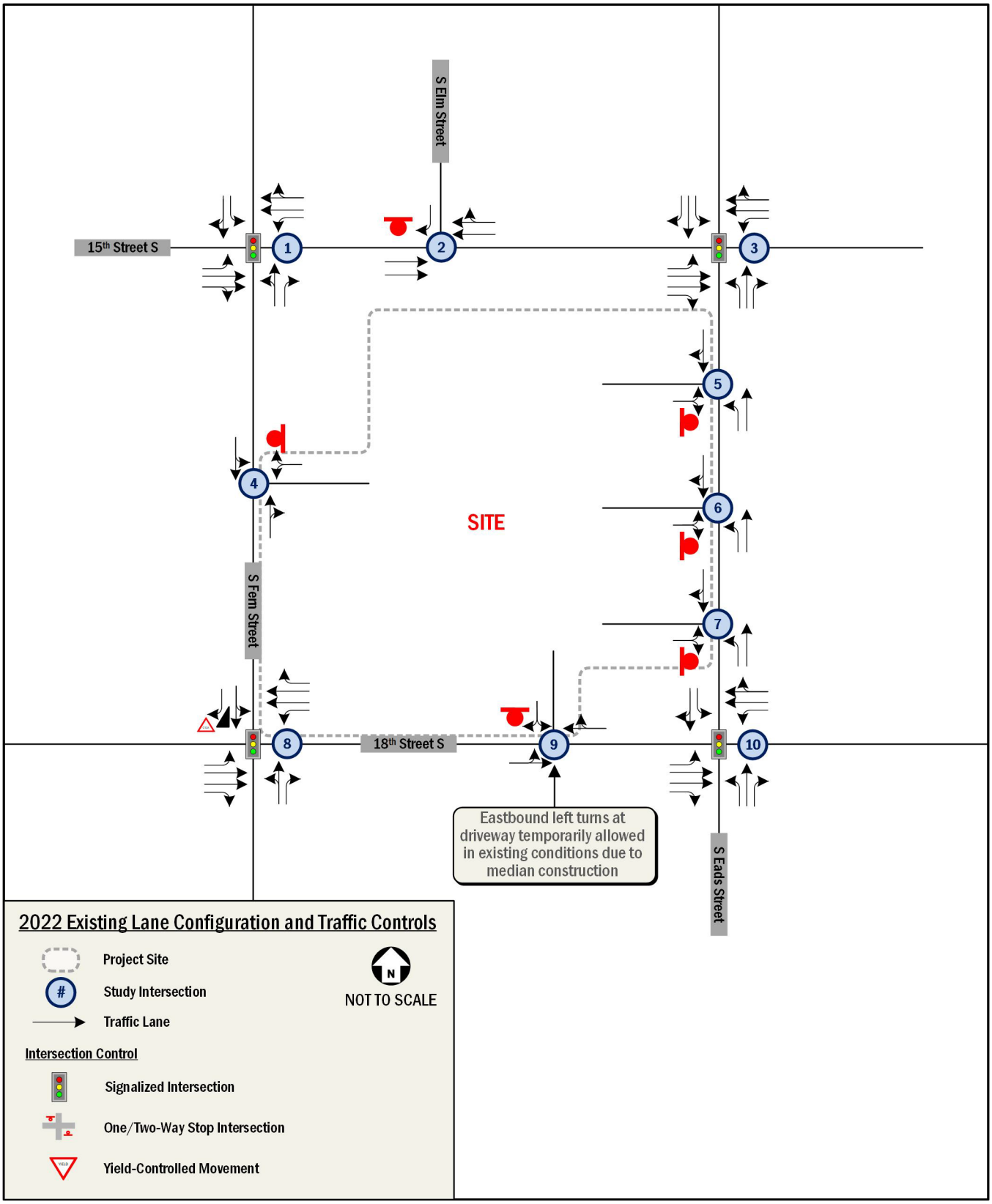

Figure 40: 2022 Existing Lane Configurations and Traffic Controls

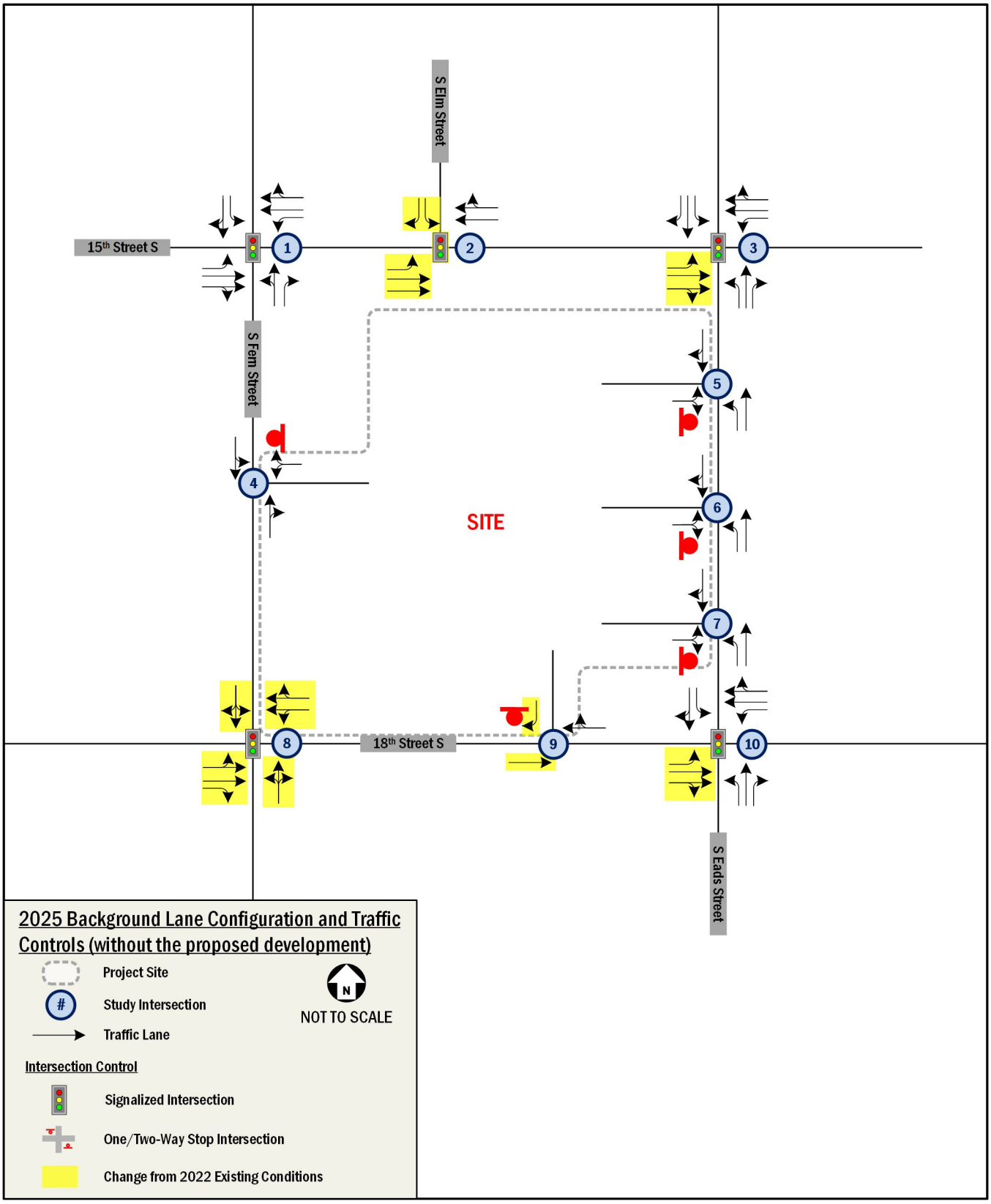

Figure 41: 2025 Background Lane Configuration and Traffic Controls (without the proposed development)

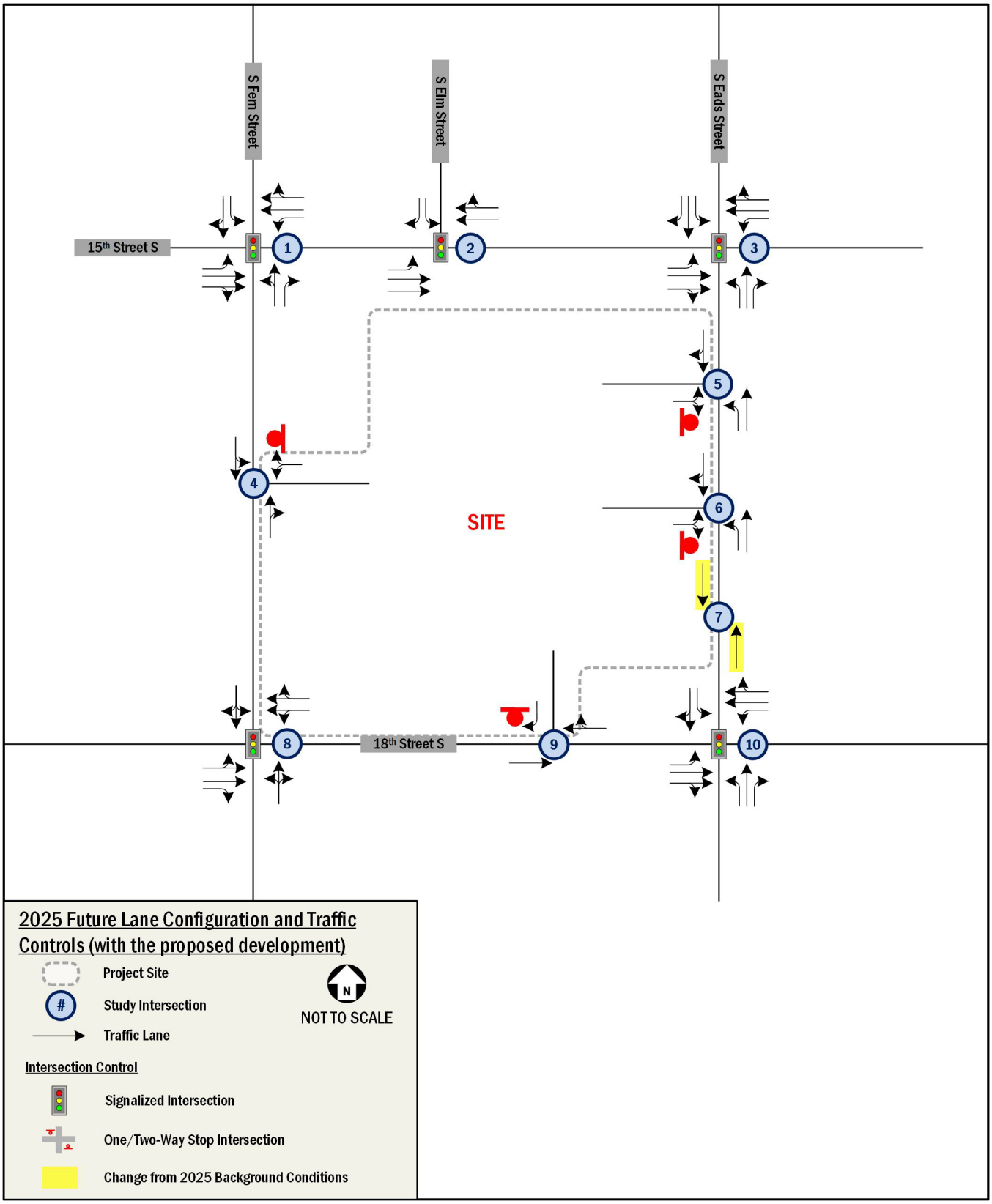

Figure 42: 2025 Future Lane Configuration and Traffic Controls (with the proposed development)

Vehicular Analysis Results

Intersection Capacity Analysis

Intersection capacity analyses were performed for the three scenarios outlined previously at the intersections contained within the study area during the morning and afternoon peak hours. *Synchro*, version 10 was used to analyze the study intersections based on the Highway Capacity Manual 2000 (HCM) methodology and includes level of service, delay, and queue length comparisons for the turning movements analyzed. Both signalized and unsignalized intersections were evaluated using HCM 2000.

Peak Hour Factors

Peak hour factors were applied in accordance with *Traffic Operations and Safety Analysis Manual 2.0* prepared by VDOT dated February 2020. As such, peak hour factors by approach between 0.85 and 1.00 were used for the existing year analysis. Where the calculated peak hour factor based on the existing turning movement counts was greater than 0.85, the calculated factor was applied. Where the calculated factor was 0.85 or less, a factor of 0.85 was applied.

Peak hour factors by approach between 0.92 and 1.00 were used for all future scenarios. Where the calculated peak hour factor based on the existing turning movement counts was greater than 0.92, the calculated factor was applied. Where the calculated factor was 0.92 or less, a factor of 0.92 was applied.

Heavy Vehicle Percentages

A heavy vehicle percentage of 2% was used for existing movements unless determined to be higher from the turning movement counts, in which case the higher percentage was used. A default heavy vehicle percentage of 2% was used for any new movements.

Geometry and Operations

Existing signal timings were obtained from Arlington County for signalized intersections in the vehicular study area. These timings were verified in the field by Gorove Slade and adjusted where necessary.

Level of Service and Delay

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each movement. A LOS grade is a letter grade based on the average delay (in seconds) experienced by motorists traveling through an intersection. LOS results range from “A” being the best to “F” being the worst. LOS E is typically used as the acceptable LOS threshold in Arlington County; although LOS F is sometimes accepted in urbanized areas if vehicular improvements would be a detriment to safety or non-auto modes of transportation. For the purpose of this analysis, it is desirable to achieve a level of service (LOS) of E or better for each movement at the intersections.

The LOS capacity analyses were based on: (1) the peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the Highway Capacity Manual (HCM) methodologies (using the *Synchro* software). The average delay of each movement and LOS is shown for the signalized intersections in addition to the overall average delay and intersection LOS grade. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay. Detailed LOS descriptions and the analysis worksheets are contained in the Technical Appendix.

Queuing Analysis

In addition to the capacity analyses, a queuing analysis was performed at the study intersections. The queuing analysis was performed using *Synchro* software. The 50th percentile and 95th percentile queue lengths are shown for each lane group at the study area signalized intersections. The 50th percentile queue is the maximum back of queue on a median cycle. The 95th percentile queue is the maximum back of queue that is exceeded 5% of the time. For unsignalized intersections, only the 95th percentile queue is reported for each lane group (including free-flowing left turns and stop-controlled movements) based on the HCM 2000 calculations. Queuing analysis worksheets are contained in the Technical Appendix.

2022 Analysis Results

The Existing (2022) results of the intersection capacity analyses for the AM and PM peak hours are expressed in level of service (LOS) and delay (seconds per vehicle) per movement and presented in Table 13. The capacity analysis results indicate that most intersections operate at acceptable LOS under the Existing (2022) Conditions; however, one (1) intersection has one or more movements that operate at levels beyond acceptable thresholds in one or more peak hour:

- 15th Street S./S. Eads Street
  - Westbound Left (PM Peak Hour)

The Existing (2022) queuing results for the AM and PM peak hours are expressed by movement are presented in Table 14. The 95th percentile queues at most lane groups at study area intersections do not exceed their available storage length in Existing Conditions; however, four (4) intersections do have at least one movement with 95th percentile queues that exceed the available storage length in the morning and/or afternoon peak hour:

- 15th Street S./S. Fern Street
  - Southbound Left (AM Peak Hour)
- 15th Street S./S. Eads Street
  - Eastbound Right (PM Peak Hour)
  - Westbound Left (PM Peak Hour)
  - Westbound Thru/Right (PM Peak Hour)
  - Southbound Left (AM Peak Hour)
- 18th Street S./S. Hayes Street/S. Fern Street
  - Northbound Right (AM Peak Hour)
- 18th Street S./S. Eads Street
  - Eastbound Left (AM Peak Hour)
  - Eastbound Thru (AM Peak Hour)
  - Eastbound Right (AM and PM Peak Hour)
  - Northbound Right (AM Peak Hour)
  - Southbound Thru/Right (AM and PM Peak Hour)

2025 Analysis Results

2025 Background Analysis Results (without the proposed development)

The Background (2025) results of the intersection capacity analyses for the AM and PM peak hours are expressed in level of service (LOS) and delay (seconds per vehicle) per movement and presented in Table 13. The capacity analysis results indicate that most intersections operate at acceptable LOS under the Background (2025) Conditions; however, two (2) intersections have one or more movements that operate at levels beyond acceptable thresholds in one or more peak hour:

- 15th Street S./S. Fern Street
  - Northbound Right (PM Peak Hour)
- 15th Street S./S. Eads Street
  - Northbound Thru (PM Peak Hour)
  - Southbound Left (AM Peak Hour)

The Background (2025) queuing results for the AM and PM peak hours are expressed by movement are presented in Table 14. The 95th percentile queues at most lane groups at study area intersections do not exceed their available storage length in the Background (2025) Conditions; however, four (4) intersections have at least one movement with 95th percentile queues that exceed the available storage length in the morning and/or afternoon peak hour:

- 15th Street S./S. Fern Street
  - Northbound Right (AM Peak Hour)
  - Southbound Left (AM and PM Peak Hour)
  - Southbound Thru/Right (PM Peak Hour)
- 15th Street S./S. Eads Street
  - Eastbound Thru/Right (AM Peak Hour)
  - Westbound Left (PM Peak Hour)
  - Westbound Thru/Right (AM and PM Peak Hour)
  - Northbound Right (AM Peak Hour)
  - Southbound Left (AM and PM Peak Hour)
  - Southbound Thru (PM Peak Hour)
- 18th Street S./S. Hayes Street/S. Fern Street
  - Eastbound Right (AM and PM Peak Hour)
- 18th Street S./S. Eads Street
  - Eastbound Left (AM and PM Peak Hour)
  - Westbound Left (PM Peak Hour)
  - Northbound Right (AM Peak Hour)
  - Southbound Left (AM Peak Hour)
  - Southbound Thru/Right (AM and PM Peak Hour)

2025 Future Analysis Results (with the proposed development)

The Future (2025) results of the intersection capacity analyses for the AM and PM peak hours are expressed in level of service (LOS) and delay (seconds per vehicle) per movement and presented in Table 13. The capacity analysis results indicate that most intersections operate at acceptable LOS under the Future

(2025) Conditions; however, one (1) intersection has one or more movements that operate at levels beyond acceptable thresholds in one or more peak hour:

- 15th Street S./S. Eads Street
  - Westbound Thru/Right
  - Northbound Thru (PM Peak Hour)
  - Southbound Left (AM Peak Hour)

The Future (2025) queuing results for the AM and PM peak hours are expressed by movement are presented in Table 14. The 95th percentile queues at most lane groups at study area intersections do not exceed their available storage length in the Future (2025) Conditions; however, four (4) intersections have at least one movement with 95th percentile queues that exceed the available storage length in the morning and/or afternoon peak hour:

- 15th Street S./S. Fern Street
  - Northbound Right (AM Peak Hour)
  - Southbound Left (AM and PM Peak Hour)
  - Southbound Thru/Right (PM Peak Hour)
- 15th Street S./S. Eads Street
  - Eastbound Thru/Right (AM Peak Hour)
  - Westbound Left (PM Peak Hour)
  - Westbound Thru/Right (AM and PM Peak Hour)
  - Northbound Right (AM Peak Hour)
  - Southbound Left (AM and PM Peak Hour)
  - Southbound Thru (PM Peak Hour)
- 18th Street S./S. Hayes Street/S. Fern Street
  - Eastbound Right (AM and PM Peak Hour)
- 18th Street S./S. Eads Street
  - Eastbound Left (AM and PM Peak Hour)
  - Westbound Left (PM Peak Hour)
  - Northbound Right (AM Peak Hour)
  - Southbound Left (AM Peak Hour)
  - Southbound Thru/Right (AM and PM Peak Hour)

2025 Future Mitigations

Mitigation measures were identified based on Arlington County standards and as outlined in the approved scoping document. The proposed development is considered to have an impact at an intersection if any of the following conditions are met:

- The overall intersection or any movement operates at LOS F in the future conditions with the proposed development where it operates at LOS E or better in the background conditions without the proposed development;
- The overall intersection or any movement operates at LOS F during the background condition and the delay increases by more than 10 percent in the future conditions with the proposed development; or
- If any 95th percentile queue length in the future condition exceeds the available capacity where it does not in the background conditions or increases by more than 150 feet where it already exceeds the available capacity in the background conditions.

Following these guidelines, there are impacts to two (2) intersections under Future (2025) Conditions. Mitigation measures were tested at these intersections, with results shown in Table 15 and Table 16, and with detailed Synchro reports included in the Technical Appendix. The following conclusions were made:

- 15th Street S. & S. Eads Street
  Under Future (2025) Conditions, during the afternoon peak hour, delay for the westbound thru/right movement increases to LOS F from LOS E in Background Conditions.

  The increase in delay at this intersection attributable to the proposed development can be mitigated through signal timing adjustments.
- 15th Street S. & S. Fern Street
  Under Future (2025) Conditions, during the afternoon peak hour, the 95th percentile queue length for the northbound right movement exceeds the storage length over Background Conditions.

  The increase in queues at this intersection attributable to the proposed development can be mitigated through signal timing adjustments.
- 18th Street S. & S. Eads Street
  Under Future (2025) Conditions, during the afternoon peak hour, the 95th percentile queue length for the

northbound left movement exceeds the storage length over Background Conditions.

The increase in queues at this intersection attributable to the proposed development can be mitigated through signal timing adjustments.

Table 13: Capacity Analysis Results

	Intersection and Movement	Existing (2022)				Background (2025)				Future (2025)			
		AM Peak		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1.	**15th Street S./S. Fern Street**												
	Overall	**13.3**	**B**	**15.4**	**B**	**25.9**	**C**	**26.2**	**C**	**26.1**	**C**	**25.5**	**C**
	Eastbound Left	11.2	B	16.2	B	16.4	B	22.6	C	16.5	B	22.7	C
	Eastbound TR	13.0	B	12.6	B	18.3	B	18.3	B	18.4	B	18.4	B
	Westbound Left	9.3	A	9.9	A	5.4	A	6.8	A	5.4	A	7.1	A
	Westbound TR	7.1	A	10.1	B	5.6	A	5.6	A	4.6	A	5.3	A
	Northbound LT	13.6	B	21.9	C	58.5	E	70.8	E	59.0	E	69.9	E
	Northbound Right	15.0	B	27.0	C	47.3	D	107.3	F	47.8	D	77.7	E
	Southbound Left	21.0	C	19.4	B	35.4	D	34.5	C	35.3	D	34.4	C
	Southbound TR	17.9	B	22.9	C	29.6	C	37.0	D	29.5	C	36.9	D
2.	**15th Street S./S. Elm Street**												
	Overall	**--**	**--**	**--**	**--**	**5.4**	**A**	**8.5**	**A**	**5.4**	**A**	**8.5**	**A**
	Eastbound Left	--	--	--	--	4.3	A	8.5	A	4.3	A	8.9	A
	Eastbound Thru	0.0	A	0.0	A	6.0	A	8.8	A	6.1	A	9.3	A
	Westbound TR	0.0	A	0.0	A	0.5	A	1.4	A	0.5	A	1.3	A
	Southbound Left	--	--	--	--	43.9	D	46.1	D	43.9	D	46.1	D
	Southbound Right	10.0	B	9.6	A	43.6	D	43.8	D	43.6	D	43.8	D
3.	**15th Street S./S. Eads Street**												
	Overall	**17.1**	**B**	**29.6**	**C**	**47.1**	**D**	**62.8**	**E**	**47.2**	**D**	**65.4**	**E**
	Eastbound Left	14.4	B	37.7	D	29.1	C	42.5	D	28.4	C	56.0	E
	Eastbound Thru	17.1	B	16.8	B	--	--	--	--	--	--	--	--
	Eastbound TR	--	--	--	--	38.0	D	45.0	D	37.4	D	43.7	D
	Eastbound Right	10.0	B	18.7	B	--	--	--	--	--	--	--	--
	Westbound Left	26.8	C	84.1	F	25.9	C	74.4	E	26.1	C	59.1	E
	Westbound TR	17.9	B	27.2	C	41.5	D	72.6	E	43.0	D	89.0	F
	Northbound Left	13.8	B	14.4	B	29.5	C	36.9	D	29.6	C	37.2	D
	Northbound Thru	16.6	B	16.4	B	70.3	E	102.5	F	70.0	E	90.8	F
	Northbound Right	16.8	B	13.7	B	47.8	D	43.3	D	48.4	D	43.2	D
	Southbound Left	17.1	B	15.2	B	89.0	F	44.7	D	87.6	F	42.6	D
	Southbound Thru	15.2	B	16.7	B	41.9	D	48.2	D	42.2	D	48.8	D
	Southbound Right	13.2	B	13.4	B	35.9	D	32.4	C	36.1	D	32.4	C
4.	**S. Fern Street/Crystal Towers Driveway**												
	Westbound LR	11.4	B	12.1	B	12.0	B	13.0	B	12.4	B	15.2	C
	Northbound TR	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
	Southbound LT	0.8	A	0.6	A	0.7	A	0.5	A	1.1	A	1.5	A
5.	**S. Eads Street/Crystal Towers Driveway (1)**												
	Eastbound LR	12.6	B	16.5	C	13.1	B	18.4	C	13.0	B	17.6	C
	Northbound Left	8.2	A	10.4	B	8.3	A	11.4	B	8.3	A	11.1	B
	Northbound Thru	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
	Southbound TR	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
6.	**S. Eads Street/Crystal Towers Driveway (2)**												
	Eastbound LR	12.7	B	16.5	C	13.5	B	18.6	C	13.5	B	16.8	C
	Northbound Left	8.4	A	10.6	B	8.5	A	11.6	B	0.0	A	0.0	A
	Northbound Thru	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
	Southbound TR	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
7.	**S. Eads Street/Crystal Towers Driveway (3)**												
	Eastbound LR	12.4	B	15.5	C	12.9	B	17.2	C	0.0	A	0.0	A
	Northbound Left	8.4	A	10.5	B	8.4	A	11.5	B	--	--	--	--
	Northbound Thru	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A

	Intersection and Movement	Existing (2022)				Background (2025)				Future (2025)			
		AM Peak		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
	Southbound TR	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
8.	**18th Street S./S. Hayes Street/S. Fern Street**												
	Overall	**18.5**	**B**	**17.3**	**B**	**38.4**	**D**	**27.6**	**C**	**38.5**	**D**	**28.5**	**C**
	Eastbound Left	15.1	B	14.7	B	--	--	--	--	--	--	--	--
	Eastbound LT	--	--	--	--	27.7	C	16.7	B	27.8	C	17.9	B
	Eastbound Thru	19.7	B	16.1	B	--	--	--	--	--	--	--	--
	Eastbound Right	14.5	B	18.1	B	20.1	C	20.2	C	20.2	C	21.6	C
	Westbound Left	20.4	C	17.7	B	--	--	--	--	--	--	--	--
	Westbound LTR	--	--	--	--	20.2	C	23.1	C	20.3	C	23.7	C
	Westbound Thru	14.1	B	14.6	B	--	--	--	--	--	--	--	--
	Westbound Right	13.7	B	13.8	B	--	--	--	--	--	--	--	--
	Northbound LT	22.0	C	16.6	B	--	--	--	--	--	--	--	--
	Northbound LTR	--	--	--	--	73.5	E	37.1	D	73.7	E	35.3	D
	Northbound Right	15.7	B	14.5	B	--	--	--	--	--	--	--	--
	Southbound LT	16.5	B	21.0	C	--	--	--	--	--	--	--	--
	Southbound LTR	--	--	--	--	27.6	C	46.7	D	27.8	C	47.9	D
	Southbound Right	14.4	B	14.4	B	--	--	--	--	--	--	--	--
9.	**18th Street S./Crystal Towers Driveway**												
	Eastbound LT	0.1	A	0.1	A	0.0		0.0		0.0		0.0	
	Westbound TR	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
	Southbound LR	9.4	A	10.4	B	9.2	A	9.9	A	9.3	A	10.2	B
10.	**18th Street S./S. Eads Street**												
	Overall	**20.8**	**C**	**38.6**	**D**	**40.5**	**D**	**47.9**	**D**	**40.3**	**D**	**54.6**	**D**
	Eastbound Left	25.6	C	22.8	C	55.4	E	49.4	D	51.5	D	47.3	D
	Eastbound Thru	23.7	C	22.1	C	--	--	--	--	--	--	--	--
	Eastbound TR	--	--	--	--	52.7	D	63.5	E	52.9	D	62.6	E
	Eastbound Right	21.1	C	46.5	D	--	--	--	--	--	--	--	--
	Westbound Left	19.9	B	23.4	C	36.6	D	69.7	E	36.5	D	67.6	E
	Westbound TR	18.9	B	23.8	C	31.1	C	43.6	D	31.0	C	42.7	D
	Northbound Left	13.3	B	33.0	C	17.6	B	25.7	C	18.2	B	46.8	D
	Northbound Thru	19.5	B	18.6	B	29.8	C	15.6	B	29.4	C	15.7	B
	Northbound Right	13.6	B	13.0	B	18.1	B	11.2	B	18.2	B	11.5	B
	Southbound Left	19.4	B	14.0	B	38.9	D	17.3	B	38.7	D	17.6	B
	Southbound TR	17.6	B	62.0	E	30.5	C	57.0	E	31.7	C	73.2	E

Table 14: Queuing Results

	Intersection and Lane Group	Storage Length (ft)	Existing (2022)				Background (2025)				Future (2025)			
			AM Peak		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*	
			50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
1.	**15th Street S./S. Fern Street**													
	Eastbound Left	115	6	18	24	65	15	41	43	97	15	41	43	98
	Eastbound TR	325	65	100	43	74	114	176	76	119	114	176	75	120
	Westbound Left	110	10	24	39	m71	9	25	15	35	10	28	17	40
	Westbound TR	225	7	16	122	m209	14	24	29	60	17	27	27	57
	Northbound LT	730	80	m108	74	113	203	277	204	290	206	280	207	290
	Northbound Right	60	34	m40	0	26	59	138	9	43	69	153	18	64
	Southbound Left	90	73	123	55	90	133	178	144	196	133	177	144	195
	Southbound TR	310	23	54	131	183	44	83	261	344	45	84	263	343
2.	**15th Street S./S. Elm Street**													
	Eastbound Left	115	--	--	--	--	5	m10	1	m5	5	m10	1	m5
	Eastbound Thru	225	--	0	--	0	120	108	82	119	123	110	91	130
	Westbound TR	350	--	0	--	0	0	3	14	m24	0	3	14	m23
	Southbound Left	235	--	--	--	--	15	40	67	119	15	40	67	119
	Southbound Right	235	--	6	--	4	0	37	0	44	0	37	0	44
3.	**15th Street S./S. Eads Street**													
	Eastbound Left	200	20	41	27	#83	21	62	27	64	23	68	34	#97
	Eastbound Thru	355	120	148	65	90	--	--	--	--	--	--	--	--
	Eastbound TR	355	--	--	--	--	120	#403	117	205	120	#404	116	163
	Eastbound Right	25	4	18	0	32	--	--	--	--	--	--	--	--
	Westbound Left	275	35	85	~197	#358	48	96	234	#446	46	93	206	#397
	Westbound TR	275	86	123	221	302	368	#558	~544	#682	368	#561	~569	#707
	Northbound Left	140	12	29	17	43	51	m57	31	49	51	m57	30	48
	Northbound Thru	760	102	156	91	155	376	454	~316	#509	370	448	~290	#484
	Northbound Right	140	76	134	0	25	108	155	0	6	104	155	0	7
	Southbound Left	120	61	121	33	70	128	#236	168	#293	128	#233	168	#280
	Southbound Thru	385	66	114	116	188	168	232	351	#523	171	234	355	#530
	Southbound Right	25	0	0	0	14	0	0	0	0	0	0	0	0
4.	**S. Fern Street/Crystal Towers Driveway**													
	Westbound LR	70	--	6	--	6	--	7	--	7	--	11	--	16
	Northbound TR	385	--	0	--	0	--	0	--	0	--	0	--	0
	Southbound LT	340	--	1	--	1	--	1	--	1	--	1	--	4
5.	**S. Eads Street/Crystal Towers Driveway (1)**													
	Eastbound LR	50	--	7	--	8	--	7	--	9	--	7	--	8
	Northbound Left	175	--	0	--	1	--	0	--	1	--	0	--	1
	Northbound Thru	175	--	0	--	0	--	0	--	0	--	0	--	0
	Southbound TR	270	--	0	--	0	--	0	--	0	--	0	--	0
6.	**S. Eads Street/Crystal Towers Driveway (2)**													
	Eastbound LR	100	--	3	--	7	--	3	--	8	--	0	--	0
	Northbound Left	100	--	1	--	2	--	1	--	2	--	0	--	0
	Northbound Thru	100	--	0	--	0	--	0	--	0	--	0	--	0
	Southbound TR	160	--	0	--	0	--	0	--	0	--	0	--	0
7.	**S. Eads Street/Crystal Towers Driveway (3)**													
	Eastbound LR	170	--	0	--	1	--	0	--	1	--	0	--	0
	Northbound Left	25	--	0	--	1	--	1	--	2	--	0	--	0

	Intersection and Lane Group	Storage Length (ft)	Existing (2022)				Background (2025)				Future (2025)			
			AM Peak		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*	
			50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
	Northbound Thru	125	--	0	--	0	--	0	--	0	--	0	--	0
	Southbound TR	80	--	0	--	0	--	0	--	0	--	0	--	0
8.	**18th Street S./S. Hayes Street/S. Fern Street**													
	Eastbound Left	132	22	50	16	36	--	--	--	--	--	--	--	--
	Eastbound LT	605	--	--	--	--	323	398	125	210	323	398	132	218
	Eastbound Thru	605	162	226	80	108	--	--	--	--	--	--	--	--
	Eastbound Right	90	0	33	24	76	45	91	84	223	45	91	90	233
	Westbound Left	75	17	45	30	63	--	--	--	--	--	--	--	--
	Westbound LTR	420	--	--	--	--	45	74	160	m219	46	76	149	m208
	Westbound Thru	420	17	32	35	55	--	--	--	--	--	--	--	--
	Westbound Right	75	0	19	0	21	--	--	--	--	--	--	--	--
	Northbound LT	240	139	227	52	94	--	--	--	--	--	--	--	--
	Northbound LTR	240	--	--	--	--	444	#688	129	172	447	#691	124	165
	Northbound Right	50	29	66	0	6	--	--	--	--	--	--	--	--
	Southbound LT	375	45	78	141	233	--	--	--	--	--	--	--	--
	Southbound LTR	375	--	--	--	--	81	135	410	469	85	142	402	475
	Southbound Right	45	0	2	0	m0	--	--	--	--	--	--	--	--
9.	**18th Street S./Crystal Towers Driveway**													
	Eastbound LT	420	--	0	--	0	--	0	--	0	--	0	--	0
	Westbound TR	200	--	0	--	0	--	0	--	0	--	0	--	0
	Southbound LR	50	--	2	--	3	--	2	--	2	--	3	--	3
10.	**18th Street S./S. Eads Street**													
	Eastbound Left	55	71	#141	25	52	136	#252	51	97	130	#243	46	m90
	Eastbound Thru	200	160	213	43	63	--	--	--	--	--	--	--	--
	Eastbound TR	200	--	--	--	--	387	464	235	292	390	467	241	298
	Eastbound Right	90	71	128	156	#266	--	--	--	--	--	--	--	--
	Westbound Left	135	18	45	35	64	32	82	77	#143	32	82	77	#141
	Westbound TR	450	42	64	79	100	82	114	164	190	82	113	163	188
	Northbound Left	220	11	30	36	#122	20	46	42	#135	25	56	68	#221
	Northbound Thru	510	124	211	119	215	316	481	141	268	307	465	132	251
	Northbound Right	50	25	55	10	29	43	82	12	35	43	82	12	36
	Southbound Left	100	43	88	12	35	107	m187	26	m44	104	m183	22	m35
	Southbound TR	140	88	144	~429	#727	185	261	672	m#1029	192	272	~699	m#1144

95th percentile volume exceeds capacity, queue may be longer.
m Volume for 95th percentile queue is metered by upstream signal.
~ Volume exceeds capacity, queue is theoretically infinite.

Table 15: Mitigated Capacity Analysis Results

	Intersection and Movement	Background (2025)				Future (2025)				Future (2025) with Mitigations			
		AM Peak		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1.	**15th Street S./S. Fern Street**												
	Overall	**25.9**	**C**	**26.2**	**C**	**26.1**	**C**	**25.5**	**C**			**26.5**	**C**
	Eastbound Left	16.4	B	22.6	C	16.5	B	22.7	C			20.5	C
	Eastbound TR	18.3	B	18.3	B	18.4	B	18.4	B			16.8	B
	Westbound Left	5.4	A	6.8	A	5.4	A	7.1	A			9.2	A
	Westbound TR	5.6	A	5.6	A	4.6	A	5.3	A	**NO MITIGATIONS**		7.8	A
	Northbound LT	58.5	E	70.8	E	59.0	E	69.9	E			64.8	E
	Northbound Right	47.3	D	107.3	F	47.8	D	77.7	E			68.7	E
	Southbound Left	35.4	D	34.5	C	35.3	D	34.4	C			40.3	D
	Southbound TR	29.6	C	37.0	D	29.5	C	36.9	D			40.4	D
3.	**15th Street S./S. Eads Street**												
	Overall	**47.1**	**D**	**62.8**	**E**	**47.2**	**D**	**65.4**	**E**			**62.6**	**E**
	Eastbound Left	29.1	C	42.5	D	28.4	C	56.0	E			53.8	D
	Eastbound Thru	--	--	--	--	--	--	--	--			--	--
	Eastbound TR	38.0	D	45.0	D	37.4	D	43.7	D			47.9	D
	Eastbound Right	--	--	--	--	--	--	--	--			--	--
	Westbound Left	25.9	C	74.4	E	26.1	C	59.1	E			56.2	E
	Westbound TR	41.5	D	72.6	E	43.0	D	89.0	F	**NO MITIGATIONS**		78.0	E
	Northbound Left	29.5	C	36.9	D	29.6	C	37.2	D			37.7	D
	Northbound Thru	70.3	E	102.5	F	70.0	E	90.8	F			93.0	F
	Northbound Right	47.8	D	43.3	D	48.4	D	43.2	D			43.3	D
	Southbound Left	89.0	F	44.7	D	87.6	F	42.6	D			45.2	D
	Southbound Thru	41.9	D	48.2	D	42.2	D	48.8	D			49.3	D
	Southbound Right	35.9	D	32.4	C	36.1	D	32.4	C			32.6	C
10.	**18th Street S./S. Eads Street**												
	Overall	**40.5**	**D**	**47.9**	**D**	**40.3**	**D**	**54.6**	**D**			**54.8**	**D**
	Eastbound Left	55.4	E	49.4	D	51.5	D	47.3	D			48.1	D
	Eastbound Thru	--	--	--	--	--	--	--	--			--	--
	Eastbound TR	52.7	D	63.5	E	52.9	D	62.6	E			63.4	E
	Eastbound Right	--	--	--	--	--	--	--	--			--	--
	Westbound Left	36.6	D	69.7	E	36.5	D	67.6	E			69.3	E
	Westbound TR	31.1	C	43.6	D	31.0	C	42.7	D	**NO MITIGATIONS**		42.8	D
	Northbound Left	17.6	B	25.7	C	18.2	B	46.8	D			46.0	D
	Northbound Thru	29.8	C	15.6	B	29.4	C	15.7	B			15.6	B
	Northbound Right	18.1	B	11.2	B	18.2	B	11.5	B			11.5	B
	Southbound Left	38.9	D	17.3	B	38.7	D	17.6	B			17.7	B
	Southbound TR	30.5	C	57.0	E	31.7	C	73.2	E			73.1	E

Table 16: Mitigated Queuing Analysis Results

	Intersection and Lane Group	Storage Length (ft)	Background (2025)				Future (2025)				Future (2025) with Mitigations			
			AM Peak		*PM Peak*		*AM Peak*		*PM Peak*		*AM Peak*		*PM Peak*	
			50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
1.	**15th Street S./S. Fern Street**													
	Eastbound Left	115	15	41	43	97	15	41	43	98			40	92
	Eastbound TR	325	114	176	76	119	114	176	75	120			71	114
	Westbound Left	110	9	25	15	35	10	28	17	40			27	41
	Westbound TR	225	14	24	29	60	17	27	27	57			50	62
	Northbound LT	730	203	277	204	290	206	280	207	290	**NO MITIGATIONS**		206	286
	Northbound Right	60	59	138	9	43	69	153	18	64			18	60
	Southbound Left	90	133	178	144	196	133	177	144	195			152	203
	Southbound TR	310	44	83	261	344	45	84	263	343			275	358
3.	**15th Street S./S. Eads Street**													
	Eastbound Left	200	21	62	27	64	23	68	34	#97			37	#94
	Eastbound Thru	355	--	--	--	--	--	--	--	--			--	--
	Eastbound TR	355	120	#403	117	205	120	#404	116	163			255	237
	Eastbound Right	25	--	--	--	--	--	--	--	--			--	--
	Westbound Left	275	48	96	234	#446	46	93	206	#397			201	#385
	Westbound TR	275	368	#558	~544	#682	368	#561	~569	#707	**NO MITIGATIONS**		~527	#687
	Northbound Left	140	51	m57	31	49	51	m57	30	48			31	48
	Northbound Thru	760	376	454	~316	#509	370	448	~290	#484			~290	#485
	Northbound Right	140	108	155	0	6	104	155	0	7			0	7
	Southbound Left	120	128	#236	168	#293	128	#233	168	#280			171	#292
	Southbound Thru	385	168	232	351	#523	171	234	355	#530			358	#530
	Southbound Right	25	0	0	0	0	0	0	0	0			0	0
10.	**18th Street S./S. Eads Street**													
	Eastbound Left	55	136	#252	51	97	130	#243	46	m90			46	m90
	Eastbound Thru	200	--	--	--	--	--	--	--	--			--	--
	Eastbound TR	200	387	464	235	292	390	467	241	298			242	299
	Eastbound Right	90	--	--	--	--	--	--	--	--			--	--
	Westbound Left	135	32	82	77	#143	32	82	77	#141			77	#143
	Westbound TR	450	82	114	164	190	82	113	163	188	**NO MITIGATIONS**		163	189
	Northbound Left	220	20	46	42	#135	25	56	68	#221			68	#220
	Northbound Thru	510	316	481	141	268	307	465	132	251			132	250
	Northbound Right	50	43	82	12	35	43	82	12	36			12	35
	Southbound Left	100	107	m187	26	m44	104	m183	22	m35			22	m35
	Southbound TR	140	185	261	672	m#1029	192	272	~699	m#1144			~705	m#1152

Crash Data Review

This chapter reviews available crash data within the study area, reviews potential impacts of the proposed development on crash rates and informs future transportation improvements that work toward the County's goals outlined in the Vision Zero Action Plan.

VDOT Crash Data

Based on guidelines contained in the Safety Analysis Guidance (May 2021) provided by Arlington County DES, crash data from 2017 to 2021 was obtained from the VDOT Crash Analysis Tool for crashes occurring in the vicinity of the site. This data was used to conduct a review of safety at study intersections and frontage of the development site. The crash data used in the analysis is included in the Technical Appendix.

Based on the historical crash data, a total of 54 crashes occurred at study area intersections and in the vicinity of the site between 2017 and 2021. The year with the highest number of crashes was 2020 with 12 crashes per year, while the years with the lowest number of crashes were 2017 and 2021 with 10 crashes. Figure 43 shows the number of crashes per year in in the study area over the last five years. The data obtained from VDOT shows a generally flat trend in the number of crashes.

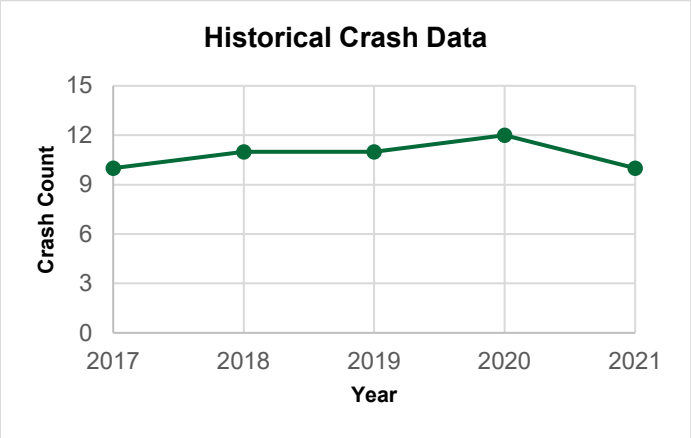

Figure 43: Historical Crash Data

Crash Characteristics

Crash Severity

According to the 2017 VDOT Crash Data Manual, crash severity is measured using the KABCO scale as per the Model Minimum Uniform Crash Criteria (MMUCC) based on the most severe injury to any person involved in the crash. The KABCO scale definitions are as follows:

- K: Fatal Injury
- A: Suspected Serious Injury
- B: Suspected Minor Injury
- C: Possible Injury
- O: Property Damage Only (No Apparent Injury)

From 2017 to 2021, 59% were classified as O (Property Damage Only) and 39% were classified as B (Suspected Minor Injury). No reported crashes involved a fatal injury, and no reported crashes involved suspected serious injuries. Table 17 shows the number of crashes according to its severity.

Table 17: Crash Count by Severity (2017-2021)

Crash Severity	Count	%
K	-	0%
A	-	0%
B	21	39%
C	1	2%
O	32	59%
Total	**54**	**100%**

Collision Type

The most common type of collision found in the study area was angle collisions, with 61% of crashes occurring in this manner, followed by rear end collisions with 15% of crashes. Table 18 summarizes the collision type for all analyzed crashes.

Table 18: Crash County by Collision Type

Collision Type	Count	%
Rear End	8	15%
Angle	33	61%
Pedestrian	3	6%
Sideswipe - Same Direction	3	6%
Other	5	9%
Head On	1	2%
Sideswipe - Opposite Direction	1	2%
Total	**54**	**100%**

Crash Factors

Several factors that contribute to crashes were reviewed. These factors include environmental factors, driver behavior, and vehicle characteristics.

Environmental Factors

Light conditions at the moment of the crash can contribute to the quantity and severity of crashes. For the data analyzed, more than 95% of the crashes occurred during daylight (67%) or during darkness in a lighted road (31%). This information suggests that, in the majority of crashes, light condition might not have been the primary cause for the crash. Table 19 summarizes the light conditions for crashes in the vicinity of the Crystal Towers site.

Table 19: Crash Count by Light Condition

Light Condition	Count	%
Daylight	36	67%
Darkness - road lighted	17	31%
Dusk	1	2%
Darkness - road not lighted	0	0%
Dawn	0	0%
Total	**54**	**100%**

Driver Behavior

The intentional or unintentional characteristics and actions that a driver performs while operating a vehicle also contribute to crashes. As shown in Table 20, a distracted driver was reported in 19% of the analyzed crashes, while alcohol and speeding were involved in 7% and 13% of the crashes, respectively. This information suggests that, in the majority of cases, driver behavior might not have been the primary cause of the crash but is a contributing cause.

Table 20: Crash Count by Driver Behavior Factors

Driver Behavior Factors	Count	%
Distracted Driver?		
Yes	10	19%
No	44	81%
Speeding?		
Yes	7	13%
No	47	87%
Alcohol Involved?		
Yes	4	7%
No	50	93%
Total	**54**	**100%**

Vehicle Characteristics

Vehicle characteristics including type of vehicle and vehicle size were analyzed to determine their contribution to crashes in the vicinity of the Crystal Towers site. As shown in Table 21, two (2) crashes involving motorcyclists have been reported in the past five (5) years while two (2) crashes have been reported to involve a bicyclist. In addition, four (4) crashes (7%) reported a large truck being involved in the crash. In terms of transportation modes other than automobiles, three (3) crashes (6%) were reported to involve a pedestrian.

Table 21: Crash Count by Vehicle Characteristics

Vehicle Characteristics Factors	Count	%
Large Truck Involved		
Yes	4	7%
No	50	93%
Motorcycle Involved		
Yes	2	4%
No	52	96%
Bike Involved		
Yes	2	4%
No	52	96%
Pedestrian Involved		
Yes	3	6%
No	51	94%
Total	**54**	**100%**

Findings

According to the VDOT historical crash data for the study area, the location with the greatest number of reported crashes was the intersection of S. Eads Street and 15th Street S., with 22 of the 54 (or 41%) reported crashes occurring at or near this intersection. Two (2) of the 22 crashes at this location involved a pedestrian, as shown in Figure 43. Also shown in Figure 43, the only other reported pedestrian collision occurred at the intersection of S. Eads Street and 18th Street S. No crashes were classified as K (fatal injury) or A (suspected serious injury). The two (2) crashes involving bicyclists occurred at the intersection of 15th Street S. and Fern Street and the intersection of 15th Street S. and S. Eads Street.

As part of the proposed development, new pedestrian facilities that meet or exceed Arlington County requirements will be provided along the street frontages of the proposed site. These improvements are consistent with several County-wide and national guidelines which prioritize shifting trips to non-auto modes, complete streets principles, and safety for all users, including the Arlington Master Transportation Plan, Vision Zero Action Plan, and NACTO Urban Streets Design Guide. The project does not propose changes to nearby intersections or the roadway network, except for pedestrian improvements along the site frontage. As such, no change is anticipated to the crash rates in the vicinity of the site.

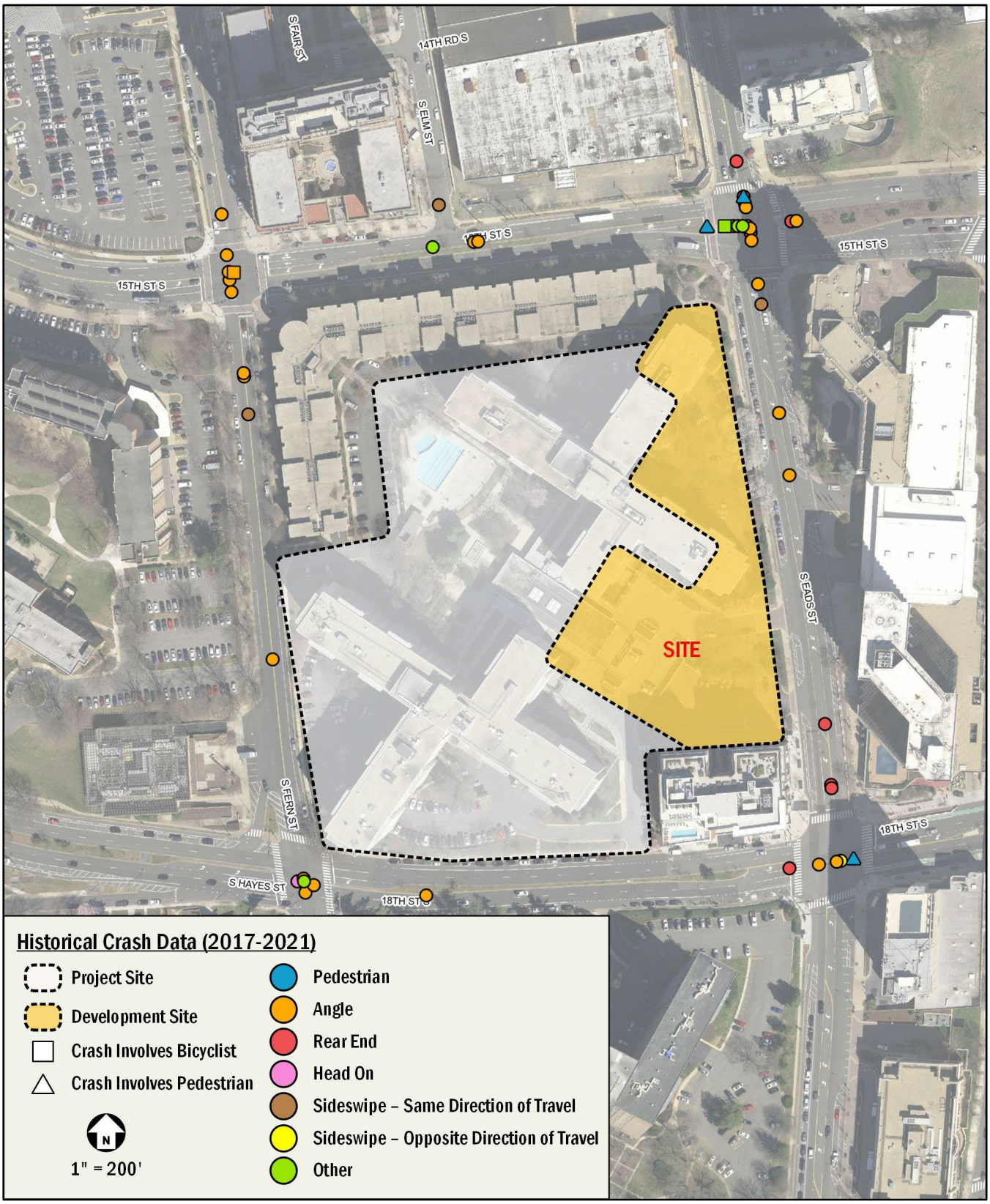

Figure 44: Historical Traffic Data (2017-2021)

Transportation Management Plan

A Transportation Management Plan (TMP) has many components that are tailored to accommodate a given facility with the goal being the reduction of automobile trips by encouraging alternative forms of transportation. A few of the typical TMP components include the establishment of a TMP coordinator, the distribution of transit literature, the establishment of ride-sharing programs, and the on-site sale of discounted fare media. Management measures taken by the proposed Crystal Towers development can be monitored and adjusted as needed to continually create opportunities to reduce the amount of vehicular traffic generated by the site.

The TMP will include a schedule and details of implementation and continued operation of the elements in the plan. The location of the site near the Crystal City Metro Station allows for a TMP that may include, but not be limited to, the following:

Participation and Funding

(1) Establish and maintain an active, ongoing relationship with Arlington Transportation Partners (ATP), or successor entity, at no cost to the developer, on behalf of the property owner.

(2) Designate and keep current a member of building management as Property Transportation Coordinator (PTC) to be primary point of contact with the County and undertake the responsibility for coordinating and completing all Transportation Management Plan (TMP) obligations. The PTC shall be trained, to the satisfaction of Arlington County Commuter Services (ACCS), to provide, transit, bike, walk, rideshare and other information provided by Arlington County intended to assist with transportation to and from the site.

(3) Contribute annually to ACCS, or successor, to sustain direct and indirect on-site and off-site services in support of TMP activities. Payment on this commitment shall begin as a condition of issuance of the First Partial Certificate of Occupancy for Tenant Occupancy for each respective building or phase of construction. Subsequent payments shall be made annually.

Facilities and Improvements

(1) Provide in the lobby or lobbies, a transportation information display(s), the number/content/design/location of which will be approved by ACCS. The developer agrees that the required transportation information displays shall meet the Arlington County Neighborhood Transportation Information Display Standards in effect on the date of the site plan approval, or equivalent as approved by the County Manager.

(2) Comply with requirements of the Site Plan conditions to provide bicycle parking/storage facilities, a Parking Management Plan (PMP), a Bicycle Facilities Management Plan, and construction worker parking.

Promotions, Services, Policies

(1) Prepare, reproduce and distribute, in digital or hard copy, materials provided by Arlington County, which includes site-specific transit, bike, walk, and rideshare related information, to each new residential lessee and retail, property management, or maintenance employee, from initial occupancy through the life of the site plan. These materials shall be distributed as a part of prospective tenant marketing materials, as well as communications associated with lease signing, on-boarding, or similar activities.

(2) Provide one time, per person, to each new residential lessee and each new retail, property management, or maintenance employee, whether employed part-time or full-time, directly employed or contracted, who begins employment in the building throughout initial occupancy, the choice of one of the following:

a. Metro fare on a SmarTrip card or successor fare medium (amount to be determined)

b. A one year bikeshare membership

c. A one year carshare membership

The County Manager may approve additions to, or substitution of one or more of these choices with a comparable transportation program incentive, as technology and service options change, if he/she finds that an incentive shall be designed to provide the individual with an option other than driving alone in a personal vehicle, either by removing a barrier to program entry, such as a membership cost, or by providing a similar level of subsidized access to a public or shared transportation system, program or service.

(3) Provide, administer, or cause the provision of a sustainable commute benefit program for each on-site property management and maintenance employee, whether

employed part-time or full-time, directly employed or contracted. This commute benefit program shall offer, at a minimum, a monthly pre-tax transit benefit or a monthly subsidized/direct transit benefit.

(4) Provide, under a “transportation information” heading on the Developer and property manager’s websites regarding this development:

a. Links to the most appropriate Arlington County Commuter Services and/or external transportation-related web page(s). Confirmation of most appropriate link will be obtained from ACCS.

b. A description of key transportation benefits and services provided at the building, pursuant to the TMP.

Performance and Monitoring

(1) During the first year of start-up of the TMP and on an annual basis thereafter, the Developer shall submit an annual report, which may be of an online, or e-mail variety, to the County Manager, describing completely and correctly, the TDM related activities of the site and changes in commercial tenants during each year.

(2) The Developer agrees to conduct and/or participate in, a transportation and parking performance monitoring study at two years, five years, and each subsequent five years (at the County’s option), after issuance of the First Certificate of Occupancy for Tenant Occupancy. The County may conduct the study or ask the owner to conduct the study (in the latter case, no reimbursement payment shall be required). As part of the study, a report shall be produced as specified below by the County. The study may include building occupancy rates, average vehicle occupancy, average garage occupancy for various day of the week and times of day, parking availability by time of day, average duration of stay for short term parkers on various days of the week and times of day, pedestrian traffic, a seven-day count of site-generated vehicle traffic, a voluntary mode-split survey, and hourly, monthly, and special event parking rates.

The building owner and/or operator shall notify, assist, and encourage building occupants and visitors on site to participate in mode-split surveys which may be of an on-line or email variety.

Summary and Conclusions

This report concludes that the proposed development will not have a detrimental impact to the surrounding transportation and roadway network assuming that all planned site design elements and recommended mitigation measures are implemented.

The Crystal Towers site is well served by transit and is surrounded by a well-connected pedestrian and bicycle network. The site is located near several principal arterials such as Route 1, VA-27 (Washington Boulevard), VA-244 (Columbia Pike), and VA-110. The arterials create connections to I-395, I-66, George Washington Memorial Parkway, and ultimately the Capital Beltway (I-495) and I-95.

The proposed development will construct a new multifamily and retail project at the existing Crystal Towers site. The development will include a 11-story residential building with ground floor retail (the “residential building), plus a separate 1-story retail building (the “retail building”). The development will include a total of approximately 209 residential units and approximately 28,000 square feet of ground-floor retail.

The development will provide approximately 41 parking spaces in a below-grade parking garage in the residential building which will be accessed from the existing below-grade garage at Crystal Towers. Additional spaces in the existing Crystal Towers garage will serve residents of the new building. 30 spaces within the existing Crystal Towers surface parking lot will be designated to serve the ground floor retail, and 10 spaces within the surface parking lot will be designated as residential visitor parking for the new residential building.

A number of planned transportation improvements in the vicinity of the Crystal Towers development are expected to be complete by 2025. The full list of improvements is detailed in the report, but projects include:

- South Eads Street Complete Street
- Army Navy Complete Street
- 12th Street South Complete Street
- Transitway Extension to Pentagon City
- 18th Street South Complete Street
- 15th Street South/South Clark-Bell Street Realignment

A capacity analysis was developed to compare the future roadway network with and without the proposed development.

Traffic projections for 2025 are based on existing volumes, plus traffic generated by approved nearby background developments, and traffic generated by the proposed Crystal Towers development.

Mitigation measures were identified based on Arlington County standards and as outlined in the approved scoping document. The proposed development is considered to have an impact at an intersection if any of the outlined conditions are met. Following these guidelines, mitigation measures were explored and included the following recommendation(s):

- Adjustments to signal timings at three (3) intersections.

With these mitigations in place, the analysis shows that traffic operations with the proposed development will improve or are consistent with the Background scenario at many intersections.

The development has many positive elements contained within its design that minimize potential transportation impacts, including:

- The proposed development’s close proximity to the Crystal City Metro Station, Pentagon City Metro Station, Crystal City VRE Station, and multiple bus lines.
- Improvements to the pedestrian facilities adjacent to the proposed site that meet or exceed Arlington County and ADA requirements.
- The inclusion of secure-long-term bicycle parking meeting zoning requirements.
- The installation of short-term bicycle parking spaces along the frontage of the site on S. Eads Street that meet zoning requirements.
- A Transportation Management Plan (TMP) that aims to reduce the demand of single-occupancy, private vehicles to/from the proposed development during peak period travel times or shifts single-occupancy vehicular demand to off-peak periods.

As noted above, this report concludes that the proposed development will not have a detrimental impact to the surrounding transportation and roadway network assuming that all planned site design elements and recommended mitigation measures are implemented.