

Comprehensive Transportation Review

5 M Street SW

Washington, DC

August 17, 2020

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Executive Summary

The following report is a Comprehensive Transportation Review (CTR) on behalf of JBG Smith (the “Applicant”) for Design Review by the Zoning Commission (Zoning Commission Case Number 20-14) for the property located at Square 649 and Lots 43, 44, 45, and 48 in Southwest, Washington, DC (and referred to herein as “5 M Street”).

The purpose of this CTR is to evaluate whether the 5 M Street SW development will generate a detrimental impact to the transportation network surrounding the site. This evaluation is based on a technical comparison of the existing conditions, background conditions, and total future conditions. This report concludes that **the project will not have a detrimental impact** to the surrounding transportation network assuming the proposed site design elements, intersection mitigation measures, and TDM measures are implemented.

Proposed Project

The site is located at 5 M Street SW, bounded by L Street SW to the north, M Street SW to the south, Half Street SW to the west, and S Capitol Street SW to the east. Two (2) development schemes are under consideration to improve the site:

- The “Mixed-Use” development scheme includes 371 residential units, 226,132 square feet of office, 25,427 square feet of retail, and 403 garage parking spaces. The 25,427 square feet of retail will be able to accommodate a small format grocer. To be conservative, this report assumes 10,628 square feet of the retail space will be potentially allocated to a small format grocer.
- The “Residential” development scheme includes 688 residential units, 23,850 square feet of retail, and 311 garage parking spaces. The 23,580 square feet of retail will be able to accommodate a small format grocer. To be conservative, this report assumes 13,065 square feet of the retail space will be potentially allocated to a small format grocer. In both schemes, vehicular access will be reduced from seven (7) curb cuts to two (2) relocated curb cuts on Half Street SW and L Street SW, which will provide access to an internal site driveway with garage entry points, loading access, and a pick-up drop off location.

The loading areas within the site consist of four (4) 30-foot loading berths and two (2) service/delivery spaces. All truck turning maneuvers will occur within the site, allowing for head-in/head-out access to and from the public roadway network. The

number of loading berths meet all zoning and DDOT dimensional requirements.

The 5 M Street SW development will satisfy the 2016 zoning requirements for bicycle parking by including 174 long-term bicycle parking spaces and 32 short-term bicycle parking spaces in the Mixed-Use scheme and 156 long-term bicycle parking spaces and 42 short-term bicycle parking spaces in the Residential scheme. In both schemes, the 5 M Street SW development will supply long-term bicycle parking in secure locations within the building and short-term bicycle parking within and along the perimeter of the site. The vehicular and bicycle parking will also meet the practical needs of the development’s employees, residents, and patrons.

Multi-Modal Overview

Trip Generation

The 5 M Street SW development is transit-, pedestrian-, and bicycle-oriented. Each development scheme of the proposed project is expected to generate new trips on the surrounding transportation network across all modes during the morning, afternoon, and Saturday peak hours. However, the new trips generated by the project will not have a detrimental impact on the transportation network due to the minor level of increased trips or as a result of mitigation measures and a TDM plan that will be implemented as part of the redevelopment. The multi-modal trip generation for each scheme of the proposed project is as follows:

Mixed-Use Scheme

The AM peak hour trip generation is projected to include 192 vehicles/hour, 172 transit riders/hour, 41 bicycle trips/hour, and 93 walking trips/hour. The PM peak hour trip generation is projected to include 225 vehicles/hour, 214 transit riders/hour, 62 bicycle trips/hour, and 202 walking trips/hour. The Saturday peak hour trip generation is projected to include 99 vehicles/hour, 107 transit riders/hour, 29 bicycle trips/hour, and 78 walking trips/hour.

Residential Scheme

The AM peak hour trip generation is projected to include 103 vehicles/hour, 151 transit riders/hour, 40 bicycle trips/hour, and 79 walking trips/hour. The PM peak hour trip generation is projected to include 144 vehicles/hour, 209 transit riders/hour, 66 bicycle trips/hour, and 183 walking trips/hour. The Saturday peak

hour trip generation is projected to include 89 vehicles/hour, 132 transit riders/hour, 36 bicycle trips/hour, and 77 walking trips/hour.

Transit

The development site is well-served by transit. It is located approximately 0.3 miles from the Navy Yard-Ballpark Metro station, approximately 0.5 miles from the Waterfront Metro station, and is served by local and regional bus routes.

Several planned or proposed transit projects will improve transit access to the site, including a peak-hour bus and bike lane on M Street as well as other improvements proposed in *MoveDC*, the District's long-range transportation plan.

The site is expected to generate a manageable amount of transit trips, and the existing service can accommodate these new trips.

As part of the proposed project, the bus stop directly on the southern (M Street) edge of the site is proposed to be relocated to the southwest corner of the site.

Pedestrian

The site is surrounded by a well-connected pedestrian network. Despite some incidences of missing crosswalks or sidewalks that do not meet width standards, overall there is an excellent, well-connected pedestrian network surrounding the site.

The site will improve the overall pedestrian environment on site by improving sidewalks along the perimeter of the site.

The site is expected to generate a manageable amount of pedestrian trips, and the existing pedestrian facilities can accommodate these new trips.

Bicycle

The site has access to several on- and off-street bicycle facilities.

Several planned and proposed bicycle projects will improve bicycle access to the site, including a car-free lane for buses and bikes on M Street, as well as an expanded network of cycle tracks and bicycle trails in the area.

The site is expected to generate a manageable amount of bicycle trips, and the existing bicycle facilities can accommodate these new trips.

The development will include long-term bicycle parking within the parking garages and short-term bicycle parking along the perimeter of the site that meet zoning requirements.

Vehicular

The site is accessible from principal arterials such as S Capitol Street to the east. The site is also directly served by M Street SW/SE and Eye Street SW, both minor arterials providing a robust network of local and regional connectivity. These roadways connect the site to I-395/I-695 and to DC-295, both of which provide access to the Capital Beltway (I-495), which surrounds Washington, DC and its inner suburbs, as well as providing connectivity to the District core.

In order to determine the project's impact on the transportation network, future conditions were analyzed with and without the development based on the number of trips the site is expected to generate under each development scheme. Intersection analyses are performed to obtain the average delay and queue a vehicle will experience. These average delays and queues are compared to the acceptable levels of delay set by DDOT standards as well as existing and background queues to determine if the project will negatively impact the study area.

The analysis concluded that five (5) and three (3) intersections require mitigation as a result of the minor impacts to delay created by the Mixed-Use and Residential development programs, respectively. Mitigation measures, which will reduce impacts to delay caused by the project are recommended as follows:

Mixed-Use Scheme

Half Street & M Street SW

Signal timing and phasing adjustments will be coordinated with DDOT in the morning and afternoon peak hours to ensure the most efficient future operation, following construction of the proposed project by 2024.

Half Street & Eye Street SW

Delays at this intersection are primarily due to queueing issues at the adjacent S Capitol Street and Eye Street SW/SE intersection. As such, these delays can be reduced with signal timing and phasing adjustments at the signalized intersection at S Capitol Street and Eye Street SW/SE. Adjustments will be coordinated with DDOT in the afternoon peak hour to ensure the most efficient future operation, following construction of the proposed project by 2024.

First Street & M Street SE

Signal timing and phasing adjustments will be coordinated with DDOT in the afternoon peak hour to ensure the most efficient

future operation, following construction of the proposed project by 2024.

S Capitol Street & Eye Street SW/SE

Signal timing and phasing adjustments will be coordinated with DDOT in the afternoon peak hour to ensure the most efficient future operation, following construction of the proposed project by 2024.

S Capitol Street & N Street SW/SE

Signal timing and phasing adjustments will be coordinated with DDOT in the afternoon peak hour to ensure the most efficient future operation, following construction of the proposed project by 2024.

Residential Scheme

Half Street & M Street SW

Signal timing and phasing adjustments will be coordinated with DDOT in the morning peak hour to ensure the most efficient future operation, following construction of the proposed project by 2024.

Half Street & Eye Street SW

Delays at this intersection are primarily due to queueing issues at the adjacent S Capitol Street and Eye Street SW/SE intersection. As such, these delays can be reduced with signal timing and phasing adjustments at adjacent signalized intersection at S Capitol Street and Eye Street SW/SE.

Adjustments will be coordinated with DDOT in the afternoon peak hour to ensure the most efficient future operation, following construction of the proposed project by 2024.

S Capitol Street & Eye Street SW/SE

Signal timing and phasing adjustments will be coordinated with DDOT in the morning and afternoon peak hour to ensure the most efficient future operation, following construction of the proposed project by 2024.

Safety

A qualitative review of study area intersections was performed to identify areas of concern due to vehicular, pedestrian, and bicycle interactions.

The analysis concluded that no study intersections are considered hazardous/high crash intersections. However, based on a review of facilities in the area, one (1) intersection was identified for further evaluation to enhance the multi-modal network surrounding the site. The evaluation of this intersection is as follows:

▪ M Street and S Capitol Street

While this intersection is not considered a hazardous/high crash intersection, this location carries a high level of vehicle traffic and pedestrian activity. This intersection has received public comments regarding pedestrian and bicycle safety. Intersection geometry or operational changes are not recommended at this time as this intersection will be improved and redesigned as part of Phase 2 of DDOT'S South Capitol Street Corridor Project.

Transportation Demand Management (TDM) Plan

Per the DDOT CTR guidelines, the goal of TDM measures is to reduce the number of single occupancy vehicles and vehicle ownership within the District. The promotion of various programs and existing infrastructure includes maximizing the use of transit, bicycle, and pedestrian facilities. DDOT has outlined expectations for TDM measures in their CTR guidelines, and this project has proposed a TDM plan based on these guidelines, which is set forth in Project Design chapter of this report.

Summary and Recommendations

This report concludes that the project will not have a detrimental impact on the surrounding transportation network assuming the proposed site design elements, mitigation measures, and TDM measures are implemented.

The 5 M Street SW project has several positive design elements that minimize potential transportation impacts, including:

- The site's close proximity to transit and existing bicycle infrastructure;
- The site being located in a well-connected pedestrian network;
- The inclusion of secure long-term bicycle parking that meets zoning requirements;
- The installation of short-term bicycle parking spaces along the frontage of the site that meet zoning requirements;
- The relocation of a bus stop so as to accommodate its continued operations once the project opens;
- The inclusion of an internal private driveway that will accommodate all parking and loading access;
- The inclusion of a designated pick-up and drop-off area that is internal to the project;
- The creation of new pedestrian sidewalks that meet or exceed DDOT and ADA requirements, improving the existing pedestrian environment; and

- A TDM plan that reduces the demand of single-occupancy, private vehicles during peak period travel times or shifts single-occupancy vehicular demand to off-peak periods.

Introduction

This report is a CTR reviewing the transportation aspects of the 5 M Street SW development. The site, shown in Figure 1 and Figure 2, is located at Square 649 and Lots 43, 44, 45, and 48 in Southwest, Washington, DC. The site is currently zoned D-5. The proposed project is undergoing Design Review by the Zoning Commission (Zoning Commission Case Number 20-14).

Purpose of Study

The purpose of this report is to:

1. Review the transportation elements of the proposed project and demonstrate that it conforms to DDOT's general policies of promoting non-automobile modes of travel and sustainability.
2. Provide information to DDOT and other agencies on how the proposed project will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the proposed project on all major modes of travel and where these trips will be distributed on such network.
3. Determine whether the proposed project will lead to adverse impacts on the local transportation network.
4. Propose design elements and TDM measures that will mitigate any potential adverse impacts to the transportation network, and minimize adverse effects,

Project Summary

The site is currently occupied with a surface parking lot and a convenience retail store. The site is located in the southwest quadrant of Washington, DC. The site is bounded by L Street SW to the north, Half Street SW to the west, M Street SW to the south, and S Capitol Street SW to the east, and an existing surface parking lot on the northeastern corner of the square.

The 5 M Street SW development includes two (2) development schemes that are under consideration to improve the site. The "Mixed-Use" development scheme includes 371 residential units, 226,132 square feet of office, 25,427 square feet of retail of which 10,628 square feet will be potentially allocated to a small format grocer, and 403 garage parking spaces. The "Residential" development scheme includes 688 residential units, 23,850 square feet of retail of which 13,065 square feet will be potentially allocated to a small format grocer, and 311 garage parking spaces. In both schemes, vehicular access will be reduced from seven (7) curb cuts to two (2) relocated curb cuts on Half Street SW and L Street SW, which will provide access to an internal site driveway with garage entry points and loading access.

The loading areas within the site consist of four (4) 30-foot loading berths and two (2) service/delivery spaces. The proposed loading facilities will accommodate the practical needs of the 5 M Street SW development, maintain loading activity within private property, and provide loading circulation that ensures head-in/head-out truck movements are performed from the public roadway network.

In both development schemes, pedestrian access is proposed on all street frontages (L Street SW, M Street SW, Half Street SW, and S Capitol Street SW). In the Mixed-Use scheme, residential access is proposed on L Street SW and Half Street SW, office access is proposed on M Street SW, and retail access is proposed on M Street SW and S Capitol Street SW. In the Residential scheme, residential access is proposed on L Street SW, M Street SW, and Half Street SW and retail access is proposed on M Street SW and S Capitol Street SW. As part of the 5 M Street SW development, pedestrian facilities surrounding the site will be improved to meet DDOT and ADA standards. New sidewalks will be installed along the perimeter of the site, and those sidewalks will meet or exceed width requirements.

There are existing bicycle facilities near the site. These include signed routes along Half Street SW, bicycle lanes along I Street SW/SE, and the Anacostia Riverwalk Trail to the south. Additionally, the proposed project will meet zoning requirements and provide 174 long-term bicycle parking spaces and 32 short-term bicycle parking spaces in the Mixed-Use scheme and 156 long-term bicycle parking spaces and 42 short-term bicycle parking spaces in the Residential scheme. Short-term bicycle parking spaces will be provided along the perimeter of the site in both schemes. The nearest Capital Bikeshare station is located 0.1 miles west of the site along M Street between Delaware Avenue SW and First Street SW.

Contents of Study

This report contains nine (9) chapters as follows:

- Study Area Overview
This chapter reviews the area near and adjacent to the proposed project and includes an overview of the site.
- Project Design
This chapter reviews the transportation components of the proposed project, including the site plan and access. This chapter also contains the proposed Transportation Demand Management (TDM) plan for the Project.

- Travel Demand Assumptions
This chapter outlines the travel demand of the proposed project. It summarizes the proposed 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. This section highlights the vehicular impacts of the project, including presenting mitigation measures for minimizing impacts as needed.
- 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 proposed project, 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 proposed project, outlines impacts, and presents recommendations as needed.
- Safety Analysis
This chapter summarizes the potential safety impacts of the project. This includes a qualitative review of existing and proposed safety features surrounding the site.
- Summary and Conclusions
This chapter presents a summary of the recommended mitigation measures by mode and presents overall findings and conclusions.

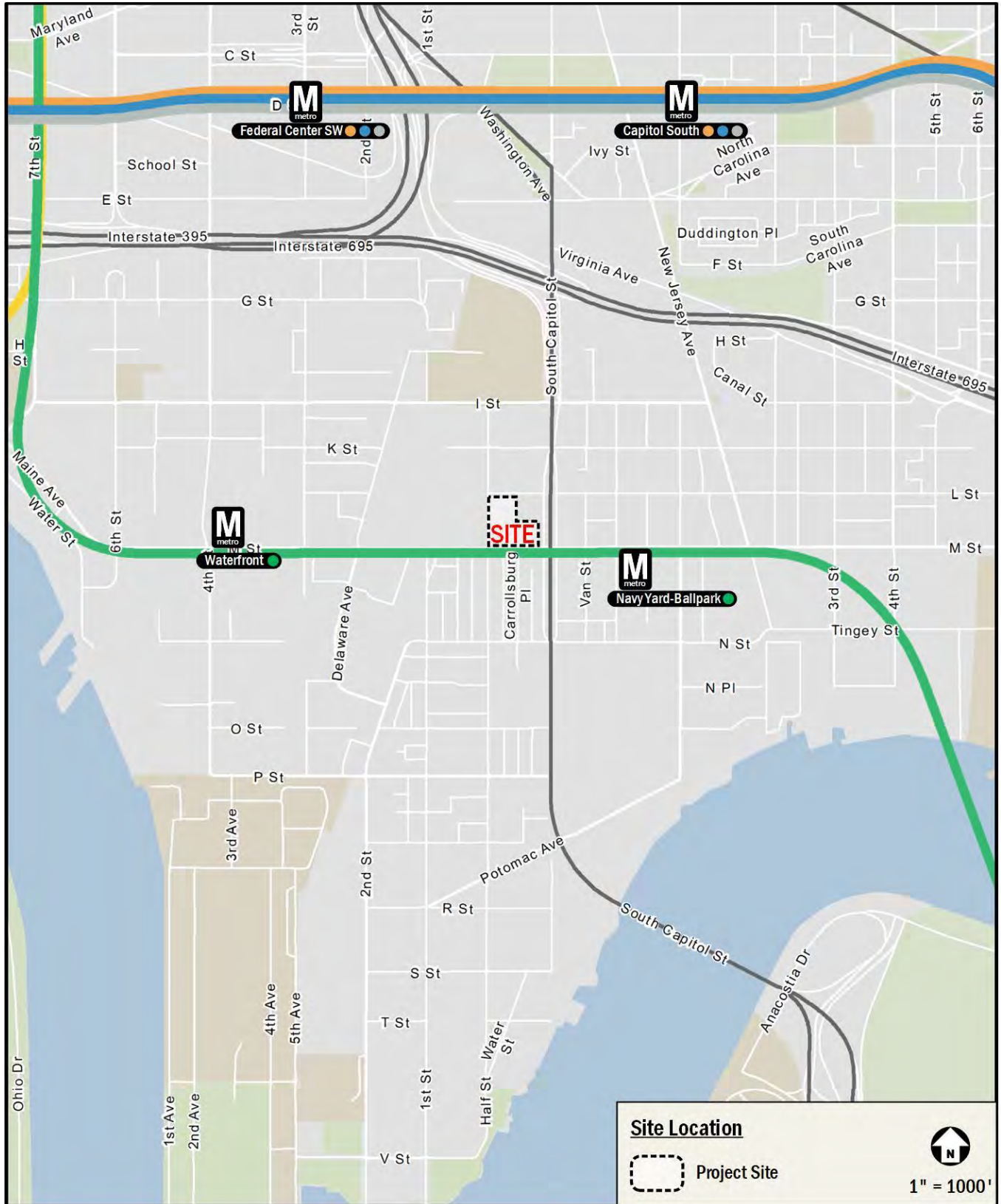


Figure 1: Site Location

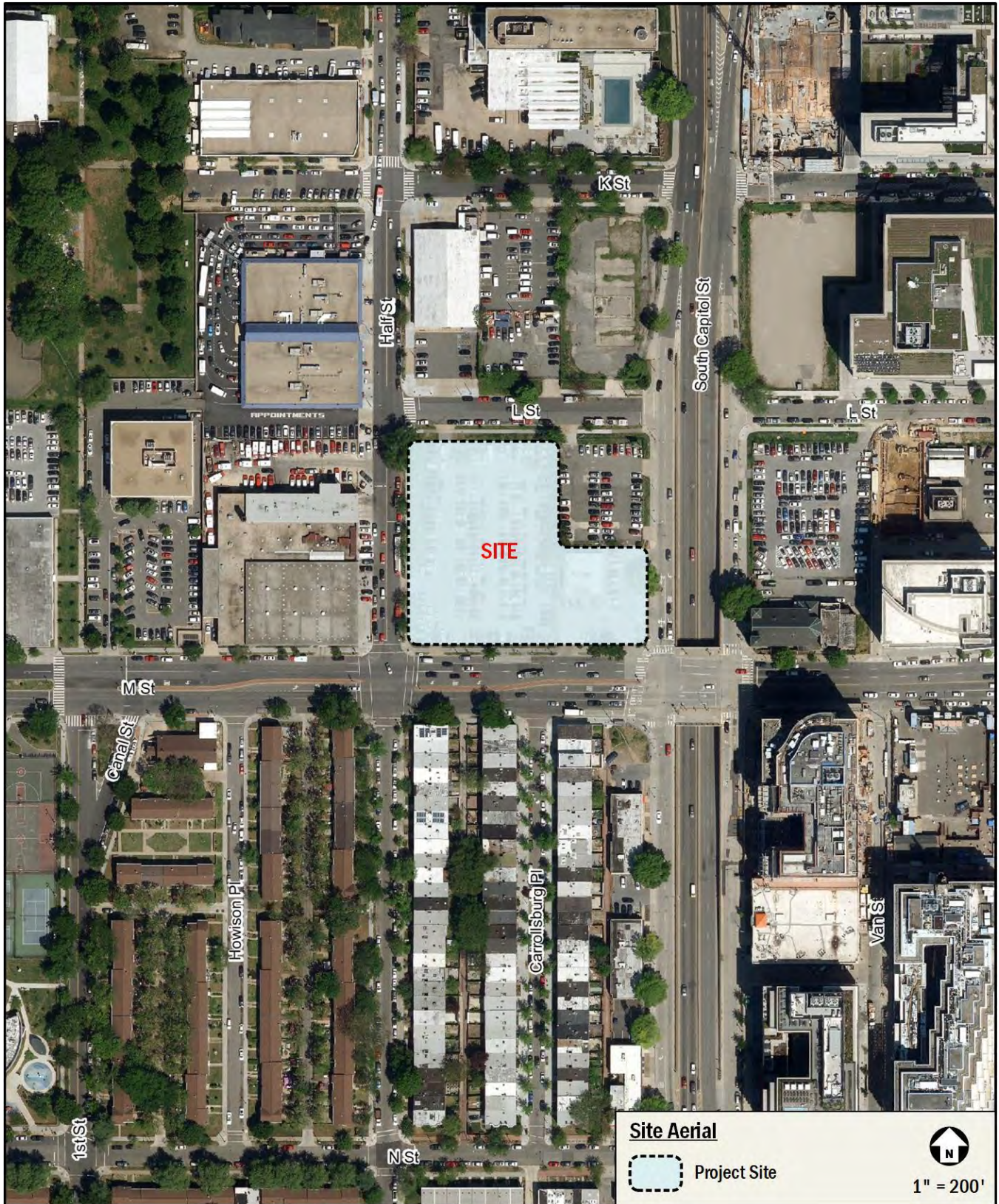


Figure 2: Site Aerial

Study Area Overview

This chapter reviews the study area and includes an overview of the site location, including a summary of the major transportation characteristics of the area and of future regional projects.

This chapter concludes:

- The site is surrounded by an extensive regional and local transportation system that will connect the proposed project's employees, residents, and patrons to the rest of the District and surrounding areas.
- The site is served by public transportation with access to several local Metrobus routes and Metrorail. These routes provide direct service to all areas of Washington, DC.
- There is bicycle infrastructure in the vicinity of the site, with connectivity to east-west and north-south bicycle facilities.
- Pedestrian conditions are generally good, particularly along anticipated major walking routes with no major barriers impeding anticipated pedestrian routes.

Major Transportation Features

Overview of Regional Access

As shown in Figure 4, the site has ample access to regional, vehicular, and transit-based transportation options that connect the site to destinations within the District, Virginia, and Maryland.

The site is accessible from principal arterials such as S Capitol Street. These roadways connect the site to I-395/I-695 and to DC-295, both of which provide access to the Capital Beltway (I-495), which surrounds Washington, DC and its inner suburbs, as well as providing connectivity to the District core.

The site is located 0.3 miles from the Navy Yard-Ballpark Metro station and 0.5 miles from the Waterfront Metro station, which are both served by the Green Line. The Green Line travels south from Greenbelt, MD through Downtown DC to Suitland, MD while providing access to the District core. Connections can be made at the Metro Center and Gallery Place-Chinatown stations to access the five (5) other Metrorail lines, allowing access to points in Virginia and Montgomery County, Maryland.

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

Overview of Local Access

There are a variety of local transportation options near the site that serve vehicular, transit, walking, and cycling trips, as shown on Figure 5. The site is directly served by M Street SW/SE and Eye Street SW — both minor arterials supplemented by an existing network of connector and local roadways.

The Metrobus system provides extensive transit service in the vicinity of the site, including connections to several neighborhoods within the District and additional Metrorail stations. As shown in Figure 5, there are five (5) Metrobus routes and one (1) DC Circulator bus line that service the site. Multiple bus stops servicing the six (6) routes are located within a two-minute walk of the site. These bus routes connect the site to many areas of Southwest, DC, including several Metrorail stations where transfers can be made to reach areas in the District, Virginia, and Maryland. A detailed review of bus routes and transit stops within a quarter mile walk of the site is provided in a later chapter of this report.

The site is located in an area with several on-street bicycle facilities. Existing on-street facilities consist of signed routes along Half Street SW and bicycle lanes along I Street SW/SE. These facilities lead to the Anacostia Riverwalk Trail to the south. Using the available connections along the on-street and off-street routes within the study area, bicyclists have access to a number of regional bicycle facilities. To accommodate bicyclists, the project will provide on-site bicycle facilities as discussed in detail in the Project Design Review chapter. A detailed review of existing and proposed bicycle facilities and connectivity is provided in a later chapter of the report.

Anticipated pedestrian routes, such as those to public transportation stops, schools, and community amenities, provide adequate pedestrian facilities; however, there are a few sidewalks, generally located several blocks north from the site, that do not meet DDOT standards due to narrow or missing buffer widths. All primary pedestrian destinations are accessible via routes with sidewalks, all of which meet DDOT standards. No sidewalks within the study area limit connectivity. 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 a well-connected local transportation network that allows for efficient transportation options via transit, bicycle, walking, or vehicular modes.

Carsharing

Two (2) carsharing companies provide service in the District: Zipcar and Free2Move. Both services are private companies that provide registered users access to a variety of automobiles. Of these, Zipcar has designated spaces for their vehicles. Currently, there are is one (1) Zipcar location within a quarter-mile of the site. The nearby locations and the number of available vehicles are listed in Table 1.

Carsharing is also provided by Free2Move, which provides point-to-point carsharing. Free2Move currently has a fleet located within areas of the District and Arlington County. Free2Move vehicles may park in any non-restricted metered curbside parking space or Residential Parking Permit (RPP) location in any zone throughout the defined "Home Area". Members do not have to pay the meters or pay stations. Free2Move does not have permanent designated spaces for their vehicles; however, availability is tracked through their website and mobile phone application, which provides an additional option for car-sharing patrons.

Table 1: Carshare Locations

Carshare Location	Number of Vehicles
Zipcar	
1272 Van Street SE	1 Vehicle
Total	1 vehicle

Bikeshare and Scooter Share

The Capital Bikeshare program provides additional cycle options for residents, employees, and visitors of the proposed project. The program has placed over 500 bikeshare stations across the Washington, DC metropolitan area with over 4,500 bicycles in the fleet.

In addition to Capital Bikeshare, five (5) electric-assist scooter (e-scooter) and electric-assist bicycle (e-bike) companies provide Shared Mobility Device (SMD) service in the District: JUMP, Lyft, Skip, Spin, and Helbiz. 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.

Walkscore

Walkscore.com is a website that provides scores and rankings for the walking, biking, and transit conditions within neighborhoods of the District. Based on this website, the site is located in the Southwest - Waterfront neighborhood. The site has a walk score of 82 (or "Very Walkable"), a transit score of 78 (or "Excellent Transit"), and a bike score of 89 (or "Very Bikeable"). Figure 3 shows the neighborhood borders in relation to the site and displays a heat map for walkability and bikeability. The following conclusions can be made based on the data obtained from Walkscore.com:

- The site is situated in an area with excellent walkability as most errands can be accomplished within walking distance;
- The site is situated in an area with excellent transit scores due to its proximity to a high number of bus routes and Metrorail; and
- The site is situated in an area with excellent bike scores due to its proximity to a number of bike facilities and flat topography.

Overall, the site and surrounding neighborhood have pedestrian, transit, and bike accessibility. The addition of mixed-use developments in the area will help increase the walk, and bike scores in the neighborhood. The 5 M Street SW development will directly improve the neighborhood's and surrounding area's walkability and bike score by enhancing the pedestrian and bicycle network with the provision of improved pedestrian sidewalks, neighborhood-serving retail and services, and new short-term bicycle parking facilities.

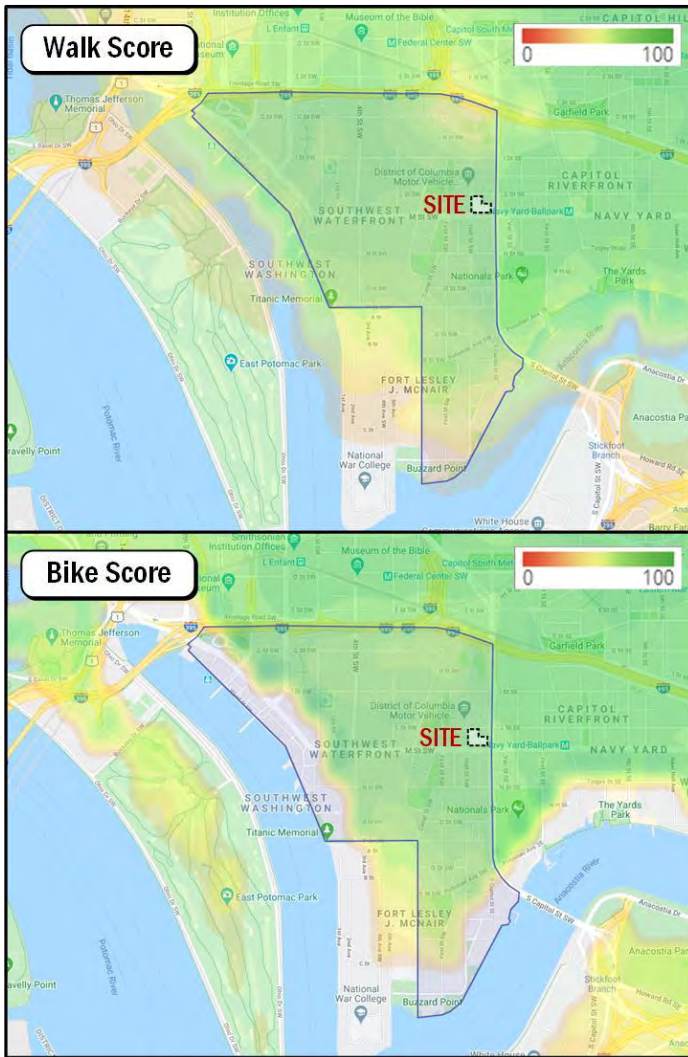


Figure 3: Summary of Site Walkscore and Bikescore

Future Projects

There are several District initiatives located in the vicinity of the site. These planned and proposed projects are summarized below.

MoveDC: Multimodal Long-Range Transportation Plan

Due to growth of population, jobs, and retail in several neighborhoods in the District and the potential for growth in other neighborhoods, the District's infrastructure is challenged with the need for transportation investments to support the recent growth and future strengthen neighborhoods. In order to meet these challenges and capitalize on future opportunities, DDOT has developed a plan to identify transit challenges and opportunities and to recommend investments. *MoveDC* is a long-range plan that provides a vision for the future of DC's transportation choices while improving the reliability of all transportation modes.

The *MoveDC* report outlines recommendations by mode with the goal of having them complete by 2040. The plan hopes to achieve a transportation system for the District that includes:

- 70 miles of high-capacity transit (streetcar or bus);
- 200 miles of on-street bicycle facilities or trails;
- Sidewalks on at least one side of every street;
- New street connections;
- Road management/pricing in key corridors and the Central Employment Area;
- A new downtown Metrorail loop;
- Expanded commuter rail; and
- Water taxis.

In direct relation to the proposed project, the *MoveDC* plan outlines recommended transit and bicycle improvements including the following:

- A segment of WMATA's Metrobus Priority Corridor Network (PCN), which would improve bus travel times, reliability, and capacity, along M Street SW/SE;
- High-capacity transit service along M Street SW/SE;
- Streetcar service along M Street SW/SE and First Street SW;
- Cycle tracks along P Street SW, South Capitol Street, 4th Street NE, and 6th Street NE; and
- A bicycle trail connecting the Capitol with the Anacostia Riverwalk Trail.

Some other *MoveDC* recommendations are already being implemented and are detailed in their respective sections of this report.

South Capitol Street Corridor Project

DDOT's South Capitol Street project replaces the Frederick Douglass Memorial Bridge with a new span featuring a design that improves bicycle, pedestrian, and vehicular safety. The project also includes two new traffic ovals, one of each side of the bridge, as well as a reconstructed South Capitol Street north of the bridge, a reconstructed Suitland Parkway/Interstate 295 interchange, and improved drainage and stormwater management. S Capitol Street will be reconstructed as a six-lane boulevard with an improved streetscape from the traffic oval to Independence Avenue SW/SE and the intersection at M Street SE will be reconstructed to be at-grade. In direct relation to the

proposed project, the South Capitol Street Corridor Project will provide a safer, more attractive bicycle and pedestrian link from the project's location in southwest, DC to areas east of the Anacostia River.

Phase 1 includes improvements from Potomac Avenue to Ferth Sterling Avenue SE. This phase is currently under construction and is planned to be complete by Summer 2022. Phase 2 includes improvements from Potomac Avenue to I-695. This phase is not yet funded and is still under design.

M Street SE-SW Transportation Study

This study identified existing and future transportation challenges and ways to address them within a roughly 1.7-square-mile area along M Street SE/SW, and the Southwest waterfront from 12th Street SE to 14th Street SW, and from the Southwest/Southeast Freeway south to the Anacostia River/Washington Channel.

In direction relation to the proposed project, the M Street SE-SW Transportation Study identifies several potential improvement options for three conditions: near-term (2013-2016), mid-term (2015-2021), and long-term (2020 and beyond). These improvement options focused on:

- Encouraging the use of public transit and non-motorized modes by enhancing and increasing transit, bicycle, and pedestrian facilities;
- Improving capacity only on a few roadways and mostly modest improvements that are feasible for the main corridors;
- Providing a more balanced function for streets in terms of mobility and accessibility; and
- Increasing connectivity for all modes.

Southwest Neighborhood Plan

The Southwest Neighborhood Plan is a community-based strategy developed for the purpose of creating an urban design, land use, and neighborhood preservation framework to enhance parks, pedestrian and street connections, integrate community amenities, enhance transportation choices, and accommodate and guide the direction of future growth in the Southwest neighborhood.

In direction relation to the proposed project, the Southwest Neighborhood Plan identifies the following recommendations:

- Enhance neighborhood edges and gateways by improving crosswalks, signage, lighting, and/or streetscapes at key

gateways, including S Capitol Street at Eye Street, L Street, M Street, and N Street;

- Improve pedestrian/bicyclist crossings through enhanced signage, redesigned crosswalk flashing signals and/or speed cameras at M Street at Half Street, First Street, 3rd Street, and 6th Street;
- Link bicycle routes across Southwest, DC by extending dedicated bicycle lanes along First Street between M Street and P Street; and
- Work with Capital Bikeshare to install additional bikeshare station at Eye Street at Randall Recreation Center.

Planned Developments

There are 19 potential development projects in the vicinity of the site. For the purpose of this analysis and consistent with DDOT and industry standards, only approved developments expected to be completed prior to the planned development with an origin/destination within the study should be included. All projects were ultimately included given the proximity of the developments from the site and site generated volumes of the planned developments impacting the study area intersections. The developments are described below.

Monument Valley

This development includes a mixed-use building with 60,000 square feet of retail space and 445 residential units. This development is currently under construction and has an expected completion year of 2019. Site observations confirmed that this development was not yet completed at the time of 2019 data collection and is still included as a background development.

West Half Street

This development includes a mixed-use building with 60,000 square feet of retail and 423 residential units. This development is currently under construction and is expected to be complete in 2020.

Square 769

Square 769 is proposed to contain 171 residential units and 4,000 square feet of retail with 215,000 square feet of office space. This development is expected to be complete in 2020. Site observations confirmed that this development was not yet completed at the time of 2019 data collection and is still included as a background development.

The Yards Parcel L1

This development has been completed and contains a hotel with 227 rooms and was not completed at the time of 2019 data collection.

The Yards Parcel L2

This development includes a mixed-use building with 285 residential units and 18,000 square feet of retail space. This development has been completed but was not open at the time of 2019 data collection.

The Yards Parcel O

The Yards Parcel O site includes a total of 330 residential units and 19,200 square feet of retail space. The parcel was split into two parts to develop two individual buildings. This development has been completed but was not open at the time of 2019 data collection.

DC Water Headquarters

The DC Water Headquarters will be a 167,000 square foot office building. The current 51,000 square foot site contains a warehouse and distribution building and the façade will be incorporated into the development. Construction on this development was completed in late 2018. Site observations confirmed that the completed development was not occupied at the time of 2019 data collection and is still included as a background development.

The Riverfront

This development is being completed over multiple phases and will include approximately 465,000 square feet of office space, 80,000 square feet of retail space, and 324 hotel rooms. This development is expected to open in 2020.

950 South Capitol Street

An under construction 13-story residential building with 300 dwelling units. This building is expected to be completed in the Summer of 2020.

Former Congressional Square

An under construction 11-story residential and retail building with 800 dwelling units and 44,000 square feet of retail. This building is expected to be complete in early 2022.

The Garrett at the Collective

An under construction 11-story residential and retail building with 375 dwelling units and 15,000 square feet of retail. This building is expected to be complete in 2020.

Capper Residential

A proposed 13-story residential building with 322 dwelling units and 9,250 square feet of retail. This building is expected to be completed in the Summer of 2022.

1000/1001 4th Street SW

As part of the larger Waterfront Station project, the 1000/1001 4th Street SW development includes 456 residential units, 11,000 square feet of retail and restaurant space, 9,000 square feet of arts/cultural space, and a 9,000 square feet daycare facility. This development is expected to be completed in 2022.

Randall School Redevelopment

A proposed mixed use 12-story building containing 470 dwelling units, 18,600 square feet of office space and 31,800 square feet of museum/library space. The Randall School Redevelopment building is expected to be completed in 2021.

CSX East Redevelopment

A mixed-use development consisting of three (3) buildings that include 222 hotel rooms, 758 residential units, and 49,000 square feet of retail. This development is expected to be completed by 2022.

375 & 425 M Street SW

375 M Street will consist of approximately 285 new residential dwelling units, 32,400 square feet of office, 18,800 square feet of retail, and a 6,000 SF community space.

425 M Street will consist of approximately 310 new residential dwelling units and 21,100 square feet of retail.

This development is expected to be completed prior to the completion of the 5 M Street SW development.

The Bard

501 I (Eye) Street will consist of approximately 105 new residential dwelling units and 29,600 square feet of space for the Shakespeare Theatre Company. This development is expected to be completed prior to the completion of the 5 M Street SW development.

Wharf Phase 2

The Wharf (Phase 2) is a large mixed-use development with retail, residential, office, and hotel uses. This development is expected to be complete along a similar timeline as the 5 M Street SW development.

Novel Capitol View

An under construction 13-story residential and retail building with 558 residential units and 3,420 square feet of retail. The forecasted reduction in vehicle trips as a result of this development was not applied to the analysis included in this report.

Figure 6 shows the location of the developments considered in relation to the proposed project.

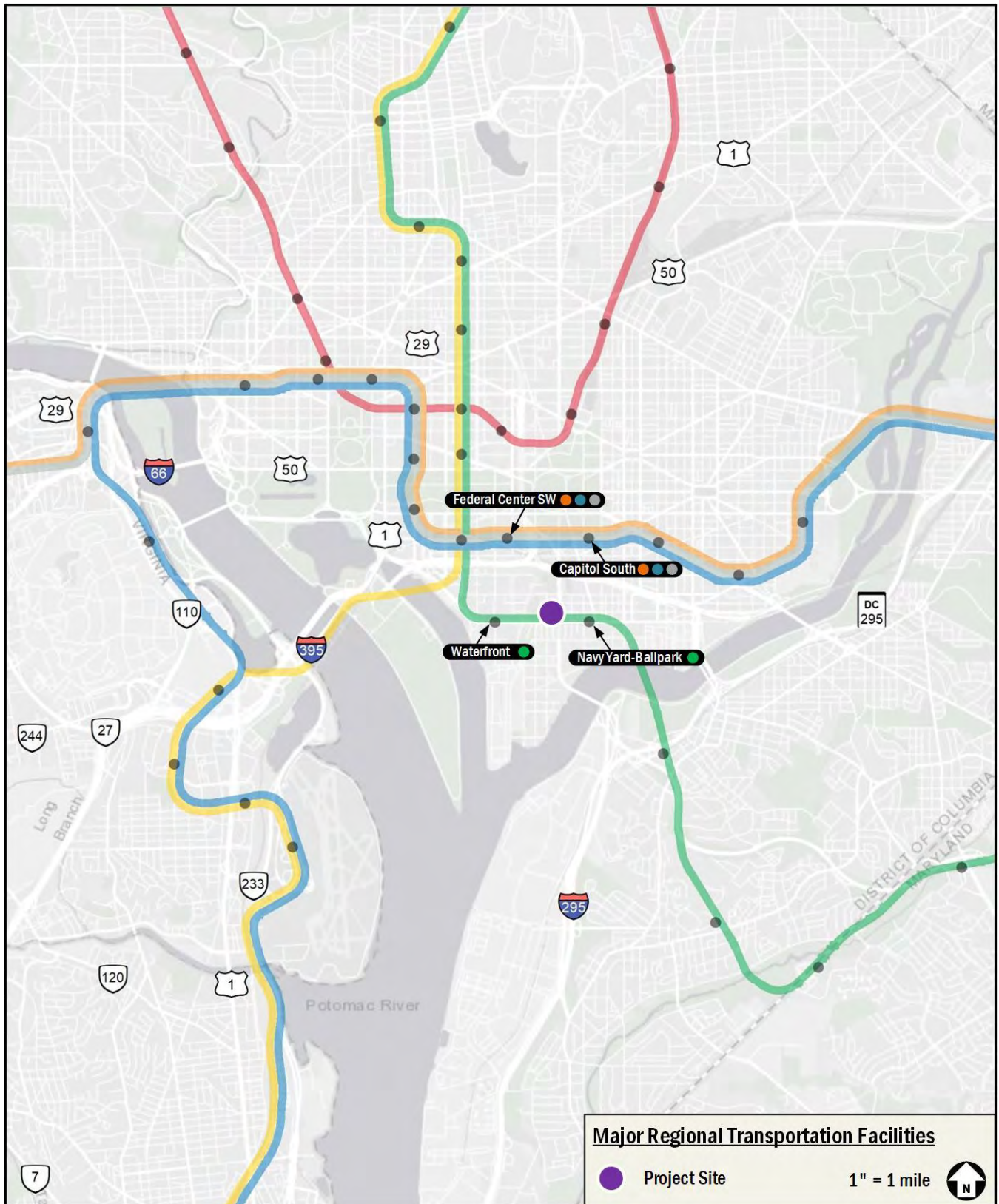


Figure 4: Major Regional Transportation Facilities



Figure 5: Major Local Transportation Facilities

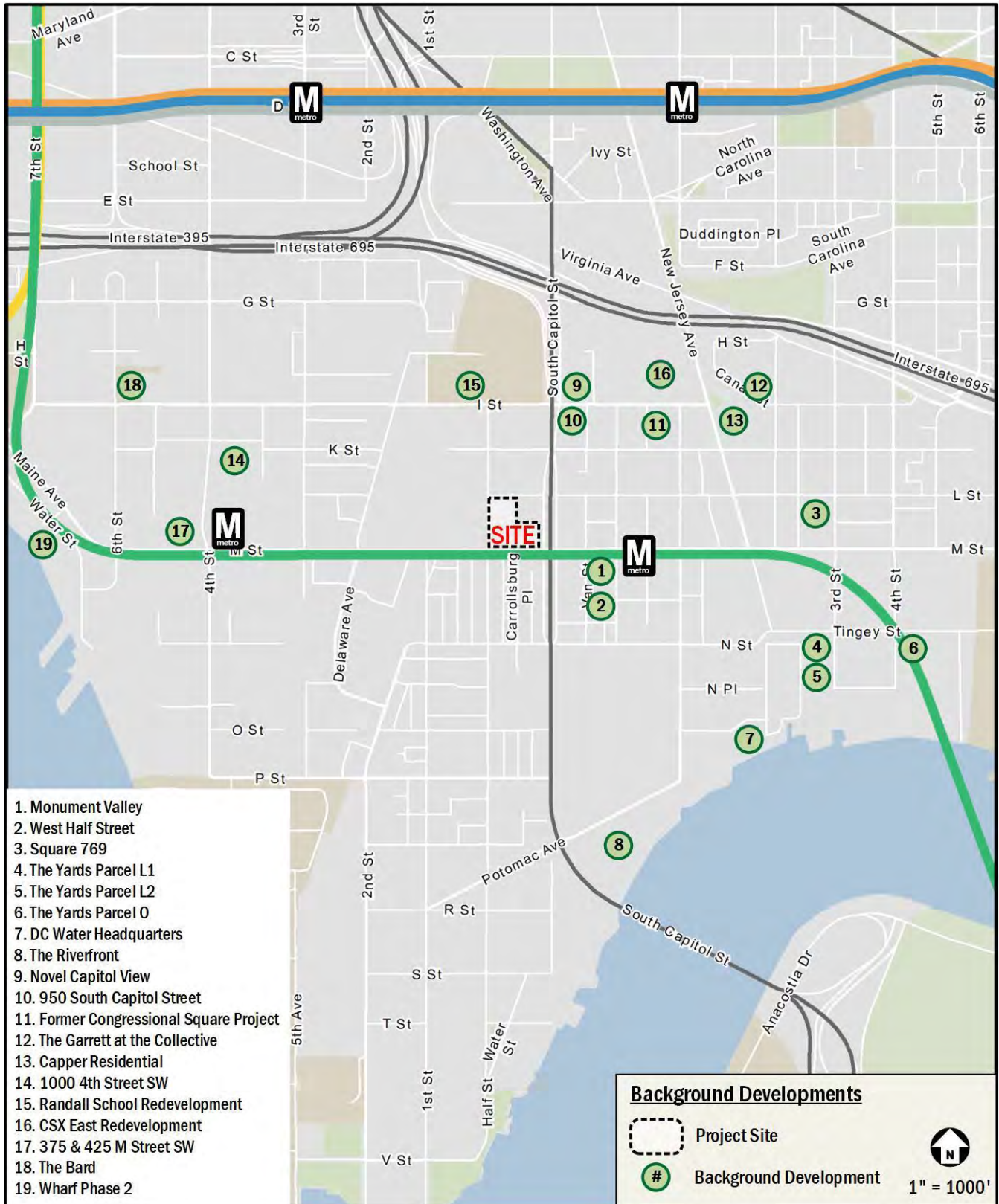


Figure 6: Background Developments

Project Design

This chapter reviews the transportation components of the 5 M Street SW development, including the proposed site plan and access points. It includes descriptions of the project's vehicular access, loading facilities, parking, bicycle, and pedestrian facilities, and the proposed TDM plan.

The 5 M Street SW development is bordered by L Street SW to the north, M Street SW to the south, S Capitol Street to the east, and Half Street SW to the west. Two (2) development schemes are under consideration to improve the site. The "Mixed-Use" development scheme includes 371 residential units, 226,132 square feet of office, 25,427 square feet of retail of which 10,628 square feet will be potentially allocated to a small format grocer, and 403 garage parking spaces. The "Residential" development scheme includes 688 residential units, 23,850 square feet of retail of which 13,065 square feet will be potentially allocated to a small format grocer, and 311 garage parking spaces. The project will replace an existing surface parking lot and a convenience retail store and is undergoing Design Review by the Zoning Commission.

Figure 7 and Figure 8 show the site plan and overview of the development program for the Mixed-Use scheme and Residential scheme, respectively.

Site Access and Circulation

Pedestrian Access

Mixed-Use Scheme

In the Mixed-Use scheme, pedestrian access to the site will primarily utilize the planned entrances on L Street SW and Half Street SW for residential use, M Street SW for office use, and M Street SW and S Capitol Street SW for retail use.

Pedestrian access to the site is shown on Figure 9 for the Mixed-Use scheme.

Residential Scheme

In the Residential scheme, pedestrian access to the site will primarily utilize the planned entrances on L Street SW, M Street SW, and Half Street SW for residential use and M Street SW and S Capitol Street for retail use.

Pedestrian access to the site is shown on Figure 10 for the Residential scheme.

Vehicular and Loading Access

The 5 M Street SW development features two (2) curb cuts for the entire site in both development schemes. One (1) curb cut will provide full inbound and outbound access along Half Street SW. One (1) curb cut will provide full inbound and outbound access along L Street SW. Access to the loading facilities will be available from the driveways along Half Street SW and L Street SW.

Figure 11 and Figure 12 show the location of the site access points for parking garage access and loading facilities.

Curbside Management

The existing curbside conditions around the site are shown on Figure 13. These parking restrictions will remain the same with the buildout of the 5 M Street SW development, regardless of development scheme, with the exception of the site's southern frontage. Parking on M Street SW along the southern frontage will be removed to accommodate the proposed bus stop relocation. Additionally, a pick-up/drop-off area will be provided within the site, for both development schemes, along the private driveway which can be accessed from Half Street SW and L Street, SW. The proposed curbside conditions around the site are shown in Figure 14.

Loading and Trash

Loading

The proposed loading facilities will accommodate all loading activity and delivery demand for the residential, office, and retail uses of the Mixed-Use scheme or the residential and retail uses of the Residential scheme without any detrimental impact to the surrounding transportation network. DDOT standards stipulate that truck movements for a development should be accommodated without back-in movements through public space. The 5 M Street SW development has been designed to accommodate all loading activity and associated backing maneuvers within the site. Truck turning diagrams using AutoTURN are provided in the Technical Attachments.

Mixed-Use Scheme

The Mixed-Use scheme will provide four (4) 30-foot loading berths and two (2) 20-foot service/delivery spaces. Per 2016 Zoning Regulations, the 5 M Street SW development is required to provide one (1) 30-foot loading berth and one (1) 20-foot

service/delivery space for residential use, three (3) 30-foot loading berths and one (1) 20-foot service/delivery space for office use, and two (2) 30-foot loading berths and one (1) 20-foot service/delivery space for retail use or three (3) 30-foot loading berths and one (1) 20-foot service/delivery space as long as internal access for all uses is provided. The proposed loading facilities satisfy the zoning requirements.

Under the Mixed-Use scheme, the site is expected to generate up to 22 total trips per day. Table 2 summarizes the site's anticipated loading activity based on similar projects analyzed by Gorove Slade and truck trip generation methodology outlined in the newly released supplement to the Institute of Transportation Engineers' (ITE) *Trip Generation*, 10th Edition.

Table 2: Site Daily Loading Activity – Mixed-Use Scheme

Land Use/Truck Generator	Loading Trips
Office	9
Retail	2
Subtotal (Shared Office and Retail Deliveries)	6
Grocer	2
Residential	2
General	5
Total	15

Notes:

1. Assumes 50% shared loading activity between office and retail (non-grocer) uses

The daily loading trip generation and assumptions for each use include the following:

- Office: 14 trips based on ITE's average truck trip generation data that estimates 0.06 truck trips for every 1,000 SF of office space (land use code 710). This estimate is assumed to include general parcel deliveries and trash removal accounted for separately, therefore, nine (9) trips are assumed for office.
- Retail (non-grocery): two (2) retail deliveries; assuming two (2) retail deliveries for each retailer, assuming one (1) retailer in addition to the grocery store
- Grocery: two (2) deliveries for the grocery store per operator information
- Residential: two (2) residential loading trips, calculated based on an average unit turnover of 18 months
- Three (3) general deliveries consisting of trash removal, mail, and parcel delivery shared between the entire site
- Shared loading activity of 50 percent between office and non-grocer retail components (UPS, FedEx, Amazon)

Residential Scheme

The Residential scheme will provide four (4) 30-foot loading berths and two (2) 20-foot service/delivery spaces. Per 2016 Zoning Regulations, the 5 M Street SW development is required to provide one (1) 30-foot loading berth and one (1) 20-foot service/delivery space for residential use and two (2) 30-foot loading berths and one (1) 20-foot service/delivery space for retail use or two (2) 30-foot loading berths and one (1) 20-foot service/delivery space as long as internal access for all uses is provided. The proposed loading facilities satisfy the zoning requirements.

Under the Residential scheme, the site is expected to generate up to 10 total trips per day. Table 3 summarizes the site's anticipated loading activity based on similar projects analyzed by Gorove Slade and truck trip generation methodology outlined in the newly released supplement to the Institute of Transportation Engineers' (ITE) *Trip Generation*, 10th Edition.

Table 3: Site Daily Loading Activity – Residential Scheme

Land Use/Truck Generator	Loading Trips
Retail	4
Subtotal (Shared Retail Deliveries)	2
Grocer	2
Residential	3
General	5
Total	12

Notes:

1. Assumes 50% shared loading activity between retail (non-grocer) uses

The daily loading trip generation and assumptions for each use include the following:

- Retail (non-grocery): four (4) retail deliveries; two (2) retail deliveries for each retailer, assuming two (2) retailers in addition to the grocery store
- Grocery: two (2) deliveries for the grocery store per operator information
- Residential: Three (3) residential loading trips, calculated based on an average unit turnover of 18 months
- Five (5) general deliveries consisting of trash removal, mail, and parcel delivery shared between the entire site
- Shared loading activity of 50 percent between uses for the non-grocer retail components (UPS, FedEx, Amazon)

Trash

In both development schemes, trash for the 5 M Street SW development will be accommodated using trash receptacles within the loading areas. No trash will be stored in public space.

Truck routing to and from the site will be focused on designated primary truck routes, such as S Capitol Street and M Street. Loading access and circulation is shown on Figure 11 and Figure 12 for the Mixed-Use scheme and Residential scheme, respectively.

Based on the expected truck deliveries, the loading facilities for the 5 M Street SW development are adequate and vehicles accessing the loading facilities will not adversely affect the local roadway network.

Parking

The site is located in a downtown zone, D-5, east of 20th Street NW. Based on the Zoning Regulations for sites zoned as such, vehicle parking is not required for the site.

Mixed-Use Scheme

The site is located within a downtown zone, zoned D-5, and exempt from the ZR16 parking requirements. However, in order to meet the parking needs of the proposed Mixed-Use scheme, the project will provide 140 vehicle spaces for residential use, 182 vehicle spaces for office use, and 81 vehicle spaces for retail use, for a total of 403 spaces. Parking for the potential small format grocer is included in the retail parking. Nine (9) electric vehicle stations will be provided. These vehicular parking spaces will be provided in a below-grade parking garage.

Residential Scheme

The site is located within a downtown zone, zoned D-5, and exempt from the ZR16 parking requirements. However, in order to meet the parking needs of the proposed Residential scheme, the project will provide 225 vehicle spaces for residential use and 86 vehicle spaces for retail use, for a total of 311 spaces. Parking for the potential small format grocer is included in the retail parking. Seven (7) electric vehicle stations will be included. These vehicular parking spaces will be provided in a below-grade parking garage.

Bicycle and Pedestrian Facilities

Bicycle Facilities

The 5 M Street SW development will meet 2016 Zoning Regulations requirements for long-term bicycle parking, short-

term bicycle parking, showers, and lockers in both development schemes.

Mixed-Use Scheme

Per the Zoning Regulations, the Mixed-Use development scheme is required to provide the following bicycle facilities:

- Long-Term Bicycle Parking Spaces (160 required)
 - Residential: One (1) space for every three (3) residential units applied at 50% after the first 50 spaces; 87 spaces are required.
 - Retail: One (1) space for every 10,000 square feet; three (3) spaces are required.
 - Office: One (1) space for every 2,500 square feet applied at 50% after the first 50 spaces; 70 spaces are required.
- Short-Term Bicycle Parking Spaces (32 required)
 - Residential: One (1) space for every 20 residential units; 19 spaces are required.
 - Retail: One (1) spaces for every 3,500 square feet; seven (7) spaces are required.
 - Office: One (1) space for every 40,000 square feet; six (6) spaces are required.
- Showers (6 required)
 - Residential: None required.
 - Retail and Office: Two (2) showers for 25,000 square feet and two (2) additional showers for every 50,000 square feet in excess of 25,000 square feet, for a maximum of six (6) showers; six (6) showers are required.
- Lockers (44 required)
 - Residential: None required.
 - Retail: 0.6 lockers for every long-term bicycle parking space required; two (2) lockers are required.
 - Office: 0.6 lockers for every long-term bicycle parking space required; 42 lockers required.

The 5 M Street SW development will meet requirements by providing at least 160 long-term bicycle parking spaces on the ground floor and at least 32 short-term bicycle parking spaces throughout the site in highly accessible areas. The project will also provide at least six (6) showers and 44 lockers for the non-residential uses of the Mixed-Use scheme.

Residential Scheme

Per the Zoning Regulations, the Residential development scheme is required to provide the following bicycle facilities:

- Long-Term Bicycle Parking Spaces (142 required)
 - Residential: One (1) space for every three (3) residential units applied at 50% after the first 50 spaces; 140 spaces are required.
 - Retail: One (1) space for every 10,000 square feet; two (2) spaces are required.
- Short-Term Bicycle Parking Spaces (41 required)
 - Residential: One (1) space for every 20 residential units; 34 spaces are required.
 - Retail: One (1) spaces for every 3,500 square feet; seven (7) spaces are required.
- Showers and Lockers
 - Residential: None required.
 - Retail: None required.

The 5 M Street SW development will meet requirements by providing at least 142 long-term bicycle parking spaces within the below-grade garage and at least 41 short-term bicycle parking spaces throughout the site in highly accessible areas. The Residential scheme will not provide showers and lockers.

Pedestrian Facilities

The 5 M Street SW development will provide improved pedestrian facilities around the perimeter of the site that meet DDOT and ADA standards. New sidewalks will be installed around the perimeter of the site that will meet or exceed the width requirements, as well as curb ramps with detectable warnings and crosswalks at the new site entrances, as needed.

Transportation Demand Management

Transportation Demand Management (TDM) is the application of policies and strategies used to reduce travel demand or to redistribute demand to other times or spaces. TDM elements typically focus on reducing the demand of single-occupancy, private vehicles during peak period travel times or on shifting single-occupancy vehicular demand to off-peak periods.

The TDM plan for the proposed project is based on DDOT expectations for TDM programs for developments of this type and size. As such, the applicant proposes the following TDM measures for the entire development and each of the uses onsite:

Site-Wide TDM Plan

- Unbundle the cost of vehicle parking from the lease or purchase or lease agreement for each residential, retail, and office unit and charge a minimum rate based on the average market rate within a quarter mile. Free parking or discounted rates will not be provided.
- Identify Transportation Coordinators for the planning, construction, and operations phases of the office units within the development. There will be a Transportation Coordinator for each retail and office tenant and the entire residential component/building. The Transportation Coordinators will act as points of contact with DDOT, goDCgo, and Zoning Enforcement.
- Will provide Transportation Coordinators' contact information to goDCgo, conduct an annual commuter survey of employees on-site, and report TDM activities and data collection efforts to goDCgo once per year. All employer tenants must survey their employees and report back to the Transportation Coordinator.
- Transportation Coordinators will develop, distribute, and market various transportation alternatives and options to the employees, including promoting transportation events (i.e., Bike to Work Day, National Walking Day, Car Free Day) on property website and in any internal building newsletters or communications.
- Transportation Coordinators will receive TDM training from goDCgo to learn about the TDM conditions for this project and available options for implementing the TDM Plan.
- Transportation Coordinator will subscribe to the applicable goDCgo's newsletters.
- Transportation Coordinator will notify goDCgo each time a new office and retail tenant moves in and provide TDM information to each tenant as they move in.
- Transportation Coordinator will provide links to CommuterConnections.com and goDCgo.com on property websites.
- Transportation Coordinators will implement a carpooling system such that individuals working in the building who wish to carpool can easily locate other employees who live nearby.
- Distribute information on the Commuter Connections Guaranteed Ride Home (GRH) program, which provides commuters who regularly carpool, vanpool, bike, walk, or take transit to work with a free and reliable ride home in an emergency.

- Provide residents and employees who wish to carpool with detailed carpooling information and will be referred to other carpool matching services sponsored by the Metropolitan Washington Council of Governments (MWCOCG) or other comparable service if MWCOCG does not offer this in the future.
- Will not lease unused parking spaces to anyone aside from tenants of the building (e.g., will not lease to other nearby office employees, single-family home residents, or sporting events).
- Following the issuance of a certificate of occupancy for the project, the Transportation Coordinator will coordinate with DDOT and goDCgo every five (5) years (as measured from the final certificate of occupancy for the project) summarizing continued compliance with the transportation and TDM conditions in the Order.
- Install a Transportation Information Center Display (electronic screen) within the residential and office lobbies (two total in either scheme), containing information related to local transportation alternatives. At a minimum the display should include information about nearby Metrorail stations and schedules, Metrobus stops and schedules, car-sharing locations, and nearby Capital Bikeshare locations indicating the availability of bicycles.
- Additional short- and long-term bicycle parking spaces above ZR16 requirements. 14 additional long-term spaces above the zoning requirements and will exceed the number of short-term spaces required by the zoning requirements.
- Provide a bicycle repair station in the bicycle parking storage rooms.
- Long-term bicycle storage rooms will accommodate non-traditional sized bikes including cargo, tandem, and kids bikes.

Residential TDM Plan

- Provide welcome packets to all new residents that should, at a minimum, include the Metrorail pocket guide, brochures of local bus lines (Circulator and Metrobus), carpool and vanpool information, CaBi coupon or rack card, Guaranteed Ride Home (GRH) brochure, and the most recent DC Bike Map. Brochures can be ordered from DDOT's goDCgo program by emailing info@godcgo.com.
- Will meet ZR16 short- and long-term bicycle parking requirements. Long-term bicycle space will be provided free of charge to residents.

- Provide one (1) collapsible shopping cart (utility cart) for every 50 residential units, for a total of seven (7) under the Mixed-Use scheme and 14 under the Residential scheme to encourage residents to walk to the grocery shopping and run errands.

Retail TDM Plan

- Will meet ZR16 short- and long-term bicycle parking requirements. Long-term bicycle parking will be provided free of charge to all employees.
- Provide a free parking space for all vehicles that employees use to vanpool to work; not to exceed one (1) space (shared with office).
- Coordinate with BID, WMATA, and local ANC on a way finding plan along walking routes to the property from the Navy Yard-Ballpark and Waterfront Metrorail stations.

Office TDM Plan – (Mixed-Use Scheme Only)

- Designate a minimum of two (2) preferential carpooling spaces and one (1) preferential vanpooling space in a convenient location within the parking garage for employee use.
- Will meet ZR16 requirements for showers and lockers for use by employees. Six (6) showers and 42 lockers are required for the office component of the project under the Mixed-Use scheme.
- Will meet ZR16 short- and long-term bicycle parking requirements. Long-term bicycle parking will be provided free of charge to all employees.
- Provide a free parking space for all vehicles that employees use to vanpool to work; not to exceed one (1) space (shared with retail).

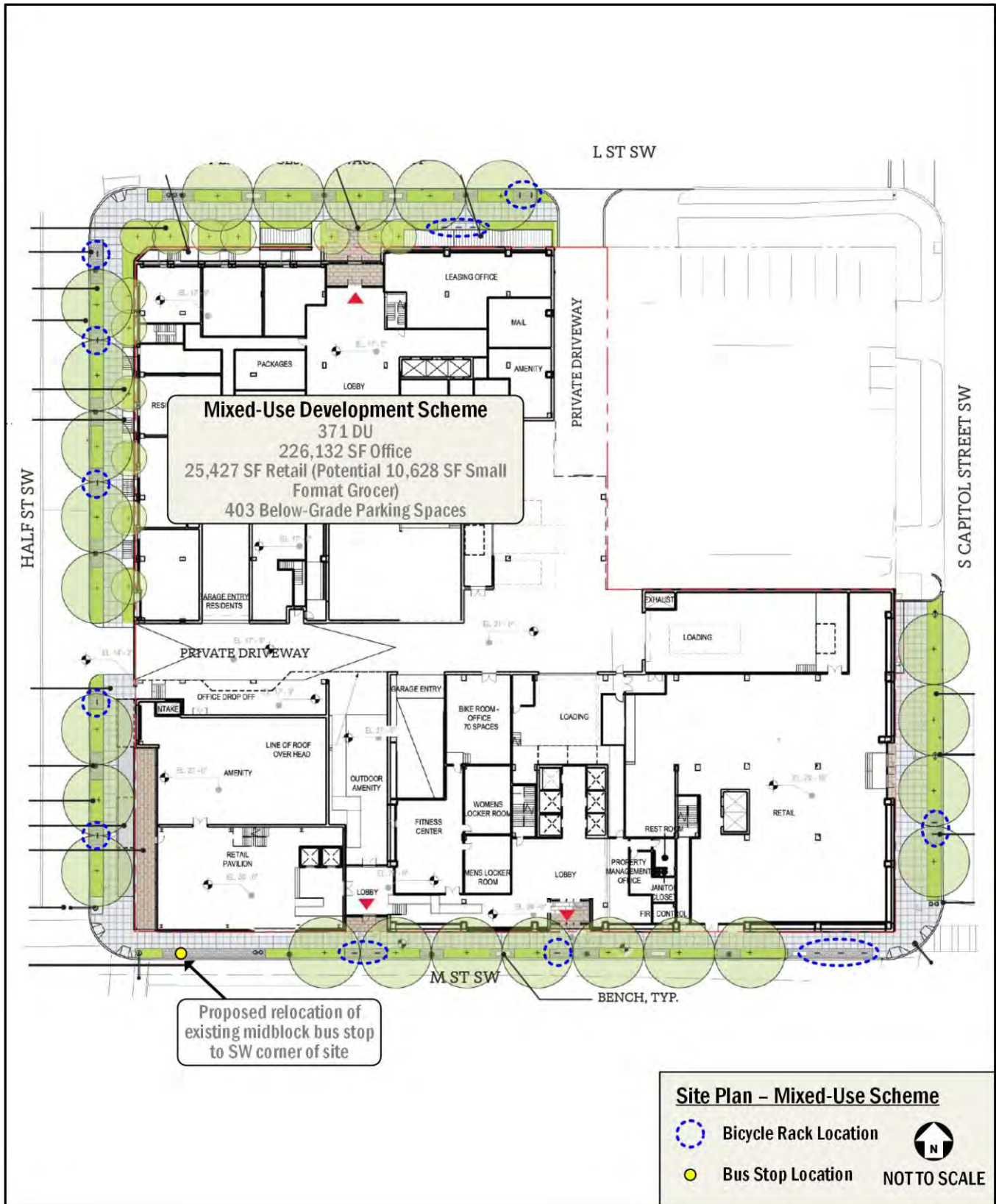


Figure 7: Site Plan - Mixed-Use Scheme

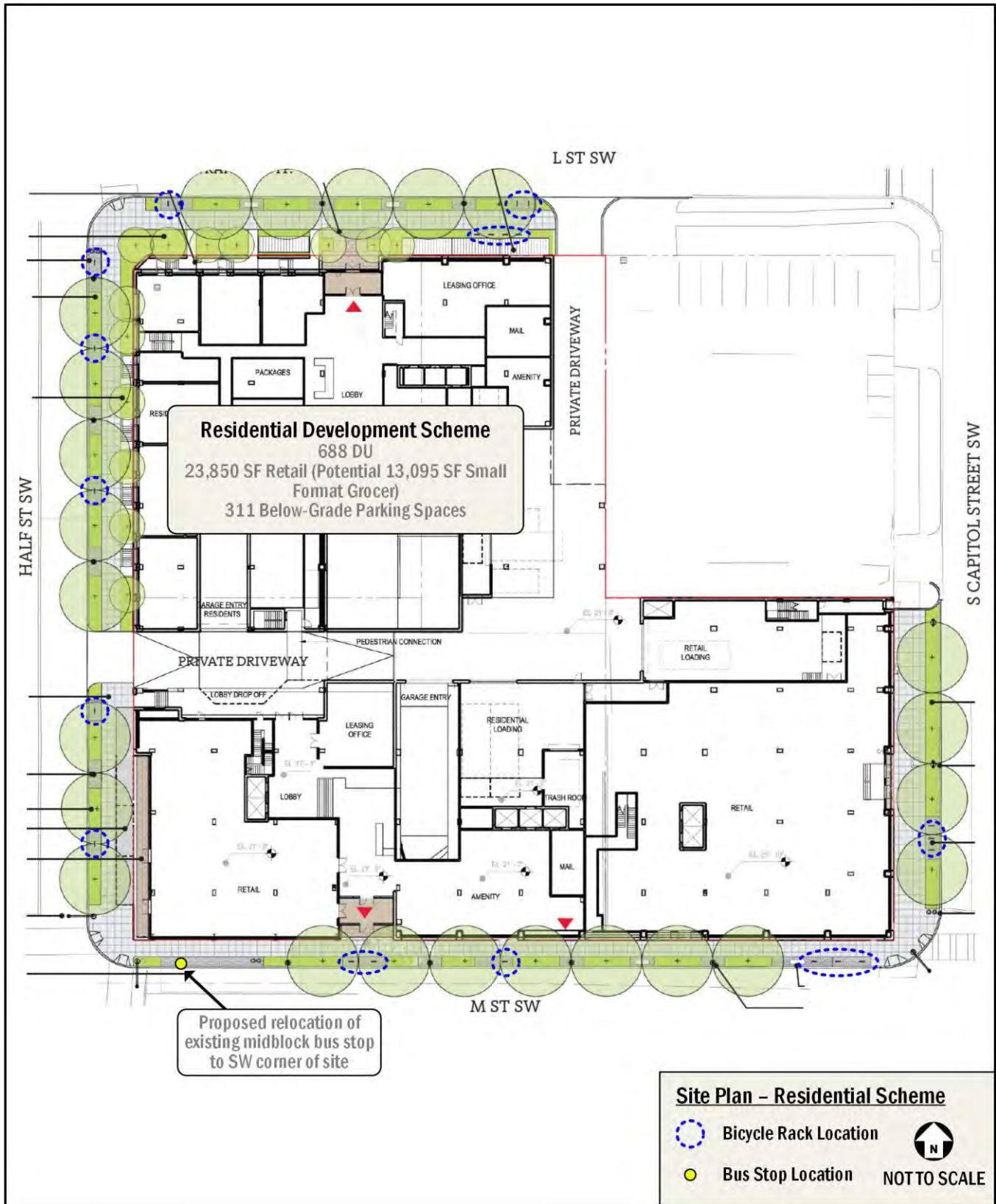


Figure 8: Site Plan – Residential Scheme

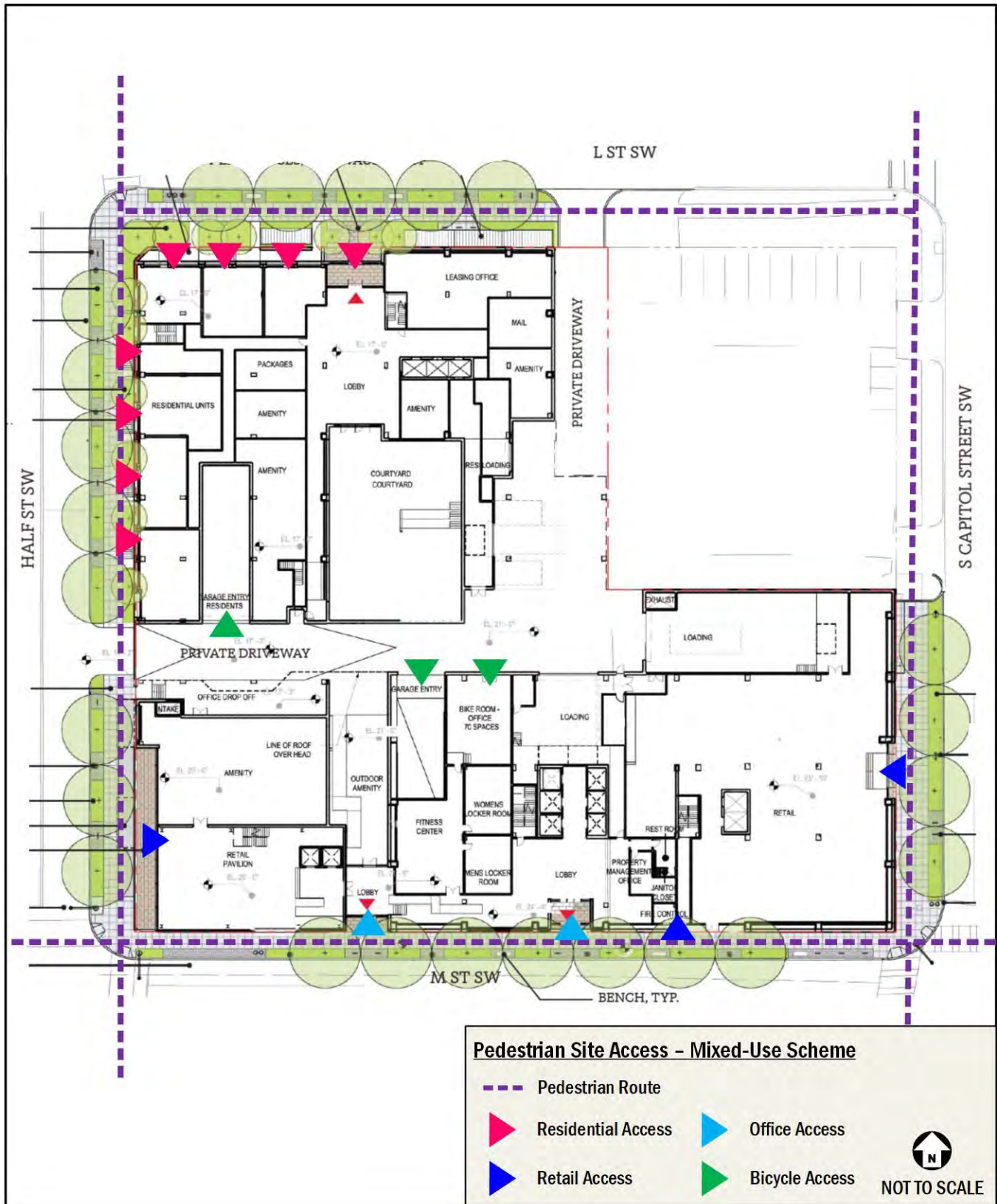


Figure 9: Pedestrian Site Access – Mixed-Use Scheme

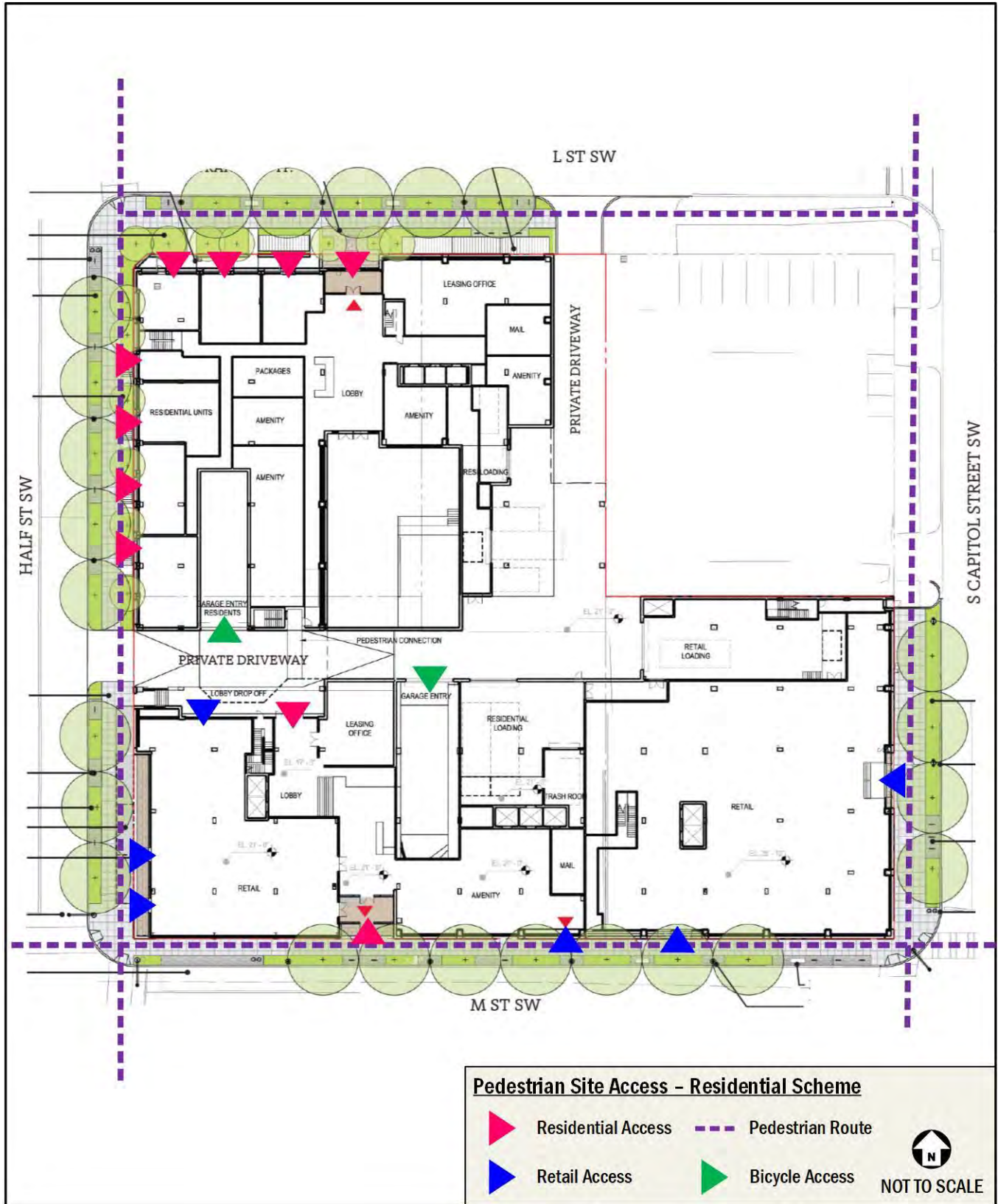


Figure 10: Pedestrian Site Access – Residential Scheme

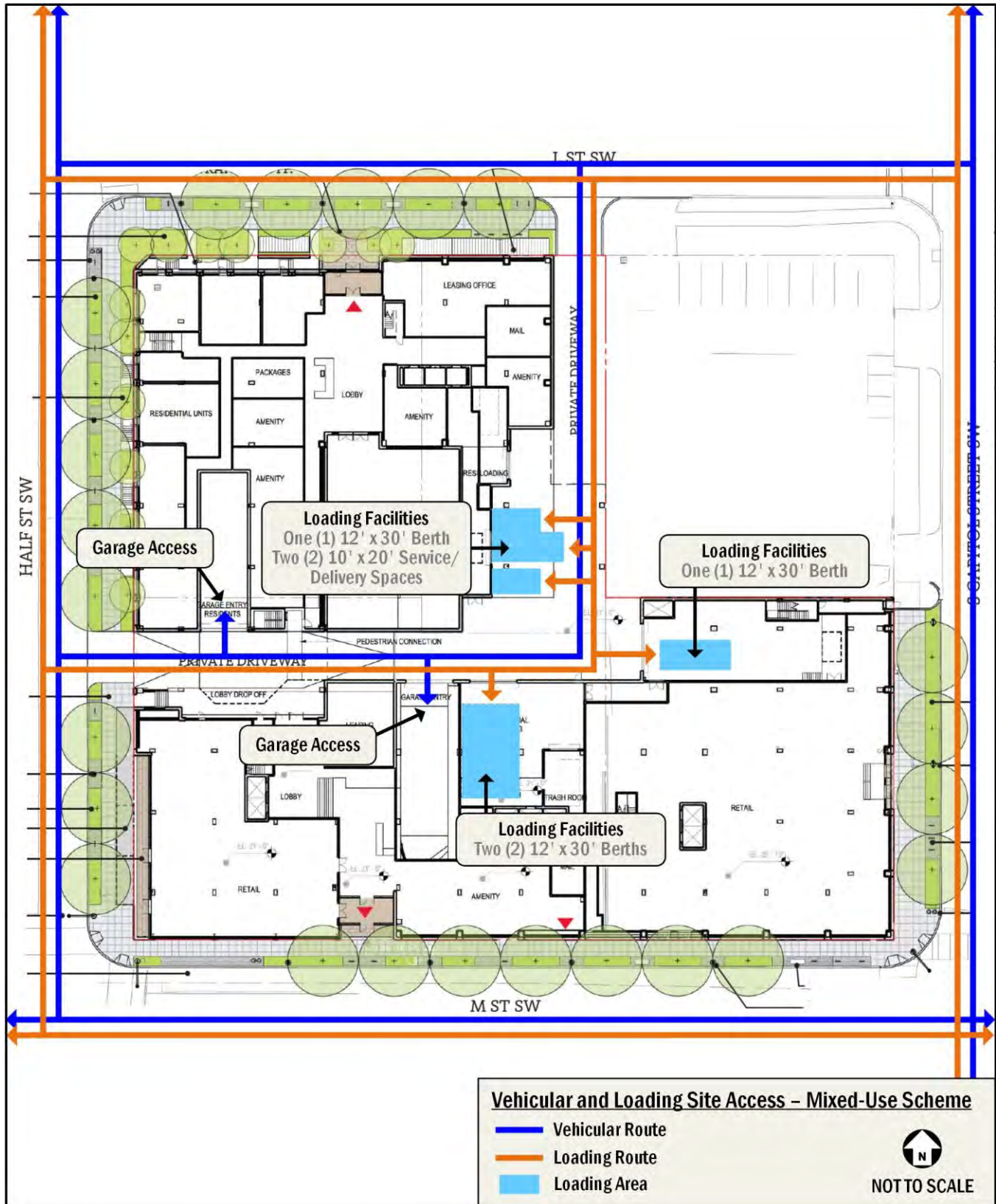


Figure 11: Vehicular and Loading Site Access – Mixed-Use Scheme

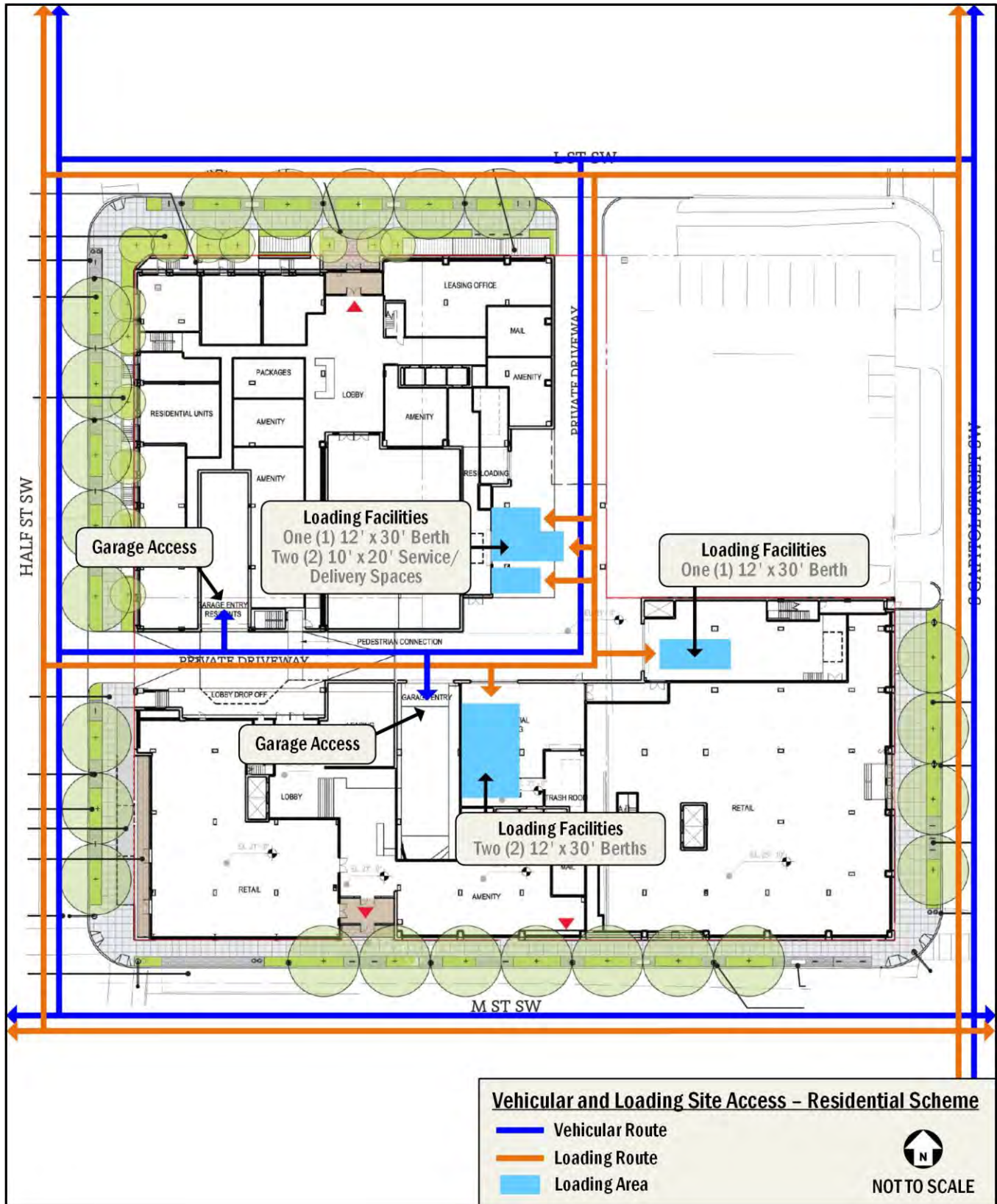


Figure 12: Vehicular and Loading Site Access – Residential Scheme

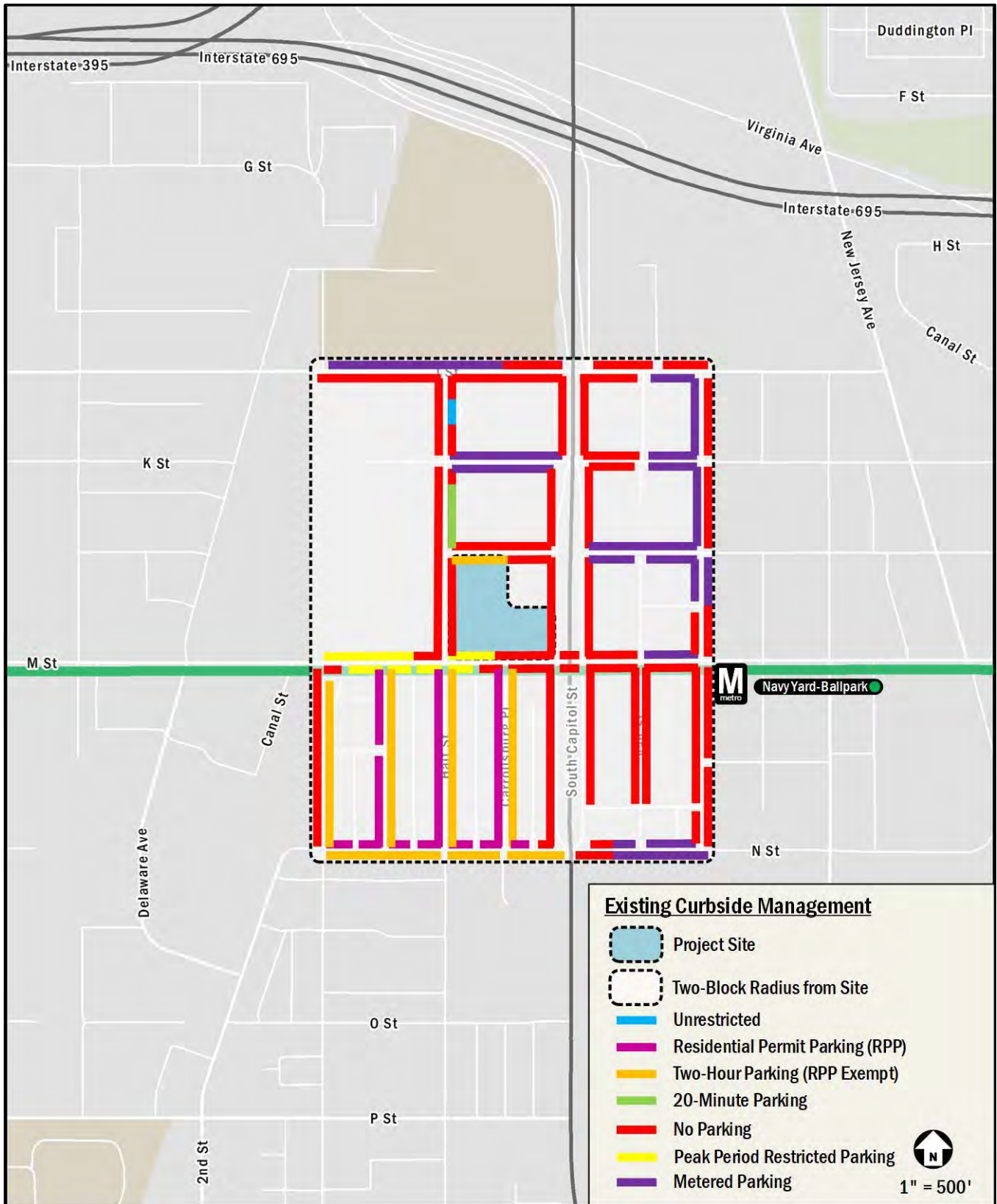


Figure 13: Existing Curbside Management

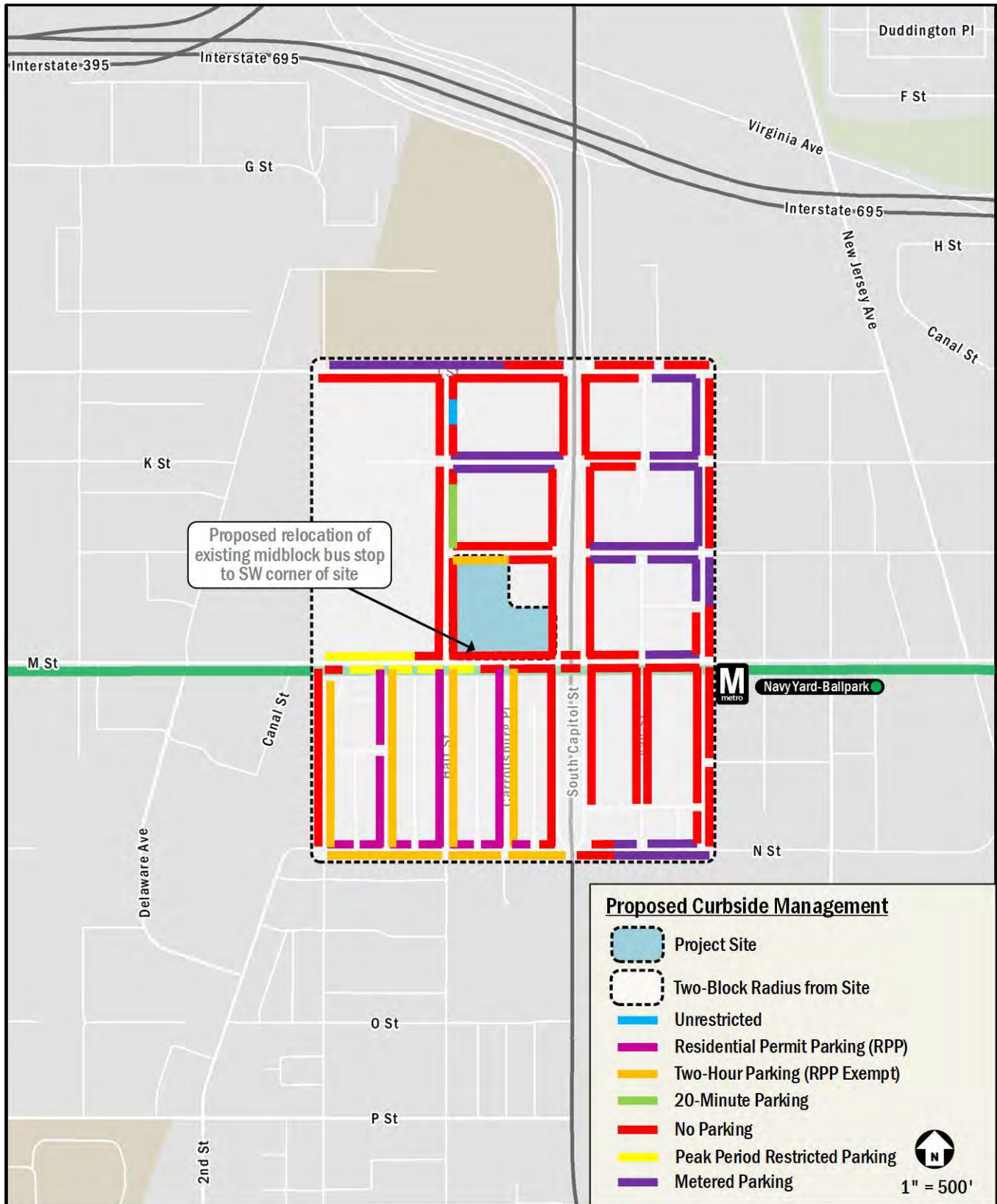


Figure 14: Proposed Curbside Management

Travel Demand Assumptions

This chapter outlines the 5 M Street SW development's transportation demand. It summarizes the projected trip generation of the proposed project by mode, which forms the basis for the chapters that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 10th Edition. This methodology was supplemented to account for the urban nature of the project (*Trip Generation* provides data for non-urban, low transit use sites) and to generate trips for multiple modes, as vetted and approved by DDOT.

Two trip generation scenarios are presented below, representing the two development schemes (Mixed-Use and Residential) that are under consideration to improve the site. In addition, there is the potential for a small format grocer in both development schemes. Trip generation for the potential small format grocer component of the project was calculated using a grocer specific trip generation rate, which results in a higher more conservative trip generation than using the traditional retail trip generation rate.

Existing Trip Generation

The site is currently occupied by a 2,667 square foot convenience retail store and a 151-space surface parking lot.

Convenience market trip generation is based on the existing 2,667 square foot convenience retail store. Convenience market trip generation was calculated based on ITE land use 821, *Convenience Market*. Trips were split into auto and non-auto modes using assumptions derived from census data for the residents that currently live near the site, census data for the commuters that currently work near the site, WMATA ridership survey data. As such, a 30% auto/70% non-auto mode split was assumed for the convenience retail store. Detailed calculations are included in the Technical Attachments.

The existing 151-space surface parking lot is used primarily for office parking and is assumed to have a typical peak weekday occupancy of 75%, based on information provided by the operator. As such, the trip generation for the parking lot was based on ITE land use 710, *General Office Building*. The surface parking lot trip generation combines the Percent of Weekday Peak Parking Demand time-of-day profile provided in ITE

Parking Generation, 5th Edition, and directional distribution (percent entering/percent exiting) provided in *Trip Generation*. Detailed calculations are included in the Technical Attachments.

Mixed-Use Scheme

Residential trip generation was calculated based on ITE land use 221, *Multifamily Housing (Mid-Rise)*. Trip generation for the office component was calculated based on ITE land use 710, *General Office Building*. Trip generation for the neighborhood-serving retail components of the site was calculated based on ITE land use 820, *Shopping Center*. Trip generation for the potential grocer component of the site was calculated based on ITE land use 850, *Supermarket*.

Trips were split into different modes using assumptions derived from census data for the residents that currently live near the site, census data for the commuters that currently work near the site, WMATA ridership survey data, and the proposed parking supply. A summary of the mode split assumptions is provided in Table 4.

Pass-by trips are vehicular trips that are already present on the road network that now deviate from their existing route due to the addition of the proposed development. A pass-by reduction of 25 percent has been applied to the weekday AM and PM peak hours, as vetted and approved by DDOT. These pass-by rates are available on the ITE Trip Generation Handbook, 3rd Edition, for the potential grocer (ITE Land Use 850). A pass-by rate of 25 percent is applied to the Saturday peak hour to be consistent with the weekday AM and PM peak hours. The net site-generated vehicular trip results after pass-by reduction is summarized in Table 6.

A summary of the multimodal trip generation for the proposed Mixed-Use development scheme of the 5 M Street SW development based on ITE is provided in Table 6 for the morning, afternoon, and Saturday peak hours. Detailed calculations are included in the Technical Attachments.

Table 4: Mode Split Assumptions – Mixed-Use Scheme

Land Use	Mode			
	Drive	Transit	Bike	Walk
Residential	35%	45%	10%	10%
Office	55%	30%	5%	10%
Retail	5%	5%	10%	80%
Grocer*	30%	20%	10%	40%

* Assumes 25% Pass-By trips

As shown on Table 6, the Mixed-Use development scheme of the 5 M Street SW development is expected to generate trips on the surrounding transportation network across all modes. The AM peak hour trip generation is projected to include 192 vehicles/hour, 172 transit riders/hour, 41 bicycle trips/hour, and 93 walking trips/hour. The PM peak hour trip generation is projected to include 225 vehicles/hour, 214 transit riders/hour, 62 bicycle trips/hour, and 202 walking trips/hour. The Saturday peak hour trip generation is projected to include 99 vehicles/hour, 107 transit riders/hour, 29 bicycle trips/hour, and 78 walking trips/hour.

A comparison of the vehicle trip generation between the existing site and the proposed Mixed-Use development scheme is presented in Table 7. As shown on Table 7, the 5 M Street SW development results in an overall net increase in vehicular trip generation, with 78 additional vehicle trips (55 inbound and 23 outbound) during the morning peak hour and 127 additional vehicle trips (44 inbound and 83 outbound) during the afternoon peak hour.

Residential Scheme

Residential trip generation was calculated based on ITE land use 221, *Multifamily Housing (Mid-Rise)*. Trip generation for the neighborhood-serving retail components of the site was calculated based on ITE land use 820, *Shopping Center*. Trip generation for the potential grocer component of the site was calculated based on ITE land use 850, *Supermarket*.

Trips were split into different modes using assumptions derived from census data for the residents that currently live near the site, census data for the commuters that currently work near the site, WMATA ridership survey data, and the proposed parking supply. A summary of the mode split assumptions is provided in Table 5.

Pass-by trips are vehicular trips that are already present on the road network that now deviate from their existing route due to the addition of the proposed development. A pass-by reduction of 25 percent has been applied to the weekday AM and PM peak

hours, as vetted and approved by DDOT. These pass-by rates are available on the ITE Trip Generation Handbook, 3rd Edition, for the potential grocer (ITE Land Use 850). A pass-by rate of 25 percent is applied to the Saturday peak hour to be consistent with the weekday AM and PM peak hours. The net site-generated vehicular trip results after pass-by reduction is summarized in Table 8.

A summary of the multimodal trip generation for the proposed Residential development scheme of the 5 M Street SW development based on ITE is provided in Table 9 for the morning, afternoon, and Saturday peak hours. Detailed calculations are included in the Technical Attachments.

Table 5: Mode Split Assumptions – Residential Scheme

Land Use	Mode			
	Drive	Transit	Bike	Walk
Residential	35%	45%	10%	10%
Retail	5%	5%	10%	80%
Grocer*	30%	20%	10%	40%

* Assumes 25% Pass-By trips

As shown on Table 8, the Residential development scheme of the 5 M Street SW development is expected to generate trips on the surrounding transportation network across all modes. The AM peak hour trip generation is projected to include 103 vehicles/hour, 151 transit riders/hour, 40 bicycle trips/hour, and 79 walking trips/hour. The PM peak hour trip generation is projected to include 144 vehicles/hour, 209 transit riders/hour, 66 bicycle trips/hour, and 183 walking trips/hour. The Saturday peak hour trip generation is projected to include 89 vehicles/hour, 132 transit riders/hour, 36 bicycle trips/hour, and 77 walking trips/hour.

A comparison of the vehicle trip generation between the existing site and the proposed Residential development scheme is presented in Table 9. As shown on Table 9, the 5 M Street SW development results in a net increase in vehicular trip generation during the morning peak hour, with 11 fewer vehicle trips (47 fewer inbound and 36 additional outbound), and a net increase in vehicular trip generation during the afternoon peak hour, with 46 additional trips (55 inbound and 9 fewer outbound).

Table 6: ITE Multi-Modal Trip Generation Summary – Mixed-Use Scheme

Mode	AM Peak Hour			PM Peak Hour			Saturday Peak Hour			Daily Total
	In	Out	Total	In	Out	Total	In	Out	Total	
Residential (371 Units)										
Auto (veh/hr)	12	35	47	35	22	57	20	21	41	707
Transit (ppl/hr)	18	53	71	53	33	86	31	31	62	1,073
Bike (ppl/hr)	4	12	16	12	7	19	7	7	14	238
Walk (ppl/hr)	5	11	16	11	9	20	7	7	14	239
Office (226,132 SF)										
Auto (veh/hr)	114	17	131	22	114	136	25	22	47	1,287
Transit (ppl/hr)	73	12	85	14	73	87	14	14	31	829
Bike (ppl/hr)	12	2	14	2	13	15	3	2	5	138
Walk (ppl/hr)	24	4	28	5	24	29	6	4	10	276
Neighborhood-Serving Retail (14,799 SF)										
Auto (veh/hr)	1	0	1	1	2	3	1	0	1	28
Transit (ppl/hr)	1	0	1	2	3	5	1	1	2	51
Bike (ppl/hr)	2	1	3	5	5	10	2	2	4	102
Walk (ppl/hr)	12	8	20	40	42	82	15	15	30	813
Grocer (10,628 SF)										
Auto (veh/hr)	6	4	10	11	11	22	4	4	8	256
Auto (25% Pass-by) (veh/hr)	2	1	3	4	3	7	1	1	2	85
Transit (ppl/hr)	9	6	15	18	18	36	6	6	12	413
Bike (ppl/hr)	5	3	8	9	9	18	3	3	6	207
Walk (ppl/hr)	18	11	29	37	34	71	12	12	24	826
Total										
Auto (veh/hr)	133	56	189	69	149	218	50	47	97	2,278
Auto (25% Pass-by) (veh/hr)	2	1	3	4	3	7	1	1	2	85
Transit (ppl/hr)	101	71	172	87	127	214	55	52	107	2,366
Bike (ppl/hr)	23	18	41	28	34	62	15	14	29	685
Walk (ppl/hr)	59	34	93	93	109	202	40	38	78	2,154

Table 7: Net Vehicular Trip Generation – Mixed-Use Scheme

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Existing Auto Trips (veh/hr)						
Convenience Market	25	25	50	20	19	39
Parking Lot	55	9	64	9	50	59
Existing Total	80	34	114	29	69	98
Proposed Auto Trips (veh/hr)*						
Mixed-use Scheme Total	135	57	192	73	152	225
Net Auto Trips (veh/hr)	+55	+23	+78	+44	+83	+127

* Includes auto and pass-by trips

Table 8: ITE Multi-Modal Trip Generation Summary – Residential Scheme

Mode	AM Peak Hour			PM Peak Hour			Saturday Peak Hour			Daily Total
	In	Out	Total	In	Out	Total	In	Out	Total	
Residential (688 Units)										
Auto (veh/hr)	23	35	47	35	22	57	37	39	76	707
Transit (ppl/hr)	34	98	132	98	63	161	56	60	116	1,990
Bike (ppl/hr)	8	21	29	22	14	36	13	13	26	442
Walk (ppl/hr)	7	22	29	22	14	36	13	13	26	443
Neighborhood-Serving Retail (10,755 SF)										
Auto (veh/hr)	1	0	1	1	1	2	1	0	1	20
Transit (ppl/hr)	1	0	1	2	2	4	1	0	1	37
Bike (ppl/hr)	1	1	2	4	4	8	1	2	3	74
Walk (ppl/hr)	8	6	14	28	31	59	11	10	21	591
Grocer (13,095 SF)										
Auto (veh/hr)	7	4	11	14	13	27	5	4	9	314
Auto (25% Pass-by) (veh/hr)	2	2	4	5	4	9	1	2	3	105
Transit (ppl/hr)	11	7	18	23	21	44	8	7	15	509
Bike (ppl/hr)	6	3	9	11	11	22	4	3	7	254
Walk (ppl/hr)	22	14	36	45	43	88	15	15	30	1,018
Total										
Auto (veh/hr)	31	68	99	79	56	135	43	43	86	1,646
Auto (25% Pass-by) (veh/hr)	2	2	4	5	4	9	1	2	3	105
Transit (ppl/hr)	46	105	151	123	86	209	65	67	132	2,536
Bike (ppl/hr)	15	25	40	37	29	66	18	18	36	770
Walk (ppl/hr)	37	42	79	95	88	183	39	38	77	2,052

Table 9: Net Vehicular Trip Generation – Residential Scheme

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Existing Auto Trips (veh/hr)						
Convenience Market	25	25	50	20	19	39
Parking Lot	55	9	64	9	50	59
Existing Total	80	34	114	29	69	98
Proposed Auto Trips (veh/hr)*						
Residential Scheme Total	33	70	103	84	60	144
Net Auto Trips (veh/hr)	-47	+36	-11	+55	-9	+46

* Includes auto and pass-by trips

Traffic Operations

This chapter provides a summary of an analysis of the existing and future roadway capacity surrounding the site. Included is an analysis of potential vehicular impacts of the 5 M Street SW 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 project on the study area roadways; and
- Discuss any potential improvements and mitigation measures to accommodate the additional vehicular trips.

This analysis was accomplished by determining the traffic volumes and roadway capacity for Existing Conditions, Background Conditions, and Total Future Conditions, including taking into account reductions in traffic volumes and roadway capacity for the existing uses on the site. The scope of the capacity analysis was developed based on DDOT guidelines and agreed to by DDOT staff.

The capacity analysis focuses on the weekday morning and afternoon commuter peak hours.

This chapter concludes:

- Under Existing Conditions, six (6) study intersections operate at unacceptable levels of service, indicating areas of concern along S Capitol Street and M Street.
- The addition of site generated trips does not significantly affect the delays or queuing at most intersections.
- In the Mixed-Use scheme, four (4) intersections meet DDOT's threshold for mitigation measures as a result of minor impacts to delay created by the project.
- In the Residential scheme, three (3) intersections meet DDOT's threshold for mitigation measures as a result of minor impacts to delay created by the project.
- Mitigations in the form of signal timing adjustments are recommended at selected intersections for both development schemes.
- In both development schemes, the project will not have a detrimental impact to the surrounding vehicular network, with the implementation of all site design elements and mitigation measures.

Study Area, Scope, & Methodology

This section outlines the vehicular trips generated in the study area along the vehicular access routes and defines the analysis assumptions.

The scope of the analysis contained within this report was extensively discussed with and agreed upon by DDOT. The general methodology of the analysis follows national and DDOT guidelines on the preparation of transportation impact evaluations of site development.

Capacity Analysis Scenarios

The vehicular capacity analyses were performed to determine whether the project will lead to adverse impacts on traffic operations. A review of potential impacts to each of the other modes is outlined later in this report. This is accomplished by comparing two future scenarios: (1) without the project (referred to as the "Background conditions" and (2) with the project approved and constructed (referred to as the "Total Future" conditions). Total Future conditions were analyzed under both the Residential scheme development program and the Mixed-Use scheme development program, taking into account reductions in traffic volumes due to the removal of the existing uses on the site.

Specifically, the roadway capacity analysis examined the following scenarios:

1. Existing Conditions (Existing Conditions);
2. 2024 Future Conditions without the Project (2024 Background Conditions);
3. 2024 Future Conditions with the Project: Residential Scheme (2024 Total Future – Residential); and
4. 2024 Future Conditions with the Project: Mixed-Use Scheme (2024 Total Future – Mixed-Use).

Study Area

The study area of the analysis is a set of intersections where detailed capacity analyses were performed for the scenarios listed above. The set of intersections decided upon during the study scoping process with DDOT are those intersections most likely to have potential impacts or require changes to traffic operations to accommodate the project. Although it is possible that impacts will occur outside of the study area, those impacts

are neither significant enough to be considered a material adverse impact nor worthy of mitigation measures.

Based on the projected future trip generation and the location of the site access points, the following intersections were chosen and agreed upon by DDOT for analysis:

1. M Street & Delaware Avenue, SW
2. M Street & First Street, SW
3. M Street & Half Street, SW
4. S Capitol Street & M Street, SE (East)
5. S Capitol Street & M Street, SW (West)
6. M Street & Van Street, SE
7. M Street & Half Street, SE
8. M Street & First Street, SE
9. Half Street & I Street, SW
10. Half Street & K Street, SW
11. Half Street & L Street, SW
12. S Capitol Street & I Street, SW/SE
13. S Capitol Street & K Street, SW/SE
14. S Capitol Street & L Street, SW
15. S Capitol Street & L Street, SE
16. Half Street & N Street, SW
17. S Capitol Street & N Street, SW
18. S Capitol Street & O Street, SW
19. Half Street SW & Driveway (Planned)
20. L Street SW & Driveway (Planned)

Figure 15 shows a map of the study area intersections.

Geometry and Operations Assumptions

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

Existing Geometry and Operations Assumptions

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 DDOT.

The lane configurations and traffic controls for the Existing Conditions are shown on Figure 16.

2024 Background Geometry and Operations Assumptions

Following national and DDOT 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 project.

Based on these criteria, the following improvements were assumed:

- Implementation of eastbound/westbound car free lanes along M Street SE east of Half Street SE. These improvements will include the following changes to roadway geometry and operations:
 - The reconfiguration of the eastbound and westbound approaches of the Half Street and M Street SE intersection to include one left/thru lane, one thru lane, and one right-turn lane.
 - The reconfiguration of the eastbound and westbound approaches of the First Street and M Street SE intersection to include one left/thru lane, one thru lane, and one right-turn lane.
- South Capitol Street is expected to be improved as part of the Frederick Douglas Memorial Bridge Project, however, the segment within the study area is not yet funded and is still in the design phase. These improvements were not included in this analysis.

The lane configurations and traffic controls for the Background Conditions are shown on Figure 17.

2024 Total Future Geometry and Operations Assumptions

The configurations and traffic controls for the 2024 Total Future Conditions were based on those for the 2024 Background Conditions with the addition of the proposed project. As part of the proposed project, the following roadway or operational changes are included:

- The addition of the unsignalized Half Street SW & Site Driveway intersection. This intersection is configured with one westbound left/right lane, one northbound thru/right lane, and one southbound left/thru lane.
- The addition of the unsignalized L Street SW and Site Driveway intersection. This intersection is configured with one eastbound thru/right lane, one westbound left/thru lane, and one northbound left/right lane.

The lane configurations and traffic controls for the Total Future Conditions are shown on Figure 18.

Traffic Volume Assumptions

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

Existing Traffic Volumes

Data collection was not possible during Spring 2020 as traffic volumes were not representative of typical traffic conditions due to District-wide restrictions in response to the COVID-19 public health crisis. In order to establish baseline conditions, the study analyzed 2020 traffic volumes comprised of turning movement count data collected between 2013-2019, with applied growth based on data collection year. Where historical intersection count data was not available, a methodology using vehicle probe data was applied at those intersections. The traffic volume sources for each study intersection are summarized below.

DDOT's Traffic Engineering and Signals Division (TESD) Volumes

DDOT's Traffic Engineering and Signals Division (TESD) collected turning movement counts in the vicinity of the project site over a 10-month period between 2017 and 2018 for traffic signal timing optimization purposes. The following intersections are based on TESD volumes:

- M Street & Delaware Avenue, SW
- M Street & First Street, SW
- M Street & Half Street, SW
- S Capitol Street & M Street, SW (East)
- S Capitol Street & M Street, SW (West)
- M Street & Half Street, SE
- S Capitol Street & I Street, SW
- S Capitol Street & O Street, SW

Historical Volumes from Approved Transportation Studies

Historical turning movement counts were collected as part of several approved transportation studies in the vicinity of the project site in 2013, 2015, and 2019. The following intersections are based on available historical volumes:

- M Street & First Street, SE (2019)
- S Capitol Street & N Street, SW (2019)
- Half Street & N Street, SW (2015)
- M Street & Van Street, SE (2015)

- Half Street & I Street, SW (2013)

StreetLight Volumes

StreetLight Insight® origin and destination data was used to determine traffic patterns during pre-COVID conditions (2019) at intersections without available data. StreetLight metrics are derived from a combination of two types of data: navigation-GPS data and Location Based Services (LBS) data, including historical data, with a sample size of approximately 23% of the adult population. This data is then transformed into contextualized, aggregated, and normalized travel patterns that can be used to create origin and destination analyses. StreetLight data was used to estimate the pre-COVID turning movement ratios at intersections without available count data. Using these turning movement ratios, existing field-collected data at adjacent intersections was extrapolated to estimate the pre-COVID turning movement counts at the following intersections:

- S Capitol Street & K Street, SW/SE
- S Capitol Street & L Street, SW/SE
- Half Street & K Street, SW
- Half Street & L Street, SW

Baseline conditions were established by projecting the available volumes into 2020 using growth rates based on DDOT's Traffic Volume Maps, using StreetLight data to estimate volumes at the intersections without available traffic count data, and balancing volumes between intersections.

The existing 2020 system peak hour traffic volumes are shown in Figure 19.

2024 Background Traffic Volumes (without the Project)

The traffic projections for the 2024 Background Conditions consist of the existing volumes with two (2) additions:

- Inherent growth on the roadway (representing regional traffic growth); and
- Traffic generated by developments expected to be completed prior to the project (known as background developments).

Following national and DDOT 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 future analysis year of 2024.

Based on these criteria, and as discussed with and agreed upon by DDOT, 19 developments were considered and determined to meet the above criteria. These developments include the following:

- Monument Valley
- West Half Street
- Square 769
- The Yards Parcel L1
- The Yards Parcel L2
- The Yards Parcel O
- DC Water Headquarters
- The Riverfront
- Novel Capitol View
- 950 South Capitol Street
- Former Congressional Square Project
- The Garrett at the Collective
- Capper Residential
- 1000 4th Street SW
- Randall School Redevelopment
- CSX East Redevelopment
- 375 & 425 M Street SW
- The Bard
- Wharf Phase 2

Trip generation for the background developments is based on available studies or *ITE Trip Generation 10th Edition*. The trip generation for background developments with available transportation studies is included in the Technical Attachments.

Trip generation for the following projects was calculated using *ITE Trip Generation 10th Edition*:

- Monument Valley
- Square 769
- The Yards Parcel O
- 950 South Capitol Street
- Former Congressional Square Project

- The Garrett at the Collective
- Capper Residential

The mode splits and trip distribution assumptions for these developments were primarily based on those used in similar developments throughout the Southwest/Waterfront/Navy Yard neighborhoods and the proposed 5 M Street SW development.

A summary of the trip generation for the background developments is shown in Table 11 and the combined background projects peak hour volumes are shown in Figure 20. Detailed mode split and trip generation information is included in the Technical Attachments.

While the background developments represent local traffic changes, regional traffic growth is typically accounted for using growth rates. The growth rates used in this analysis are derived using the Metropolitan Washington Council of Government’s (MWCOCG) currently adopted regional transportation model, comparing the difference between the year 2019 and 2025 model scenarios as vetted and agreed to by DDOT. The growth rates observed in this model served as a basis for analysis assumptions, and where negative growth was observed a conservative 0.10 percent annual growth rate was applied to the roadway. The applied growth rates are shown in Table 10. The traffic volumes generated by the inherent growth along the network are shown in Figure 21.

Table 10: Applied Annual and Total Growth Rates

Road & Direction	Proposed Annual Growth Rate		Total Growth between 2020 and 2024	
	AM Peak	PM Peak	AM Peak	PM Peak
EB M St SW (west of S. Capitol St)	0.50%	0.50%	2.02%	2.02%
WB M St SW (west of S. Capitol St)	0.20%	0.50%	0.80%	2.02%
EB M St SE (east of S. Capitol St)	0.50%	0.10%	2.02%	0.40%
WB M St SE (east of S. Capitol St)	0.10%	0.16%	0.40%	0.64%
EB I St	0.50%	0.31%	2.02%	1.25%
WB I St	0.26%	0.50%	1.04%	2.02%
SB S Capitol St	0.35%	0.50%	1.41%	2.02%
NB Capitol St	0.50%	0.50%	2.02%	2.02%
All Other	0.10%	0.10%	0.40%	0.40%

The existing peak hour volumes, presented in Figure 19, were combined with the background projects’ peak hour volumes, shown in Figure 20, and background growth peak hour volumes shown in Figure 21, in order to establish the 2024 Background traffic volumes. The traffic volumes for the 2024 Background conditions are shown in Figure 22.

Table 11: Summary of Background Trip Generation

Background Development	Trip Generation Source	AM Peak Hour (veh/hr)			PM Peak Hour (veh/hr)		
		In	Out	Total	In	Out	Total
Monument Valley	ITE Trip Gen. 10 th Ed.	33	56	89	97	84	181
W Half St	Gorove Slade Study	35	85	120	119	91	210
Square 769	ITE Trip Gen. 10 th Ed.	8	19	27	22	16	38
Yards Parcel L	Gorove Slade Study	36	25	61	42	42	84
Yards Parcel L2	Gorove Slade Study	10	40	50	39	21	60
Parcel O	ITE Trip Gen. 10 th Ed.	16	35	51	45	31	76
DC Water HQ	Gorove Slade Study	112	13	125	19	102	121
Riverfront	Gorove Slade Study	297	131	428	163	285	448
950 S Capitol S	ITE Trip Gen. 10 th Ed.	15	61	76	59	33	92
Former Congressional Square Project	ITE Trip Gen. 10 th Ed.	43	91	134	122	95	217
The Garrett at the Collective	ITE Trip Gen. 10 th Ed.	18	42	60	53	39	92
Capper	ITE Trip Gen. 10 th Ed.	15	36	51	43	30	73
1000/1001 4th St	Gorove Slade Study	58	115	173	122	82	204
Randall School Redevelopment	Gorove Slade Study	32	106	138	110	67	177
CSX East Redevelopment	Gorove Slade Study	132	232	364	176	144	320
375 & 425 M Street SW	Gorove Slade Study	60	119	179	136	104	240
The Bard	Gorove Slade Study	35	19	54	44	19	63
Wharf Phase 2	Gorove Slade Study	379	108	487	176	396	570
Total		1,222	1,189	2,114	1,405	1,294	2,697

2024 Total Future Traffic Volumes (with the Project)

The 2024 Total Future traffic volumes consist of the following:

- Existing volumes, shown in Figure 19;
- Background developments, shown in Figure 20;
- Inherent growth on the study area roadways, shown in Figure 21;
- Removed existing site volumes for the existing uses on site, shown in Figure 28;
- Site-generated and pass-by volumes for the 5 M Street development based on the development schemes under consideration.

Trip distribution for the site-generated trips was determined based on: (1) Census Transportation Planning Products (CTPP) Traffic Analysis Zone (TAZ) data, (2) existing and future travel patterns in the study area, and (3) previously approved methodologies employed in studies within the vicinity of the site.

Based on this review and the site access locations, the site-generated trips were distributed through the study area intersections. Trip distribution assumptions and specific routing was analyzed by land use for inbound and outbound trips. Residential, retail, and office distribution assumptions for the project are provided in Figure 23 and Figure 24 for inbound and outbound trips, respectively. Trip distribution assumptions for the grocer pass-by trips for inbound trips and outbound trips are provided in Figure 25 and Figure 26, respectively. These distributions were applied to both development schemes. Detailed distributions at each study intersection are shown in Figure 27.

Mixed-Use Scheme

Site-generated and grocer pass-by volumes for the Mixed-Use scheme development program are presented in Figure 29 and Figure 30, respectively. The 2024 Total Future traffic volumes with the 5 M Street SW development based on the Mixed-Use scheme are presented in Figure 31.

Residential Scheme

Site-generated and grocer pass-by volumes for the Residential scheme development program are presented in Figure 32 and Figure 33, respectively. The 2024 Total Future traffic volumes with the 5 M Street SW development based on the Residential scheme are presented in Figure 34.

Vehicular Analysis Results

Intersection Capacity Analysis

Intersection capacity analyses were performed for the four (4) 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 HCM 2000 methodology.

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. 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 D is typically used as the acceptable LOS threshold in the District; although LOS E or F is sometimes accepted in urbanized areas if vehicular improvements would be a detriment to safety or non-auto modes of transportation.

The LOS capacity analyses were based on: (1) the intersection peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the HCM methodologies (using *Synchro* software). The average delay of each approach 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 Attachments.

Table 12 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the Existing, 2024 Background, and 2024 Total Future scenarios. Table 13 shows a comparison of the volume to capacity (v/c) ratios for each scenario.

As shown in Table 12, six (6) of the study intersections operate at unacceptable conditions or have one or more approaches operating at unacceptable levels during the existing conditions:

- First Street SW & M Street SW
 - Southbound (AM)
- Half Street SW & M Street SW
 - Southbound (PM)
- W S Capitol Street Service Road & M Street SW
 - Southbound (AM/PM)
- E S Capitol Street Service Road & M Street SE
 - Northbound (AM)
- S Capitol Street & Eye Street SW/SE
 - Eastbound (AM/PM)

- S Capitol Street & N Street SW/SE
 - Overall (PM)
 - Westbound (AM/PM)
 - Southbound Ramp (AM/PM)

The introduction of trips from background developments results in seven (7) study intersections that operate at unacceptable conditions or have one or more approaches operating at unacceptable levels during the background conditions:

- First Street SW & M Street SW
 - Southbound (AM)
- Half Street SW & M Street SW
 - Southbound (AM/PM)
- W S Capitol Street Service Road & M Street SW
 - Eastbound (AM)
 - Southbound (AM/PM)
- E S Capitol Street Service Road & M Street SE
 - Westbound (AM)
 - Northbound (AM)
- Van Street SE & M Street SE
 - Northbound (AM/PM)
- First Street SE & M Street SE
 - Overall (PM)
 - Eastbound (PM)
- Half Street SW & Eye Street SW
 - Northbound (PM)
- S Capitol Street & Eye Street SW/SE
 - Overall (PM)
 - Eastbound (AM/PM)
 - Westbound (AM)
- S Capitol Street & N Street SW/SE
 - Overall (PM)
 - Westbound (AM/PM)

Mixed-Use Scheme

The introduction of the site-generated trips for the Mixed-Use scheme results in additional delays that meet DDOT's mitigation threshold at five (5) study intersections where an approach delay was increased to unacceptable levels or an unacceptable delay increased by over five (5) percent as compared to background conditions:

- Half Street & M Street SW
 - Southbound (AM/PM)
- First Street & M Street SW
 - Overall (PM)
 - Eastbound (PM)
- Half Street & Eye Street SW
 - Northbound (PM)

- S Capitol Street & Eye Street SW/SE
 - Overall (PM)
- S Capitol Street & N Street SW/SE
 - Overall (PM)

Measures mitigating vehicular capacity concerns at these intersections are discussed below.

Residential Scheme

The introduction of the site-generated trips for the Residential scheme results in additional delays that meet DDOT's mitigation threshold at three (3) study intersections where an approach delay was increased to unacceptable levels or an unacceptable delay increased by over five (5) percent as compared to background conditions:

- Half Street & M Street SW
 - Southbound (AM)
- Half Street & Eye Street SW
 - Northbound (PM)
- S Capitol Street & Eye Street SW/SE
 - Overall (PM)
 - Eastbound (AM/PM)

Measures mitigating vehicular capacity concerns at these intersections are discussed below.

Queuing Analysis

In addition to the capacity analyses presented above, a queuing analysis was performed at each of the study intersections. The queuing analysis was performed using *Synchro* software. The 50th percentile and 95th percentile maximum queue lengths are shown for each lane group at the study area signalized intersections. The 50th percentile maximum queue is the maximum back of queue on a typical cycle. The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. For unsignalized intersections, the 95th percentile queue is reported for each lane group (including free-flowing left turns and stop-controlled movements) based on the HCM calculations.

Table 14 shows the queuing results for the study area intersections. Seven (7) of the study intersections exhibit one or more lane group that exceeds the given storage length during the existing conditions:

- First Street SW & M Street SW
 - Northbound Right (PM)
- Half Street SW & M Street SW

- Westbound Through/Right (AM)
- Southbound Left/Through/Right (PM)
- W S Capitol Street Service Road & M Street SW
 - Southbound Left (AM/PM)
 - Southbound Left/Through/Right (AM/PM)
- E S Capitol Street Service Road & M Street SE
 - Eastbound Left (AM)
 - Northbound Left (AM)
 - Northbound Left/Through/Right (AM)
- S Capitol Street & Eye Street SW/SE
 - Eastbound Left/Through (PM)
 - Westbound Left/Through (PM)
 - Northbound Through/Right (AM/PM)
- S Capitol Street & N Street SW/SE
 - Westbound Left/Through/Right (AM/PM)
 - Northbound Through (AM)
 - Northbound Right (AM)
 - Southeastbound Through (PM)
- S Capitol Street & O Street SW/SE
 - Northbound Left/Through (AM)

The introduction of trips from background developments and improvements results in seven (7) study intersections that exhibit one or more lane group that exceeds the given storage length:

- First Street SW & M Street SW
 - Northbound Right (PM)
- Half Street SW & M Street SW
 - Eastbound Left (AM)
 - Westbound Through/Right (AM)
 - Southbound Left/Through/Right (AM/PM)
- W S Capitol Street Service Road & M Street SW
 - Eastbound Right (PM)
 - Southbound Left (AM/PM)
 - Southbound Left/Through/Right (AM/PM)
- E S Capitol Street Service Road & M Street SE
 - Eastbound Left (AM)
 - Westbound Through/Right (AM)
 - Northbound Left (AM)
 - Northbound Left/Through/Right (AM)
- S Capitol Street & Eye Street SW/SE
 - Eastbound Left/Through (AM/PM)
 - Westbound Left/Through (AM/PM)
 - Westbound Right (AM)
 - Northbound Through/Right (AM/PM)
- S Capitol Street & N Street SW/SE
 - Westbound Left/Through/Right (AM/PM)
 - Northbound Through (AM)
 - Northbound Right (AM)
 - Southeastbound Through (PM)

- S Capitol Street & O Street SW/SE
 - Northbound Left/Through (AM)

Mixed-Use Scheme

The introduction of the site-generated trips for the Mixed-Use scheme results in no additional study intersections exhibiting a queue which exceeds the storage length or increases a queue exceeding storage in the background scenario by 150 feet.

Residential Scheme

The introduction of the site-generated trips for the Residential scheme results in no additional study intersections exhibiting a queue which exceeds the storage length or increases a queue exceeding storage in the background scenario by 150 feet.

Mitigation Measures

Based on DDOT standards, the project is considered to have an impact at an intersection within the study area if any of the following conditions are met:

- The capacity analyses show a LOS E or F at an intersection or along an approach in the future with conditions with the project where one does not exist in the background conditions;
- There is an increase in delay at any approach or overall intersection operating under LOS E or F of greater than 5 percent when compared to the background conditions;
- The 95th percentile queues exceed storage along an approach in the future conditions with the project where one does not exist in the background scenario; or
- There is an increase in the 95th percentile queues by more than 150 feet along an approach in that exceeds storage in the background scenario.

Based on these criteria, the following intersections are impacted by the Mixed-Use development scheme of the project:

- Half Street & M Street SW
- Half Street & Eye Street SW
- First Street & M Street SE
- S Capitol Street & Eye Street SW/SE
- S Capitol Street & N Street SW/SE

Based on these criteria, the following intersections are impacted by the Residential development scheme of the project:

- Half Street & M Street SW
- Half Street & Eye Street SW
- S Capitol Street & Eye Street SW/SE

Project Impact and Recommendations

This section summarizes the results of the capacity analyses for the intersections with movements or approaches that operate at unacceptable conditions and lists the scenarios for which this occurs. Impacts associated with the 5 M Street SW development are noted where delays for failing approaches or intersections increase by five percent or more or where an intersection or approach change from an acceptable LOS to an unacceptable one as compared between Background and Total Future conditions.

Mixed-Use Scheme

Half Street & M Street SW

During the morning peak hour, the southbound approach experiences unacceptable delays in the Background and Total Future conditions. The southbound delay increases by over five (5) percent between Background and Total Future conditions as a result of the project's traffic volumes.

Delays in the southbound direction can be reduced to levels comparable to those seen in background conditions through minor signal timing adjustments to increase the green time for the southbound phase and adjusting the intersection offset.

During the afternoon peak hour, the southbound approach experiences unacceptable delays in the Existing, Background, and Total Future conditions. The southbound delay increases by over five (5) percent between Background and Total Future conditions as a result of the project's traffic volumes.

Delays in the southbound direction can be reduced to levels comparable to those seen in background conditions through minor signal timing adjustments to increase the green time for the eastbound and westbound phases. This report recommends coordination with DDOT to optimize signal timings at this intersection to ensure the most efficient operation in the future following the construction of the 5 M Street SW development.

The recommended mitigation to this intersection would have no negative impact on the amount of time pedestrians receive to navigate the intersection.

Half Street & Eye Street SW

During the afternoon peak hour, the northbound approach experiences unacceptable delays in the Background and Total Future study conditions. The northbound delay increases by more than DDOT's five (5) percent mitigation threshold between

Background and Total Future conditions as a result of the project's traffic volumes.

Delays at this intersection are primarily due to queueing issues at the adjacent S Capitol Street and Eye Street SW/SE intersection. As such, these delays can be reduced by improving queues at the S Capitol Street and Eye Street SW/SE intersection. Signal timing adjustments to this adjacent intersection improves coordination between these intersections, reducing queues and improving the Half Street and Eye Street SW intersection within five (5) percent of background delays. This report recommends coordination with DDOT to optimize signal timings at the S Capitol Street and Eye Street SW/SE intersection to ensure the most efficient operation in the future following the construction of the 5 M Street SW development.

First Street & M Street SE

During the afternoon peak hour, the overall intersection and eastbound approach experience unacceptable delays in the Background and Total Future study conditions. The overall intersection and eastbound approach delays increase by more than DDOT's five (5) percent mitigation threshold between Background and Total Future conditions as a result of the project's traffic volumes.

Signal timing adjustments were found to improve conditions at this intersection within five (5) percent of background delays. Overall intersection and eastbound approach delays can be reduced by increasing the green time for the eastbound phase and adjusting the intersection offset. This report recommends coordination with DDOT to optimize signal timings at this intersection to ensure the most efficient operation in the future following the construction of the 5 M Street SW development.

The recommended mitigation to this intersection would have no negative impact on the amount of time pedestrians receive to navigate the intersection.

S Capitol Street & Eye Street SW/SE

During the afternoon peak hour, the overall intersection experiences unacceptable delays in the Background and Total Future study conditions. The overall intersection delay increases by more than DDOT's five (5) percent mitigation threshold between Background and Total Future conditions as a result of the project's traffic volumes.

Signal timing adjustments were found to improve conditions at this intersection within five (5) percent of background delays. Overall intersection delays can be reduced by increasing the

green time for the eastbound and westbound phases and adjusting the intersection offset. This report recommends coordination with DDOT to optimize signal timings at this intersection to ensure the most efficient operation in the future following the construction of the 5 M Street SW development.

The recommended mitigation to this intersection would have no negative impact on the amount of time pedestrians receive to navigate the intersection.

S Capitol Street & N Street SW/SE

During the afternoon peak hour, the overall intersection experiences unacceptable delays in the Existing, Background, and Total Future study conditions. The overall intersection delay increases by more than DDOT's five (5) percent mitigation threshold between Background and Total Future conditions as a result of the project's traffic volumes.

Signal timing adjustments were found to improve conditions at this intersection within five (5) percent of background delays. Overall intersection delays can be reduced by increasing the green time for the southeastbound phase. This report recommends coordination with DDOT to optimize signal timings at this intersection to ensure the most efficient operation in the future following the construction of the 5 M Street SW development.

The recommended mitigation to this intersection would have no negative impact on the amount of time pedestrians receive to navigate the intersection.

Residential Scheme

Half Street & M Street SW

During the morning peak hour, the southbound approach experiences unacceptable delays in the Background and Total Future conditions. The southbound delay increases by over five (5) percent between Background and Total Future conditions as a result of the project's traffic volumes.

Delays in the southbound direction can be reduced to levels comparable to those seen in background conditions for the through minor signal timing adjustments to increase the green time for the southbound phase and adjusting the intersection offset. This report recommends coordination with DDOT to optimize signal timings at this intersection to ensure the most efficient operation in the future following the construction of the 5 M Street SW development.

The recommended mitigation to this intersection would have no negative impact on the amount of time pedestrians receive to navigate the intersection.

Half Street & Eye Street SW

During the afternoon peak hour, the northbound approach experiences unacceptable delays in the Background and Total Future study conditions. The northbound delay increases by more than DDOT's five (5) percent mitigation threshold between Background and Total Future conditions as a result of the project's traffic volumes.

Delays at this intersection are primarily due to queueing issues at the adjacent S Capitol Street and Eye Street SW/SE intersection. As such, these delays can be reduced by improving queues at the S Capitol Street and Eye Street SW/SE intersection. Signal timing adjustments to this adjacent intersection improves coordination between these intersections, reducing queues and improving the Half Street and Eye Street SW intersection within five (5) percent of background delays. This report recommends coordination with DDOT to optimize signal timings at the S Capitol Street and Eye Street SW/SE intersection to ensure the most efficient operation in the future following the construction of the 5 M Street SW development.

S Capitol Street & Eye Street SW/SE

During the morning peak hour, the eastbound approach experiences unacceptable delays in the Existing, Background, and Total Future study conditions. The eastbound delay increases by more than DDOT's five (5) percent mitigation threshold between Background and Total Future conditions as a result of the project's traffic volumes.

Signal timing adjustments were found to improve conditions at this intersection within five (5) percent of background delays. Delays in the eastbound direction can be reduced by increasing the green time for the eastbound phase and adjusting the intersection offset.

During the afternoon peak hour, the overall intersection and eastbound approach experience unacceptable delays in the Existing, Background, and Total Future study conditions. The overall intersection and eastbound delay increase by more than DDOT's five (5) percent mitigation threshold between Background and Total Future conditions as a result of the project's traffic volumes.

Signal timing adjustments were found to improve conditions at this intersection within five (5) percent of background delays.

Overall intersection delays and delays in the eastbound direction can be reduced by increasing the green time for the eastbound phase and adjusting the intersection offset. This report recommends coordination with DDOT to optimize signal timings at this intersection to ensure the most efficient operation in the future following the construction of the 5 M Street SW development.

The recommended mitigation to this intersection would have no negative impact on the amount of time pedestrians receive to navigate the intersection.

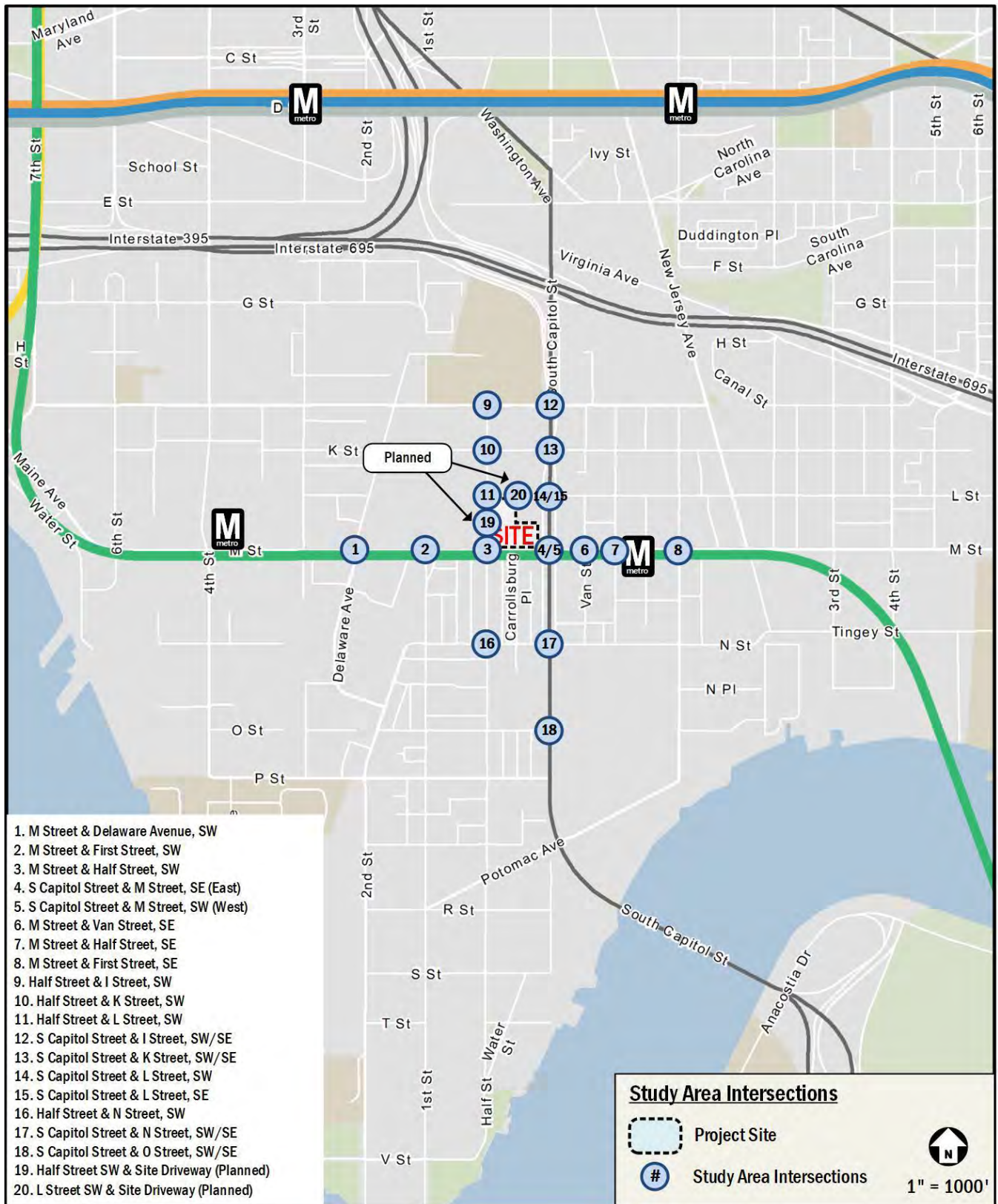


Figure 15: Study Area Intersections

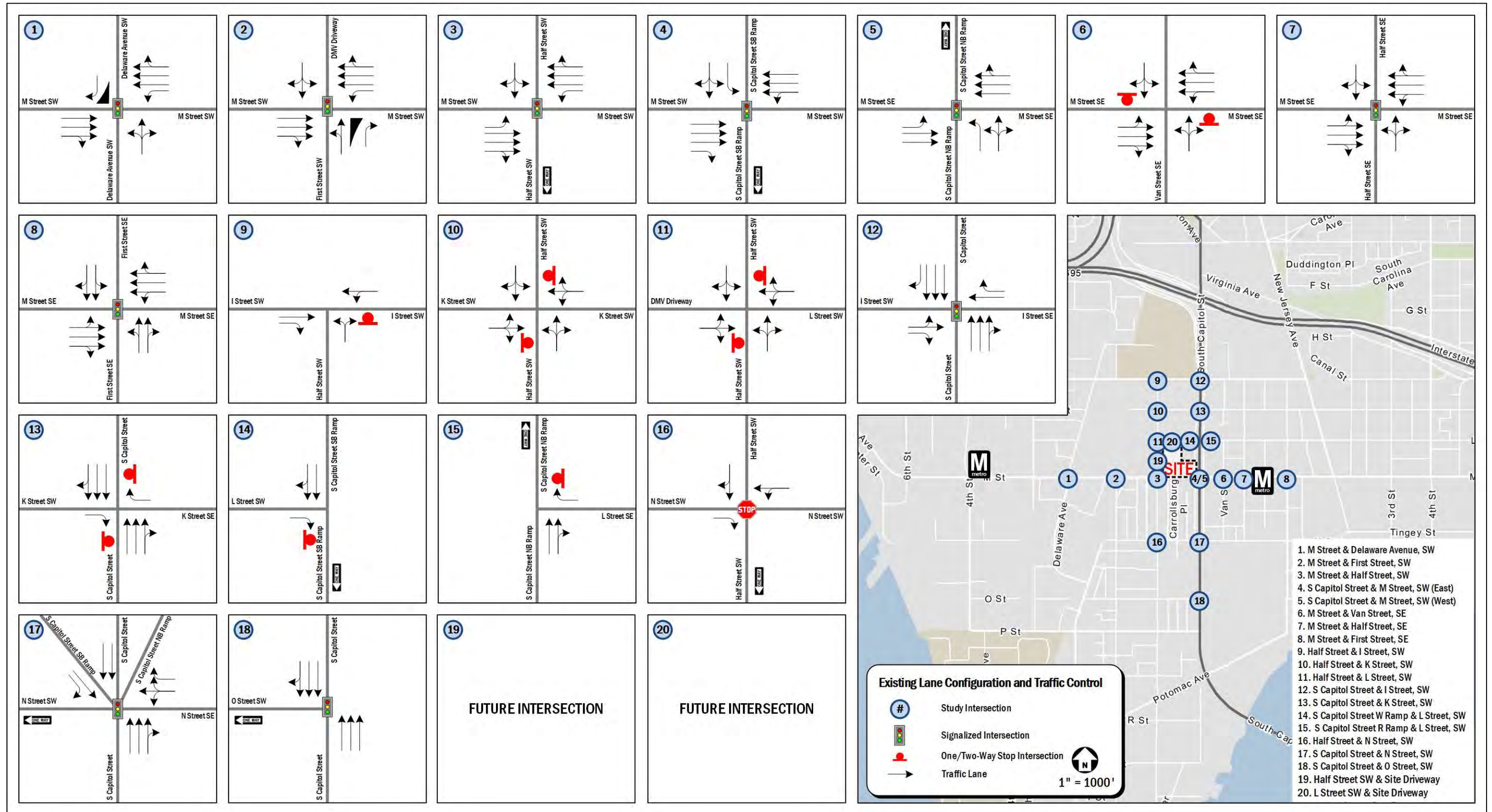


Figure 16: Existing Lane Configuration and Traffic Control

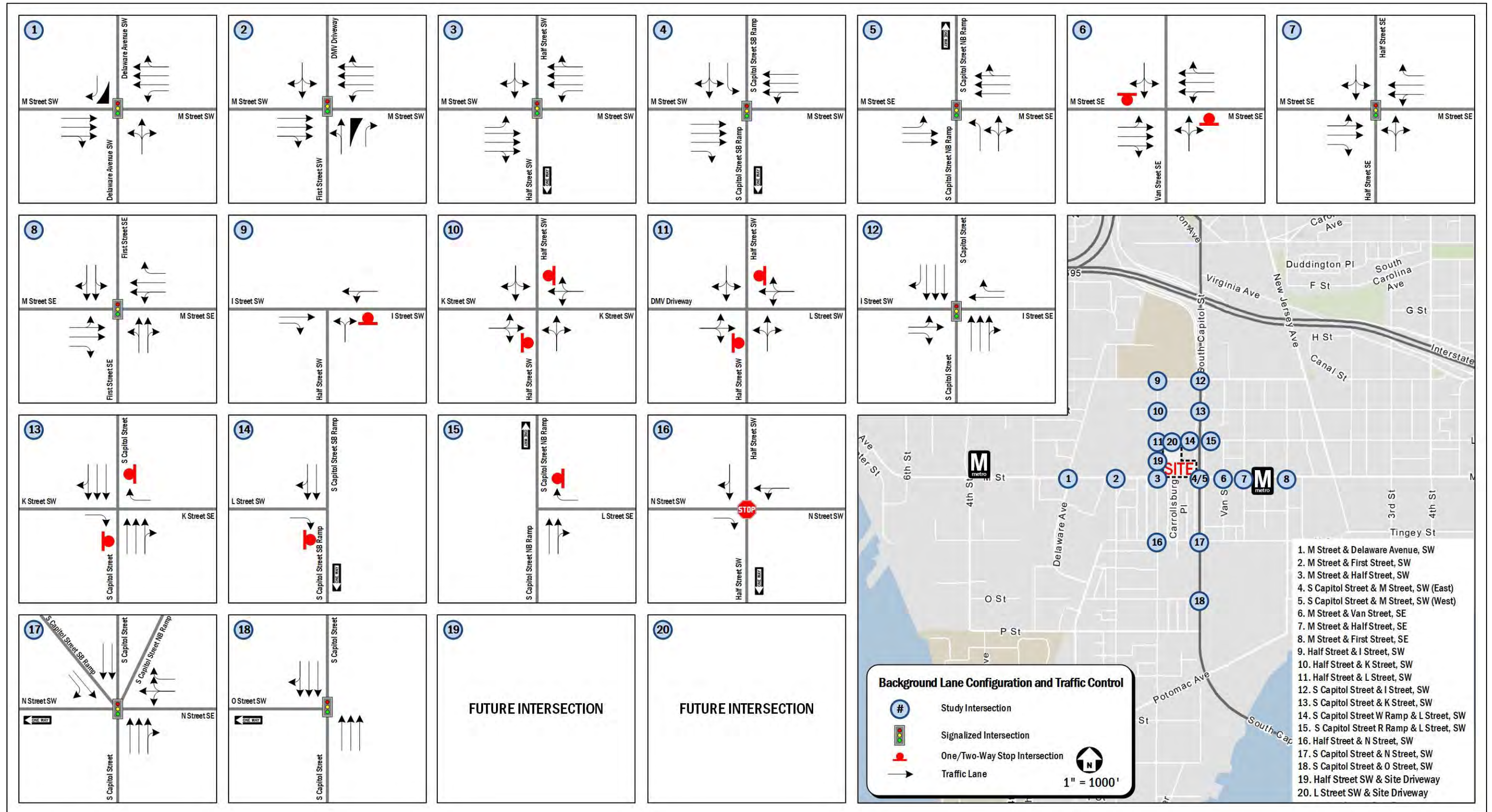


Figure 17: Background Lane Configuration and Traffic Control

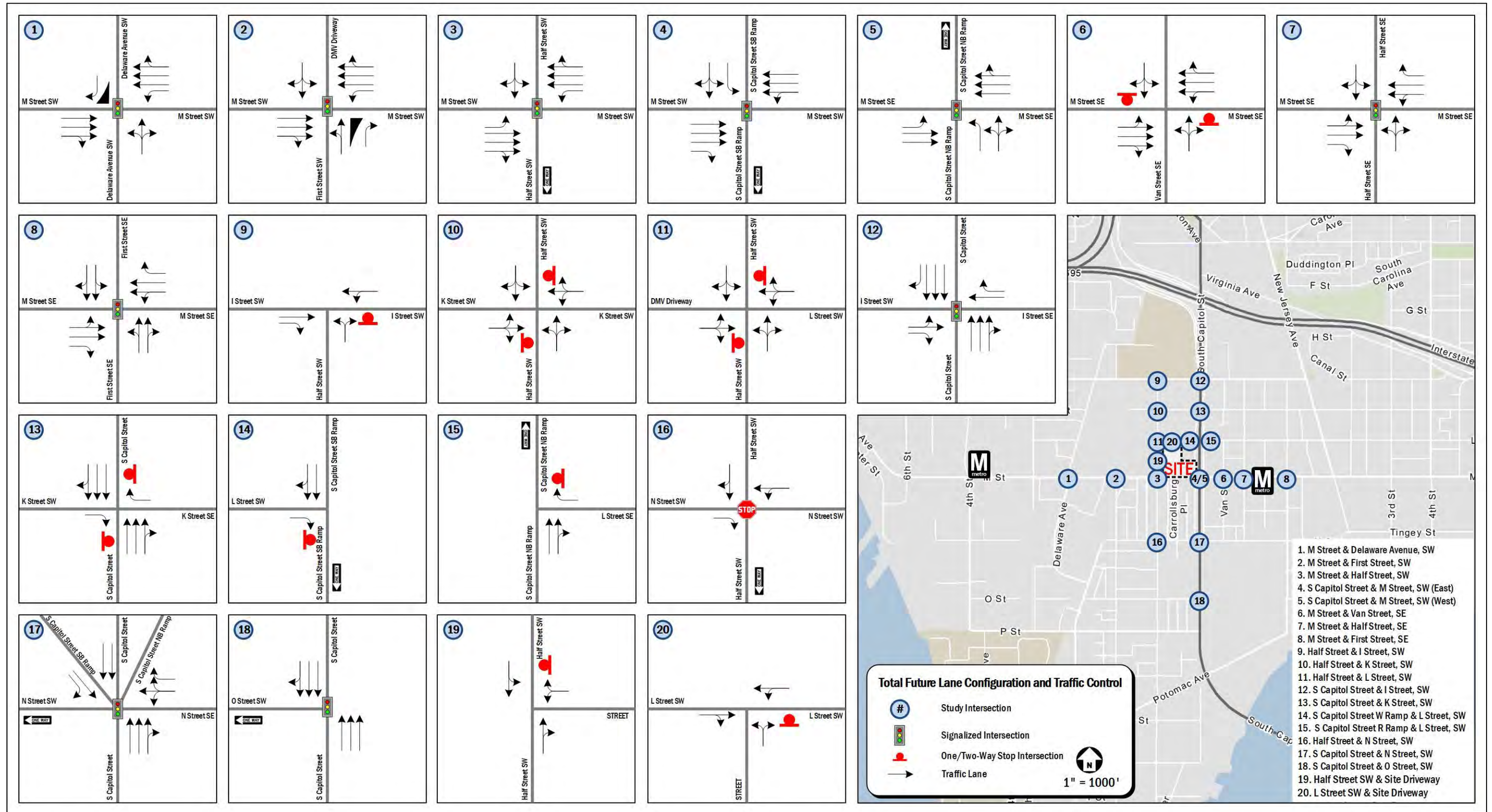


Figure 18: Total Future Lane Configuration and Traffic Control

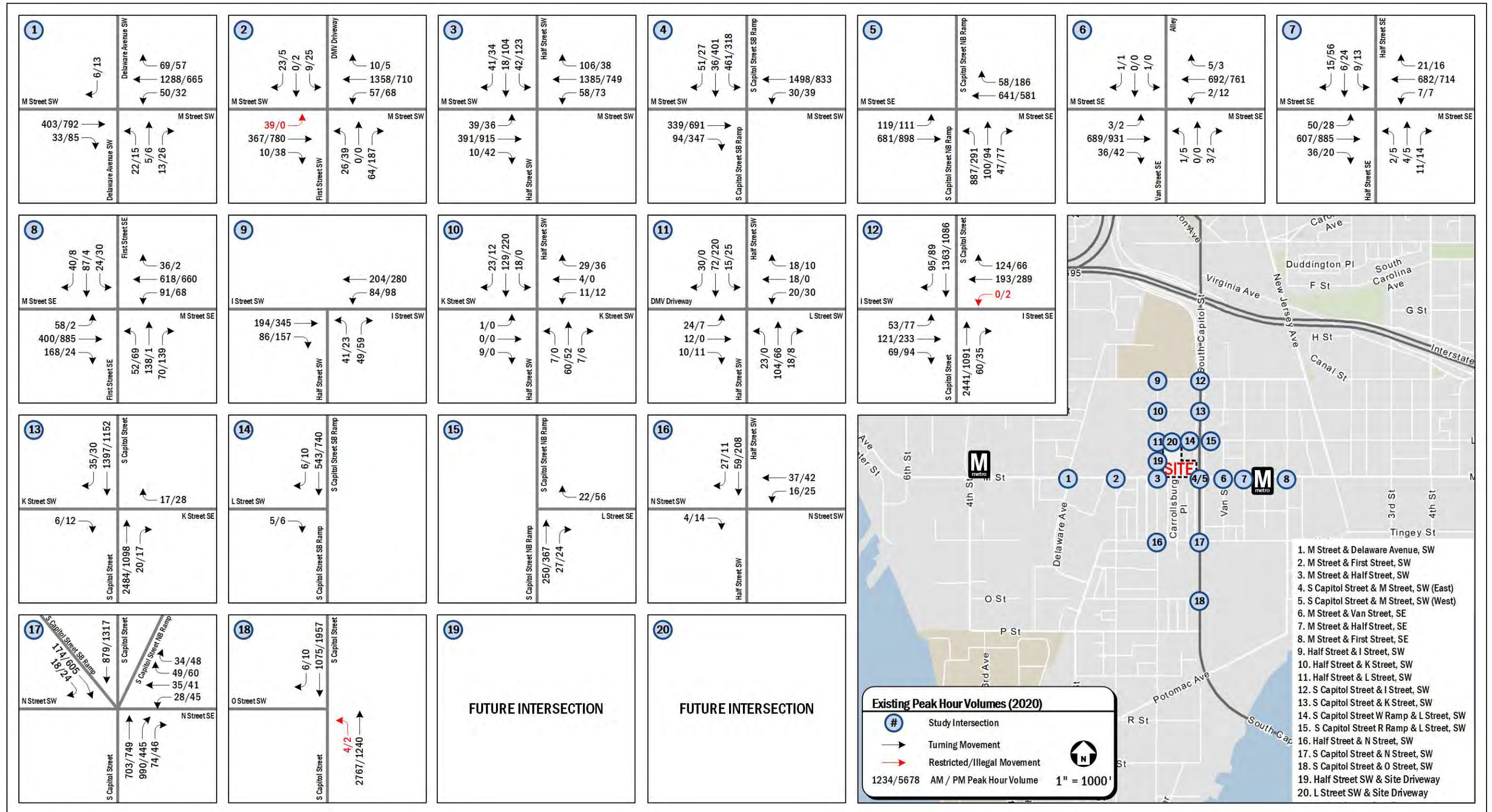


Figure 19: Existing Peak Hour Volumes

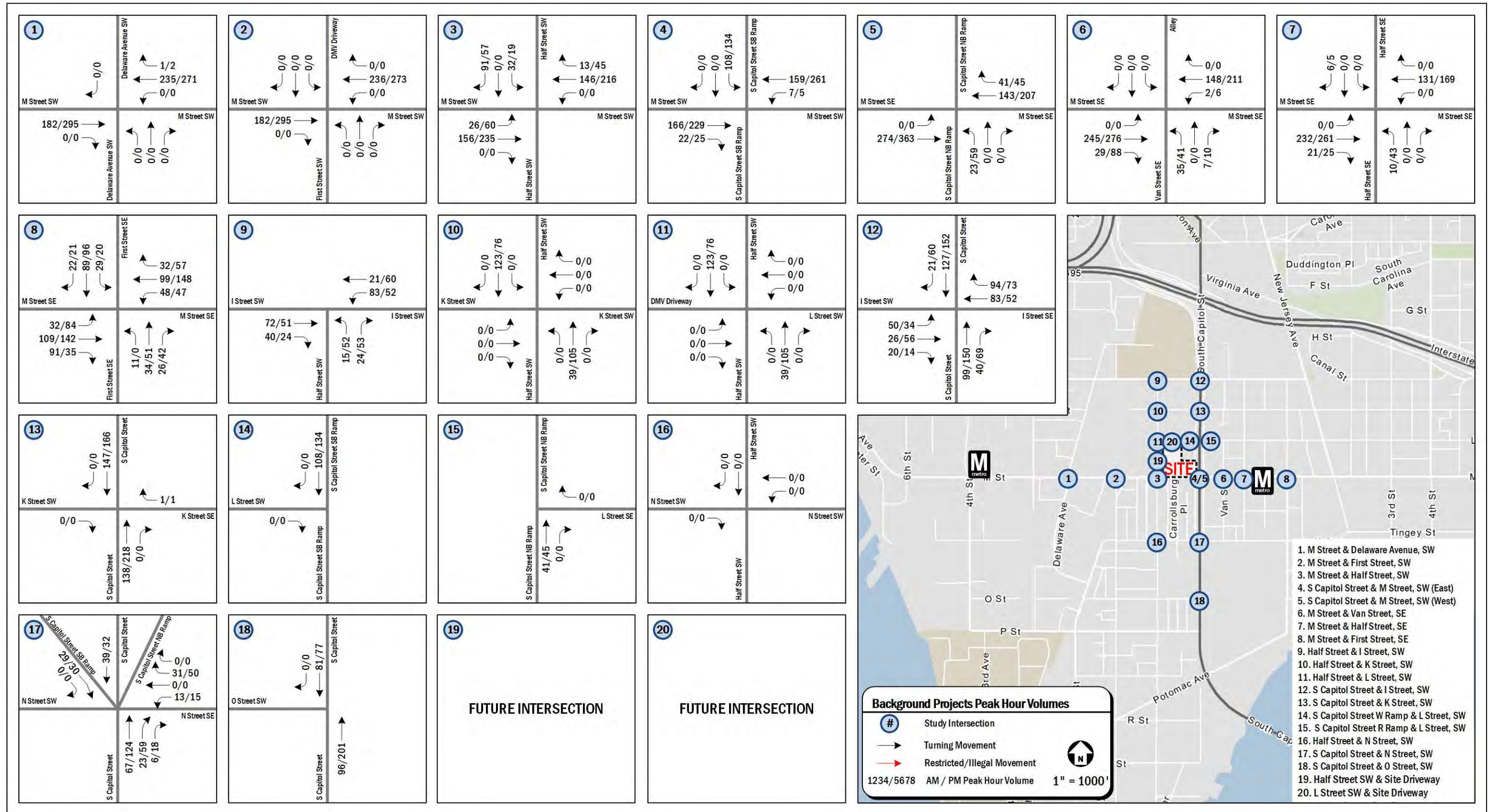


Figure 20: Background Projects Peak Hour Volumes

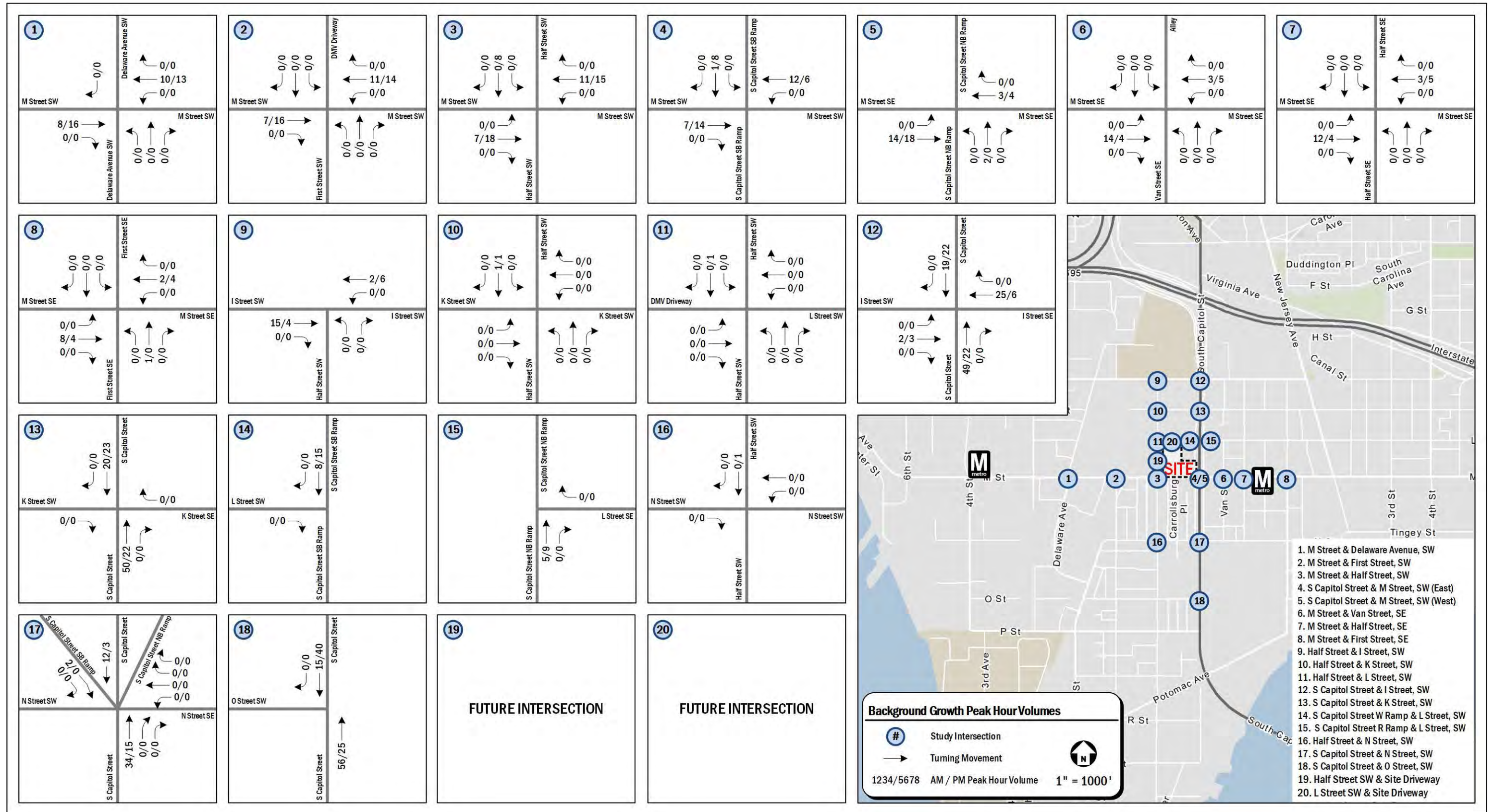


Figure 21: Background Growth Peak Hour Volumes

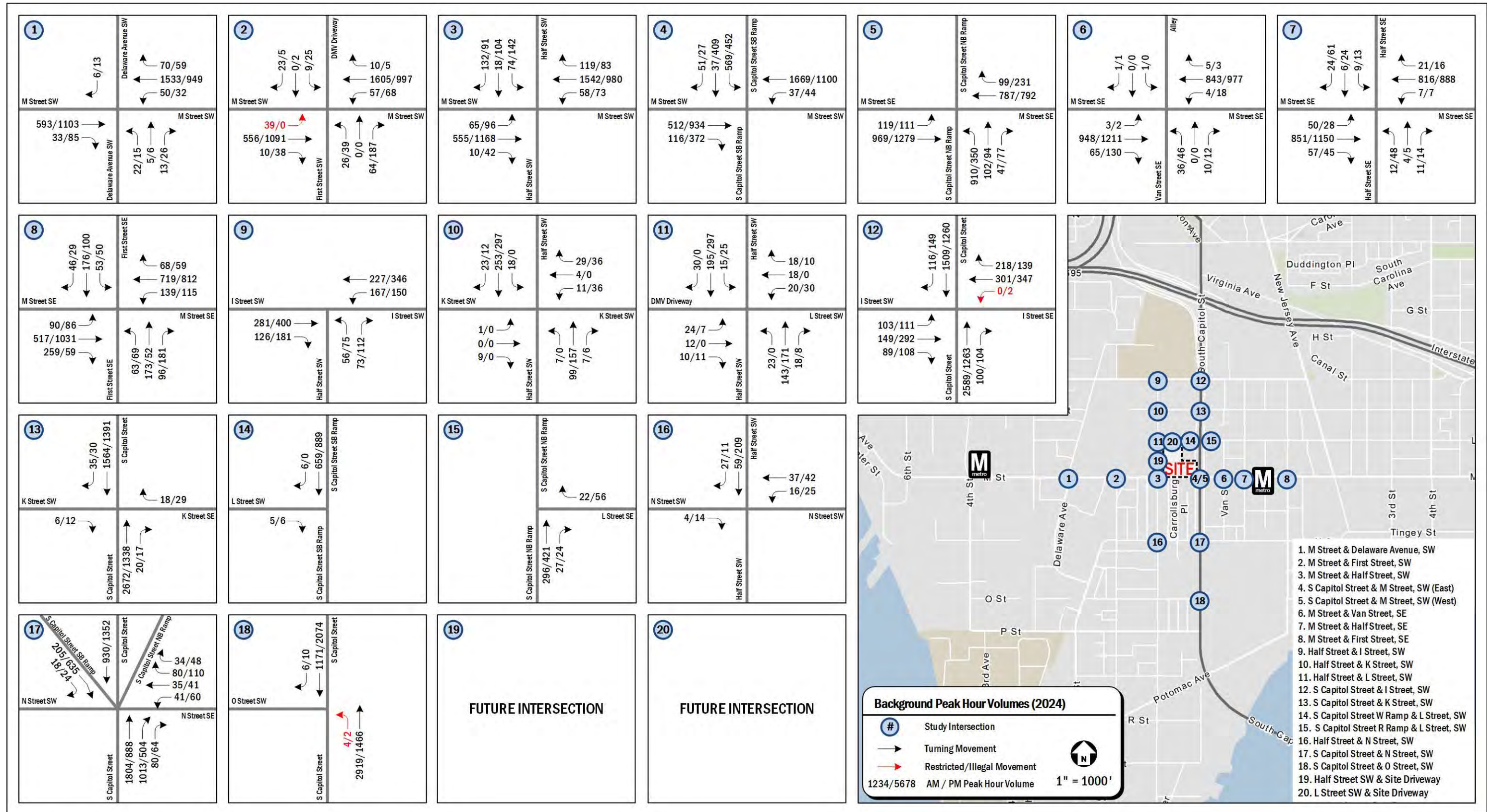


Figure 22: Background Peak Hour Traffic Volumes

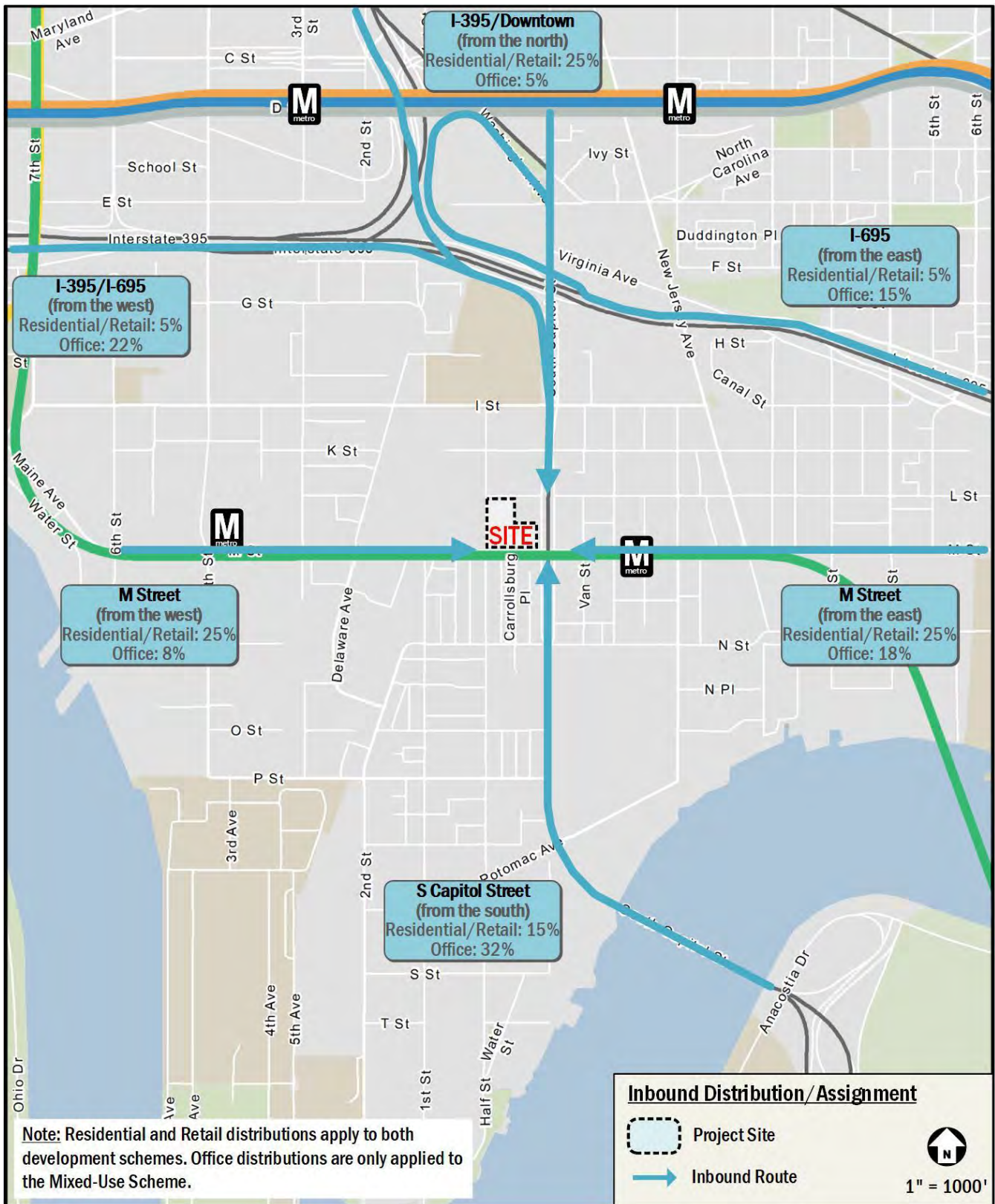


Figure 23: Inbound Distribution

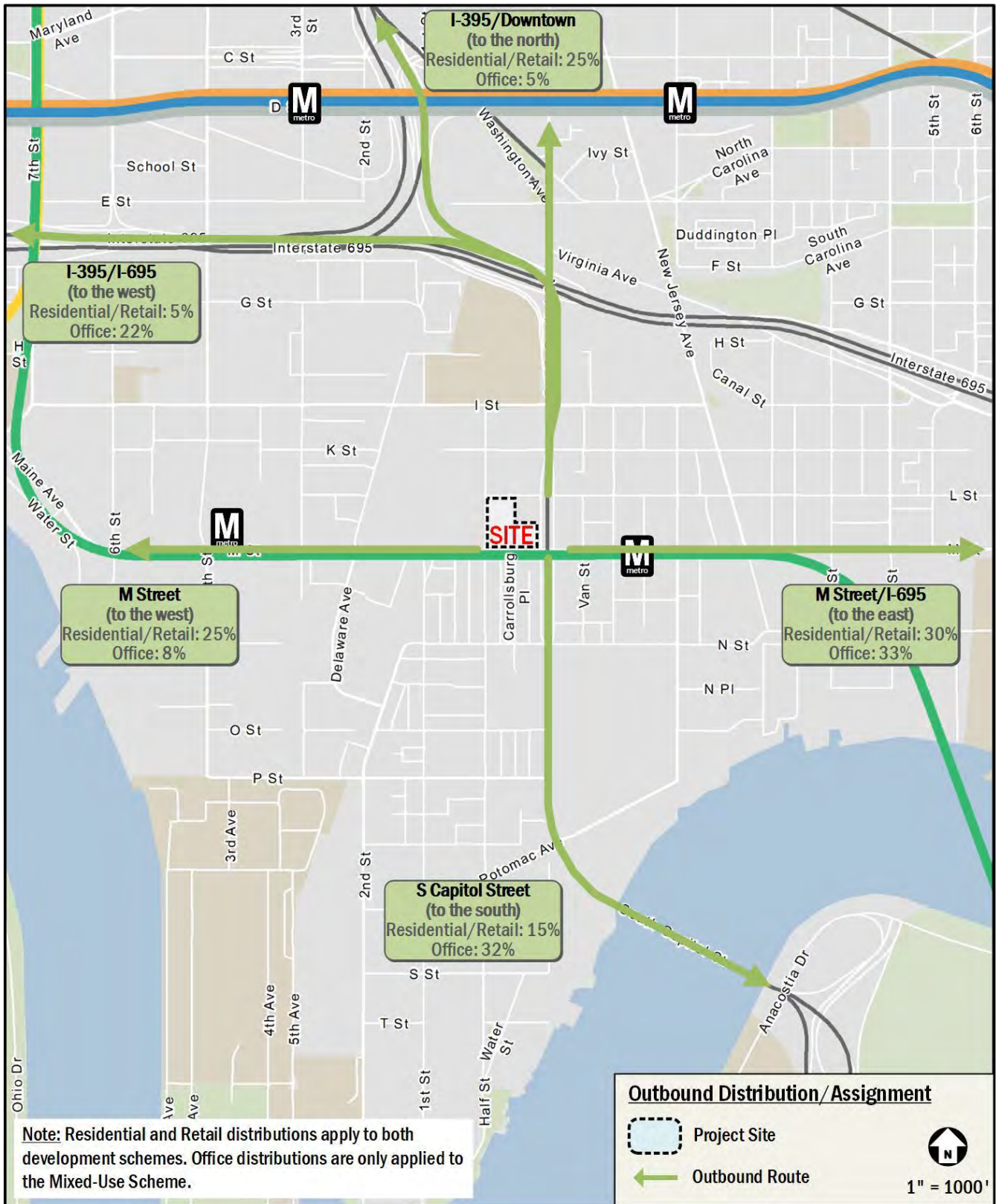


Figure 24: Outbound Distribution

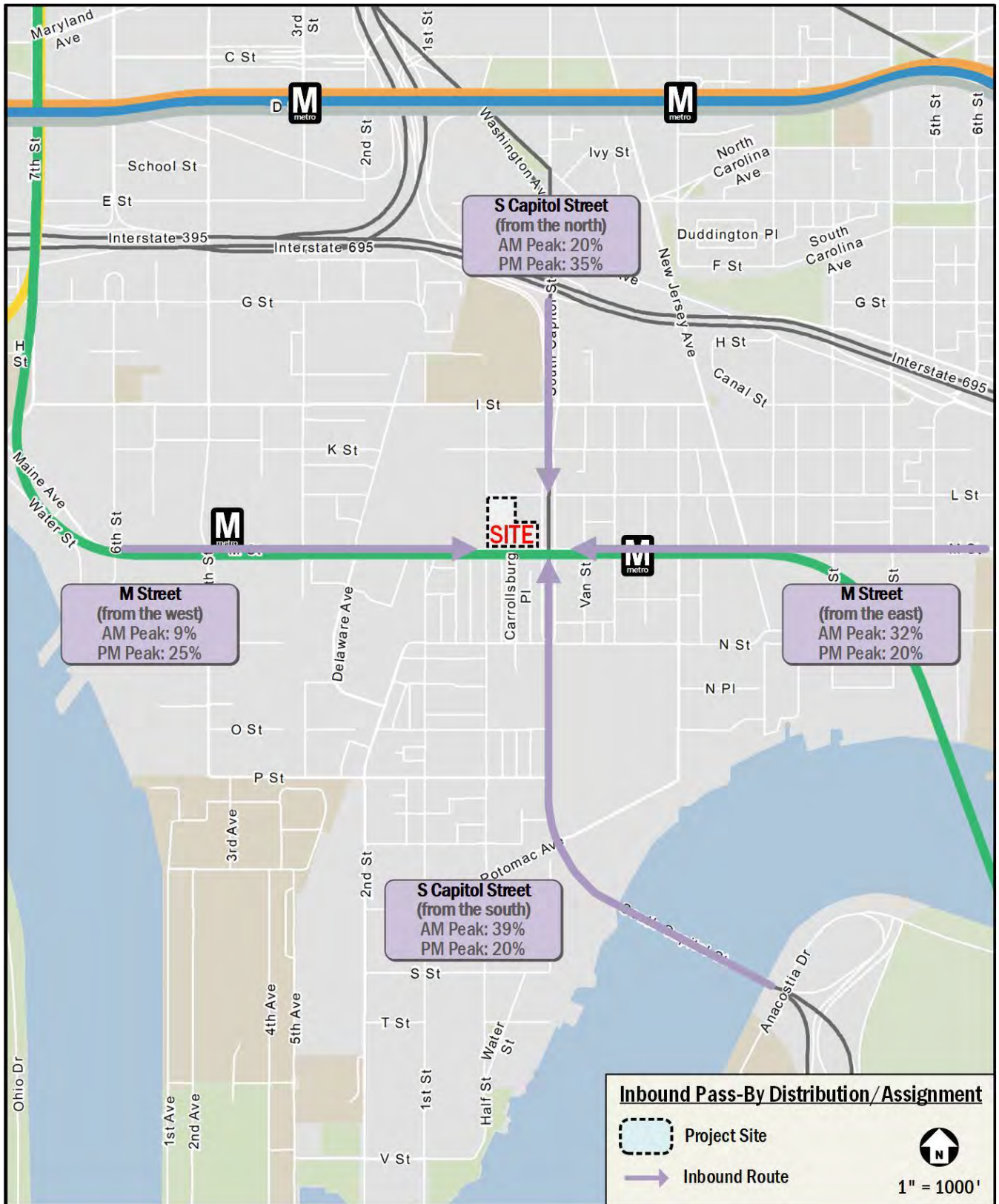


Figure 25: Inbound Pass-By Distribution

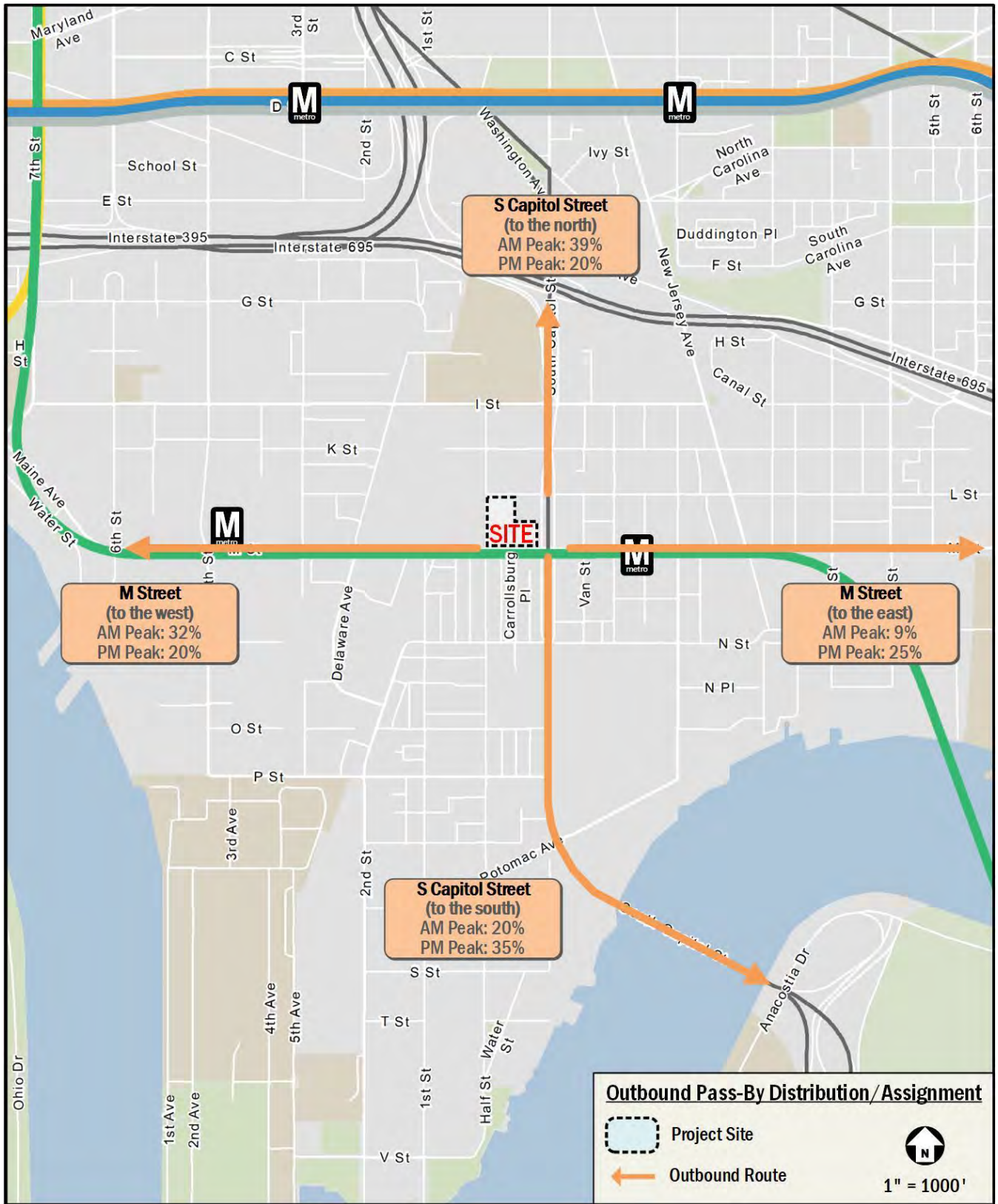


Figure 26: Outbound Pass-By Distribution

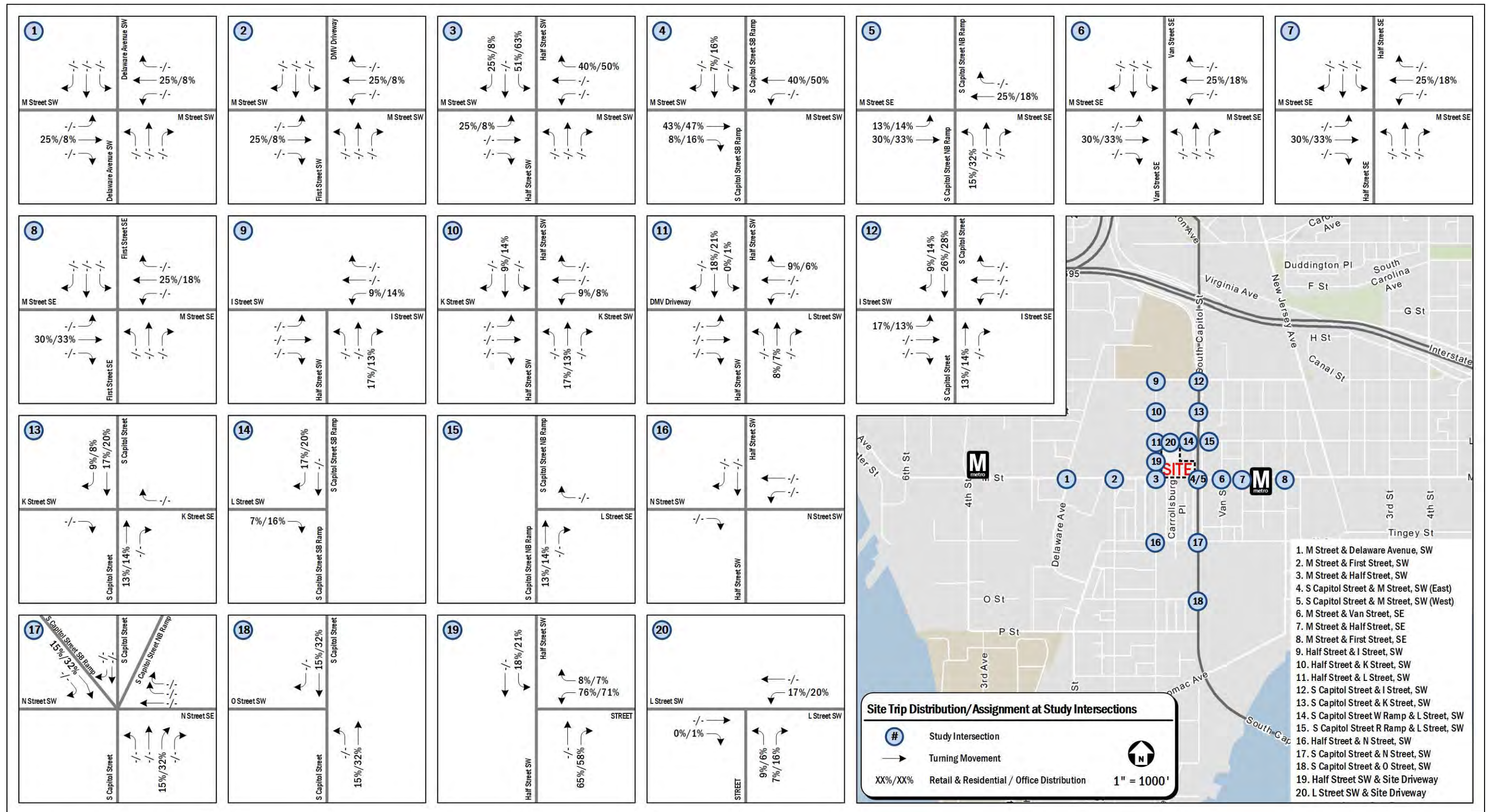


Figure 27: Site Trip Distribution/Assignment at Study Intersections